FINAL ARGUMENT ON BEHALF OF

THE CLEAN ENERGY ASSOCIATION OF BRITISH COLUMBIA

Re: BRITISH COLUMBIA HYDRO and POWER AUTHORITY

Transmission Service Market Reference-Priced Rates
PART 2 – Incremental Energy Rate

Project No. 1599053

July 6, 2020

BC HYDRO Transmission Service

Market-Reference Priced Rates Application

PART 2 – Incremental Energy Rate

Final Argument of CEABC

I. EXECUTIVE SUMMARY

The Clean Energy Association of B.C. (*"CEABC"*) supports this 2nd part of BC Hydro's Market Reference-Priced Rates Application (*"Application"*), dealing with the year-round Incremental Energy Rate, (*"IER"*)on the basis that it offers a reasonable benefit to participating customers, while avoiding any significant risk of adverse impacts on non-participating ratepayers.

The original application included two proposed rates:

- **RS 1892** – a proposal to make the **Freshet Rate** into a permanent rate, since it has now been tested on a pilot basis during the 2016 through 2019 freshet seasons; and
- **RS 1893** – the **Incremental Energy Pilot Rate**, a proposal to make a similar rate available on a year-round basis, for a 3-year pilot period.

The RS 1893 rate was given an interim approval by the British Columbia Utilities Commission (*"BCUC"*), in order to commence January 1, 2020. CEABC has already filed its comments on the RS 1892 Freshet Rate, and will here focus on the RS 1893 Incremental Energy Rate.

The IER offers an opportunity for qualifying transmission service customers (i.e. large industrial customers), to purchase incremental energy (i.e. over and above their established baseline consumption), at the Mid-C index price plus an Adder amount. The Adder will vary from $3/MWh during the freshet months to a flat $7/MWh during the remaining 9 months of the year.

CEABC looks to two indicators that the proposed IER Pilot is a desirable addition to BC Hydro's rate schedules:

1. That the proposed rate will provide a benefit to both parties, both BC Hydro and the participating customers.
2. That there is very little risk of adverse impacts on the non-participating ratepayers, when considered over a period of years.

II. GENERAL COMMENTARY.

1. Both the Freshet Rate and the Incremental Energy Rate seem to have attracted a reasonable number of the eligible participants and enabled them to achieve a significant saving, while also increasing BC Hydro's energy sales and revenues.

BC Hydro has stated that *"Approximately 30 per cent of eligible customers, across a broad range of industries and locations across the province, participated in the Freshet Rate pilot."*[1] And BC Hydro provided the following table showing the number of participating sites from each industry segment over the pilot period from 2016 to 2019, and anticipated for the upcoming 2020 freshet season:[2]

Freshet Rate (RS 1892) participant customer sites					
Industry	Year 1	Year 2	Year 3	Year 4	Year 5
Pulp and Paper	9	9	8	8	1
Solid wood	12	12	12	11	11
Oil and Gas	6	6	6	4	4
Chemicals	3	4	4	3	2
Mining	6	10	13	9	3
Cement	1	1	1	1	1
Other	2	2	1	1	2
Total	39	44	45	37	24

Apparently, the decline in intended participation for the 2020 year (Year 5) can be explained due to 5 sites that are presently shut down (likely pulp and paper or mining), and16 customers who have elected to take service under the pilot RS 1893 (which operates essentially the same during the freshet months, but allows for incremental purchases over the balance of the year as well, albeit at a $7/MWh adder instead of $3/MWh).

The number of participants in each of the rate classes was updated by BC Hydro in the following table, which shows 42 participating customers in the two rate classes, compared to 37 participating last year in the Freshet Rate Pilot:[3]

RS 1892		
	Year 4 - F2020 (01 May - 31 May 2019)	Year 5 - F2021 (01 May - 31 July 2020
Number of RS 1892 Participant Customers	37	25
RS 1893		
	01 January 2020 - 31 March 2020	01 April 2020 - 31 March 2021
Number of RS 1893 Participant Customers	13	17

BC Hydro also provided the following energy sales volumes and revenues for the thirteen RS 1893 customer sites for the current year, to the end of April:[4]

[1] BC Hydro Final Written Submission, page 4, paragraph 17.
[2] Exhibit B-6. Response to BCUC Pre-filed Question 1.0 for SRP
[3] Exhibit B-12, response to CEABC IR 3.20.1, issued June 19,2020
[4] Exhibit B-11, response to BCUC IR 3.4.3

RS 1893 Energy Sales for Billing Periods of January - April 2020				
Billing Month	Total Billed RS 1893 Energy (kWh)	Total RS 1893 Energy Charges ($)	Total Energy Charge Adder Revenue ($)	Total RS 1893 Energy Charges ($)
Jan-20	25,048,562	$ 749,327	$ 175,340	$ 924,667
Feb-20	14,280,455	$ 320,168	$ 99,963	$ 420,131
Mar-20	11,108,105	$ 362,808	$ 77,757	$ 440,565
Apr-20	40,316,464	$ 1,046,083	$ 282,215	$ 1,328,298
	90,753,586	**$ 2,478,386**	**$ 635,275**	**$ 3,113,661**

The Freshet Rate Pilot sold 569 GWh over the 3-month freshet period over 4 years, an average of 142 GWh per year. BC Hydro has projected the RS 1893 sales of 266 GWh in a typical year, with up to half of that in the freshet months and the balance in the non-freshet months.[5] It has already sold 90 GWh over the first 4 (non-freshet) months.

CEABC believes that this extent of interest in the RS 1893 is a strong indication that these customers are achieving a benefit from this rate offering, and also that BC Hydro is achieving increased sales and revenues.

Because utilizing this rate is optional to the customers, if it ceases to be attractive they can simply revert to their normal rates under RS 1823.

CEABC's remaining concern is the risk, if any, of adverse impacts on the non-participating ratepayers.

2. The risk of adverse impacts on the non-participating ratepayers appears to be minimal over the longer term.

BC Hydro has analyzed the variability of the net benefits as a function of the customer uptake and forecast prices, with the following results:[6]

Table 9 Option 2A – Flat $7/MWh Adder in Non-freshet months

RESULTS (all values on a per year basis):		
Expected Incremental Load Net Revenue	1315	kCAD
10th Percentile Net Revenue	-257	kCAD
50th Percentile Net Revenue	1308	kCAD
90th Percentile Net Revenue	2881	kCAD
Expected Incremental Load	266	GWh
10th Percentile Incremental Load	243	GWh
50th Percentile Incremental Load	272	GWh
90th Percentile Incremental Load	282	GWh

With the proposed flat $7 Adder, BC Hydro expects to achieve a net benefit (to the non-participating ratepayers), of $1.3 million per year. There is a small risk, with low uptake, that the net benefit in any particular year could be slightly negative in some years. However, there is also a significant possibility that the benefit

[5] Exhibit B-12, response to CEABC IR 3.15.4
[6] Exhibit B-1, Application page 77, Table 9

could be well above the expected value. In CEABC's view, this should be an acceptable trade-off when the rate is evaluated over a number of years, especially in view of the considerable uptake already experienced in the first 4 months.

BC Hydro also analyzed the variability of the net benefit over a range of different hydrological conditions, with the following results:[7]

> **Using the same modeling and assumptions as performed for BC Hydro's response to BCUC IR 1.7.1, over the 46 years of historical weather sequences used in the modeling, the expected annual financial impact of the RS 1893 pilot on ratepayers by water condition is:**
>
> **(i) Favourable: $1,952,000;**
>
> **(ii) Normal: $957,000; and**
>
> **(iii) Unfavourable: -$373,000.**

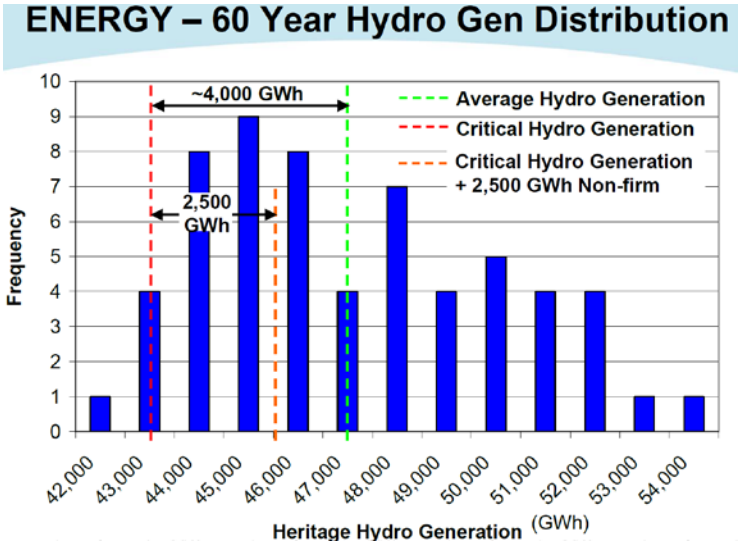
The three conditions described here were defined by BC Hydro as follows:

> (i) Favourable water conditions are when annual inflows are at least 10 per cent higher (wetter) than average;
> (ii) Normal water conditions are when annual inflows are within +/-10 per cent of average; and
> (iii) Unfavourable water conditions are when annual inflows are at least 10 per cent lower (drier) than average.

Unfortunately, this set of condition definitions does not reveal anything about the underlying probabilities of these conditions. When CEABC tried to ascertain what the probability distribution of historical weather sequences might look like, BC Hydro declined to provide that information, on the grounds that this data "*could be used by third parties to model BC Hydro's system inflows, to the disadvantage of BC Hydro and its ratepayers.*"[8]

In the absence of the updated information from BC Hydro, CEABC used the following older, outdated public information to assess the probabilities of 10% higher and 10% lower system water flows:

[7] Exhibit B-11, response to BCUC IR 3.1.1
[8] Exhibit B-12, responses to CEABC IR 3.17.1 to 17.3



From this histogram of the 60 year history of Heritage Hydro Generation,[9] CEABC observes that the distribution is quite skewed. That is to say, there are more below-average years, but the dry years are not as extreme as the wet years. The bulk of the below-average years are clustered in the 2%-7% range. There is only one year (out of 60), that was drier than 10% below average. On the other hand, there were 6 years that were wetter than 10% above average.

Based on this probability distribution, CEABC would conclude that the two outcomes characterized by BC Hydro as "Favourable" and "Unfavourable" are not equally likely to occur. This gives CEABC further confidence that positive net benefits to BC Hydro's ratepayers are much more likely than negative ones, and, this is further evidence that the risks of adverse impacts to the non-participating ratepayers are an acceptable trade-off, over a number of years, when considered against the potential for significant gains.

Further evidence that the risks to ratepayers are minimal, can be found by considering the way in which the net benefits are measured.

BC Hydro has stated that it has made *"the simplifying assumption that in the non-freshet period only Condition 3 applies."*[10] This means that BC Hydro expects that virtually all of the sales during the non-freshet months will be supplied from system storage, rather than directly by imports (Condition 2) or by avoiding forced exports (Condition 1). Appendix 1, as attached, contains a synopsis of Conditions 1-3.

We know from the experience with the Freshet Rate in 2019 that losses can occur under Condition 3. Under Condition 1 (supply by avoiding forced exports), there will always be a profit on the sale. Condition 2 (supply by directly importing the

[9] BC Hydro slide from a 2007 presentation titled System Needs: An Energy Planning Perspective
[10] Exhibit B-12, response to BCOAPO IR 3.58.1

energy) will generally result in a break-even situation when the Adder is $7, or a loss of $4 (when the Adder is $3 during the freshet months).

However, gains and losses calculated under Condition 3 are more hypothetical than real. That is to say they cannot be tracked down and verified by the accounting system. They are based on the projected future "opportunity value" of the energy, rather than the accounting cost of the energy.

When Condition 3 applies (i.e. when sales are supplied from system storage), the gain or loss on the sale is calculated by subtracting the System Marginal Value (*"SMV"*) from the sales price (Mid-C + $7). But the System Marginal Value is not the actual historical cost of that energy, as derived by BC Hydro's accounting system. Rather, it is the hypothetical value placed on the energy by BC Hydro's energy modeling studies (after possible adjustments, up or down, by the system operators). It may be right or it may be wrong, but there is no evidence that its long-run accuracy has been verified by benchmarking.

To illustrate how the gains and losses under Condition 3 are more hypothetical than real, suppose the situation where BC Hydro purchases 100 MWh of electricity at attractive prices during the LLH of the night. Those electrons will be instantaneously used to power the loads in the system, but an equivalent 100 MWh of electrons will be conserved in the water behind the storage dams, and that 100 MWh will be assigned a hypothetical value called the System Marginal Value.

If, the following day, 100 MWh is sold to a customer under RS 1893, those electrons will be supplied from the storage dams, and the gain or loss on the sale will be calculated based on the SMV that had been assigned the previous night. If the SMV is set at a value higher than Mid-C + $7 then the sale will show as a loss. However, that is not a loss in the accounting records, it is only the loss of a supposed "opportunity value", as predicted by a series of 85 computer models (plus adjustments made by the operators) – without the benefit of benchmarking to verify whether those predicted opportunity values actually come true.

In that sense, any losses (or gains, for that matter), calculated on the sales under Condition 3 can never be verified by any accounting system. They are merely hypothetical and notional gains and losses based on conjectures about the possible future value of that energy.

3. Adjustments to the Ratepayer Benefits

BC Hydro has also been asked to calculate the impact of certain adjustments to the Ratepayer Benefit calculated for the RS 1893.[11] These include deductions for implementation costs and certain load shifting occurrences that could be viewed

[11] Exhibit B-11, BCUC IR 3.4.2, which BC Hydro declined to provide due to insufficient data

as potentially detrimental to the benefits otherwise derived. These adjustments were not provided for RS 1893 but, by way of example, were calculated for the Freshet Pilot Rate as shown in Table 12, below:[12]

Table 12 Estimate of Adjusted Ratepayer Benefit by Year

Ratepayer Benefit - Adjustment Description	Year 1 ($,000)	Year 2 ($,000)	Year 3 ($,000)	Total ($,000)
Preliminary ratepayer benefit	$ 2,259	$ 2,194	$ 1,872	**$ 6,325**
Less implementation costs	$ (115)	$ (30)	$ (60)	**$ (205)**
Less customer-reported load shift impact	$ (32)	$ -	$ (50)	**$ (82)**
Less unexplained load variance impact	$ -	$ -	$ -	**$ -**
Less natural load growth impact	$ (470)	$ (340)	$ (450)	**$ (1,260)**
Less RS 1880 replacement service impact	$ (233)	$ (820)	$ -	**$ (1,053)**
Adjusted Ratepayer Benefit	**$ 1,409**	**$ 1,004**	**$ 1,312**	**$ 3,725**
**actuals for Year 1 and Year 2; forecast for Year 3*				

A few comments are in order regarding these potential deductions.

Implementation costs -- These include items like rate design, stakeholder engagement and evaluation report preparation, which is expected to be greatly reduced going forward.

Customer-reported load shift impact – This derives from customers who might have rescheduled plant maintenance from the freshet period to some other period, so as to take advantage of the cheaper energy price. As a result they may not use any more energy over the whole year. The negative impact of this appears to be very minor and inconsequential. The vast majority of customers are treating these market reference-priced rates as an incentive to increase total energy usage but they will attempt to focus that increase, if they can, during the freshet period, when the incremental energy is expected to be cheaper.

Natural load growth impact – This refers to customers who may have increased their load simply because of the growth of the customer's business, which would have happened anyway, even without the incentive rate. However, there is no guaranty that this presumption is true. It's merely a hypothesis. It's also possible that the incentive was the trigger that prompted the customer to grow its business. Either way, BC Hydro's ratepayers are better off for having the load growth in both categories. There is no actual loss to the ratepayers relative to the prior revenues from this customer. The presumed loss is merely relative to some hypothetical potential revenue gain as calculated using the higher RS 1823 rate. This gain may or may not have occurred in the absence of the Freshet Rate.

RS 1880 replacement service impact – This refers to customers who experienced a forced outage of their own self-generation. Since they could have taken service under RS 1880, at a higher price, BC Hydro views this as another cost to ratepayers. However, once again, it is only a loss when considered relative

[12] Exhibit B-1, Appendix D, Freshet Pilot Final Evaluation Report – Dec. 2018, page 41 of 296

to the hypothetical gain that BC Hydro could have made due to the customer's unfortunate outage. It is not a loss of sales relative to the normal sales to that customer. Normally, that customer would have been using its own self-generation. Because of the outage, BC Hydro actually gains both sales and profits. Calling this a "cost" is, again, purely hypothetical.

Accordingly, CEABC asserts that the true benefit derived by ratepayers is best shown in the top line of Table 12, rather than after the adjustments shown in the bottom line.

Nonetheless, regardless of which way these deductions are interpreted, there should be a significant net benefit accruing to the non-participating ratepayers over time, in addition to a substantial benefit derived by the participating customers. The IER therefore provides a significant gain for everyone.

4. Additional Submissions.

BC Hydro has proposed a 3 year period in which to offer the RS1893 as a "Pilot" rate, after which an evaluation report would be issued in December, 2023.

In CEABC's view, this is a reasonable time frame in which to evaluate the proposed rate.

All of which is respectfully submitted.

APPENDIX 1

A Brief Synopsis of BC Hydro's System "Conditions"

BC Hydro has defined three System Conditions, which are described in the Final Evaluation Report,[13] and summarized below:

- **Condition 1, "Forced Export"**, also referred to as "Minimum Generation with Exports." This is a system condition in which BC Hydro cannot reduce generation any further, but has insufficient load to use all the energy. It is forced to either export or spill. Spilling water is only preferred if the export market would yield a negative amount after wheeling and losses.

  Profit or loss on avoided Forced Exports? If BC Hydro can supply incremental energy by avoiding Forced Exports, that sale should always provide a profit of approximately $10/MWh during the freshet months (the $3 adder plus the $7 saved on the avoided wheeling and losses), or approximately $14/MWh during the non-freshet months (because the adder is increased to $7 during those months). However, BC Hydro experienced this Condition only 13% of the time during the freshet months of the four-year trial period of the Freshet Rate Pilot, and does not expect it to occur during the non-freshet months.[14]

- **Condition 2, "Market Import"**, also referred to as "Minimum Generation with Imports." This is a system condition in which BC Hydro minimizes its generation in order to import the maximum amount of available low priced energy that the transmission capacity will allow. It requires 3 ingredients: sufficient energy available on the market; attractive prices; and adequate transmission capacity to import the energy. If, for some reason, one of these ingredients is absent, then BC Hydro will be forced to rely on its discretionary generation to supply the incremental load, and that condition will be classed as Condition 3.

  Profit or loss on Market Imports? Supplying incremental energy from Market Imports will result in a loss of about $4/MWh during the freshet months (the $3 adder does not compensate for the $7 cost of wheeling and losses). There would be a break-even during the non-freshet months (because the adder is increased to $7 during those months), however, as for

[13] Exhibit B-1, Appendix D, Freshet Pilot Final Evaluation Report – Dec. 2018, page 23 of 296
[14] Exhibit B-12, response to BCOAPO IR 3.58.1

Condition 1, BC Hydro does not expect this Condition to occur during the non-freshet months.[15]

- **Condition 3, "System Basin"**, also referred to as "Higher Basin Generation on the Margin." This is a system condition in which BC Hydro may either choose to, or be forced to, supply incremental energy load by operating its discretionary generation from the system storage dams. BC Hydro expects that this is the only Condition that will occur during the non-freshet months.

  BC Hydro may choose this option in preference to Condition 2, Market Imports, if the value it has set for the energy in system storage (the System Marginal Value, "SMV") is less than the cost of imports (including wheeling and losses). **Profit or loss?** There will be a profit for the ratepayers (as was the case in years 1 to 3 of the Freshet Rate Pilot). The exact amount of the profit will depend on how much the SMV is <u>below</u> the IER price of Mid-C plus $3 (in freshet months), or Mid-C plus $7 (in non-freshet months).

  Or BC Hydro may be forced into this alternative even if system storage is more highly priced than the imports, or if either import energy or import transmission is unavailable. **Profit or loss?** In this case there will likely be a loss for the ratepayers (which was the predominant situation in year 4 of the Freshet Rate Pilot). The exact amount of the loss will depend on how much the SMV has been set <u>above</u> the IER price of Mid-C plus $3 (in freshet months), or Mid-C plus $7 (in non-freshet months).

Profits and losses summarized:

Sales under Condition 1 will always show a profit ranging from $10/MWh (in freshet months), to $14 (in non-freshet months).

Sales under Condition 2 will show a loss of about $4/MWh (in freshet months), or a break-even (in non-freshet months).

Sales under Condition 3 may show a profit or a loss, which depends on how high or low the System Marginal Value has been set, relative to the RS 1893 price of Mid-C plus $3 (in freshet months), or Mid-C plus $7 (in non-freshet months).

The main objective of both the Freshet Rate and the Incremental Energy Rate is to incentivize incremental load during the freshet season, so that BC Hydro can avoid Condition 1 (Forced Exports), and also to have more of Condition 2 (the acquisition of inexpensive imports).[16] A secondary objective of the IER is to

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[15] Exhibit B-12, response to BCOAPO IR 3.58.1

[16] Slide 27 of BC Hydro's October 11, 2018 Transmission Rate Design Workshop Presentation illustrates BC Hydro's need for this increased load. During the freshet months, domestic load is static, yet available energy surges due to heavy inflows. EPA energy increases by about 500

provide a similar incentive during the remaining nine months of the year. In CEABC's view, the proposed IER (RS 1893) will likely be successful at both objectives.

GWh/mo., (regardless of dry or wet years). However, BC Hydro's other system inflows typically add about 5,000 GWh of available energy in May and July, and about 8,000 GWh in June.