Anarchist Mountain Community Society and
Regional District Of Okanagan-Similkameen (AMCS-RDOS)
Response to British Columbia Utilities Commission IR No. 1
FortisBC Inc. 2017 Cost of Service Analysis and Rate Design Application

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1.0 Reference: RESIDENTIAL CONSERVATION RATE
Exhibit C3-7, AMCS/RDOS Evidence, pp. 5–6, 10, 17, 20, 24, 26, 27, Table 2.1;
Exhibit B-1, Application, pp. 16, 63
Design of residential conservation rate

Page 5 of the evidence filed by the Anarchist Mountain Community Society & Regional District Okanagan-Similkameen (AMCS/RDOS) states the following:

> A properly designed two-tier RIB Rate must be cost-based, using the following design principles:
>
> 1. Tier 1 Rate equal to the Flat Rate;
>
> 2. Tier 2 Rate equal to the marginal cost of new supply; and
>
> 3. Threshold(s) set so that each customer has some consumption in Tier 2 but not so much as to be unable to avoid a bill increase by improving energy efficiency,

1.1 Please provide the source/reference material which supports the assertion that the three design principles stated in the above preamble are required for a "properly designed" two-tier Residential Inclining Block (RIB) Rate.

AMCS-RDOS Response

BC Hydro in its 2008 RIB Rate Application examined the economic concept of RIB rates and design options. In its Final Argument of July 9, 2008, pp 15-18, BC Hydro articulated the concept and associated design criteria as follows:

> "**3.1. Toward a More Efficient Price Signal**
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> Compared to the existing flat rate, the proposed RIB rate structure improves performance on the efficient price signal criterion by introducing a Step-2 Rate that better reflects the incremental cost of new supply.
>
> **3.1.1. Pricing at Long Run Marginal Cost of New Supply**
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> BC Hydro's evidence defines an efficient price signal as follows:
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> > "The RIB rate application defines an efficient pricing signal as one that encourages efficient use and discourages inefficient use. This is reasonable under the assumption that a customer chooses a consumption level which yields a marginal benefit equal to the electricity rate that the customer faces. If

the electricity rate rises (falls), the customer responds to the rate increase (decrease) by reducing (increasing) his/her consumption.

Given the customer's consumption behaviour, if the electricity rate deviates from BC Hydro's marginal cost of serving the customer's consumption, a change in the electricity rate can yield an economic gain. To see this point, consider the following two cases:

- **Case 1:** The electricity rate, which presently reflects the customer's marginal benefit, is below BC Hydro's marginal cost. In this case, an increase in the electricity rate discourages inefficient use because a marginal kWh reduction in the customer's consumption has the following effects: (a) the customer's consumption benefit declines by an amount equal to his/her marginal benefit; and (b) BC Hydro's supply cost declines by an amount equal to its marginal cost. As (a) is less than (b) in size, the resulting economic gain is the positive difference between marginal cost and marginal benefit.

- **Case 2:** The electricity rate, which presently reflects the customer's marginal benefit, is above BC Hydro's marginal cost. In this case, a decrease in the electricity rate encourages efficient use because a marginal kWh increase in the customer's consumption has the following effects: (a) the customer's consumption benefit increases by an amount equal to his/her marginal benefit; and (b) BC Hydro's supply cost increases by an amount equal to its marginal cost. As (a) is greater than (b), the resulting economic gain is the positive difference between marginal benefit and marginal cost.

The concept of long-run economic efficiency in electricity ratemaking is that the price signal should encourage investment by customers in long-living energy-efficient measures (e.g. energy-efficient refrigerators). An investment is said to be efficient if its benefits exceed costs.

Consider a customer making an energy-efficiency investment. In doing so, the customer reveals his/her expectation that the future bill savings would exceed the incremental payment for energy-efficiency. If electricity is priced at the utility's long-run marginal cost, the customer's expected bill savings are the utility's long run supply cost avoided by the customer's investment. Thus, the customer's investment decision is efficient, with benefits (i.e., the avoided cost of electricity supply) exceeding costs (i.e., the incremental payment for energy efficiency).

3.1.2. BC Hydro's Four Economic Efficiency "Tests"

BC Hydro (established) "efficiency tests" to assist it in assessing the degree to which potential rate structures were adequately reflecting a more efficient price signal. The four efficiency tests are paraphrased as follows:

1. No rate decreases;

2. Maximize the number of customers that see the Step-2 Rate;

3. Maximize the differential between the Step-1 Rate and the Step-2 Rate; and

4. Increase the Step-2 Rate to no more than the full incremental cost of new supply (adjusted to account for the collection of fixed costs)."

The three design principles stated in AMCS-RDOS' evidence elaborate on BC Hydro's efficiency tests and are based on Mr. Marty's experience as the former Director of Demand Policy and Analysis with the Federal Government's Office of Energy Efficiency.

- The first principle, setting the Tier 1 rate equal to the Flat Rate, will ensure "no rate decreases" as reflected in the first efficiency test. In its 2008 RIB Application, BC Hydro stated that "the Step-1 rate should be no less than the current flat rate" (BCUC Reasons for Decision, September 24, 2008, p 88).

- The second principle, setting the Tier 2 rate equal to marginal cost, is slightly different from BC Hydro's fourth efficiency test which states that the Tier 2 rate should be "no more" than marginal cost.

- The third principle modifies BC Hydro's second efficiency test to describe the necessary conditions for achieving the RIB rate objective of promoting investment in long-living energy-efficient measures, as explained below.

The first and second principles, as stated, eliminate the need for BC Hydro's third efficiency test, since setting the Tier 1 rate equal to the flat rate (rather than above it) and setting the Tier 2 rate equal to marginal cost (rather than below it) maximizes the differential between the Tier 1 and Tier 2 rates while ensuring that BC Hydro's first efficiency test, of no rate decreases, is still being met.

To achieve the RIB objective of encouraging economically efficient investments by customers in long-living energy-efficient measures, it is insufficient simply to "Maximize the number of customers that see the Step-2 Rate". To encourage the desired behaviour, a customer must

- be aware of the rate, and

- decide that the higher Step-2 Rate justifies the upfront costs associated with investing in a long-living energy-efficient measure, such as a more energy-efficient refrigerator.

Even if a customer is aware of the higher Step 2 rate, a customer would have to be consuming enough Step 2 rate power to reach the relevant economic threshold that would justify the investment decision.

At the same time, for the adoption of the RIB rate to be revenue neutral for FBC, the RIB rate should not generate more revenue than the utility would receive under the Flat Rate. Therefore, the amount of consumption in Step 2 should not be so significant that customers cannot avoid the majority of the bill increase by improving efficiency. Hence, the third principle modifies

slightly BC Hydro's second test in order to describe more precisely the necessary conditions for achieving the RIB rate objective of promoting investment in long-living energy-efficient measures.

BCUC Preamble to 1.2

On page 16 of the FortisBC Inc. (FBC) 2017 Cost of Service Analysis and Rate Design Application (Application), FBC provides Dr. Bonbright's eight principles of rate design.

1.2 Please explain, with reference to AMCS/RDOS' description of a "properly designed two-tier RIB Rate", which Bonbright principles AMCS/RDOS considers should be given priority and why.

AMCS-RDOS Response

All eight principles are important as guiding concepts, but the final rate design will reflect a balance of the principles. Given the objective of the RIB Rate, Principle 3 should be given the most weight.

In its final argument of July 9, 2008, p 9, BC Hydro stated:

> "the existing flat rate structure performs well on seven of the criteria, but performs poorly on "price signals that encourage efficient use and discourage inefficient use" (Principle 3) and that "it would be appropriate to begin restructuring the residential rate now to improve its performance on the efficiency criteria".

Thus, BC Hydro's rationale for moving from a flat rate to a RIB rate was to address Principle 3.

A properly designed two-tier RIB Rate can outperform the flat rate on Principle 3 when the marginal cost of supply exceeds the flat rate. In its 2008 RIB Application, p I-9, BC Hydro stated:

> "where the long-run cost of new electricity supply is substantially higher than the embedded cost of BC Hydro's existing assets, such a rate structure sends price signals that will encourage economically efficient electricity consumption choices and, thus, electricity conservation".

The FBC system reflects a different reality though. According to FBC, its long-run cost of new electricity supply is lower than its flat rate. As a result, the FBC RIB Rate, with a Tier 2 rate above the flat rate, sends the wrong price signals, encouraging inefficient consumption choices, and does not satisfy Principle 3.

In addition to the eight Bonbright principles, priority should also be given to the stated government objectives of improving air quality and reducing greenhouse gas emissions. In a hydro-based system such as FBC's, raising the price of electricity can result in fuel switching from hydro electricity to fossil fuels, thereby undermining the government's environmental objectives.

1.3 Please discuss AMCS/RDOS' view on the importance of the following Bonbright principles: (i) customer understanding and acceptance (Principle 4); and (ii) practical and cost effective to implement (Principle 5). Please discuss whether, in consideration of FBC's circumstances, AMCS/RDOS' "properly designed two-tier RIB Rate" would be aligned with these principles and explain why or why not.

AMCS-RDOS Response

Principle 4 – customer understanding and acceptance

Having a single threshold of 1600 kWh for a two-month billing period may be simpler to understand than having multiple thresholds. However, if customers that use electricity for space and water heating perceive such a threshold as discriminatory, they may not accept the rate even if they understand it.

This outcome is evidenced by the many complaints since the implementation of the RCR in 2012 from customers who use electricity for space and water heating. The level of complexity is not the determining factor for acceptance, fairness is.

Principle 5 – practical and cost effective to implement

A multi-tiered RIB Rate may be more complex to design and implement than the current RCR but opting for an overly-simplified RIB Rate resulted in a RCR that violates most of the Bonbright principles, for example:

- Principle 2 (fair apportionment of costs among customers) – the RCR is resulting in significant intra-class cross-subsidization (Section 4.5, AMCS-RDOS evidence, pp 25-27);

- Principle 3 (price signals that encourage efficient use and discourage inefficient use) – the RCR is promoting energy inefficient behaviour (Section 4.1, AMCS-RDOS evidence, pp 19-20);

- Principle 6 (rate stability) – the RCR can cause rates for customers that use electricity for space and water heating to fluctuate by more than 40% during the year (Section 6.6, AMCS-RDOS evidence, p 45); and

- Principle 8 (avoidance of undue discrimination) – the RCR is price discriminating against high use electricity customers (Section 4.4, AMCS-RDOS evidence, pp 24-25).

BCUC Preamble to 1.4

Page 10 of AMCS/RDOS' evidence summarizes the "major conclusions" of British Columbia Hydro and Power Authority's (BC Hydro) 2014 RIB Evaluation Report, including the following: "35% of BC Hydro's customers 'never' saw the Step 2 price in 2012 while 25% of customers 'always' did and 40% of customers 'sometimes' did."

Page 20 of AMCS/RDOS' evidence explains

> "It is not possible for customers with half or three-quarters of their consumption in Tier 2 to eliminate the adverse bill impacts of the RCR [Residential Conservation Rate] through energy efficiency improvements alone, particularly since they may not be energy inefficient in the first place."

1.4 In AMCS/RDOS' view, and with reference to its third principle of a "properly designed two-tier RIB Rate", what is the optimal percentage of customers that should see their consumption in Tier 2 and therefore would respond to the conservation price signal accordingly? Please provide support for this response.

AMCS-RDOS Response

The optimal percentage of customers that should see some of their consumption in Tier 2 is 100%. In an email to Mr. Marty, dated February 27, 2014, the BCUC stated: "The rate is intended to help achieve the Policy Action of the Provincial Energy Plan and to create conservation awareness among **all users**" (emphasis added)

1.5 What are the market signals that would suggest a threshold that results in too much energy being consumed at Tier 2 in such a manner that customers are unable to avoid a bill increase by improving energy efficiency? Please discuss.

AMCS-RDOS Response

FBC states in its Application, p 65, that: "the level of consumption that will produce an equivalent bill on the flat rate is closer to 1,250 kWh per month". This means that consumption over 15,000 kWh per year results in bill increases relative to the flat rate.

- A customer using 15,000 kWh per year would have, on average, 36% of his/her consumption in Tier 2 (see response to BCUC Request 2.1.1).

- A customer using 20,000 kWh per year would have, on average, 52% of consumption in Tier 2 and would have to reduce his/her electricity consumption by 25% (i.e. to 15,000 kWh per year) to avoid a bill increase under the RCR relative to the flat rate.

- A customer using 30,000 kWh per year would have to reduce his/her consumption by 50%.

To reduce electricity consumption by such major percentages, customers would need to replace appliances, hot water heaters and/or heating and cooling systems with more efficient models and/or upgrade the efficiency of the building shell.

Even with a Tier 2 rate of 15.6 cents/kWh, however, it would not make economic sense (or environmental sense) to scrap a refrigerator that is in good condition to replace it with an equivalent model that is more energy efficient. It might make sense to do so when the appliance has reached the end of its useful life but that may be 10 or 15 years in the future.

Further, the new more energy-efficient appliance may have additional features that actually increase electricity consumption. Moreover, there is no reason to believe that high use electricity customers are energy inefficient in the first instance.

Many houses on Anarchist Mountain are heated with geothermal ground-source heat pumps; the most efficient way to heat a home with electricity. Yet, these houses often consume around 30,000 kWh per year. Upgrading the efficiency of the heating system is not an option. New residents building houses on the Mountain are now looking at installing wood stoves or propane heating systems, which, of course, are worse for the environment than electrical heating systems. In addition, residents who are renting homes that use electricity for space and water heating and/or air conditioning have little or no ability to improve the efficiency of their residences and higher electricity rates provide no incentive to landlords to improve efficiency since they do not pay the utility bills.

Further, low and fixed-income residents may not be able to afford the upfront costs of upgrading home efficiency, particularly with the higher electricity bills taking more of their disposable income.

In response to AMCS-RDOS IR#2, Q 1.6, FBC stated:

> "As evidenced by third party studies, the utility customers (particularly residential customers) have a low price elasticity of demand. This means that changes in prices do not lead to significant changes in the demand for electricity."

How much any customer can reduce his/her demand for electricity through energy efficiency improvements alone will vary by customer and can only be determined by an energy audit of the residence, but it is certainly unrealistic to expect customers to be able to reduce their consumption by 25%-50% or more. Moreover, demand reductions achieved through improvements in efficiency may be offset by higher heating demands if it is a cold winter or by higher cooling demands if it is a hot and smoky summer.

Further evidence of the difficulty of reducing demand to avoid higher bills under the RCR is provided in FBC's Application (Tables 6-6 – 6-10) that show that even after six years of experiencing rates that are both above the flat rate and above the marginal cost of electricity supply, 20% of customers are still consuming more than 15,000 kWh per year and thus have been unable to avoid higher bills compared to the flat rate.

The Testimonials of AMCS-RDOS residents, included in Appendix C of AMCS-RDOS Evidence, reveal that many customers have reduced their consumption by taking non-energy efficiency enhancing measures (such as sacrificing comfort and switching to fossil fuels) to the detriment of their own personal welfare and the environment. This was confirmed in FBC's response to AMCS-RDOS IR#2, Q 4.2:

> "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 (i.e. improving energy efficiency, "doing without" behavioural change and switching to a non-electric source of energy). 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".

Thus, the percentage of customers who have been unable to reduce their consumption to the Threshold level by energy efficiency measures alone is considerably higher than 20%

BCUC Preamble to 1.6

AMCS/RDOS further states on page 5 of its evidence: "The most important residential consumption factor, by far, is whether the home uses electricity, rather than other fuels, for space and water heating, which together account for 78% of a typical home's energy consumption."

1.6 Please provide supporting data/references for the statement that space and water heating account for 78 percent of a typical home's energy consumption. As part of this response, please define a "typical" home and explain all assumptions which were made in determining the percentage of consumption related to space and water heating.

AMCS-RDOS Response

FBC's website for natural gas in the Southern Interior (FBC Website: Natural Gas; Homes; Switch to Natural Gas; Southern Interior; Approximate Annual Fuel Cost – Space Heating) states: "Heating your home and water consumes a whopping 78% of the total energy used in your home".

On this website, FBC refers to a "typical single family home (2300 square feet) in the Southern Interior". In their response to AMCS/RDOS IR#1, 4.1, FBC provides more details concerning the electricity consumption of such a typical single family home.

The 78% percent figure used by FBC is consistent with the data in the following table that shows total residential energy use in BC for 2015, broken down by end-use:

End-Use	Percent Share
Space Heating	52.7
Water Heating	25.1
Appliances	16.1
Lighting	5.1
Space Cooling	1.0

Source: National Energy Use Database, Office of Energy Efficiency, Natural Resources Canada http://oee.nrcan.gc.ca/corporate/statistics/neud

Since space heating and space cooling are both weather dependent, these percentage shares vary depending on the home's location. Residents living in colder climate zones will tend to have a greater percentage of their electricity used for space and water heating and those living in climate zones with hot summers will tend to have a greater percentage of their electricity consumption used for space cooling.

The BC average percent share for space cooling is low (1.0%) because many residences in BC have no space cooling. This percentage is likely to be significantly higher in the RDOS region due to the high temperatures experienced in summer.

BCUC Preamble to 1.7

AMCS/RDOS provides an example on page 6 (Table 2.1) of its evidence showing a RIB Rate design with percentage or multiple thresholds.

1.7 Please explain the rationale for setting the Tier 2 threshold equal to 90 percent of each customer's total electricity consumption.

AMCS-RDOS Response

Under the current RCR the percentage of customer consumption in Tier 2 ranges from 0% to more than 70%. Under a properly designed RIB rate, all customers would have roughly the same percentage of electricity consumption in Tier 2 and would therefore pay roughly the same average electricity rate.

There are two options for ensuring that all customers have roughly the same percentage of consumption in Tier 2:

1. the Customer Baseline Load (CBL) structure that sets the individual customer thresholds based on a percentage of historic use" (2008 BC Hydro RIB Application, BCUC Reasons for Decision, September 24, 2008, Section 3.2); or

2. the Segmentation structure that sets different thresholds for different sub-classes of residential customers defined by their characteristics including, for example, the location or type of primary heat source (2008 BC Hydro RIB Application, BCUC Reasons for Decision, September 24, 2008, Section 4.2).

Both approaches are valid, although both are complicated to design and implement.

Table 2.1 is an illustrative example of how either one of these two approaches could be used to design a RIB rate that would effectively meet its objective of promoting economically efficient consumption behaviour.

The 90% value was chosen because FBC's threshold of 1600 kWh per two-month billing period was determined by calculating 90% of average residential electricity consumption in the FBC service area. This suggests that the BCUC considered customers, on average, to be capable of reducing their electricity consumption by 10% through energy efficiency measures. AMCS-RDOS is not aware of any studies, however, in support of the 10% figure.

1.8 Please explain the basis for AMCS/RDOS' Tier 1 rate of $0.08 per kilowatt-hour (kWh).

1.8.1 As part of the above response, please confirm, or explain otherwise, that neither FBC's current Tier 1 rate nor its proposed flat rate is equal to $0.08 per kWh.

AMCS-RDOS Response

AMCS-RDOS confirms that neither FBC's current Tier 1 rate nor its proposed flat rate is equal to $0.08 per kWh.

It was not possible to use FBC's proposed flat rate and their estimate of marginal cost in this illustrative example because FBC's estimate of marginal cost is below its proposed flat rate and a RIB rate is not appropriate in such circumstances. A flat rate of $0.08 per kWh and a marginal cost of $0.12 per kWh were used solely for illustrative purposes.

1.9 Please explain the basis for AMCS/RDOS' Tier 2 rate of $0.12 per kWh.

AMCS-RDOS Response

Please refer to the response to BCUC Q 1.8.

1.10 Please discuss whether AMCS/RDOS considers a "properly designed" RIB Rate (which includes percentage or multiple thresholds) to be more appropriate than a flat rate structure and explain why or why not.

AMCS-RDOS Response

A RIB Rate will only encourage greater efficiency than the flat rate when the flat rate is below the marginal cost of supply. FBC states that their marginal cost of supply is below the flat rate. In such a situation, a flat rate structure is the appropriate rate structure.

If the BCUC were to determine that FBC's marginal cost of supply is higher than its flat rate, then a "properly designed" RIB Rate could result in better price signals being sent to customers to encourage them to invest in energy efficient measures. However, the complexity of designing multiple thresholds, the associated administrative costs and the risk of making design mistakes suggest that even such a RIB Rate should only be implemented in those circumstances where the potential benefits clearly exceed the potential costs.

The benefits might exceed the costs in circumstances when the marginal cost of supply is significantly higher than the flat rate and when there is an environmental imperative to reduce electricity demand to reduce greenhouse gas emissions.

FBC, however, has a hydro-based system, so raising electricity rates to reduce demand can encourage customers to switch to fossil fuels, thereby increasing greenhouse gas emissions and air pollution. Thus, the flat rate would be more appropriate than a RIB Rate even if the marginal cost of supply were greater than the flat rate. In FBC's situation, Demand-Side Management programs, properly designed, would be more effective at promoting energy efficiency improvements than a RIB Rate because they can be targeted specifically at promoting energy efficiency without also encouraging customers to switch to fossil fuels.

1.11 If FBC were to implement a "properly designed" RIB Rate, would AMCS/RDOS support such a rate? Please explain why or why not.

AMCS-RDOS Response

If the BCUC determined that FBC should continue with a RIB Rate beyond January 1, 2019, then AMCS-RDOS would support a "properly designed" RIB Rate rather than an "improperly" designed RIB rate, such as the current RCR.

However, a flat rate is the most appropriate rate structure, for the reasons outlined in the response to BCUC Q 1.10.

BCUC Preamble to 1.12

Page 17 of AMCS/RDOS' evidence states the following:

> By setting the Tier 1 and Tier 2 rates based on FBC's 95%/10% principle, the Tier 1 Rate was set below the Flat Rate. And by approving a "pricing principle" that would see the Tier 2 Rate increasing faster over time than the Tier 1 Rate, the Tier 2 Rate did not reflect the marginal cost of new supply.

1.12 Please discuss AMCS/RDOS' recommendations towards how the annual revenue requirement increases should be coordinated with adjustments to rate design. Should there be a rate design application following every revenue requirement adjustment in order to ensure that the rate design principles are sound? If so, what are the costs/benefits of such a requirement?

AMCS-RDOS Response

AMCS-RDOS asks that FBC return to the flat rate on January 1, 2019. With that change, there would be no need to monitor changes in marginal cost or to adjust threshold and tier rates to ensure FBC is receiving its revenue requirements and there would be minimal intra-class cross-subsidization of customer rates.

If the BCUC, however, were to continue with a RIB rate structure, given the complexities involved, it would be incumbent to monitor the rate system to ensure that it is meeting its objectives.

The 2013 and 2014 RCR Evaluation Reports submitted by FBC did not assess the performance of the RCR against its design principles, particularly Principle 3 (price signals that encourage efficient use and discourage inefficient use), which is the rationale for implementing a RIB Rate. The Evaluation Reports also did not assess the performance of the RCR against the Government's policy objectives, in particular, the Government's objective of reducing the consumption of fossil fuels.

There are two major components of any RIB system: the Tier rates and the Tier threshold(s). For a RIB rate to be successful at promoting economically efficient consumption and reduced air emissions, regular Evaluation Reports will be required to review both components to ensure

that the RIB Rate objectives are being met. There would only be a need for a rate design application in the event the Evaluation Reports indicated that one or both of the components required significant adjustments. There would be costs associated with such an ongoing evaluation process but the costs of not doing so, in terms of unintended adverse impacts, would likely be much higher, as evidenced by the major negative impacts resulting from the RCR.

1.13 How does AMCS/RDOS recommend that FBC should monitor its marginal cost of new supply? What are the costs/benefits of such an exercise?

AMCS-RDOS Response

Please refer to the response to BCUC Request 1.12.

1.14 Does AMCS/RDOS agree that marginal cost of new supply could change from time to time for any utility, for example as a result of changes in technology, construction costs, or marginal cost of market purchases?

AMCS-RDOS Response

Yes.

1.15 Please explain how AMCS/RDOS would propose to ensure that the Tier 2 rate is always aligned with marginal cost of new supply at any given point in time. As part of this response, please address the following points:

- Should Tier 2 be monitored routinely to ensure it still aligns with marginal cost? If so, should this be done annually, every 5 years, or some other time period? Would Tier 1 then be adjusted to recover the residual revenue requirement?
- Should Tier 2 be held constant and the threshold be adjusted? If so, how often?
- Should there only be a redesign when there is a marked change in marginal cost of new supply? Why or why not?

AMCS-RDOS Response

AMCS-RDOS is not proposing the continuation of FBC's RIB Rate, in any form, beyond January 1, 2019. If the BCUC approves a continuation of a RIB Rate, it would be important to monitor the ongoing appropriateness of the Tier Rates and the Tier Threshold.

B.C. Hydro, in its 2008 RIB Application, stated that

> "the Step-2 Rate (should be) no more than the full incremental cost of new supply (adjusted to account for the collection of fixed costs)." (see response to BCUC request 1.1).

Since, in FBC's case, rates that are higher than cost will encourage fuel switching from hydro to fossil fuels, the Tier 2 rate should not rise above marginal cost.

Setting the Tier 2 rate close to, but not above, the marginal cost ensures that the price signals are correct. The Threshold(s) determines who receives the correct price signals and the extent to which those customers base their consumption behaviour on those signals.

The customer's consumption responses to the Tier 2 rate and the extent to which the customer is able to reduce his/her consumption to the Threshold level will, in turn, determine the average rates paid by customers and the extent to which there is an over-recovery or under-recovery of FBC's revenue requirements. The setting of the Threshold is independent of the setting of the Tier 2 rate. Whether there is a need to adjust the Threshold will depend on how customers respond to the Tier 2 rate.

There should be a redesign if Tier 2 rate is above marginal cost or customers are paying average rates that are significantly above (or below) the flat rate. The evidence shows that is currently the case for FBC's RIB Rate. The RCR's current Tier 2 rate is 58% above marginal cost and customers' average rates, under the RCR, range from 10.1 cents/kWh to more than 14.5 cents/kWh, while the flat rate is equal to 12 cents/kWh (AMCS-RDOS Evidence, Section 4.1, p. 19).

BCUC Preamble to 1.16

AMCS/RDOS states the following on page 24 of its evidence:

> Price discrimination occurs when different customers are charged different prices for the same good or service. In economic terms, the RCR constitutes price discrimination if it is charging some customers higher rates than others, where there is no cost justification for the differential.

On page 26 of its evidence, AMCS/RDOS states: "high use customers are cross-subsidizing low-use customers."

AMCS/RDOS further states on page 27: "This cost to serve differential should be added to the revenue differential to obtain a full estimate of the amount of the overcharges and cross-subsidization."

1.16 Please clarify if AMCS/RDOS is recommending that FBC should design separate residential rate schedules which recognize customers' end uses of energy.

AMCS-RDOS Response

No. The above statement comments on the appropriate way to estimate the amount of the cross-subsidization of bills that is occurring under the RCR.

The AMCS-RDOS requests the immediate termination of the RIB rate and a return to the flat rate to prevent such cross-subsidization from continuing beyond January 1, 2019.

1.17 Has AMCS/RDOS considered the utility's cost of redesigning and maintaining such rate structures? If yes, please analyze the costs and benefits of this approach and whether the benefits outweigh the costs. If no, please explain why not.

AMCS-RDOS Response

Please refer to the response to BCUC Q 1.16.

BCUC Preamble to 1.18

On page 63 of the Application, FBC states the following:

> Postage stamp rates in general will result in some intra-class subsidies. This does not mean that separate rate classes, or subdivisions within a particular rate class, should be pursued. FBC supports the postage stamp rate concept where all customers with substantially similar characteristics are billed on the same rate.

1.18 Please discuss whether AMCS/RDOS agrees that postage stamp rates will, in general, result in some intra-class subsidies.

> If yes, please explain whether AMCS/RDOS considers a certain degree of intra-class subsidy to be acceptable.
>
> If AMCS/RDOS does not agree, please explain why not.

AMCS-RDOS Response

AMCS-RDOS agrees that postage stamp rates result in some intra-class subsidies. Since many regulatory agencies and utilities support the concept of postage stamp rates, AMCS-RDOS presumes that postage stamp rates have been found to be in the public interest and hence the resulting intra-class subsidy is justifiable. In the case of the RCR, there is no valid justification for the resulting intra-class subsidy.

1.19 Please provide AMCS/RDOS' view on the appropriateness of postage stamp rates, and in particular, the appropriateness of postage stamp rates for FBC's residential customer class.

AMCS-RDOS Response

AMCS-RDOS intervention in this proceeding focuses on the RIB RCR rate.

AMCS-RDOS does not disagree with past regulatory decisions that postage stamp rates are in the public interest and is not seeking any change to the continuation of postage stamp rates for FBC's residential customer class.

2.0 Reference: RESIDENTIAL CONSERVATION RATE
Exhibit C3-7, Tables 4.1, 4.3, 4.4, pp. 19, 26, 27
Performance of RCR

AMCS/RDOS states on page 19 of its evidence: "As shown in Table 4.1, 20% of customers have, on average, more than 36% of their consumption in Tier 2."

2.1 Please provide the supporting references from the evidence in the proceeding to support the statement that "20% of customers have, on average, more than 36% of their consumption in Tier 2."

2.1.1 As part of the above response, please provide the supporting references for the data/information contained in the "Percent of Customers" column and the "Percent of Use in Tier 2" column in Table 4.1.

AMCS-RDOS Response

The following table shows the calculation of the percentage of consumption in Tier 2 for different levels of total annual electricity consumption. FBC's Application (Tables 6-6 through 6-10) shows the percentage of customers whose consumption is between 15,000 kWh – 20,000 kWh per year; 20,000 kWh – 25,000 per year etc. FBC's Tables 6-6 through 6-10 show that 20% of customers have annual electricity consumption greater than 15,000 kWh; hence 20% of customers have more than 36% of their consumption in Tier 2.

kWh per year	**kWh in Tier 1**	**kWh in Tier 2**	**kWh in Tier 2 divided by kWh per year**
15,000	9,600	5,400	.36
20,000	9,600	10,400	.52
25,000	9,600	15,400	.62
30,000	9,600	20,400	.68
35,000	9,600	25,400	.73

BCUC Preamble to 2.2

AMCS/RDOS states the following on page 26 of its evidence:

> Table 4.3 shows, for each electricity consumption category, how much the average customer is currently paying over and below the Flat Rate. This year customers with consumption higher than 15,000 kWh per year are being overcharged by at least $6.6 million. Customers whose consumption is in the 30,000 kWh – 35,000 kWh range are being overcharged, on average, almost $700 per year.

2.2 Please provide all supporting references and calculations to show how the amounts contained in the "Average Per Customer Payment Above Flat Rate" and "Total Payments Above Flat Rate" columns were determined.

AMCS-RDOS Response

All of the numbers contained in Table 4.3 and Table 4.4, including the number of customers, were taken from FBC's Response to AMCS-RDOS IR#1, Q 3.1. In providing these calculations FBC stated:

> "Please find the requested information for the years contained in the tables in Section 6 of the Application (Current RCR and 2019 through 2022). The analysis for prior years is not comparable since the RCR rates for those years were calculated based on the rates from the revenue requirement applications as applied to the load for the year in which they were in effect. All of the rates (current through 2022) used in the Application are based on the same load and are therefore revenue neutral to each other and comparable. Redoing the model for the previous years utilizing the appropriate load and rates for each year would require several days of work and would yield results that are consistent with the Current RCR table but at slightly lower per kWh rates. The information is provided on the same basis as in the Application for other examples contained within it. Rates are those from Table 6-10 applied to 2016 consumption in all cases. The average rate shown in column 2 is calculated from the sum of Tier 1 and Tier 2 charges divided by annual kWh."

In IR#2, Q 9.6, AMCS-RDOS asked FBC:

> "Is $6.6 million a reasonable estimate of how much high use customers will subsidize low use customers this year? If not, please explain.

FBC's response was:

> "The figures in the table are based on a sample of 2016 consumption at 2018 rates, and do not account for 100 percent of current customers. FBC does not have the data available to provide a comparable number for 2018, but assumes that considering all load and customers would result in a higher value than produced by the sample information.

Thus, the $6.6 million estimate of how much extra above the flat rate high use customers (i.e. those consuming more than 15,000 kWh per year) will pay in 2018 is an underestimate.

BCUC Preamble to 2.3

AMCS/RDOS states the following on page 27 of its evidence:

> Table 4.4 shows that if the RCR is phased out over the next four years, rather than being terminated on January 1, 2019, high use electricity customers will be overcharged, and forced to cross-subsidize low electricity customers, by at least a further $14 million.

2.3 Please provide the applicable reference(s) from the evidence in the proceeding to support the "Number of Customers" column in Tables 4.3 and 4.4.

AMCS-RDOS Response

Please refer to the response to BCUC Q 2.2.

2.4 Please provide all supporting references and calculations to show how the amounts contained in the "Cumulative Average Per Customer Payment Above Flat Rate" and "Cumulative Total Payments Above Flat Rate" columns were determined.

AMCS-RDOS Response

Please refer to the response to BCUC Q 2.2. The cumulative amounts were calculated by summing up FBC's tables for 2019, 2020, 2021 and 2022.

3.0 Reference: RESIDENTIAL CONSERVATION RATE
Exhibit C3-7, Table 6.5, p. 45
Proposed phase-in of flat rate

AMCS/RDOS provides the following table (Table 6.5) on page 45 of its evidence:

Table 6.5 Winter Rate Shock: Customer Consuming 7,500 kWh (two month billing)

FBC Phase-In	Winter Rate $/kWh	Tier 1 Rate $/kWh	Winter Rate Shock
Current RCR	0.144	0.101	+43%
Year 1	0.140	0.104	+35%
Year 2	0.136	0.108	+25%
Year 3	0.131	0.112	+17%
Year 4	0.126	0.116	+8.5%

3.1 Please provide all supporting references and calculations for the rates shown in the "Winter Rate" column of Table 6.5. Please explain all assumptions used in the calculation of these rates.

AMCS-RDOS Response

One of the outcomes of having a fixed threshold of 1600 kWh for each two month billing period is that the rate paid by a customer rises and falls as his/her electricity consumption rises and falls. If a customer uses electricity for space and water heating, that customer's electricity consumption will rise and fall throughout the year depending on weather conditions.

Outside of the winter months, such customers may be able to keep their electricity consumption at or below the 1600 kWh bimonthly threshold. In such cases, they would be paying the Tier 1 rate of 10.1 cents per kWh, the same as many low-use electricity customers. However, their electricity consumption will rise during the winter months when outside temperatures drop.

The amount of electricity consumption during the winter months can vary significantly among customers depending on their geographic location (and associated climate zone), the severity of the winter, the efficiency and type of heating system, the square footage being heated etc.

There are residents of Anarchist Mountain, with efficient heating sytems, that see their electricity consumption rise to between 7,000 kWh and 8,000 kWh during the coldest winter months (December – February). The table below shows how the "Winter Rate" column was calculated for each year of the FBC Phase-in period, based on the assumption that the customer's bimonthly electricity consumption rises to 7,500 kWh in winter

FBC Phase-In	Consumption in Dec-Feb billing period	Consumption in Tier 1	Consumption in Tier 2	Bill (before Customer Charge & Taxes)	Winter Rate (Bill divided by total consumption)
Current RCR	7,500 kWh	1600 kWh	5,900 kWh	$1,082	$.144
Year 1 (2019)	7,500 kWh	1600 kWh	5,900 kWh	$1,051	$.140
Year 2 (2020)	7,500 kWh	1600 kWh	5,900 kWh	$1,018	$.136
Year 3 (2021)	7,500 kWh	1600 kWh	5,900 kWh	$ 982	$.131
Year 4 (2022)	7,500 kWh	1600 kWh	5,900 kWh	$ 943	$.126

3.2 Please provide all supporting references and calculations for the rates shown in the "Tier 1 Rate" column of Table 6.5. Please explain all assumptions used in the calculation of these rates.

AMCS-RDOS Response

The Tier 1 rates shown in the Tier 1 Rate column were taken from FBC's Rate Application, Section 6.1.4.5, Table 6-9: Transition of RCR to Flat Rate, p 71.

3.3 Please provide the supporting calculations for the "Winter Rate Shock" column of Table 6.5.

AMCS-RDOS Response

The "Winter Rate Shock" was calculated using the assumption that the customer was able to keep his/her bimonthly electricity consumption at or below 1600 kWh outside of winter. Thus, the "Winter Rate Shock" was determined by dividing the Winter Rate by the Tier 1 Rate.

The size of the "Rate Shock" would vary among customers depending upon their specific circumstances – how high their consumption goes in winter and how low it goes during the other seasons. However, many customers that heat their homes with electricity will experience a "rate shock" in winter that is significantly greater than the 3.5 percent "rate shock" limit that FBC is proposing. Moreover, such "rate shocks" will persist (albeit at diminishing levels) until the end of FBC's proposed transition period.

4.0 Reference: OPTIONAL TIME OF USE RATES
Exhibit C3-7, p. 32; Exhibit B-21, BCUC IR 137.5.1
Potential Revenue Deficiency

On page 32 of Exhibit C3-7 AMCS/RDOS states:

> Like the RCR, mandatory TOU Rates could end up promoting inefficient customer behaviour, encouraging the greater use of fossil fuels and imposing discriminatory rates on customers using electricity for space and water heating. To prevent this from happening, it is essential that the TOU rate system be optional with customers having the right to stay with a default Flat Rate…
>
> If the rate differential exceeded the amount of the resulting savings, then this would constitute a cross-subsidy from customers paying the default rate to those paying TOU rates. The TOU system will need to be closely monitored to ensure that such cross-subsidization of customers does not occur.

In its response to BCUC IR 137.5.1 FBC provides a table with the estimated revenue deficiency, by rate class, that could result if customers that would see a bill decrease under the proposed optional Time-of-Use (TOU) rates opt in to the program and do not change their consumption. For the residential class, the estimated revenue deficiency is between $9,379,657 as compared to the current residential rate and $729,433 as compared to the proposed Year 5 flat rate.

4.1 Please discuss AMCS/RDOS's views on how the potential revenue deficiency that could result from the optional nature of FBC's TOU rates proposal should be treated.

AMCS-RDOS Response

The problem of free riders is not due to the optional nature of FBC's proposed TOU system. The problem of free riders exists under a mandatory TOU system, except there is no revenue deficiency because those customers under the TOU system whose consumption occurs more often during peak periods will experience bill increases to offset the lower bills of those customers whose consumption occurs more often during off-peak periods. Customers who use electricity for space and water heating and/or electricity for space cooling cannot shift a large percentage of their consumption to off-peak periods and so would likely incur the higher bills.

Under an optional TOU system, the revenue deficiency would be made up by those customers paying the default rate, many of whom would be customers using electricity for space and water heating because they would be less likely to opt into an optional TOU system since they would not likely benefit financially from doing so. Thus, both the mandatory and optional TOU systems have a free rider issue that could result in significant intra-class cross-subsidization. The intra-class cross-subsidization just happens in two different ways and there will be some differences in terms of who pays.

The issue is not how to "treat" the potential revenue deficiency, in terms of deciding who should subsidize whom. Rather, the challenge is to set the TOU rates (peak, mid-peak and off-peak) so as to minimize the potential revenue deficiency. This means designing the TOU rates to be less

attractive in terms of reducing customers' bills relative to the default rate.

Once data has been generated on the nature and degree of customer responses to the TOU rates, the system could then be further modified to enhance customer take-up and the TOU's overall effectiveness. Fortunately, the time can be taken to get the TOU rates correct.

In response to BCUC IR#1, Request 79.1.4, FBC states: "in the short term FBC does not have the need for new resources and has sufficient capacity to meet load growth for several years".