bcuc
British Columbia
Utilities Commission

Patrick Wruck
Commission Secretary

Commission.Secretary@bcuc.com
bcuc.com

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

January 23, 2020

Sent via eFile

BCH TRANSMISSION SERVICE MARKET REFERENCE-PRICED RATES EXHIBIT A-4

Mr. Fred James
Chief Regulatory Officer
Regulatory & Rates Group
British Columbia Hydro and Power Authority
16th Floor – 333 Dunsmuir Street
Vancouver, BC V6B 5R3
bchydroregulatorygroup@bchydro.com

Re: British Columbia Hydro and Power Authority – Transmission Service Market Reference-Priced Rates Application – Project 1599053 – BCUC Information Request No. 1

Dear Mr. James:

Further to your October 31, 2019 filing of the above-noted application, enclosed please find British Columbia Utilities Commission Information Request No. 1. In accordance with the regulatory timetable, please file your responses no later than Thursday, February 20, 2020.

Sincerely,

Original signed by:

Patrick Wruck
Commission Secretary

/jo
Enclosure

bcuc
British Columbia
Utilities Commission

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
bcuc.com

P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102

British Columbia Hydro and Power Authority
Transmission Service Market Reference-Priced Rates Application

INFORMATION REQUEST NO. 1 TO BC HYDRO

Table of Contents **Page no.**

A. GENERAL

1.0 Reference: INTRODUCTION
Exhibit B-1, Application, Sections 1.1.3 and 1.1.4, pp. 7 and 10; Appendices B and C
Eligibility

On page 7 of the British Columbia Hydro and Power Authority (BC Hydro) Transmission Service Market Reference-Priced Rates Application (Application), BC Hydro states:

> The Incremental Energy Rate Pilot is similar in concept and design to the Freshet Rate, but would be offered on a year-round basis. BC Hydro expects that some customers will prefer the seasonal Freshet Rate, while others will prefer the annual Incremental Energy Rate [IER] Pilot. Having both rates available will provide transmission service customers with choice during the proposed pilot period. It will also permit direct observation of customer preferences and specific actions taken to increase load.

On page 10 of the Application, BC Hydro states:

> On September 30, 2019, the BCUC issued Order No. G-236-19 which approved BC Hydro's application to expand the availability of RS 1880 (Standby and Maintenance Supply) to customers taking service under RS 1828 (Biomass Energy Program). In this application, BC Hydro is seeking similar approval for the Freshet Rate (RS 1892) and Incremental Energy Rate Pilot (RS 1893) to be available to customers taking service under RS 1828, in addition to those taking service under RS 1823. The terms and conditions for RS 1823 and RS 1828 are similar and, in BC Hydro's view, customers taking service under RS 1828 should have equal access to the same non-firm service options as customers taking service under RS 1823.

In the proposed tariff pages as outlined in Appendices B and C, BC Hydro indicates that a Customer may only take service under one of Rate Schedule (RS) 1892 or 1893 in any Billing Year. Specific to RS 1892 in Appendix B, the clause "with the exception of the period ending March 31, 2021" was added.

1.1 Please explain whether it is possible for a RS 1823 or RS 1828 Customer to have multiple sites. If so, please clarify how will BC Hydro bill a Customer with multiple sites when the Tariff provides

that the Customer may only take service under one of the two rate schedules (i.e. Freshet Rate RS 1892 or IER Pilot RS 1893).

1.2 Please clarify what BC Hydro means by "with the exception of the period ending March 31, 2021" with respect to the proposed Freshet Rate RS 1892.

1.3 Please explain why the proposed Freshet Rate and IER Pilot are only offered to transmission service rate customers under RS 1823 and 1828. Has BC Hydro considered making the same offerings available to other transmission service rate customer rate schedules (e.g. RS 1825, 1827, 1852, etc.)? Why or why not?

2.0 Reference: AMENDED FRESHET RS 1892 AND INCREMENTAL ENERGY RATE PILOT RS 1893
Exhibit B-1, Appendices B and C
Rate Schedule Comparison

On page 1 of Appendix B to the Application, BC Hydro states:

> The charge applied to energy supplied under this Rate Schedule 1892 during each HLH [High Load Hours] and LLH [Low Load Hours] of the current Freshet Period is equal to:
>
> 1. The greater of
>
> (a) The Intercontinental Exchange (**ICE**) Mid-Columbia (**Mid-C**) Peak or Mid-C Off-Peak weighted average index price, as published by the ICE in the ICE Day Ahead Power Price Report, applicable to the hour; and
>
> (b) $0/kWh; plus
>
> 2. An $3.00/MWh adder.

On page 1 of Appendix C to the Application, BC Hydro states:

> The charge applied to energy supplied under this Rate Schedule 1893 during each HLH and LLH in the Billing Period is equal to:
>
> 1. The greater of
>
> (a) The Intercontinental Exchange (**ICE**) Mid-Columbia (**Mid-C**) Peak or Mid-C Off-Peak weighted average index price, as published by the ICE in the ICE Day Ahead Power Price Report, applicable to the hour on each day of the Billing Period; and
>
> (b) $0/kWh; plus
>
> 2. An adder of $3.00/MWh for the May, June and July Billing Periods and $7.00/MWh for all other Billing Periods.

2.1 Please confirm, or explain otherwise, that the proposed rates charged under each of RS 1892 and RS 1893 are the same during the May, June and July Billing Periods.

2.1.1 If confirmed, please explain why. Does BC Hydro expect that a customer would choose RS 1893 over RS 1982 because the rates under RS 1893 are the same as RS 1892 during freshet months and in addition RS 1893 provides the option of accessing market energy during non-freshet months?

2.1.2 To the extent that there is a competitive rate signal between RS 1892 and RS 1893, please discuss the implications to BC Hydro's forecast revenues in these rate schedules.

2.2 Please explain under what circumstance an eligible transmission service customer would choose RS 1892 over RS 1893.

3.0 Reference: IMPLEMENTATION COSTS
Exhibit B-1, Appendix D, p. 35
Pilot Program Costs by Year and Type

In Table 10 on page 35 of Appendix D to the Application, BC Hydro provides a breakdown of implementation costs associated with the Freshet Rate Pilot, from years 1 through 3.

Table 10 Pilot Implementation Costs by Year

Implementation Cost Description	Year 1	Year 2	Year 3	Totals
Freshet rate design / regulatory proceedings	$ 40,000	$ -	$ -	$ 40,000
Customer and stakeholder engagement	$ 30,000	$ 15,000	$20,000	$ 65,000
Billing	$ 20,000	$ 10,000	$30,000	$ 60,000
Evaluation report preparation	$ 25,000	$ 5,000	$10,000	$ 40,000
Total	**$ 115,000**	**$ 30,000**	**$60,000**	**$ 205,000**

3.1 Please include the pilot implementation costs for Year 4 of the Freshet Rate Pilot.

3.2 Please provide an annual breakdown of implementation costs for the IER Pilot, similar in form to Table 10 as provided in the preamble.

4.0 Reference: AMENDED FRESHET RS 1892 AND INCREMENTAL ENERGY RATE PILOT RS 1893
Exhibit B-1, Appendices B and C
Baseline Disputes

In the proposed Tariff pages under Special Conditions of the Freshet Rate and IER Pilot, there are provisions for which the British Columbia Utilities Commission (BCUC) will determine the baselines and reference demands if BC Hydro and the Customer depart from the Tariff or if the two parties cannot reach an agreement.

4.1 Please explain what process BC Hydro anticipates for the BCUC to review and determine the appropriate baseline or reference demand.

4.2 Please identify whether there have been cases where BC Hydro and the Customer cannot reach an agreement on the baseline or reference demand during the Freshet Rate Pilot. Describe the resolution process between BC Hydro and the Customer.

4.3 Please specify whether BC Hydro has sought BCUC review and approval of any baselines or reference demands related to the Freshet Rate Pilot.

B. FRESHET RATE PROPOSAL

5.0 Reference: INTRODUCTION
Exhibit B-1, Section 1.1.2, p. 4
Freshet Rate Timeline

The Freshet Rate pilot is an optional rate for non-firm, interruptible electricity service above normal RS 1823 baseline amounts during a historical freshet period commencing May 1 and ending July 31. The Freshet Rate terminated on December 31, 2019.

BC Hydro is applying for approval of an amended Freshet Rate – Rate Schedule 1892 (RS 1892) effective April 1, 2020 on an ongoing basis. BC Hydro proposes a decision on the Freshet Energy Rate by February

28, 2020. The BCUC established a regulatory timetable by Order G-327-19.

5.1 Please discuss BC Hydro's plan to enroll customers for the 2020 Freshet period commencing on May 1, 2020 in light of the established regulatory timetable.

6.0 Reference: BC HYDRO'S FRESHET RATE PROPOSAL
Exhibit B-1, Section 4.1.1, p. 46
Impact of Variability of Water Flows

On page 46 of the Application, BC Hydro states "BC Hydro notes that there can be significant variability in system water inflows, in the range of +/- 7,000 GWh/yr. During high inflow years the freshet period energy surplus will be higher and during low inflow years, the freshet period energy surplus will be lower."

6.1 Please list the hydro plants and reservoirs contributing to the energy used to serve the Freshet Rate Pilot.

6.2 Please provide water inflow levels (e.g. GWh/yr and in meters), for the past 5-years, for each of the reservoirs contributing to the Freshet Rate Pilot.

6.3 Please explain whether BC Hydro assesses an optimal water inflow level required to serve RS 1892 incremental load. If so, how does BC Hydro arrive at the estimate and what were they for each year of the Freshet Rate Pilot? If not, please explain the limitation of conducting such assessment.

6.3.1 If applicable, please show how the historical water inflow levels compare to the optimal water inflow levels required to serve the RS 1892 incremental load.

6.3.2 If applicable, please discuss any water inflow trends, identified in the past 5 years, that may have negatively impacted the Freshet Rate Pilot.

7.0 Reference: BC HYDRO'S FRESHET RATE PROPOSAL
Exhibit B-1, Section 5.5.1, pp. 72–73; Appendix D, Freshet Rate Pilot Final Evaluation Report – December 2018
Economic Justification and Ratepayer Impacts

On pages 72–73 of the Application, BC Hydro states:

> BC Hydro uses energy study models designed to optimize BC Hydro's system operations through representation of the components of BC Hydro's load, transmission network, generating system, EPAs and external markets. The models incorporate market prices, inflows and weather conditions for each day of each forecast year for a set of historical weather scenarios. On a forecast basis, BC Hydro uses these models to determine an optimal set of reservoir and generating station operations and market transactions, based on current forecast information.

In BC Hydro's consultations, climate change was identified as a potential factor impacting the Freshet Rate Pilot. In the December 2018 consultation report, regarding the question as to whether the Freshet Rate Pilot should be made permanent, the following comment was noted, "Define permanent. With climate change we may not have a benefit of over storage or markets could react negatively (re: price)."

7.1 Please provide BC Hydro's revenue forecast and ratepayer impact of the Freshet Rate over the next 3 years, similar to that provided for the IER pilot.

7.2 Please provide analysis showing how forecast revenues and ratepayer impact of the Freshet Rate are expected to vary with a change in freshet period inflows. Provide high, low, and

average inflow scenarios to show a sensitivity analysis.

7.3 Please provide a forecast of expected reservoir inflows over the next 3 years. State all input data used and assumptions.

7.3.1 Please discuss how BC Hydro determines a "set of historical weather scenarios" used to prepare BC Hydro's forecasts. What input data (i.e. actual precipitation data) were used in the scenarios?

7.4 Please confirm if BC Hydro has prepared a forecast of reservoir inflows for the 2020 freshet period based on forecast 2020 weather data and actual precipitation to-date.

7.4.1 If confirmed, please explain how the forecast inflows from 2019–20 weather data compare to the expected inflows from BC Hydro's set of historical weather scenarios.

7.5 Please explain whether BC Hydro has considered climate change (e.g. change in temperature, precipitation levels, rate of snow melt, etc.) when forecasting water inflows and to determine the optimal set of reservoir levels. If so, please specify how these factors are included in BC Hydro's forecasts. If not, please explain why such factors are not considered.

8.0 Reference: BC HYDRO'S FRESHET RATE PROPOSAL
Exhibit B-1, Section 4.1, p. 45, Appendix E, pp. 13–19
Evaluation Report for Year Four

On page 45 of the Application, BC Hydro states:

> BC Hydro has identified that Year 4 of the Freshet Rate pilot represented a substantial change in conditions compared to Years 1 to 3. As described in the 2019 Evaluation Report for Year 4 contained in **Appendix E**, conditions during the May to July 2019 freshet period were characterized by a electricity supply issue as a result of the Enbridge gas pipeline issue and low reservoir inflows. This reduced the freshet energy surplus and contributed to higher system marginal prices and higher market energy imports. These conditions resulted in a revenue loss of $0.5 million for 2019. This compares to revenue gains of $2.3 million in 2016, $2.2 million in 2017 and $1.9 million in 2018.
>
> … Although there is a risk of loss to ratepayers in any given year if adverse conditions arise, the rate design is expected to provide net benefits to ratepayers over a multiyear time period.

On page 19 of Appendix E, BC Hydro states:

> Across the winter of 2018/2019, low winter inflows into the BC Hydro system in combination with the Enbridge Gas Pipeline explosion (that impacted thermal generation) resulted in strong downward pressure on system storage. Williston and Kinbasket Reservoirs both approached record minimum storage levels.

Further on page 16 of Appendix E of the Application, BC Hydro provides the following table:

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**

8.1 Please clarify what is meant by "revenue gain" and "revenue loss". How will revenue gains and losses affect ratepayers enrolled in the Freshet Rate and all other BC Hydro ratepayers? In other words, who will benefit from revenue gains and who will bear revenue losses resulting from the Freshet Rate?

8.2 Please provide a detailed explanation on the revenue loss to BC Hydro in Year 4 of the Freshet Rate Pilot. In your response, please include all calculations to support the $543,000 revenue loss.

8.3 Please explain the direct effect of the Enbridge pipeline rupture on BC Hydro's electricity supply and how this contributed to a negative net revenue in Year 4.

8.4 Please discuss what impact, resulting from the incremental demand of the Freshet Rate during 2018 and prior freshet periods have had on Williston and Kinbasket reservoir levels in October 2018.

8.5 Please explain in detail under what conditions would yield revenue losses to BC Hydro in the three factors (i.e. forced export, market import, system basin) identified in Table 5.

8.5.1 What mitigation factors, if any, have BC Hydro considered to address any identified conditions.

8.5.2 Are there any other factors that may contribute to the ratepayer impacts associated with the Freshet Rate?

9.0 Reference: BC HYDRO'S FRESHET RATE PROPOSAL
Exhibit B-1, Section 1.1.1, p. 2, Section 4.1, p. 45; Appendix D; Appendix E, p. 14
Order G-17-16, Reasons for Decision dated February 9, 2016
Curtailment Criteria

On page 45 of the Application, BC Hydro states:

> The Freshet Rate is non-firm and interruptible. BC Hydro will provide energy and

capacity under this rate schedule only to the extent it is available.

In the Reasons for Decision for the BC Hydro Transmission Service Freshet Rate Pilot dated February 9, 2016, on page 13, one of the evaluation criteria noted was as follows:

> Did BC Hydro curtail any customers under the non-firm provisions of the rate? If so, what led to the curtailments? If not, were there any financial impacts on BC Hydro from not curtailing customers during constrained periods?

In Appendix D of the Application, the Freshet Rate Pilot Final Evaluation Report – December 2018, BC Hydro states:

> BC Hydro did not curtail RS 1892 service to any customer during the 2018 Freshet Period. Sufficient energy and capacity were available at all times to serve the incremental load. <u>There were no negative financial impacts to BC Hydro from not curtailing customers.</u> [Emphasis added]

The underlined statement was also noted in the Year 1 and Year 2. However, in Year 4, on page 14 of Appendix E, BC Hydro states:

> BC Hydro did not curtail RS 1892 service during the 2019 Freshet Period. Sufficient energy and capacity were available at all times to serve incremental load.

On page 2 of the Application, with respect to the proposed Freshet Rate and Incremental Energy Rate Pilot, BC Hydro also states:

> Minimize risk to all ratepayers by not requiring BC Hydro to undertake system reinforcements and not requiring BC Hydro to provide service if the electrical system is constrained for technical reasons such as forced or planned outages of its transmission or generation system. <u>For greater certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons</u>. [Emphasis added]

9.1 Please clarify what is meant by "BC Hydro will provide energy and capacity… only to the extent it is available." What is meant by available (i.e. operationally, economically, or other)?

9.2 Please explain whether the revenue loss in Year 4 of the Freshet Rate Pilot could have been avoided due to curtailment or otherwise.

9.3 From Year 1 through Year 3, it appears that BC Hydro had two interruption considerations: (i) sufficient energy and capacity available and (ii) no negative financial impact to BC Hydro from not curtailing customers. However, BC Hydro appears to have omitted (ii) financial impact in Year 4. Please explain the changes to BC Hydro's interruption consideration from Year 1 to Year 4.

9.4 Please clarify why "BC Hydro does not propose to interrupt these non-firm services for economic reasons." Please clarify whose economic considerations the statement refers to. Please discuss the benefits and risks to RS 1892 ratepayers, BC Hydro, and all other ratepayers if curtailment is not considered due to "economic reasons".

9.5 If conditions during the May to July 2019 freshet period were characterized by an electricity supply issue as a result of the Enbridge gas pipeline interruption and low reservoir inflows, please explain why BC Hydro did not curtail the supply of electricity under the Freshet Rate Pilot.

9.6 In practice, please explain the conditions and priority levels for BC Hydro to curtail RS 1892 Freshet Rate customers.

9.6.1 Please specify these curtailment provisions in the proposed tariff.

9.7 Please confirm, or otherwise explain, that during the 2019 Freshet Rate Pilot period, due to a reduction in the availability of the freshet energy surplus, market energy imports were purchased in place of freshet energy to meet load demands under RS 1892.

9.7.1 If confirmed, please quantify the amount of market energy purchased and the associated costs during this time period in order to meet load demands under RS 1892.

9.7.2 Please explain why BC Hydro incurred market import losses during the Freshet Rate Pilot when RS 1892 rates are based on the Mid-C market price plus an energy charge adder. Were the rates under RS 1892 insufficient to cover BC Hydro's costs to import market energy from Mid-C to serve incremental load during the Freshet Rate Pilot?

10.0 Reference: INTRODUCTION
Exhibit B-1, Section 4.1.1, p. 47; *BC Clean Energy Act* Part 1, Section 2
Market Energy Imports and Exports

On page 47 of the Application, BC Hydro states:

> In a low inflow year, there is an increased risk that market energy imports might be used to serve incremental energy under the Freshet Rate in any given hour. This is described as "Condition 2: Minimum Generation with Imports" in the Final Evaluation Report and 2019 evaluation report for Year 4.

The *BC Clean Energy Act* Part 1, Section 2, states BC's energy objectives, including the following:

> (c)to generate at least 93% of the electricity in British Columbia from clean or renewable resources and to build the infrastructure necessary to transmit that electricity; …
>
> (n)to be a net exporter of electricity from clean or renewable resources with the intention of benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity while protecting the interests of persons who receive or may receive service in British Columbia;

10.1 Please discuss how the Freshet Rate affected BC Hydro's ability to be a net exporter of electricity in each year of the pilot.

10.2 Please discuss how BC Hydro's Freshet Rate affected gross and net energy imports in each year of the pilot.

10.3 Please discuss how BC Hydro's Freshet Rate affected the total percentage of electricity consumed in British Columbia coming from clean or renewable sources.

10.4 If the proposed Freshet Rate is approved as permanent and considering that BC Hydro will use market energy imports to serve load, please discuss how BC Hydro ensures that BC's Energy Objectives (c) and (n) will be met in the future.

10.5 Please explain how the carbon intensity of BC Hydro's electricity imports is accounted for in BC's provincial emissions inventory[1].

[1] https://www2.gov.bc.ca/gov/content/environment/climate-change/data/provincial-inventory

11.0 Reference: MARGINAL COST
Exhibit B-1, pp. 2, 45
System Marginal Value

In footnote 2 on page 2 of the Application, BC Hydro states:

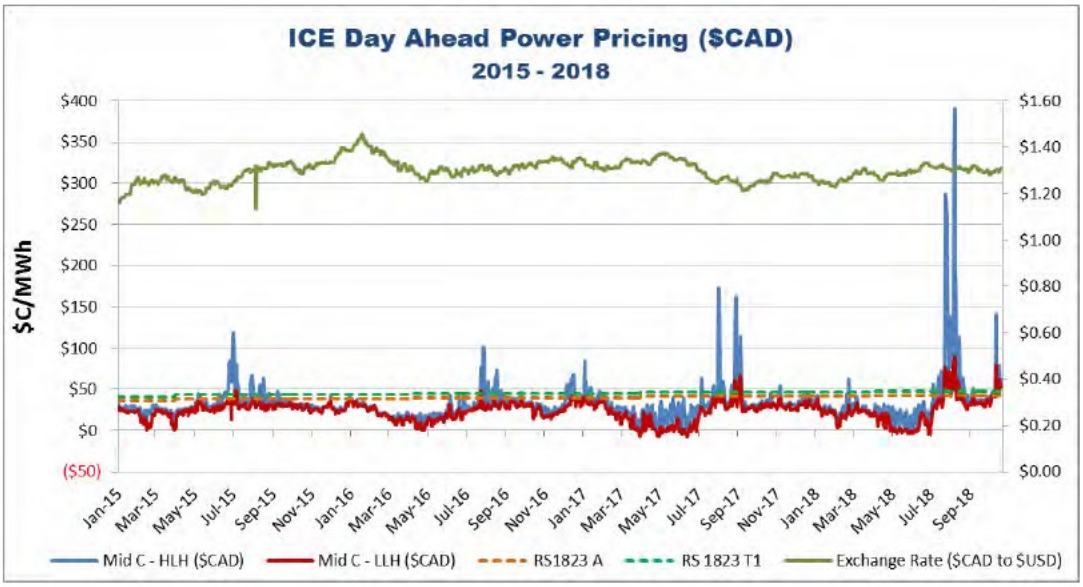
> BC Hydro uses "system marginal value" as its marginal cost of energy for incremental sales. The system marginal value represents the estimated marginal value of energy in the system, which is typically the expected value of generation from one of BC Hydro's large storage reservoirs.

On page 45 of the Application, BC Hydro states "Freshet Rate energy pricing is based on the Mid-C market price, which is expected to be generally reflective of BC Hydro's marginal cost of energy."

11.1 Please reconcile the statement "BC Hydro uses 'system marginal value' as its marginal cost of energy for incremental sales" with the statement "Freshet Rate energy pricing is based on the Mid-C market price, which is expected to be generally reflective of BC Hydro's marginal cost of energy." Is BC Hydro's marginal cost of energy equal to the Mid-C market price, or the system marginal value?

12.0 Reference: MARGINAL COST
Exhibit B-1, Appendix D, pp. 32, 53
Market Indices

In Figure 12 of Appendix D, BC Hydro provides a historical comparison of the Mid-C Market High Load Hours (HLH) and Low Load Hours (LLH) Prices against the RS 1823 Tier 1 and Part A energy charges.



On page 32 of Appendix D, BC Hydro provides a chart showing its Northwest Power Pool import/export activity during each of the Freshet Rate Pilot. BC Hydro states:

> In general, BC Hydro is on net exports for a significant portion of the freshet months (May through July) to manage higher volumes of surplus energy and to enable exports to US and Alberta markets on days when market prices are high.

12.1 Please update the Figure 12 to incorporate actual prices up to December 31, 2019.

12.2 Please create two graphs similar to Figure 12 from the preamble that compares the following data sets up to and including December 31, 2019:

- Graph 1: Mid-C Market HLH, RS1823 A, RS 1823 T1, Alberta Pool HLH Index
- Graph 2: Mid-C Market LLH, RS1823 A, RS 1823 T1, Alberta Pool LLH Index

12.3 Please discuss whether BC Hydro has considered using the Alberta Pool Price[2] as a reference price for the Freshet Rate in place of (or in combination with) the Mid-C market price. Please explain why this would or would not be appropriate? Please assess and compare the pros and cons of using the Alberta Pool Price vs. Mid-C market price, or some combination of the two.

13.0 Reference: BENEFITS TO NON-PARTICIPANTS
Exhibit B-1, Appendix D, pp. 23–25, 46
Scenario Analysis

On page 46 of Appendix D to the Application, BC Hydro states:

> Footnote 29 – System Minimum Generation – if the system is operating exclusively on must-take energy, then it is considered to be operating at minimum generation.
>
> Footnote 30 – System Minimum Energy – is the sum of must-take and freshet shapeable energy. At times where system minimum energy is higher than system load, there is a system surplus for that time period. When this happens, BC Hydro is forced to either sell the surplus energy or spill.

13.1 Please define and explain the term "freshet shapeable energy."

13.2 Please confirm, or otherwise explain, that the only difference between system minimum generation and system minimum energy is freshet shapeable energy.

Table 8 on page 25 of Appendix D to the Application shows BC Hydro's calculation of ratepayer benefit (cost) based on three different system conditions, as reflected below:

Table 8 Monthly Ratepayer Benefit by System Condition

	Condition 1	Condition 2	Condition 3	
	$,000	$,000	$,000	$,000
Year 1 (2016)	**Export**	**Import**	**System Basin**	**Ratepayer benefit**
May	$ 61	$ (6)	$ 481	$ 536
June	$ -	$ -	$ 806	$ 806
July	$ -	$ -	$ 917	$ 917
	$ 61	**$ (6)**	**$ 2,204**	**$ 2,259**
Year 2 (2017)	**Export**	**Import**	**System Basin**	**Ratepayer benefit**
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)	**Export**	**Import**	**System Basin**	**Ratepayer benefit**
May	$ 205	$ (78)	$ -	$ 127
June	$ 170	$ (77)	$ 50	$ 143
July	$ 65	$ (4)	$ 1,541	$ 1,602
	$ 440	**$ (159)**	**$ 1,591**	**$ 1,872**
			Total	**$ 6,325**

[2] https://www.aeso.ca/market/market-and-system-reporting/

On page 23 of Appendix D, BC Hydro states:

> **Condition 1: Minimum Generation with Exports**
> When BC Hydro is experiencing a minimum generation constraint, and there are net exports, incremental domestic sales under RS 1892 will reduce exports. Holding market price constant, BC Hydro will see a revenue increase equal to the difference between the CAD $3/MWh wheeling rate and 5 per cent rate rider collected under RS 1892 and the avoided US $5.16/MWh wheeling charge paid for energy delivery from the BC border to the Mid-C market (converted to Canadian dollars daily) plus 1.9 per cent transmission losses.

13.3 In a functional spreadsheet format, please provide an example calculation of "Condition 1: Minimum Generation with Exports" that illustrates the revenue increase associated with a reduction in net exports to serve incremental domestic sales under RS 1892 for each of the following scenarios:

i. BC Hydro is experiencing a minimum generation constraint, and the market price (i.e. Mid-C market price) is positive;

ii. BC Hydro is experiencing a minimum generation constraint, and the market price (i.e. Mid-C market price) is negative;

iii. BC Hydro is not experiencing a minimum generation constraint, and the Mid-C market price is positive; and

iv. BC Hydro is not experiencing a minimum generation constraint, and the Mid-C market price is negative.

On page 23 of Appendix D, BC Hydro states:

> **Condition 2: Minimum Generation with Imports**
> When BC Hydro is experiencing a minimum generation constraint, with economic market imports, incremental domestic sales under RS 1892 will increase market imports. Holding market price constant, BC Hydro will see a revenue decrease equal to the difference between the CAD $3/MWh wheeling rate and 5 per cent rate rider collected under RS 1892 and the US $5.16/MWh wheeling charge paid for energy delivery from the Mid-C market to the BC border (converted to Canadian dollars daily) plus 1.9 per cent transmission losses. On days where the market price is negative, the daily revenue loss is reduced by the difference between the actual market price and $0/MWh floor price under RS 1892.

13.4 Please explain what is meant by the term "economic market imports".

13.5 Please explain why load served under RS 1892 would not be curtailed, if all scenarios show that the ratepayer benefit is negative (i.e. costs to ratepayers increase), as reflected in Table 8 of the preamble.

13.6 In a functional spreadsheet format, please provide an example calculation of "Condition 2" Minimum Generation with Imports" that illustrates the revenue decrease associated with increasing economic market imports to serve incremental domestic sales under RS 1892 for each of the following scenarios:

i. BC Hydro is experiencing a minimum generation constraint, and the market price (i.e. Mid-C market price) is positive;

ii. BC Hydro is experiencing a minimum generation constraint, and the market price (i.e. Mid-C market price) is negative;

iii. BC Hydro is not experiencing a minimum generation constraint, and the market Mid-C price is positive; and

iv. BC Hydro is not experiencing a minimum generation constraint, and the market Mid-C price is negative.

13.6.1 For each scenario, please calculate the alternative where load served under RS 1892 is curtailed and compare the results.

13.7 Please explain whether Network Integrated Transmission Service (NITS) is used to serve load under the Freshet Rate.

13.7.1 If yes, please explain why customers under the Freshet Rate appear to not be paying for this NITS cost (or any other third party wheeling costs) on the electricity consumed under the Freshet Rate.

13.7.2 If no, please confirm, or otherwise explain, that there are no other transaction costs in addition to the "the US $5.16/MWh wheeling charge paid for energy delivery from the Mid-C market to the BC border (converted to Canadian dollars daily) plus 1.9 per cent transmission losses".

On page 24 of Appendix D, BC Hydro states:

> **Condition 3: Higher Basin Generation on the Margin**
> Holding import/export volumes constant, the loading of BC Hydro's large basin generation will be increased to serve additional RS 1892 load. BC Hydro considers that the cost consequence (i.e., revenue gain or loss) of this circumstance can be estimated by comparing the actual revenue gained from RS 1892 energy sales with the deemed marginal value of the water/energy removed to serve the additional load rather than being held in storage. The value of the incremental generation from the large basin that is operated to serve the load can be expressed as a daily System Marginal Value. For any day where basin energy was used to serve RS 1892 loads, the difference between the value of actual RS 1892 energy sales and BC Hydro's System Marginal Value is used to determine the revenue gain or loss on that day. This condition typically results in a revenue gain for BC Hydro. Similar to Condition 1, where there might otherwise be an export of surplus energy into low-priced markets, a revenue gain arises from the avoidance of wheeling fee and losses to shape and deliver the energy to market in some future period.

13.8 Please discuss the circumstances under which BC Hydro could hold system energy in storage to supply any customer in a future period rather than to serve RS 1892 load during the current freshet period.

13.9 Please discuss the circumstances under which BC Hydro could hold system energy in storage for export in a future period, rather than serve load under RS 1892 during the current freshet period.

13.9.1 In a functional spreadsheet format, please provide an example calculation that illustrates the forgone net revenue gain or loss of future system exports compared to the net revenue gain or loss from serving load under RS 1892. In your response, please explain how this comparison is measured.

14.0 Reference: BC HYDRO'S FRESHET RATE PROPOSAL
Exhibit B-1, Section 3.1.7, pp. 36–38
Load Shifting Impacts Monitoring

On page 36 of Appendix D of the Application, BC Hydro states, "BC Hydro sought to identify and verify the energy consumption impact of any load shifting events by participant customers in Year 1 (2016) and Year 2 (2017)."

Further on page 38 of Appendix D, BC Hydro states:

- Identify customers that purchased less RS 1823 energy compared to F2016. The intent of this comparison is to identify any potential relationship between a reduction in RS 1823 energy sales and a corresponding increase in RS 1892 energy sales, such that there was no net annual load increase; and

- Identify customers that purchased more RS 1823 energy compared to F2016. The intent of this comparison is to assess whether there was any relationship between an increase in both RS 1823 energy sales and RS 1892 energy sales, such that the load increase (e.g., natural load growth) might reasonably be expected to have occurred anyway.

14.1 Please confirm, or otherwise explain, that BC Hydro will continue to monitor load shifting impacts if the proposed Freshet Rate is made permanent.

14.1.1 If confirmed, will BC Hydro continue to use F2016 annual energy sales under 1823 to calculate the financial impact for new participants of the Freshet Rate? Please explain BC Hydro's rationale for the comparator year used and whether BC Hydro has considered using more current comparator year(s).

15.0 Reference: BC HYDRO'S FRESHET RATE PROPOSAL
Exhibit B-1, Section 3.2, pp. 19–23; Appendix F
Engagement with Customers and Stakeholders

BC Hydro states that it conducted broad province-wide engagement with RS 1823 customers, the Association of Major Power and Customers (AMPC) and stakeholders on market reference-priced rates. On pages 22–23 of the Application, BC Hydro provides statistics on the number of attendees at the October 2018, November 2018, and September 2019 workshops. Based on the feedback from these workshops, BC Hydro considers that responses from the participants "demonstrate strong support for the Freshet Rate to be made availability on an ongoing basis."

In Appendix F of the Application, BC Hydro included letters of support from AMPC, Copper Mountain Mine (BC) Ltd., ERCO Worldwide, and the Ministry of Energy, Mines and Petroleum Resources.

15.1 To the extent possible, please provide a further breakdown showing the representation of attendees in the following categories: (i) RS 1823 or RS 1828 customers already enrolled in the Freshet Rate Pilot, (ii) RS 1823 or RS 1828 customers not enrolled in the Freshet Rate Pilot, and (iii) non-RS 1823 or 1828 customers.

15.2 The Transmission Service Freshet Rate Pilot – Evaluation Report for Year 4 is dated October 31, 2019. Did BC Hydro communicate Year 4 results to customers and stakeholders, particularly in the September 2019 Workshop, that the pilot experienced a revenue loss of approximately $0.5 million in Year 4?

15.2.1 With respect to the letters of support, did BC Hydro communicate to these customers and stakeholders the Year 4 results prior to the parties submitting their letters?

15.2.2 Has BC Hydro communicated to any other customers or stakeholders of its Year 4 results prior to filing the Application? Please specify.

C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

16.0 Reference: INTRODUCTION
Exhibit B-1, pp. 58–59
Rationale for the IER Pilot

On page 59, with respect to the IER Pilot, BC Hydro states, "BC Hydro assessed ratepayer impacts under a range of scenarios and expects them to be positive over the pilot period..."

Footnote 36 of page 59 states "The economic analysis considers 46 unique years of historical weather sequences, water inflows and market prices."

16.1 Please confirm, or otherwise explain, how many scenarios were run that assessed ratepayer impacts of the IER Pilot. Identify how many of these scenarios reflected a positive ratepayer impact.

16.2 Please confirm, or otherwise explain, that the statement that "ratepayer impacts under a range of scenarios…" are expected "…to be positive over the pilot period" implies that the IER Pilot is expected to have a favourable rate impact to <u>all</u> ratepayers over the pilot period.

17.0 Reference: INCREMENTAL ENERGY RATE PILOT PROPOSAL
Exhibit B-1, Section 5.5.1, pp. 72–73
Economic Justification and Ratepayer Impacts

On pages 72 to 73 of the Application, BC Hydro states:

> BC Hydro uses energy study models designed to optimize BC Hydro's system operations through representation of the components of BC Hydro's load, transmission network, generating system, EPAs and external markets. The models incorporate market prices, inflows and weather conditions for each day of each forecast year for a set of historical weather scenarios. On a forecast basis, BC Hydro uses these models to determine an optimal set of reservoir and generating station operations and market transactions, based on current forecast information.

17.1 Please provide analysis showing how revenues and ratepayer impact of the IER program are expected to vary with a change in reservoir inflows.

17.2 Please confirm whether BC Hydro uses trends in historical data to forecast future reservoir inflows, as opposed to strictly using historical average data.

17.2.1 If confirmed, please explain how these forecasts differ from BC Hydro's revenue forecasting based on historical weather scenarios.

17.2.2 If not, please explain why not.

17.3 Please explain how the revenue gains and losses will affect ratepayers enrolled in the IER pilot and all other BC Hydro ratepayers? In other words, who will benefit from financial gains and who will bear losses associated with the IER Pilot?

18.0 Reference: INTRODUCTION
Exhibit B-1, Section 1.1.3, p. 7; Section 5.5.1, pp. 72–73
Hydrology and Operations

On page 7 of the Application, BC Hydro states "The Incremental Energy Rate Pilot is similar in concept and design to the Freshet Rate, but would be offered on a year-round basis."

On pages 72–73 of the Application, BC Hydro states:

> BC Hydro uses energy study models designed to optimize BC Hydro's system operations through representation of the components of BC Hydro's load, transmission network, generating system, EPAs and external markets. The models incorporate market prices, inflows and weather conditions for each day of each forecast year for a set of historical weather scenarios. On a forecast basis, BC Hydro uses these models to determine an optimal set of reservoir and generating station operations and market transactions, based on current forecast information.

18.1 Please list the hydro plants and reservoirs that contributing to the energy used to serve the year-round IER pilot.

18.1.1 For the reservoirs contributing to the IER Pilot, please show how the average water inflow levels (e.g. in GWh/yr and meters) compare to the optimal set of reservoir levels required to run the year-round IER Pilot.

18.2 How will this year-round IER pilot impact BC Hydro's short term and medium term resource planning (including operating and maintenance implications on BC Hydro's generating plants and reservoirs, management of dam water levels, implications of downstream distribution facilities to serve additional load, any capacity constraints on any part of BC Hydro's system).

18.2.1 What curtailment strategies, if any, has BC Hydro considered in the event of an unscheduled plant outage.

19.0 Reference: INCREMENTAL ENERGY RATE PILOT RS 1893
Exhibit B-1, Section 1.1.1, p. 2, Appendix C, p. 5
Interruption Criteria

On page 5 of Appendix C to the Application, BC Hydro states "BC Hydro agrees to provide Electricity under this Rate Schedule to the extent that it has the energy and capacity to do so."

On page 2 of the Application, with respect to the proposed Freshet Rate and Incremental Energy Rate Pilot, BC Hydro also states:

> Minimize risk to all ratepayers by not requiring BC Hydro to undertake system reinforcements and not requiring BC Hydro to provide service if the electrical system is constrained for technical reasons such as forced or planned outages of its transmission or generation system. <u>For greater certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons</u>. [Emphasis added]

19.1 Please clarify what is meant by the statement that BC Hydro agrees to provide electricity "… to the extent that it has the energy and capacity to do so." As part of your response, please identify what factors are taken into consideration (i.e. operationally, financially, or other)?

19.1.1 Please confirm, or otherwise explain, that imports may be required to serve customers under the IER Pilot whenever sufficient energy or capacity exists.

19.2 Please clarify why "BC Hydro does not propose to interrupt these non-firm services for economic reasons." Please clarify whose "economic reasons" is referred to in the above underlined portion of the preamble. Please discuss the benefits and risks to RS 1893 ratepayers, BC Hydro, and all other ratepayers if curtailment is not considered due to "economic reasons".

19.3 Please discuss whether the process BC Hydro would use to apply curtailments to customers under the IER Pilot would be the same process BC Hydro uses to apply curtailments to customers under different non-firm and interruptible rate schedules, including RS 1892. If there

are any differences in treatment, please specify and explain.

20.0 Reference: SYSTEM MARGINAL VALUE
Exhibit B-1, pp. 73–74
Scenario Analysis

On pages 73 to 74 of the Application, BC Hydro states:

> BC Hydro used its forecast of system marginal value from the energy study models in estimating the ratepayer impact of serving incremental customer load under the proposed Incremental Energy Rate Pilot for the pilot period. This methodology and approach is consistent with the ratepayer impact analysis described in the Final Evaluation Report and the 2019 evaluation report for Year 4.
>
> The system marginal value represents the estimated marginal value of energy stored as water in the system, which is typically the expected value of generation from one of BC Hydro's large storage reservoirs.
>
> For the Incremental Energy Rate Pilot:
>
> - Where the forecast RS 1893 revenue is greater than the cost of supply evaluated at the system marginal value, there is a forecast net revenue gain to BC Hydro; and
> - Where the forecast RS 1893 revenue is less than the cost of supply evaluated at the system marginal value, there is a forecast net revenue loss to BC Hydro.

20.1 Please provide an example calculation in Excel format that illustrates a forecast net revenue gain to BC Hydro when forecast RS 1893 revenue is greater than the cost of supply.

20.2 Please provide an example calculation in Excel format that illustrates a forecast net revenue loss to BC Hydro when forecast RS 1893 revenue is less than the cost of supply.

20.3 Please explain why the system marginal value is used to represent the cost of supply.

20.3.1 Please discuss whether system marginal value, or some other value, would be the appropriate marginal cost measurement if BC Hydro was required to import electricity to serve load under the IER Pilot.

20.4 Please discuss whether BC Hydro could choose to export energy from the system at a later period rather than serve load under RS 1893 in the current period, if it were deemed to generate higher expected net revenues.

20.5 Please discuss whether imports could be used to serve load for RS 1893 customers.

20.5.1 If yes, please provide an example calculation in Excel format that illustrates a forecast net revenue gain or loss to BC Hydro consequent to using imports to serve load to RS 1893 customers.

20.5.2 If yes, please explain whether NITS is used in cases where market energy is imported to serve load under the IER Pilot.

20.5.2.1 If NITS is used, please explain why the IER Pilot customers appear to not be paying this portion of BC Hydro's NITS (or any other third party wheeling costs), in cases where market energy imports are used to serve this load.

20.6 Please provide a historical monthly chart in Excel format that compares the system marginal values against the daily Mid-C price over the past 10 years. As part of the response, please include a brief description of the relative difference between Mid-C and system marginal value

and explain any notable annual or monthly trends or correlations between the two values.

21.0 Reference: ECONOMIC JUSTIFICATION AND RATEPAYER IMPACTS
Exhibit B-1, pp. 75–76
Energy Charge Adder Modelling Assumptions

On pages 75 to 76 of the Application, BC Hydro states:

> A key sensitivity for estimating the ratepayer impact is the pricing of the energy charge adder. The adder is designed to mitigate the forecast risk of under-recovering marginal costs from participant customers and to incorporate a reasonable margin to address uncertainties and make a contribution to fixed costs. BC Hydro considered various options for the adder that will provide price signals to participant customers that are fair, transparent and easy to understand. For example, by shaping the pricing of the adder in specific months, BC Hydro can send a relative price signal to customers regarding the prospective incremental costs of energy which impact the risk of revenue under-recovery in that month.
>
> BC Hydro's financial modeling is designed to estimate forecast incremental energy volumes and net revenue for the Incremental Energy Rate Pilot. The model incorporates forward-looking data inputs for the three-year period of fiscal 2020 to fiscal 2022. The results are sensitive to BC Hydro's forecast of system marginal values, forecast Mid-C market prices, assumed customer-specific incremental consumption and energy charge adder pricing.
>
> Key model assumptions are as follows:
>
> - $55/MWh all-in customer strike price[3] for incremental non-firm load;
> - Model incorporates 46 years of historical weather sequences with the impact of natural gas price and weather on forward Mid-C market prices;
> - Model calculates the difference between forward Mid-C prices and the expected value of energy in the system to estimate the BC Hydro ratepayer impact; and
> - Results are preliminary, illustrative and subject to change.
>
> Customer-specific assumptions regarding incremental load potential were provided to BC Hydro staff through confidential meetings and discussions. Estimates of incremental load were validated against prior Freshet Rate results and known plant operational capabilities.

21.1 Please clarify and substantiate BC Hydro's statement, "the adder is designed to mitigate the forecast risk of under-recovering marginal costs from participant customers and to incorporate a reasonable margin to address uncertainties and make a contribution to fixed costs." Please provide calculations to illustrate that forecast revenues collected by serving load under RS 1892 are sufficient to recover costs under this rate schedule over the pilot period.

21.2 Please explain whether price elasticity has been considered in the financial modelling used in estimating forecast incremental energy volumes and net revenues for the IER Pilot. Discuss how price elasticity would affect the results.

21.3 Please clarify whether BC Hydro's use of the "strike price" should be interpreted to mean the term used in financial securities (e.g. the exercise price in an option contract).[4]

---

[3] On page 74 of the Application, BC Hydro describes the "strike price" to be the estimated price at which the customer will stop taking incremental load and/or turndown to their baseline.

[4] For example: https://www.cfainstitute.org/-/media/documents/book/rf-publication/2013/rf-v2013-n3-1-sum.ashx (p. 4)

21.4 To what extent is BC Hydro's $55/MWh strike price for incremental non-firm load is based on the trade-off to take firm service under the Tier 2 rate of RS 1823 (and the comparable RS 1828, as applicable).

21.5 Please confirm whether the "expected value of energy in the system" is equivalent to the system marginal price. If not, please explain what "expected value of energy in the system" means.

22.0 Reference: ECONOMIC JUSTIFICATION AND RATEPAYER IMPACTS
Exhibit B-1, pp. 76–80
Assessment of Energy Adder Alternatives

Table 6 on page 76 of the Application is shown below, and summarizes the six energy charge adder alternatives:

Table 6 Summary of Energy Charge Adder Alternatives

ENERGY CHARGE ADDER ALTERNATIVES ($/MWh)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Option 1A - Flat	$8.00	$8.00	$8.00	$8.00	$3.00	$3.00	$3.00	$8.00	$8.00	$8.00	$8.00	$8.00
Option 1B - Shaped	$9.00	$9.00	$9.00	$6.00	$3.00	$3.00	$3.00	$6.00	$6.00	$9.00	$9.00	$9.00
Option 2A - Flat	$7.00	$7.00	$7.00	$7.00	$3.00	$3.00	$3.00	$7.00	$7.00	$7.00	$7.00	$7.00
Option 2B - Shaped	$8.00	$8.00	$8.00	$5.00	$3.00	$3.00	$3.00	$5.00	$5.00	$8.00	$8.00	$8.00
Option 3A - Flat	$6.00	$6.00	$6.00	$6.00	$3.00	$3.00	$3.00	$6.00	$6.00	$6.00	$6.00	$6.00
Option 3B - Shaped	$7.00	$7.00	$7.00	$4.00	$3.00	$3.00	$3.00	$4.00	$4.00	$7.00	$7.00	$7.00

Tables 7, 8 and 9 on page 77 summarize system modeling results for expected energy adder Option 1A, 1B and 2A:

Table 7 Option 1A – Flat $8/MWh Adder in Non-freshet months

RESULTS (all values on a per year basis):		
Expected Incremental Load Net Revenue	1473	kCAD
10th Percentile Net Revenue	-69	kCAD
50th Percentile Net Revenue	1457	kCAD
90th Percentile Net Revenue	3015	kCAD
Expected Incremental Load	264	GWh
10th Percentile Incremental Load	240	GWh
50th Percentile Incremental Load	270	GWh
90th Percentile Incremental Load	280	GWh

Table 8 Option 1B – Shaped Adder in Non-freshet months that averages $8/MWh

RESULTS (all values on a per year basis):		
Expected Incremental Load Net Revenue	1445	kCAD
10th Percentile Net Revenue	-85	kCAD
50th Percentile Net Revenue	1436	kCAD
90th Percentile Net Revenue	2986	kCAD
Expected Incremental Load	263	GWh
10th Percentile Incremental Load	239	GWh
50th Percentile Incremental Load	268	GWh
90th Percentile Incremental Load	280	GWh

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

On page 79 of the Application, BC Hydro also states:

> BC Hydro's proposal in this application is to proceed with Option 2A, which uses a flat energy charge adder of $7/MWh in non-freshet months and a flat $3/MWh energy charge adder of $3/MWh in freshet months. This option reflects AMPC's proposal and is generally consistent with customer feedback requesting simplicity in adder pricing.

22.1 Please explain the rationale for selecting Option 2A over both of Option 1A or 1B, when the alternatives appear to provide higher expected incremental load net revenue.

22.2 Please explain why expected incremental load changes under each of the six energy adder scenarios (e.g. 263 GWh in Option 1B and 266 GWh in Option 2A) when only the energy charge adder is different in each scenario.

23.0 Reference: INTRODUCTION
Exhibit B-1, pp. 79–81
Risk Assessment – Market Imports and Low Inflows

On page 79 of the Application, BC Hydro states:

> BC Hydro's proposal in this application is to proceed with Option 2A, which uses a flat energy charge adder of $7/MWh in non-freshet months and a flat $3/MWh energy charge adder of $3/MWh in freshet months.

On page 80 of the Application, BC Hydro states:

> For any day where market energy imports are deemed to serve incremental RS 1893 load, BC Hydro would see an approximate net revenue loss equal to the difference between the RS 1893 energy charge adder collected and the current US$5.16 /MWh wheeling cost for delivery from the Mid-C market to the B.C. Border plus 1.9 per cent transmission losses deemed to be paid (converted to Canadian dollars daily). On days where the market price is negative, the revenue loss from deemed market imports would be reduced by the difference between the actual market price and the $0/MWh floor price under RS 1893.

23.1 Please provide an Excel file that calculates the break-even price when market energy imports are used to serve RS 1893 load (i.e. net revenue loss equals zero) (i) during freshet months and (ii) during non-freshet months.

23.1.1 Please calculate the break-even exchange rate on days where the prevailing market price is negative.

23.2 Please explain how BC Hydro could mitigate the risk of low inflows in order to minimize net revenue losses associated with market energy imports.

23.3 Please explain how BC Hydro could mitigate exchange rate risks associated with transmission used to transport market energy imports from Mid-C to the BC Border.

On pages 80 to 81, BC Hydro states:

> For any day where basin energy is deemed to serve incremental RS 1893 loads, the difference between the value of actual RS 1893 energy sales and BC Hydro's System Marginal Value would be used to determine the revenue gain or loss on that day. If system conditions are characterized by low reservoir levels and below average inflows, there would be a bias towards higher system marginal prices. In turn, this can lead to higher revenue losses if the marginal value of water in the system is higher than the Mid-C marginal energy prices (plus adder) used as a reference for RS 1893 pricing.

23.4 Please provide an Excel file that calculates the break-even price when basin energy is deemed to serve incremental RS 1893 load (i) during freshet months and (ii) during non-freshet months.

23.5 Please discuss explain how BC Hydro could mitigate the risk of low inflows in order to minimize net revenue losses associated with serving RS 1893 load with basin energy.

23.6 Absent the IER Pilot, in the case where system conditions would be biased towards higher system marginal prices due to low reservoir levels and below average inflows, please discuss whether BC Hydro would choose to import market energy to conserve reservoir levels.

23.7 Please explain whether the optimal scenario to serve RS 1893 load would be when BC Hydro's System Marginal Value is lower than the Mid-C price. In your response, please explain under what conditions the System Marginal Value could be lower than the Mid-C price and provide a calculation in Excel format.

On page 81, BC Hydro also states:

> Another scenario that was described is a low inflow year with limited market energy available. This might occur, for example, where BC Hydro has to buy replacement energy from the market during a current period to help serve domestic load at some future period. There could be a net revenue loss if BC Hydro uses lower cost market energy to serve Incremental Energy Rate Pilot load in real time during a low market price period rather than storing that energy in large reservoirs for later domestic use during a higher market price period. This net revenue loss impact would be in addition to the adder potentially not covering the cost of wheeling described above. The net revenue loss impact will be greater if the future market energy import is priced higher than the freshet market energy import and will be lower if the future market energy import is priced lower than the freshet market energy import.
>
> An additional scenario which could occur is if, in high load periods, BC Hydro has to reduce its sales of energy to market to serve Incremental Energy Rate Pilot load, there may be a revenue loss if the forgone export would have been at a higher price than the price of the Incremental Energy Rate. BC Hydro notes this risk may be low given the situation is more likely to occur during high priced periods, which may have lower customer participation as described in the final paragraph of section 5.2.

23.8 Please explain whether BC Hydro could purchase forward market energy to serve RS 1893 customers in future periods. Provide an example calculation that would demonstrate the net revenue or loss under this scenario.

23.9 Please provide an example calculation in Excel format that illustrates a net revenue loss from serving RS 1893 load during a low market price period rather than a higher market price period.

23.10 Please explain how the freshet market energy imports affect the net revenue loss under the IER Pilot when market energy is imported in the future to serve load under the IER pilot.

23.11 Please provide an example calculation in Excel that illustrates a net revenue loss resulting from forgone exports at prices higher than what can be sold at the IER Pilot rates.

23.12 Please discuss what strategies BC Hydro could use to mitigate risks associated with using replacement energy in low market priced periods to serve load under the IER pilot.

24.0 Reference: INCREMENTAL ENERGY RATE PILOT PROPOSAL
Exhibit B-1, Section 5.5.4, p. 79; *BC Clean Energy Act*, Chapter 22, Part 1, Section 2 Hydrology Conditions and Energy Imports

On pages 79 to 80 of the Application, BC Hydro states:

> Based on the assumptions provided, for energy charge adder Option 2A:
>
> - Expected incremental RS 1893 energy sales are 266 GWh per year and expected net revenue to BC Hydro is approximately $1.3 million per year;
> - At the 10th percentile, there is a 10 per cent chance that BC Hydro would see a forecast annual net revenue loss of approximately ($0.3 million) or more for

approximately 243 GWh of incremental energy sales; and

- At the 90th percentile, there is a 10 per cent chance that BC Hydro would see a forecast annual net revenue gain of approximately $2.9 million or more for approximately 282 GWh of incremental energy sales.

The *BC Clean Energy Act* Part 1, Section 2, states BC's energy objectives, including the following:

> (c)to generate at least 93% of the electricity in British Columbia from clean or renewable resources and to build the infrastructure necessary to transmit that electricity; …
>
> (n)to be a net exporter of electricity from clean or renewable resources with the intention of benefiting all British Columbians and reducing greenhouse gas emissions in regions in which British Columbia trades electricity while protecting the interests of persons who receive or may receive service in British Columbia;

24.1 Please discuss how the forecast incremental electricity consumption from the IER Pilot is expected to affect reservoir storage levels over the next 3 years.

24.2 Please discuss how BC Hydro expects the IER Pilot to affect BC Hydro's ability to be a net exporter of electricity.

24.3 Please discuss how BC Hydro expects the IER Pilot to affect gross and net energy imports for the duration of the pilot.

24.4 Please discuss how BC Hydro expects the IER Pilot to affect the total percentage of electricity consumed in British Columbia coming from clean or renewable sources, for the duration of the pilot.

24.5 Please discuss how BC Hydro will ensure that BC's Energy Objectives (c) and (n) will be met in the future, considering the possibility of a low-inflow year in conjunction with expected incremental energy demand from the IER Pilot.

25.0 Reference: INCREMENTAL ENERGY RATE PROPOSAL
Exhibit B-1, Section 5.4, p. 67
RS 1893 Baseline Determination

On page 67 of the Application, BC Hydro states:

> For a Customer with at least two years of consumption history, the default period for determining HLH and LLH Baselines and Monthly Reference Demand will be the 365 days of BC Hydro's fiscal 2019.

Further on footnote 40 on page 67 of the Application, BC Hydro states:

> Fiscal 2019 is the most recent fiscal year for which customers have a final Energy CBL [Customer Baseline] that has been filed with and approved by the BCUC. This will ensure alignment of RS 1893 energy baselines with the customer's annual Energy CBL determined in accordance with TS 74.

25.1 Please confirm or otherwise explain that Fiscal 2019 consumption data will be used for determining HLH, LLH Baselines and Monthly Reference Demand for customers that participate in the IER Pilot in any year of the proposed pilot period.

25.2 Please explain whether BC Hydro also considers previous year's consumption to set the Energy CBL and Monthly Reference Demand under RS 1823 (and the comparable RS 1828, if applicable).

25.2.1 If confirmed, please explain why this is also appropriate for customers participating under RS 1893.

26.0 Reference: INCREMENTAL ENERGY RATE PILOT PROPOSAL
Exhibit B-1, Section 3.4.2, pp. 35–36
10 MVA Minimum Size Threshold

As part of its customer engagement for the IER Pilot, BC Hydro sought feedback for a 10 MVA minimum size threshold. BC Hydro stated its concerns as follows:

> … BC Hydro was concerned that prospective new customers might acquire (or choose to locate at) existing customer brownfield sites with minimal historical consumption, such that the majority of new load might be taken under the Incremental Energy Rate rather than under RS 1823. Where any new load is not "truly incremental", such that the load might reasonably be considered to have occurred in the absence of the Incremental Energy Rate Pilot, there would be a different electricity pricing and revenue outcome. To the extent that a revenue reduction arises, relative to RS 1823, this could lead to an under-recovery of BC Hydro's fixed costs and negative impacts for ratepayers.

However, existing and prospective new customers did not support the 10 MVA minimum size threshold because such a threshold would exclude them being able to participate. BC Hydro submits that approximately 55 per cent of existing RS 1823 transmission service load customers would not meet the minimum 10 MVA threshold.

As an alternative, BC Hydro proposes to limit the volume of incremental energy made available to the customer under RS 1893 to a maximum level not to exceed two times their monthly baselines.

26.1 In light of the risks identified by BC Hydro pertaining to the under-recovery of fixed costs and negative impacts for ratepayers, please state the pros and cons for BC Hydro under two mitigation methods: (i) initial 10 MVA minimum threshold and (ii) setting the maximum level of energy available to customers. Compare and contrast the two methods with the objective of mitigating the identified risks.

27.0 Reference: INCREMENTAL ENERGY RATE PILOT PROPOSAL
Exhibit B-1, Section 5.4, p. 66
RS 1893 as an Alternative to RS 1880 for Customers with Self-Generation

On page 66 of the Application, BC Hydro proposes that Customers with self-generation may elect to use RS 1893 as an alternative to RS 1880 for the instantaneous pick-up of load due to loss of self-generation. However, the Customer must choose one service or the other. There is no ability to switch back and forth between RS 1893 and RS 1880.

27.1 Please explain under what circumstances (e.g. financial and operational considerations) would a customer choose to remain in RS 1893 and not switch to RS 1880.

27.2 Please clarify what is BC Hydro's rationale to not allow customers to switch back and forth between RS 1893 and RS 1880.

28.0 Reference: INCREMENTAL ENERGY RATE PILOT PROPOSAL
Exhibit B-1, Section 5.3, p. 61
Annual Monitoring and Evaluation

On page 61 of the Application, BC Hydro proposes to conduct annual monitoring and prepare an evaluation report to consider the results and impacts of the rate in fall 2023 after the results for the

initial period (January 1, 2020 to March 31, 2021) and three complete fiscal years (fiscal 2021, fiscal 2022 and fiscal 2023) are available.

BC Hydro indicates that this will provide time for BC Hydro to conduct further analysis and consultation regarding whether any changes to the rate should be made and whether it should be extended as a pilot or made a permanent rate.

28.1 Please clarify whether BC Hydro is proposing to file annual reporting regarding the IER Pilot or will the first evaluation report occur in fall 2023.

28.1.1 If BC Hydro is proposing to file annual reports, please indicate when BC Hydro will submit the first and subsequent filings and detail the information that is proposed to be included.

28.1.2 Please compare the proposed IER Pilot reporting timeframe against the previously approved Freshet Rate Pilot.

28.2 Please state the key success measures of the IER Pilot in order to determine whether the IER Pilot should be continued, extended, made permanent, or terminated. Discuss each measure and indicate whether certain measures should be given more (or less) weight.

28.3 Considering that the IER Pilot will end on March 31, 2024, please explain what process BC Hydro expects to undertake to determine whether the IER pilot should be continued, extended, made permanent, or terminated.

28.3.1 Will BC Hydro be seeking a BCUC review and decision by March 31, 2024 subsequent to BC Hydro filing its evaluation report in fall 2023? Does BC Hydro view that there will be sufficient time for such process?

28.3.2 Please propose a specific filing date for the evaluation report in fall 2023.