REQUESTOR NAME: Clean Energy Association of B.C. (CEABC)

INFORMATION REQUEST ROUND NO: #3

TO: BRITISH COLUMBIA HYDRO & POWER AUTHORITY

DATE: May 22, 2020

PROJECT NO: 1599053 Order G-327-19

APPLICATION NAME: Transmission Service Market Reference-Priced Rates Application ("Application")

14.0 **Reference: Exhibit B-1, Application, Appendix E, Freshet Rate Pilot Final Evaluation Report for Year 4, 2019, pages 13 to 16, Discussion of Ratepayer Impact Analysis, and summary Table 5, and Exhibit B-1, Section 5.5, Economic Justification and Ratepayer Impacts of the Incremental Energy Rate Pilot Proposal.**

In Section 1.8.3 of Appendix E, BC Hydro explained the differences between Conditions 1, 2, and 3, and in Table 5, BC Hydro presented the "Monthly Ratepayer Impact by Marginal Resource", for the Freshet Rate Pilot, over the 4 years from 2016 to 2019:

Table 5 RS 1892 Monthly Ratepayer Impact by Marginal Resource for Years 1 - 4

Year 1 (2016)	Forced Export	Market Import	System Basin	Revenue gain (loss)
May	$ 61	$ (6)	$ 481	$ 536
June	$ -	$ -	$ 806	$ 806
July	$ -	$ -	$ 917	$ 917
	$ 61	**$ (6)**	**$ 2,204**	**$ 2,259**
Year 2 (2017)	**Forced Export**	**Market Import**	**System Basin**	**Revenue gain (loss)**
May	$ 56	$ (93)	$ 424	$ 387
June	$ 117	$ (55)	$ 402	$ 464
July	$ 38	$ -	$ 1,305	$ 1,343
	$ 211	**$ (148)**	**$ 2,131**	**$ 2,194**
Year 3 (2018)	**Forced Export**	**Market Import**	**System Basin**	**Revenue gain (loss)**
May	$ 205	$ (78)	$ -	$ 127
June	$ 170	$ (77)	$ 50	$ 143
July	$ 65	$ (4)	$ 1,541	$ 1,602
	$ 440	**$ (159)**	**$ 1,591**	**$ 1,872**
Year 4 (2019)	**Forced Export**	**Market Import**	**System Basin**	**Revenue gain (loss)**
May	$ 45	$ (107)	$ (275)	$ (337)
June	$ 65	$ (91)	$ (55)	$ (81)
July	$ -	$ (94)	$ (31)	$ (125)
	$ 110	**$ (292)**	**$ (361)**	**$ (543)**
Totals	**$ 822**	**$ (605)**	**$ 5,565**	**$ 5,782**

In this table, the three Conditions (1, 2, and 3) are represented by the three columns "Forced Export", "Market Import", and "System Basin", respectively.

14.1 Please confirm that the three columns in Table 5 (representing the three Marginal Resources), correspond to the three Conditions described by BC Hydro in Section 1.8.3 of Appendix E. And please confirm that these same three Conditions (or Marginal Resources) are also used for the evaluation of the Incremental Energy Rate ("IER"), as they did for the Freshet Rate. If there is a difference, please explain in detail.

14.2 Please provide a table similar to Table 5, covering the same 4 year period, F2016 to F2019, but showing the hypothetical Ratepayer Impacts that would have occurred for the Incremental Energy Rate, if it had been in effect for that period. However, instead of a monthly breakdown, break each fiscal year into 3 segments: "Freshet" (May-July), "Winter" (October-March), and "Shoulder" (April, August, September), in the same way that BC Hydro has used for the evaluation of the "Shaped Adder" alternatives described on page 76 of the Application. Assume the $7 Flat Adder alternative ($3 during Freshet months) throughout the period, and assume the same participation and incremental loads as were assumed for the Flat vs. Shaped Adder analysis shown in Tables 7-12 in Section 5.5 of the Application.

14.3 During the Non-Freshet months, over the entire 4 year period, how many GWh of incremental energy was modeled to have occurred during periods designated as Condition 1 (i.e. Forced Export), during those Non-Freshet months? And how many GWH occurred during periods designated as Condition 2 (i.e. Market Import), during those Non-Freshet months?

15.0 **Reference: Exhibit B-1, Application, section 5.5.4, BC Hydro's Energy Charge Adder Proposal, and Exhibit B-1-1, erratum for page 79, Table 13**

In its evaluation of the possible Adder alternatives, BC Hydro presented the following summary table, showing the expected incremental loads and Net Revenue impacts:

Table 13 Summary of Expected Net Revenue by Adder Option

ENERGY CHARGE ADDER ALTERNATIVES	ADDER ($/MWh)	Expected Incremental Load (GWh)	Expected Incremental Net Revenue ($M)
Option 1A - Flat	~~$6.00~~ 8.00	264	$ 1.47
Option 1B - Shaped		263	$ 1.45
Option 2A - Flat	$ 7.00	266	$ 1.32
Option 2B - Shaped		265	$ 1.29
Option 3A - Flat	~~$8.00~~ 6.00	268	$ 1.12
Option 3B - Shaped		267	$ 1.13

BC Hydro states that its proposed alternative is Option 2A – the Flat $7 Adder during all Non-Freshet months, with a $3 Adder during the Freshet months.

15.1 Please confirm that this table means that BC Hydro's proposed $7 Adder is expected to yield an average of 266 GWh of incremental load, annually, and approximately $1.32 million of Net Revenue, annually.

15.2 Were the values in this table produced by simulating the operation of the Incremental Energy Rate ("IER") over the 46 different system inflow scenarios (years 1973-2019) used by BC Hydro's Energy Studies models? Please describe all of the key assumptions that were used, and how the models were operated to produce these simulations.

15.3 Of the 266 annual GWh of incremental load achieved under Option 2A, how much of it occurred during the Non-Freshet months, in a period designated as Condition 1 (i.e. Forced Exports)? And how much of it occurred in the Non-Freshet months during periods designated as Condition 2 (i.e. Market Import)?

15.4 How did BC Hydro determine that 266 GWh was the appropriate amount of incremental energy that would be achieved by this year-round Incremental Energy Rate? The Freshet Rate Pilot, only operating for 3 months each year, achieved 569 GWh of incremental energy over a 4 year period, an average of 142 GWh per year. How much of the 266

GWh/year of the IER's expected incremental energy is expected to occur in the Freshet Months?

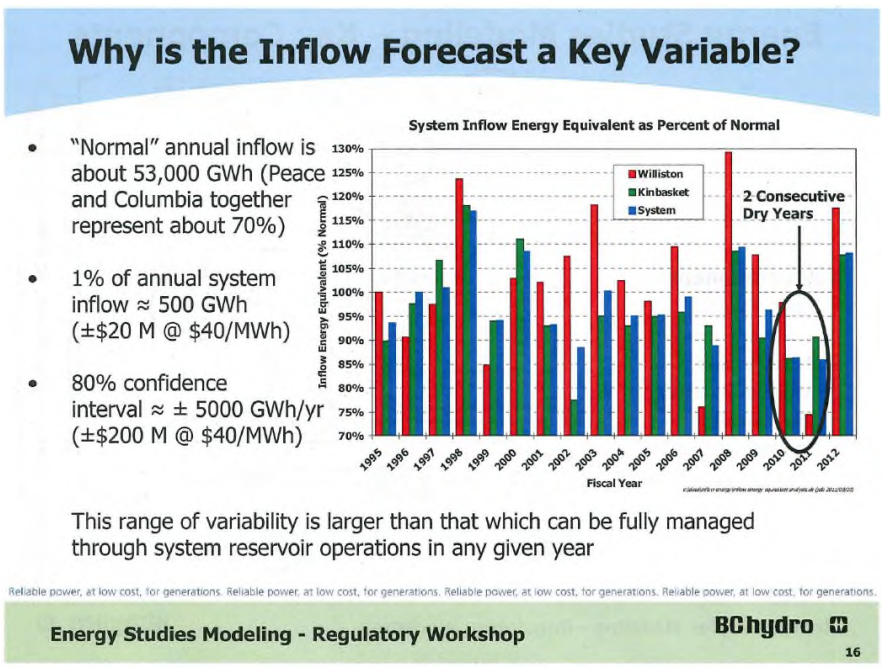
15.5 The table appears to show that increasing the Flat Adder from $7 to $8 would result in a loss of only 2 GWh per year of incremental load, but a gain of $150,000 in Net Revenue. However, there should be an immediate gain of $1 x 264,000 MWh = $264,000. This immediate gain would be offset by the loss of 2,000 MWh, but for that loss to amount to $114,000, would require a loss per MWh of $57. Please explain how the Net Revenue lost per MWh could possibly be that large.

15.6 Please explain how the 2 GWh change in Expected Incremental Load is determined as a result of the $1 change in the Adder. Is there some elasticity of demand assumed on the part of the participants? If so, how was that elasticity determined and applied?

15.7 If the $8 Adder is expected to produce $150,000 more per year than the $7 Adder, then why is Option 1A not BC Hydro's preferred alternative?

16.0 **Reference: Exhibit B-1, Application, Section 5.5, Economic Justification and Ratepayer Impacts of the Incremental Energy Rate Pilot Proposal, and BC Hydro's Energy Studies modeling.**

On page 73 of the Application, BC Hydro describes the use of its energy modeling process for the evaluation of economic justification and ratepayer impacts of the Incremental Energy Rate Pilot Proposal. It refers to a workshop presentation from the F2012-F2014 RRA (Exhibit B-13 from that RRA), and that presentation contains the following chart (slide 16):



This chart gives a very good picture of the degree of variability in the inflows between one year and the next, and between one basin and the others basins, but only shows a limited time period.

16.1 Please provide a similar chart, showing the full 46 year period that is currently being used in the Energy Studies models. Include a 4th bar designated as the '"Overall System" (assuming that the blue bar designated as "System" in the chart represents all the system inflows other than Williston and Kinbasket).

16.2 The slide states that "Normal" annual inflow is about 53,000 GWh, and that the Peace and Columbia systems together represent about 70%. Are those statements still correct,

or have they changed since 2012? Is "Normal" considered to be the same as "Average"? When the legend refers to "Columbia" does it referring only to Mica and Revelstoke generation? Does the blue bar designated as "System" represent all the other inflows in the system other than Williston and Kinbasket?

16.3 When Site C is put into service in F2025, what will be its impact on the amount of the "Normal" annual inflow generation equivalent, and how will Site C's generation be reflected in the above chart?

17.0 **Reference: Exhibit B-6, BC Hydro response to BCUC Questions for Streamlined Review Process IR 1.7, energy modeling for ratepayer impact of the Freshet Rate.**

In its response, BC Hydro defines three scenarios for evaluation:

i. Favourable water conditions – at least 10% wetter than average;
ii. Normal water conditions – within +/- 10% of average; and
iii. Unfavourable water conditions – at least 10% lower than average.

BC Hydro goes on to explain that *"the majority of inflow scenarios fall into the normal and favourable categories…"*

17.1 Based on the 46 years of system inflow data that is used in BC Hydro's Energy Studies modeling, and as charted in the previous question, please provide a histogram showing the frequency distribution of the "Overall System" annual inflows, ranging from 80% to 120% of the average, in 1% increments.

17.2 Given this frequency histogram, what Overall System inflow levels correspond to the 10th, the 20th, the 50th, the 80th, and the 90th percentiles?

17.3 What percentiles would correspond to the levels of +10% or -10% of average?

18.0 **Reference: Exhibit B-6, BC Hydro response to BCUC Questions for Streamlined Review Process IR 1.7, energy modeling for ratepayer impact of the Freshet Rate.**

18.1 In a similar way to that used for the response to BCUC SRP IR 1.7 (Exhibit B-6), please model the annual Net Revenue impacts that BC Hydro would forecast for the Incremental Energy Rate, under conditions where the Overall System annual inflows are at the 10th, the 20th, the 50th, the 80th, and the 90th percentiles, as determined in the histogram frequency analysis from the previous question. Please describe all the key assumptions that BC Hydro makes in doing this modeling analysis.

19.0 **Reference: Exhibit B-1, Application, Section 5.5.5, Discussion of Risks**

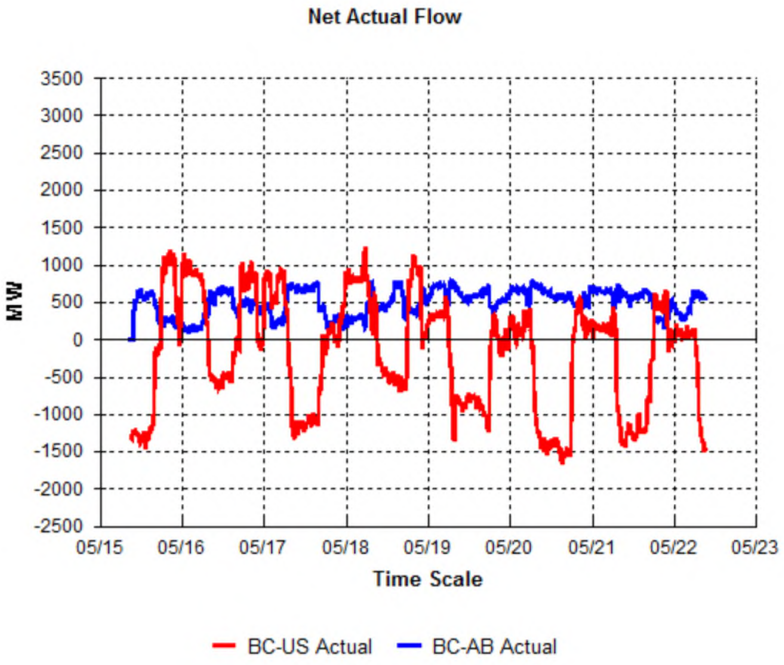
On page 81, BC Hydro describes *"An additional scenario which could occur is if, in high load periods, BC Hydro has to reduce its sales of energy to market so serve Incremental Energy Rate Pilot load."*

19.1 If BC Hydro sees an additional profitable opportunity for market sales, why would it not take advantage of that opportunity, in addition to supplying the IER load? Why can BC Hydro not do both?

20.0 **Reference: Impact of RS 1892 and RS 1893 during current market conditions.**

BC Hydro posts the following import/export energy flows on its website:

https://www.bchydro.com/energy-in-bc/operations/transmission/transmission-system/actual-flow-data.html



The current week's energy flows indicate that, during mid-day hours, BC Hydro has been importing significant amounts of energy from the U.S. For roughly 8 to 10 hours each day, it has imported at rates that ranged from ~500MW on Saturday, May 16, to ~1500MW on Wednesday, May 20. During the same periods, it simultaneously exported ~500MW to Alberta. During the overnight hours, BC Hydro has been primarily exporting energy to both the U.S. and Alberta.

All of this importing and exporting is occurring while RS 1892 and RS 1893 are in effect, and both allow industrial customers to purchased incremental energy with a $3 adder over the Mid-C price. It would, therefore, be of interest to know how much impact these two incremental energy rates are having on BC Hydro's imports and exports during the current freshet period.

20.1 How many participants are currently subscribed under RS 1892 and RS 1893, as compared to last year, and what are the reasons for any difference?

20.2 Are all of the mid-day energy imports, shown on the above chart, considered to be Market Imports, and those periods therefore designated as Condition 2, under the terms of RS 1892 and RS 1893?

20.3 Of the 22 days so far in May, how many HLH and LLH time periods have been classified as Condition 1 (Forced Export), and how many have been classified as Condition 2 (Market Import)? And how much incremental energy, pursuant to RS 1892 and RS 1893, has been purchased under each Condition? What average loads do these energy purchases represent?

20.4 The above chart shows a roughly even balance between exports and imports during the current week. For the total month of May, so far, what are the total exports and imports to each of Alberta and the U.S?

20.5 Of all of the exports to Alberta in May, what proportion is classified as Market Exports and what proportion is designated as System Basin supply?

20.6 What are the MWh of Forced Exports to Alberta and the U.S. in May, so far?