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February 20, 2020

Mr. Patrick Wruck
Commission Secretary and Manager
Regulatory Support
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

RE: Project No. 1599053
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Transmission Service Market Reference-Priced Rates Application
Responses to BCUC and Interveners Information Request No. 1

BC Hydro writes in compliance with BCUC Order No. G-327-19 to provide its responses to Round 1 information requests as follows:

Exhibit B-4	Responses to Commission IRs (Public Version)
Exhibit B-4-1	Responses to Commission IRs (Confidential Version)
Exhibit B-5	Responses to Interveners IRs

BC Hydro is filing a number of IR responses and/or attachments to responses confidentially with the BCUC. BC Hydro confirms that in each instance, an explanation for the request for confidential treatment is provided in the public version of the IR response. BC Hydro seeks this confidential treatment pursuant to section 42 of the *Administrative Tribunals Act* and Part 4 of the BCUC's Rules of Practice and Procedure.

For further information, please contact Anthea Jubb at 604-623-3545 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

Fred James
Chief Regulatory Officer

sh/ma

Enclosure

1.0 A. GENERAL

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.

1.1.1 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).

RESPONSE:

Yes, it is possible for a Customer (such as Canfor or West Fraser, for example) to own and operate multiple sites. However, it is not possible for a unique Customer site to be served (and billed) under RS 1823 and RS 1828 simultaneously.

BC Hydro provides firm transmission voltage service on a Customer site-specific basis under the applicable rate schedule as follows:

- **RS 1823 is BC Hydro's default rate for most firm transmission voltage customers; and**
- **RS 1828 only applies where the transmission voltage Customer site has an Electricity Purchase Agreement (EPA) under BC Hydro's Biomass Energy Program. At present, only two such Customer sites are served under RS 1828.**

The Freshet Rate (RS 1892) and the IER Pilot (RS 1893) are optional non-firm services that BC Hydro proposes to make available to all eligible RS 1823 and RS 1828 Customer sites. Per the "Availability" criteria specified in RS 1892 and RS 1893 and described in the preamble, the Customer may only take service under one of these Rate Schedules in any Billing Year.

For billing purposes, each participating Customer site will be billed under the applicable firm service Rate Schedule (whether RS 1823 or RS 1828) for its baseline electricity use and under the applicable non-firm service Rate Schedule (whether RS 1892 or RS 1893) for its incremental energy use.

1.0 A. GENERAL

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Exhibit B-1, Application, Sections 1.1.3 and 1.1.4, pp. 7 and 10; Appendices B and C
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1.1.2 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.

RESPONSE:

BC Hydro intends that a Customer may only take service under RS 1892 or RS 1893 in any Billing Year.

The reason that BC Hydro added "*with the exception of the period ending March 31, 2021*" to the availability provision of RS 1892 was to address the uncertainty as to if and when the BCUC might approve BC Hydro's proposals for RS 1892 and RS 1893.

BC Hydro's expectation is that the BCUC's decision on these rate proposals would be provided during fiscal 2021. Accordingly, BC Hydro sought to ensure that a customer who might elect to participate in RS 1892 for the May to July period of 2020 would not be prohibited from also participating in RS 1893 for the balance of the fiscal 2021 period between August 2020 and March 2021.

Both RS 1892 and RS 1893 require the customer to provide their notice of participation for one rate schedule or the other by March 1st. The implication of the March 1st sign-up date is that the customer must choose to participate in one of the rates by that date and could not transfer to the other rate schedule during the same Billing Year absent the proposed language "… with the exception of the period ending March 31, 2021."

Subsequently, if both rate schedules are available, customers can choose to participate in one rate or the other in a future Billing Year by March 1st.

1.0 A. GENERAL

Reference: INTRODUCTION
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Eligibility

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On page 10 of the Application, BC Hydro states:

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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.

1.1.3 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?

RESPONSE:

RS 1823 and RS 1828 customers represent all but five transmission service load customers served under firm transmission voltage rate schedules. RS 1823 and RS 1828 customers have control over their electricity use, such that they have the ability to increase electricity use under the proposed Freshet Rate and IER Pilot.

BC Hydro considers that it is not appropriate to make these same offerings available to customers served under other firm transmission service rates for the following reasons:

- **No customer is presently served under RS 1825. No customer has requested service under RS 1825 since the rate was introduced in April 2006;**
- **Four customers are exempted from default service under RS 1823 with the approval of the BCUC and served under RS 1827. One customer is served under RS 3808. These customers are either a public utility, or have made representations to the BCUC that they operate like a public utility and should be exempted from RS 1823 as they do not control electricity use by the customers they serve; and**
- **RS 1852 service (Modified Transmission Demand) is only available for a customer already taking service under RS 1823 – it is not a firm service alternative.**

2.0 A. GENERAL

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:
> - 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
> - 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:
> - 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
> - An adder of $3.00/MWh for the May, June and July Billing Periods and $7.00/MWh for all other Billing Periods.

1.2.1 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.

RESPONSE:

BC Hydro confirms that the charges (Mid-C index price plus adder) under both rate schedules are the same in each of the May, June and July Billing Periods.

2.0 A. GENERAL

Reference: AMENDED FRESHET RS 1892 AND INCREMENTAL ENERGY RATE PILOT RS 1893
Exhibit B-1, Appendices B and C
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> (b) $0/kWh; plus
> - An adder of $3.00/MWh for the May, June and July Billing Periods and $7.00/MWh for all other Billing Periods.

1.2.1 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.

1.2.1.1 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?

RESPONSE:

Customers provided feedback to BC Hydro that their decision to participate in either RS 1892 or RS 1893 would be impacted by factors that include:

- **The ability to increase load over three months rather than over 12 months, including the resources required to manage site operations for incremental load based on daily price signals;**
- **The capability of their site operation to manage the prospective risk of interruption and market price exposure over three months rather than over twelve months; and**
- **The use of seasonal baselines (three in total) with seasonal billing settlement under RS 1892 as opposed to monthly baselines (36 in total) and monthly billing settlement under RS 1893.**

2.0 A. GENERAL

Reference: AMENDED FRESHET RS 1892 AND INCREMENTAL ENERGY RATE PILOT RS 1893
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> (b) $0/kWh; plus
> - An adder of $3.00/MWh for the May, June and July Billing Periods and $7.00/MWh for all other Billing Periods.

1.2.1 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.

1.2.1.2 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.

RESPONSE:

As described in BC Hydro's response to BCUC IR 1.2.1, the proposed charges under each of RS 1892 and RS 1893 are the same during the May to July Billing Periods.

2.0 A. GENERAL

Reference: AMENDED FRESHET RS 1892 AND INCREMENTAL ENERGY RATE PILOT RS 1893
Exhibit B-1, Appendices B and C
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> (b) $0/kWh; plus
> - An adder of $3.00/MWh for the May, June and July Billing Periods and $7.00/MWh for all other Billing Periods.

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

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.2.1.1.

3.0 A. GENERAL

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**

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

RESPONSE:

Implementation costs for Year 4 of the Freshet Rate Pilot were estimated at $50,000. Please refer to section 1.8.2 of Appendix E to the Application. All other staff and administration costs were funded under existing operating budgets.

3.0 A. GENERAL

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.

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Evaluation report preparation	$ 25,000	$ 5,000	$10,000	$ 40,000
Total	**$ 115,000**	**$ 30,000**	**$60,000**	**$ 205,000**

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

RESPONSE:

BC Hydro's estimated implementation costs for the RS 1893 Pilot are shown in the table below. The costs in the table do not include any costs associated with a potential regulatory proceeding in regards to the final evaluation report.

Estimated Implementation Costs for RS 1893 Pilot	Year 1 (F20-21)	Year 2 (F22)	Year 3 (F23)	Year 4 (F24)	Totals
RS 1893 rate design and regulatory approval	$ 66,000	$ -	$ -	$ -	$ 66,000
Customer and stakeholder engagement	$ 15,000	$ 10,000	$ 10,000	$ 30,000	$ 65,000
Billing	$ 105,000	$ 5,000	$ 5,000	$ 5,000	$ 120,000
Evaluation report preparation	$ -	$ -	$ -	$ 30,000	$ 30,000
Total	**$ 186,000**	**$ 15,000**	**$ 15,000**	**$ 65,000**	**$ 281,000**

4.0 A. GENERAL

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.

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

RESPONSE:

BC Hydro expects a similar review process that the BCUC has used to approve Baselines and Reference Demands for the Freshet Rate Pilot. For example, refer to BCUC Order No. G-94-18 dated May 17, 2018, regarding BC Hydro's Rate Schedule 1892 Transmission Service Freshet Energy Baseline Application.

In this process BC Hydro submits an application to the BCUC describing and requesting approval of the proposed Baselines and Reference Demands. The application includes a summary of BC Hydro's determination in accordance with RS 1892 and a copy of the proposed baselines that were agreed to by the customer.

BC Hydro believes this process is efficient and sufficient for the review of Baselines and Reference Demands baselines for the Incremental Energy Rate Pilot.

4.0 A. GENERAL

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.

1.4.2 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.

RESPONSE:

There have been no cases where BC Hydro and the Customer could not reach agreement on alternative electricity baselines pursuant to Special Condition No. 4 of RS 1892. The process used for review and determination of the agreed-to baselines between BC Hydro and the Customer is described in the following applications to the BCUC:

- **Rate Schedule (RS) 1892 Transmission Service Freshet Energy Baseline Application (2018), approved by BCUC Order No. G-94-18 on May 17, 2018;**
- **Rate Schedule (RS) 1892 – Transmission Service Freshet Energy Baselines Application (2017), approved by BCUC Order No. G-77-17 on May 18, 2017; and**
- **Rate Schedule (RS) 1892 – Transmission Service Freshet Energy Baselines Application (2016), approved by BCUC Order No. G-76-16 on May 27, 2016.**

4.0 A. GENERAL

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.

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

RESPONSE:

BC Hydro sought BCUC review and approval of baselines or reference demands related to the Freshet Rate Pilot in 2016, 2017 and 2018. These baselines and reference demands were approved by BCUC Order Nos. G-76-16, G-77-17 and G-94-18.

5.0 B. FRESHET RATE PROPOSAL

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.

1.5.1 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.

RESPONSE:

BC Hydro is proceeding to enroll customers for the 2020 freshet period on the premise that an Order to approve the rate will be provided by the BCUC prior to May 1, 2020.

BC Hydro has requested that customers provide written notice of their intent to participate in the 2020 freshet period by March 1, 2020, pursuant to the proposed Special Condition No. 2 of RS 1892. An email to this effect, with detailed instructions, was sent by BC Hydro to all eligible RS 1823 and RS 1828 customers on February 3, 2020.

BC Hydro confirms that customers understand that their notice of intent to participate in RS 1892 for the 2020 freshet period is only valid if the rate is approved by the BCUC.

6.0 B. FRESHET RATE PROPOSAL

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."

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

RESPONSE:

BC Hydro operates its system of resources as an integrated portfolio to serve the domestic load and provide marketing opportunities for electricity trade. As such, we are unable to specifically attribute the contribution of any particular hydro plants, reservoirs, or EPA resources to serving the RS 1892 or RS 1893.

6.0 B. FRESHET RATE PROPOSAL

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1.6.2 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.

RESPONSE:

All assets that are generating during the freshet are contributing to periods of freshet oversupply. This includes dispatchable and non-dispatchable heritage assets owned by BC Hydro, and Independent Power Producers.

Below are the May to July inflows into BC Hydro's heritage assets.

Year	May to July BC Hydro Inflows (GWh)
2015	[redacted]
2016	[redacted]
2017	[redacted]
2018	[redacted]
2019	[redacted]

BC Hydro operates the generation assets as a portfolio, as a result the inflow numbers cannot be translated into meters as the energy per meter conversion varies by asset and by the reservoir elevation of that asset.

BC Hydro does not disclose system inflow information for our reservoirs as those values provide information on the price that BC Hydro is likely willing to transact with Powerex Corp. Disclosure of the information may have impacts on BC Hydro's potential transactions with Powerex. Accordingly, BC Hydro has redacted this information in the public version of this IR response and requests that the BCUC treat it as confidential.

6.0 B. FRESHET RATE PROPOSAL

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

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1.6.3 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.

RESPONSE:

BC Hydro interprets this question to ask whether there is a minimum amount of inflow during the freshet period that would ensure ratepayers are not negatively impacted by the proposed RS 1892. BC Hydro has not computed such an inflow.

The intent of RS 1892 is to ameliorate the expected oversupply of energy during the freshet period. This oversupply is the result of system minimum energy during the freshet period, which includes inflows and must-take energy from Independent Power Producers.

6.0 B. FRESHET RATE PROPOSAL

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1.6.3 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.

1.6.3.1 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.6.3.

6.0 B. FRESHET RATE PROPOSAL

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."

1.6.3 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.

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

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.6.3 for a review of the inflow during the four years of the Freshet Rate Pilot. An analysis of fiscal 2015 has not been prepared.

Over the four years of the Freshet Rate Pilot, fiscal 2019 was the only year when the combination of market prices, inflows and reservoir elevations resulted in a revenue loss of $0.5 million. Please also refer to Appendix E of the Application for the 2019 evaluation.

7.0 B. FRESHET RATE PROPOSAL

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)."

1.7.1 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.

RESPONSE:

BC Hydro has assessed the results for expected RS 1892 net revenue (excluding implementation costs and load shifting impacts) over the freshet periods of 2020, 2021 and 2022 as shown below. BC Hydro used the same approach and inputs as for the IER Pilot and incorporated the following RS 1892 participation and load assumptions:

- **The number of future RS 1892 customer participants will be approximately 50 per cent lower than the number of historical RS 1892 participants due to forestry sector plant shutdowns and certain customers electing to take RS 1893 service rather than RS 1892 service;**

- **Maximum incremental load demand, in aggregate, across RS 1892 participant customers for the freshet period on any given day is an average of 30 MW over each hour; and**

- **CAD $55/MWh all-in customer strike price for incremental load was used (being the average RS 1892 price at which BC Hydro expects the customer would reduce incremental load to basline).**

RESULTS (all values on a per year basis):		
Expected Incremental Load Net Revenue	71	kCAD
10th Percentile Net Revenue	-314	kCAD
50th Percentile Net Revenue	81	kCAD
90th Percentile Net Revenue	436	kCAD
Expected Incremental Load	64	GWh
10th Percentile Incremental Load	60	GWh
50th Percentile Incremental Load	65	GWh
90th Percentile Incremental Load	66	GWh

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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)."

1.7.2 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.

RESPONSE:

BC Hydro cannot provide the requested forecast as it has not completed the analysis. However, the four-year trial period covered various inflow conditions. Please also refer to BC Hydro's response to BCOAPO IR 1.9.5 for description of the marginal resource condition during the four-year pilot period.

7.0 B. FRESHET RATE PROPOSAL

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

RESPONSE:

The table below presents annual expected inflows into BC Hydro assets, which are calculated as the average of 46 separate weather sequences.

Year	Forecast System Inflow (GWh)
Fiscal 2021	[redacted]
Fiscal 2022	[redacted]
Fiscal 2023	[redacted]

As of October 2019, historic inflow data exists for the period 1973 through 2018. These 46 years of inflows provide the basis for an ensemble of inflow forecasts in cubic meters per second. These inflows are converted to energy using the suite of Energy Studies models.

BC Hydro does not disclose forecast system inflow information for our reservoirs as those values provide information on the price that BC Hydro is likely willing to transact with Powerex Corp. Disclosure of the information may have impacts on BC Hydro's potential transactions with Powerex. Accordingly, BC Hydro has redacted this information in the public version of this IR response and requests that the BCUC treat it as confidential.

7.0 B. FRESHET RATE PROPOSAL

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

1.7.3.1 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?

RESPONSE:

Please refer to Attachment 1, which contains BC Hydro's response to BCUC IR 1.31.1 as submitted in BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application Proceeding.

British Columbia Utilities Commission Information Request No. **1.31.1** Dated: **April 23, 2019** British Columbia Hydro & Power Authority Response issued **June 6, 2019**	Page 1 of 4
British Columbia Hydro & Power Authority **Fiscal 2020 to Fiscal 2021 Revenue Requirements Application**	**Exhibit: B-5**

31.0 D. CHAPTER 4 – COST OF ENERGY

Reference: COST OF ENERGY
Exhibit B-1, Appendix DD, pp. 9, 13
Monthly energy studies – Backtesting

BC Hydro states on page 9 of Appendix DD to the Application that "[m]ost of the 85 models involved in the Energy Studies process are documented in the Model inventory, and have been assigned a primary and a secondary owner."

On page 13 of Appendix DD, BC Hydro states that "[n]o regular back testing (or benchmarking) is performed in the current process."

1.31.1 Please explain whether a range of inputs are used in the 85 models. If yes, please elaborate on how the range of values is determined and explain the methodology on how the range of inputs to the 85 models are compiled to produce the single values reported for each of the Cost of Energy components.

RESPONSE:

There are many dependencies between models within the Energy Studies process, where the outputs from one are used as the inputs for another. Most models take inputs in ensemble form and produce an ensemble of results, corresponding to 45 different weather years (1973-2017).

Please see the Hydrology section below for details on the implementation of the ensemble of weather years.

The use of these weather year ensembles ensures that the variability in inflows, prices, loads, and resources due to the impacts of weather are well represented in the models, producing a range of possible outcomes. This range captures both dry and wet periods and accurately represents the historic geographic correlation in weather between the regions included in the modeling. This range is large enough that BC Hydro considers the average of the resulting forecast to be an unbiased estimator of the drivers, and hence how the system will be operated.

<u>Incorporation of Variability in Hydrology</u>

Hydrology, such as the inflows to each reservoir, is the largest driver of uncertainty in the Energy Studies. The inflows are a result of rainfall, and snow pack and glacier melt. Once the annually variable snowpack has melted (usually

towards the end of summer), rainfall becomes the primary driver of reservoir inflows.

Seasonal inflow forecasts are made at the beginning of every month for each of 25 BC Hydro basins. These forecasts are in ensemble form, with one ensemble member for each historic weather sequence. In the Energy Study, forecast inflows are used for the Peace, Columbia, Kootenay and Pend-d'Oreille basins.

As of 2018, historic weather and inflow data exists for the period 1973 through 2017. These 45 years provide the basis for the ensemble set. The Energy Study models require 5 years of inflow data. As a result, a set of parallel sequences is created from the data that preserves any year-over-year correlation, as follows:

- **January 1973 to December 1977**
- **January 1974 to December 1978**
- **January 2014 to December 1973**
- **January 2017 to December 1976**

Note that to ensure a continuous sequence of five years in all ensembles, the initial year (1973) is assumed to follow the last year (in this case, 2017), This same set of 45 weather year ensembles was used in all key model inputs. 2018 historic data is now available, and in January 2019 the number of ensembles increased to 46 with the addition of the 2018 data.

Within the Energy Studies the use of these weather year ensembles ensures that variability in inflows, prices, loads, and resources due to the impacts of weather are well represented in the models, producing a range of possible outcomes.

For the small plants that are not explicitly modelled, historic generation is used with adjustments for upgrades, outages, or restrictions.

<u>Incorporation of Variability in Markets:</u>

The Energy Studies market model uses historic variability in the price of natural gas at Henry Hub to produce a forecast of gas price variability. This variability flows through to variability in Sumas gas and Mid-C electricity market prices. The Henry Hub gas prices are assumed to be uncorrelated with weather, but weather drivers do have some impact on the Sumas gas and Mid-C electricity forecasts.

British Columbia Utilities Commission Information Request No. **1.31.1** Dated: **April 23, 2019** British Columbia Hydro & Power Authority Response issued **June 6, 2019**	Page 3 of 4
British Columbia Hydro & Power Authority **Fiscal 2020 to Fiscal 2021 Revenue Requirements Application**	**Exhibit: B-5**

Incorporation into Energy Studies:

The sources of uncertainty listed above are addressed in the Energy Study by using modeling techniques that are tailored to explicitly represent these uncertainties in the economic optimization process, and produce a distribution of outcomes in the form of an ensemble of forecasts.

The 45 possible weather sequences were used as an input into the October 2018 Energy Studies, along with the starting elevation of each reservoir as of October 1, 2018.

The monthly Energy Studies models are proprietary decision support software developed in-house specifically to represent the characteristics of the BC Hydro system and adjacent energy markets. The suite of models forecasts, over a five-year time horizon, an optimal set of reservoir and generating station operations and import/export activity.

BC Hydro uses historic storage levels as a benchmark when ranking the current or forecasted storage. Historic storage levels are not used in the forecasting of future storage levels.

Primary System Operation Risks to Cost of Energy:

From an energy perspective, the primary system operation risks are not having enough water and having to import energy when prices are high, and having too much water and having to spill water and export energy when prices are low. Both of these risks can affect the cost of energy, and the Energy Studies is the primary tool used to assess the potential financial and system operating risks.

Dry Period Risks:

Some of the scenarios examined will have combinations of higher winter loads, lower winter inflows, and lower delivery from BC Hydro small hydro facilities and independent power producers. These scenarios may forecast a draft of system storage, increased imports, and the operation of Island Generation to manage system storage.

Scenarios that result in exceptional drafts of storage are examined to ensure that load requirements can be met.

Wet Period Risks:

BC Hydro reviews the results of the Energy Studies to manage the risk of spill in wet/warm sequences.

British Columbia Utilities Commission Information Request No. **1.31.1** Dated: **April 23, 2019** British Columbia Hydro & Power Authority Response issued **June 6, 2019**	Page 4 of 4
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Results for the Test Period:

The values reported under the Heritage Energy section (lines 1-3) and Market Energy section (lines 8-10) of Schedule 4 of Appendix A of the Application are derived from the October 2018 Energy Study. The Energy Study calculates these values with a monthly granularity for an ensemble of weather years. The average of the ensemble is used as the basis for the fiscal year forecasts.

7.0 B. FRESHET RATE PROPOSAL

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

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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)."

1.7.4 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.

RESPONSE:

BC Hydro updates the forecast of reservoir inflows every month as part of the Energy Studies using actual precipitation to date and using the weather ensembles explained in BC Hydro's response to BCUC IR 1.7.3.1.

7.0 B. FRESHET RATE PROPOSAL

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1.7.4 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.

1.7.4.1 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.3.1.

7.0 B. FRESHET RATE PROPOSAL

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
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1.7.5 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.

RESPONSE:

The requested information is provided in Attachment 1 to this response, which contains BC Hydro's response to CEC IR 1.17.1 from BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application.

Commercial Energy Consumers Association of British Columbia Information Request No. **1.17.1** Dated: **May 2, 2019** British Columbia Hydro & Power Authority Response issued **June 6, 2019**	Page 1 of 1
British Columbia Hydro & Power Authority **Fiscal 2020 to Fiscal 2021 Revenue Requirements Application**	**Exhibit: B-6**

17.0 Reference: Exhibit B-1, page 4-15

> System, market and weather conditions can significantly affect market prices. Large snowpack, windy and wet conditions act to depress the Mid-C electricity price, while hot, dry summer or cold winter conditions act to raise Mid-C prices.

1.17.1 How does BC Hydro account for climate change related weather conditions in assessing its cost of energy and market prices for energy, if at all?

RESPONSE:

BC Hydro accounts for weather variability in assessing the cost of energy for the three main drivers as described in BC Hydro's response to BCUC IR 1.31.1. BC Hydro's assessment includes:

- **Weather variability affecting inflow;**
- **Weather variability affecting load; and**
- **Weather variability affecting markets.**

Each year, the most recent year of historic data is added to the modeled weather sequences, so that the range adjusts over time and always includes the most recent data. This is based on the assumption that the variability in the historic record is an order of magnitude larger than the impact of any climate change on the mean forecast for the test period. This also means that impacts of climate change are implicitly included in the forecast.

8.0 B. FRESHET RATE PROPOSAL

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**

1.8.1 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?

RESPONSE:

The revenue gains and losses referred to are impacts to all ratepayers. Directionally, revenue gains have the effect of reducing BC Hydro’s overall revenue requirements (to the benefit of ratepayers), while losses have the effect of increasing BC Hydro’s overall revenue requirements (to the detriment of ratepayers).

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Totals	**$ 822**	**$ (605)**	**$ 5,565**	**$ 5,782**

1.8.2 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.

RESPONSE:

The 2019 year of the Freshet Rate Pilot had periods where the system was under marginal resource Condition No. 1 approximately 10 per cent of the time, Condition No. 2 approximately 60 per cent of the time, and Condition No. 3 approximately 30 per cent of the time.

BC Hydro estimates that, as a result of periods under Condition No. 2, BC Hydro imported approximately 68 GWh, which represents 61 per cent of the total 2019 RS 1892 load of 111 GWh.

BC Hydro provides as Confidential Attachment 1 to this IR a spreadsheet containing a detailed breakdown for each day by HLH and LLH block. The attachment follows the same format as the examples in the attachments to

BC Hydro's response to BCUC IRs 1.20.1 and 1.20.2. BC Hydro requests confidential treatment of this attachment as it contains day ahead Mid-C ICE pricing, which has been provided by ICE to BC Hydro subject to confidentiality terms. BC Hydro only has permission to share this data confidentially with the Commission.

BC Hydro also provides as Public Attachment 1 to this IR, a redacted version of this spreadsheet, which excludes day ahead Mid-C ICE pricing.

BC Hydro
Power smart

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(Accessible by opening the Attachments Tab in Adobe)

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	$ 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**

1.8.3 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.

RESPONSE:

BC Hydro is not able to provide a direct impact of the Enbridge pipeline rupture on the availability of electricity during the freshet of 2019. Absent the Enbridge pipeline rupture, BC Hydro believes there would still have been a negative impact to ratepayers due to the dry conditions in spring 2019.

8.0 B. FRESHET RATE PROPOSAL

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.
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> … 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
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	$ 110	**$ (292)**	**$ (361)**	**$ (543)**
Totals	**$ 822**	**$ (605)**	**$ 5,565**	**$ 5,782**

1.8.4 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.

RESPONSE:

The Freshet Rate incremental energy had a negligible impact on the elevation of the major reservoirs in 2018.

8.0 B. FRESHET RATE PROPOSAL

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> … 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.

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Totals	**$ 822**	**$ (605)**	**$ 5,565**	**$ 5,782**

1.8.5 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.

RESPONSE:

"Forced export", "market import", and "system basin" are synonymous with the marginal resource conditions 1, 2 and 3, respectively, which are described in the Application.

Under condition 1, there is always expected to be a net benefit to the ratepayer.

Under condition 2, there is a ratepayer loss unless the Mid-C price is sufficiently negative (refer to BC Hydro's response to BCUC IR 1.23.1).

Under condition 3, where system storage is the marginal resource, 'Revenue gain (loss)' is a notional term as it is based on the difference between the RS 1892 Rate and the system marginal value at the time of the incremental load.

Please refer to the attachment to BC Hydro's response to BCUC IR 1.13.3 for detailed calculations of the ratepayer impact from these conditions.

8.0 B. FRESHET RATE PROPOSAL

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> … 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.

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	$ 110	**$ (292)**	**$ (361)**	**$ (543)**
Totals	**$ 822**	**$ (605)**	**$ 5,565**	**$ 5,782**

1.8.5 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.

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

RESPONSE:

Potential negative ratepayer impacts from serving the incremental load could be mitigated by raising the energy charge adder.

The proposed adder pricing has been chosen because BC Hydro believes it to be low enough to encourage additional load and high enough that other ratepayers are not negatively impacted in most of the scenarios analyzed.

8.0 B. FRESHET RATE PROPOSAL

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

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	$ 110	**$ (292)**	**$ (361)**	**$ (543)**
Totals	**$ 822**	**$ (605)**	**$ 5,565**	**$ 5,782**

1.8.5 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.

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

RESPONSE:

Table 3 of the Freshet Rate Final Evaluation Report, included as Appendix D to the Application, lists the additional factors that impact ratepayers. These are: implementation costs; customer reported load shifting; unexplained load variances; natural load growth; and RS 1880 replacement service.

9.0 B. FRESHET RATE PROPOSAL

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</u>

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.9.1 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)?

RESPONSE:

"Available" in this context refers to the availability of energy and capacity not being limited by system constraints. BC Hydro would import to serve RS 1892 and RS 1893 load. BC Hydro does plan to meet this load requirement in an operational view, but we do not add it to our load forecast in a planning view and would not build new resources to meet it.

Proposed Rate Schedule 1892 Special Condition No. 1, provided in Appendix B, provides further clarity and is shown below.

> ***BC Hydro agrees to provide Electricity under this Rate Schedule to the extent that it has energy and capacity to do so. BC Hydro may refuse Service under this Rate Schedule in circumstances where BC Hydro does not have sufficient energy or capacity. For greater certainty, BC Hydro will not be required to construct a System Reinforcement under Electric Tariff Supplement No. 6 or 88 to provide Service under this Rate Schedule.***

The language used in Rate Schedule 1892 Special Condition No. 1 is consistent with BC Hydro's standard language for non-firm rate schedules that have already been approved by the BCUC. For example: Rate Schedule 1880 – Transmission Service – Standby and Maintenance Supply; Rate Schedule 1853 Transmission Service – IPP Station Service; and Rate Schedule 1891 Transmission Service Shore Power Service.

In all cases of non-firm service, electricity service may be interrupted in circumstances where BC Hydro does not have sufficient energy or capacity, which BC Hydro considers to reflect transmission and generation system constraints.

9.0 B. FRESHET RATE PROPOSAL

Reference: BC HYDRO'S FRESHET RATE PROPOSAL
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certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

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

RESPONSE:

The revenue loss in Year 4 of the Freshet Rate Pilot could not have been avoided due to curtailment, as the conditions required for curtailment under RS 1892 were not present in the Year 4 Freshet Period.

As described in BC Hydro's response to BCUC IR 1.9.1, curtailment under RS 1892 would only have been curtailed in the event energy or capacity was not available. Please refer to BC Hydro's response to BCUC IR 1.9.4 for a discussion of why curtailment is not proposed for economic reasons.

Mitigating losses to ratepayers in Year 4 of the Freshet Energy Rate would have required that either BC Hydro not offer the Freshet Energy Rate, or do so with an energy charge adder that was higher than the $3/MWh approved as part of RS 1892 by the BCUC. BC Hydro notes that the energy charge adder of $3/MWh was sufficient to provide ratepayer benefits in years one, two and three of the Freshet Energy Rate pilot.

On April 8, 2019, BC Hydro applied to the BCUC to offer the Freshet Energy Rate in 2019. As described in that application, BC Hydro initially decided to not offer the Freshet Rate in 2019 because of water conditions and the possibility of high Mid-C prices. However, in consideration of customer feedback and the strong performance of the Freshet Energy Rate in prior years, BC Hydro decided to file the application to offer the Freshet Energy Rate in 2019. That application was subsequently approved by BCUC Order No. G-106-19.

9.0 B. FRESHET RATE PROPOSAL

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> 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</u>

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.9.3 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.

RESPONSE:

There were no changes to BC Hydro's interruption considerations from Year 1 to Year 4.

The same interruption provisions existed in all four years of the Freshet Rate Pilot. These were described in Special Condition No. 2 of Rate Schedule 1892.

9.0 B. FRESHET RATE PROPOSAL

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> 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. There were no negative financial impacts to BC Hydro from not curtailing customers. [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:

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

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certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.9.4 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".

RESPONSE:

BC Hydro notes that none of its nine[1] existing, non-firm service Rate Schedules in its Electric Tariff (excluding RS 1892 and RS 1893) require BC Hydro to interrupt the service for economic reasons.

In the Application, interrupting service for economic reasons refers to curtailment of service under conditions where energy and capacity is available, but providing service may result in an economic loss to ratepayers.

BC Hydro would import to serve non-firm load. BC Hydro does plan to meet non-firm load requirement in an operational view, but we do not add it to our load forecast in a planning view and would not build new resources to meet it.

The economic considerations used in the analysis of ratepayer impacts of the Freshet and Incremental Energy Rates refers to the difference between the revenues received for the service under the Freshet or Incremental Energy Rate Schedules and the system marginal value of resources used to serve the incremental load.

While the ability to interrupt service for economic reasons may reduce the risk of such an economic loss to ratepayers, there are barriers to developing reliable and transparent indicators during time periods when service may result in an economic loss to ratepayers. For example, there would be additional costs to BC Hydro and to participating customers associated with developing, communicating and implementing an economic interruption provision. Further, providing public information indicative of the system marginal value of BC Hydro resources could compromise BC Hydro's ability to benefit from energy trade. BC Hydro considers the system marginal value information to be confidential.

[1] **These are: RS 1105, RS 1205, RS 1206, RS 1207, RS 1253, RS 1280, RS 1853, RS 1880 and RS 1891.**

BC Hydro acknowledges that if these non-firm services are not interrupted for economic reasons, then there is a risk of revenue loss that is borne by all ratepayers as was experienced in Year Four of the Freshet Rate Pilot. However, for the four-year Freshet Energy Rate Pilot period, the Freshet Energy Rate pricing was sufficient to result in net benefits to all ratepayers.

BC Hydro's view is that pricing for these proposed non-firm services, and in particular the proposed energy charge adder, reasonably mitigates the risk of providing non-firm service when it might be uneconomic to all ratepayers under certain conditions. As shown in Appendices B and C, the proposed Freshet Energy Rate and Incremental Energy Rate each include an energy charge adder, which is a charge that is added to the market index price to mitigate the risk of such negative impacts to ratepayers. Relative to developing and enforcing reliable and transparent conditions under which service may be interrupted for economic reasons, the proposed adders can achieve similar outcomes for all ratepayers for lower overall administrative cost, complexity and controversy.

Under the proposed Freshet and Incremental Energy Rates, BC Hydro does retain the right to interrupt service due to lack of sufficient capacity and energy, and BC Hydro will not undertake any system reinforcements that may be required to serve the non-firm load.

9.0 B. FRESHET RATE PROPOSAL

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> 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. There were no negative financial impacts to BC Hydro from not curtailing customers. [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. For greater

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.9.5 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.

RESPONSE:

From May to July 2019, there was an electricity supply issue as a result of the Enbridge gas pipeline interruption and low reservoir inflows which contributed to a reduction in the freshet energy surplus, higher system marginal prices and higher market energy imports.

Under Special Condition 2 of RS 1892, BC Hydro had the right to withdraw service if there was a lack of available energy or capacity. However, BC Hydro still had available energy and capacity to serve RS 1892 customers during this period and therefore did not curtail the supply of electricity under the Freshet Rate Pilot. Please also refer to BC Hydro's response to BCUC IR 1.9.1.

9.0 B. FRESHET RATE PROPOSAL

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:

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> 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</u>

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

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

RESPONSE:

The following are the conditions under which RS 1892 service could be withdrawn:

- **For planned or unplanned transmission constraints; and**
- **For planned or unplanned generation (energy) constraints.**

Such events tend to be local or regional in nature as opposed to a system wide provincial constraint. When the constraint is local and only impacts a local subset of RS 1892 customers, BC Hydro will request that only the RS 1892 customers affected by the constraint curtail load. When the constraint is system-wide, all RS 1892 customers will be requested to curtail load. This approach avoids having to establish unique conditions or priority levels for curtailment specific to RS 1892 customers.

As BC Hydro has no direct means to physically curtail loads at the customer site, RS 1892 customers will be asked to curtail load to their Reference Demand level until the constraint is resolved. BC Hydro will follow its curtailment notification procedures as documented in its System Operating Order to effect a curtailment request to RS 1892 customers.

More broadly, under NERC Mandatory Reliability Standards for Capacity and Energy Emergencies, BC Hydro's priority for curtailing loads is to curtail non-firm interruptible loads first (including RS 1892 and other non-firm services) in order to balance the system before curtailing firm loads (including RS 1823 and other firm services) if additional actions are required.

Consistent with these standards, BC Hydro will follow this curtailment priority for both planned and unplanned (including emergency) conditions. BC Hydro may also, without notice to the customer, in emergency conditions and events, terminate the supply of electricity if at any time BC Hydro does not have sufficient energy or capacity.

9.0 B. FRESHET RATE PROPOSAL

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
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> 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:

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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</u>

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

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

1.9.6.1 Please specify these curtailment provisions in the proposed tariff.

RESPONSE:

Special Condition No. 1 of RS 1892 currently provides the following provisions for curtailment:

> ***BC Hydro agrees to provide Electricity under this Rate Schedule to the extent that it has energy and capacity to do so. BC Hydro may refuse Service under this Rate Schedule in circumstances where BC Hydro does not have sufficient energy or capacity. For greater certainty, BC Hydro will not be required to construct a System Reinforcement under Electric Tariff Supplement No. 6 or 88 to provide Service under this Rate Schedule.***

BC Hydro has developed notification procedures specific to the curtailment and restoration of RS 1892 service for system constraints. These procedures are incorporated into the System Operating Order, as described in BC Hydro's response to BCUC IR 1.9.6.

However, BC Hydro has not specified any additional curtailment provisions in RS 1892. This is in contrast to BC Hydro's proposed RS 1893. For example:

- **Special Condition No. 3a of RS 1893 requires the customer to satisfy BC Hydro that it can reduce its load to Monthly Reference Demand within one hour of receiving notice to do so from BC Hydro; and**
- **Special Condition No. 4 of RS 1893 describes the consequences if a customer fails to reduce load to its Monthly Reference Demand in accordance with a notice from BC Hydro.**

BC Hydro does not propose interruption criteria as Special Conditions in RS 1892 so as to minimize the technical and administrative burden for BC Hydro and customers associated with a short seasonal rate offer that has a low risk of interruption. For example, during the four-year RS 1892 Pilot, there were no events

or conditions which required interruption of RS 1892 supply due to insufficient energy or capacity.

BC Hydro intends to utilize an internal daily operations plan for prospective RS 1892 service interruption that will be administered by its real time operating staff. In the event of a system constraint, real time operating staff will follow the notification procedures set out in the System Operating Order to request curtailment of RS 1892 customer loads.

For the reasons above, BC Hydro does not currently view additional curtailment provisions in RS 1892 as being required.

9.0 B. FRESHET RATE PROPOSAL

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
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> 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</u>

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.9.7 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.2.

9.0 B. FRESHET RATE PROPOSAL

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
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> 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. For greater

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.9.7 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.

1.9.7.1 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.2.

9.0 B. FRESHET RATE PROPOSAL

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
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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</u>

certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.9.7 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.

1.9.7.2 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?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.2 for a discussion of ratepayer impacts.

10.0 B. FRESHET RATE PROPOSAL

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;

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

RESPONSE:

Shown below are Freshet Energy Rate sales compared to Market Energy Imports or Exports.[1]

- **In F2017 total Market Energy exports were 5,488 GWh, while RS 1892 energy sales were 139 GWh;**

[1] **Please refer to BC Hydro's response to CEABC IR 2.43.1 in the BC Hydro Fiscal 2020 to Fiscal 2021 Revenue Requirements Application for additional information on net purchases or sales from Powerex.**

- **In F2018 total Market Energy exports were 5,479 GWh, while RS 1892 energy sales were 168 GWh;**
- **In F2019 total Market Energy imports were 452 GWh, while RS 1892 energy sales were 150 GWh; and**
- **F2020 total Market Energy imports are not yet available but are forecast to be 5,488 GWh.**

BC Hydro notes that net purchases in F2019 were impacted by an electricity supply issue arising from the explosion of the Enbridge Pipeline in October 2018 and low water inflows to BC Hydro's reservoirs.

Generally BC Hydro has a significant surplus that will not be significantly affected by the volumes of energy sales under the Freshet Rate. The expected energy sales under the Freshet Rate are a small fraction of BC Hydro's domestic load, and far less than the variation in system inflows.

10.0 B. FRESHET RATE PROPOSAL

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:

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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;

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

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.1.

10.0 B. FRESHET RATE PROPOSAL

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:

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>
> (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;

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

RESPONSE:

BC Hydro notes that objective (c) referred to in the preamble is specific to electricity generation and not electricity consumption.

British Columbia's energy objectives as defined the *Clean Energy Act* includes the objective stated in section 2(c), which is to generate at least 93 per cent of the electricity in British Columbia from clean or renewable resources. To the extent there are any incremental imports (not from generation within B.C.) to meet the additional load associated with RS 1893, these incremental imports neither advance nor conflict with this objective.

In addition, regarding Objective (n), to the extent there are any incremental imports to meet the additional load associated with RS 1892, any emissions associated with such imports would be reported by Powerex as part of the Industrial Facility Greenhouse Gas Emissions as per the British Columbia's *Greenhouse Gas Industrial Reporting Control Act* (GGIRCA). Summary information is publicly reported at: https://www2.gov.bc.ca/gov/content/environment/climate-change/data/industrial-facility-ghg.

10.0 B. FRESHET RATE PROPOSAL

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:

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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;

1.10.4 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.

RESPONSE:

BC Hydro's ability to meet British Columbia's Energy Objectives (c) or (n) was not impacted by the RS 1892 pilot. On that basis, we expect this to continue should RS 1892 be approved as an ongoing rate.

Please also refer to BC Hydro's response to BCUC IRs 1.10.1 and 1.10.3.

10.0 B. FRESHET RATE PROPOSAL

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:

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>
> (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;

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

RESPONSE:

The carbon intensity of BC Hydro's electricity imports is not included in the Provincial Greenhouse Gas Emissions Inventory referenced in the information request because the inventory only covers the emissions emanating from within the province. Emissions from electricity imports are not reported in the National Inventory Report since they occur outside of the province and are not included in international guidelines on assembly of national inventories (IPCC/UNFCCC

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

guidelines). These emission sources are reported in the jurisdiction in which the electricity is generated.[2]

However, emissions associated with electricity imports into B.C. are reported as part of the Industrial Facility Greenhouse Gas Emissions as per the British Columbia's *Greenhouse Gas Industrial Reporting Control Act* (GGIRCA). Powerex reports emissions associated with electricity imports under the GGIRCA Reporting Regulation Schedule D. Summary information is publicly reported at: https://www2.gov.bc.ca/gov/content/environment/climate-change/data/industrial-facility-ghg.

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

11.0 B. FRESHET RATE PROPOSAL

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."

1.11.1 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?

RESPONSE:

BC Hydro's marginal cost of energy under Condition No. 3 is the system marginal value.

The system marginal value is calculated by the monthly Energy Studies modelling, which produces a value of the water in system storage over the three year operating time horizon. As such it is the best value to use as the cost of serving an incremental load when system storage is the marginal resource, Condition No. 3.

The Mid-C market is the dominant trading hub for energy transactions in the Pacific Northwest. The day-ahead Mid-C prices are transparent and available via subscription. The Mid-C market price is an input to the Energy Studies, and is one of the key drivers that can significantly affect the output of the Energy Studies. As such, the Mid-C market price affects BC Hydro's system marginal value, and BC Hydro has used the Mid-C price as a transparent proxy for BC Hydro's modelled system marginal value because the Energy Studies and system marginal value are confidential. This is what is implied by 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".

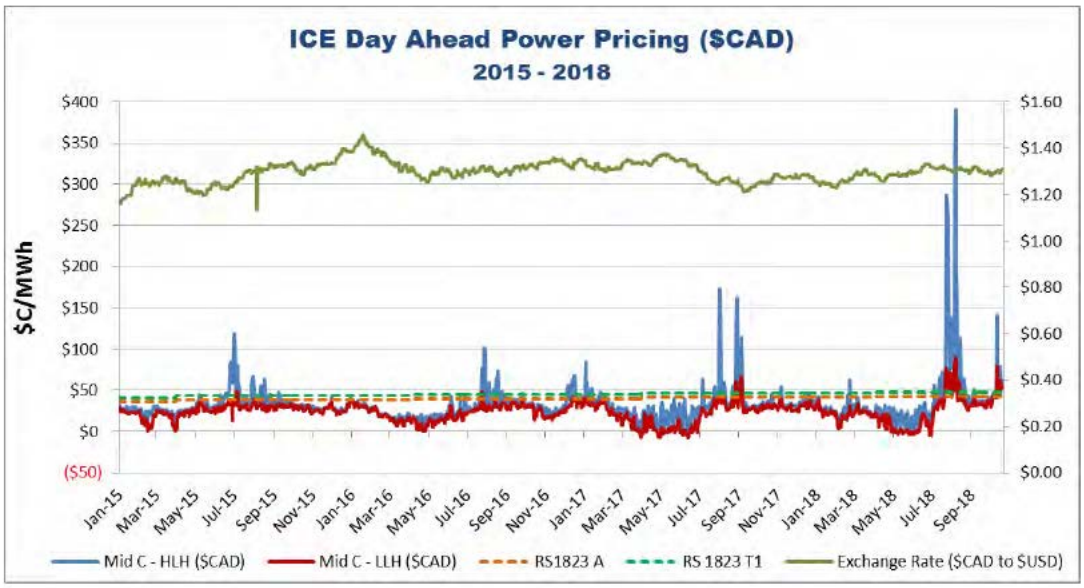
Please note that the Application used the term 'short run marginal price', synonymous with 'system marginal value'. However, BC Hydro's modelled system marginal value is not specific to system conditions in operations in any given hour, nor the conditions in external markets which can change from hour to hour. Therefore, the system marginal value is not intended to reflect BC Hydro's actual hourly marginal cost of energy. For example, if the marginal value of the Williston Reservoir is lower than the Kinbasket Reservoir it implies that all of the available units at GMS generating station (Williston) should be used prior to using units at Mica generating station (Kinbasket). However, in operations such a unit configuration is rarely possible due to a number of system needs so the resulting actual generation configuration will be different.

Furthermore, during periods under Condition Nos. 1 and 2, the Mid-C market is considered the marginal cost of energy as incremental load would result in less exports (Condition No. 1) or more imports (Condition No. 2). However, these conditions do not change the modelled system marginal value during those periods.

12.0 B. FRESHET RATE PROPOSAL

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.

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

RESPONSE:

The requested chart has been updated to include the Mid-C market data information up to December 31, 2019 and is provided below. This chart is provided to the BCUC on a confidential basis and BC Hydro requests confidential treatment of this information as it contains day ahead Mid-C ICE pricing, which has been provided by ICE to BC Hydro subject to confidentiality terms. BC Hydro only has permission to share this data confidentially with the BCUC.

12.0 B. FRESHET RATE PROPOSAL

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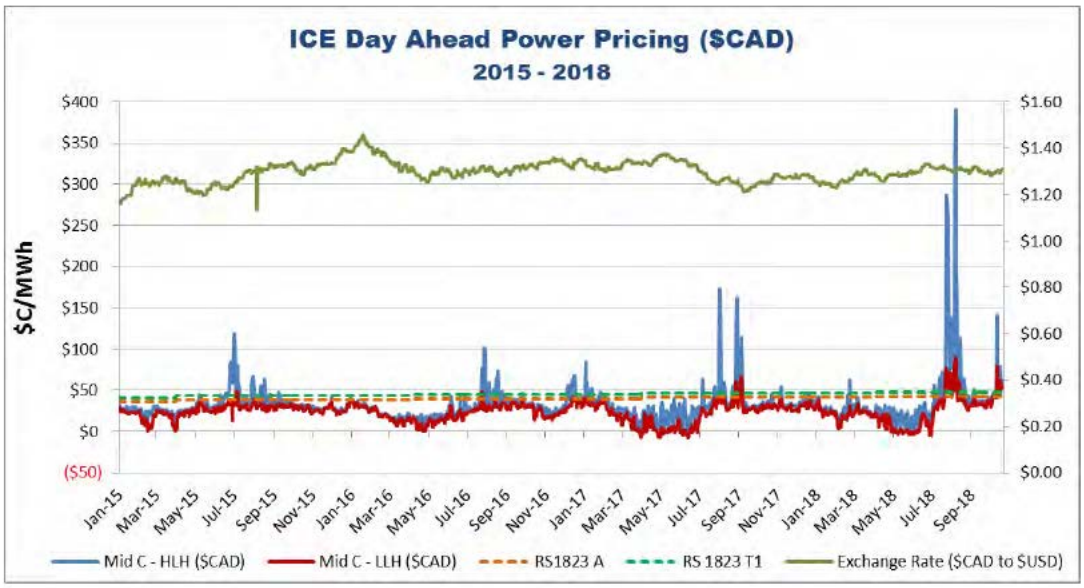


On page 32 of Appendix D, BC Hydro provides a chart showing its Northwest Power Pool import/export activity during each of the Freshet Rate Pilot.
BC Hydro states:

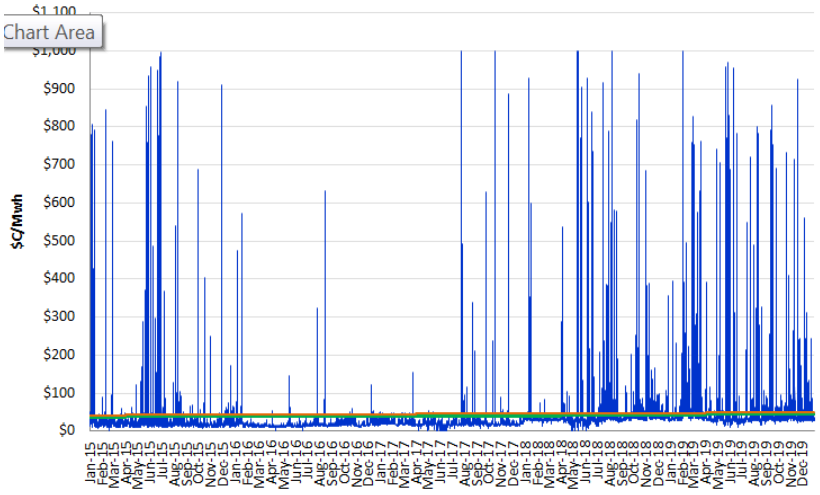
> In general, BC Hydro is on net exports for a significant portion of the freshet months (May through July) to manage higher volumes of surplus energy and to enable exports to US and Alberta markets on days when market prices are high.

1.12.2 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

RESPONSE:

The Alberta Electric System Operator (AESO) Power Pool is an hourly market and does not transact in HLH/LLH blocks. The requested chart has been prepared comparing the hourly AESO Pool Price with RS 1823 Tier 1 and RS 1823A energy prices for the requested period.



Fiscal year	RS1823 T1 Price ($/MWh)	RS 1823 A Price ($/MWh)
F15	$36.19	$40.59
F16	$38.36	$43.03
F17	$39.81	$44.75
F18	$41.20	$46.32
F19	$42.44	$47.71
F20	$45.35	$50.98

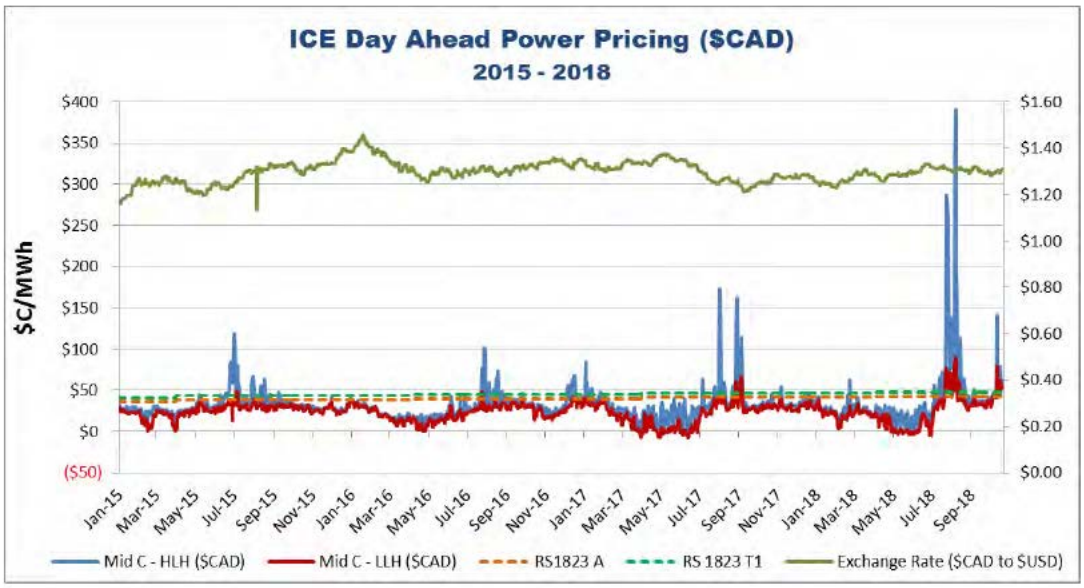
Hourly AESO Power Pool prices are available at http://ets.aeso.ca/.

This Mid-C Market HLH and LLH data can be found in BC Hydro's confidential response to BCUC IR 1.12.1.

12.0 B. FRESHET RATE PROPOSAL

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.

1.12.3 Please discuss whether BC Hydro has considered using the Alberta Pool Price[1] 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.

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

RESPONSE:

The Intercontinental Exchange Mid-Columbia (Mid-C) Peak or Mid-C Off-Peak weighted average index price was approved to be used as the reference price for the Freshet Rate by BCUC Order No. G-17-16 as part of BC Hydro's 2015 Rate Design Application.[2]

As part of that application, BC Hydro considered both the market prices at the Alberta Pool and Mid-C and determined that the Mid-C pricing index is appropriate because "*Mid-C reflects BC Hydro's short run opportunity cost. In addition, flows on the US intertie are much greater than on the Alberta intertie*."[3]

When prices in Alberta deviate from Mid-C prices (adjusting for exchange rates and transmission costs between the two markets), the B.C.-Alberta intertie, being significantly smaller than the B.C.-U.S. intertie, becomes fully scheduled such that no incremental energy can flow between B.C. and Alberta, which effectively disconnects the price in Alberta from Mid-C. However, the B.C.-U.S. intertie typically has additional capacity so that incremental energy can flow between B.C. and the U.S., which allows Mid-C to reflect B.C.'s short run opportunity cost as noted above.

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[2] **https://www.bcuc.com/ApplicationView.aspx?ApplicationId=511.**

[3] **2015 Rate Design Application, Chapter 7 page 7-40.**

13.0 B. FRESHET RATE PROPOSAL

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.

1.13.1 Please define and explain the term “freshet shapeable energy.”

RESPONSE:

“Freshet shapeable energy” is the energy generated from large storage plants that is required within the freshet period to maintain an acceptable spill risk. This energy can be dispatched to higher value hours, but must be generated during freshet.

13.0 B. FRESHET RATE PROPOSAL

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.

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

RESPONSE:

Not confirmed.

System Minimum Generation is a state of the system in which the system is operating exclusively on must-take energy.

System Minimum Energy is a volume of energy, composed of must-take and freshet shapeable energy. A system surplus exists in freshet when this volume of energy is higher than the total energy load in freshet.

13.0 B. FRESHET RATE PROPOSAL

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

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**

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.

1.13.3 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.

RESPONSE:

All scenarios from this IR and BCUC IR 1.13.6 are included in Attachment 1 to this response. Please note:

- **Scenarios 1.13.3.i and 1.13.3.ii qualify as Condition No. 1;**
- **Scenarios 1.13.6.i and 1.13.6.ii qualify as Condition No. 2; and**
- **Scenarios 1.13.3.iii and 1.13.3.iv qualify as Condition No. 3 along with scenarios 1.13.6.iii and 1.13.6.iv. They are presented in the attached workbook under conditions where the system is importing and exporting.**

BC Hydro
Power smart

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(Accessible by opening the Attachments Tab in Adobe)

13.0 B. FRESHET RATE PROPOSAL

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

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.

1.13.4 Please explain what is meant by the term “economic market imports”.

RESPONSE:

BC Hydro’s economic market imports are purchases from Powerex made because the market price, net of transmission cost, is lower than the Threshold Purchase Price under the Transfer Pricing Agreement. BC Hydro sets the Threshold Purchase Price based on the marginal basin prices in the Energy Studies.

13.0 B. FRESHET RATE PROPOSAL

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

On page 23 of Appendix D, BC Hydro states:

> **Condition 2: Minimum Generation with Imports**
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> 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.

1.13.5 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.9.4 where BC Hydro describes the practical and customer barriers to service interruption for economic reasons.

13.0 B. FRESHET RATE PROPOSAL

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

On page 23 of Appendix D, BC Hydro states:

> **Condition 2: Minimum Generation with Imports**
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> 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.

1.13.6 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.

RESPONSE:

Please refer to Attachment 1 of BC Hydro's response to BCUC IR 1.13.3.

13.0 B. FRESHET RATE PROPOSAL

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

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.

1.13.6 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.

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

RESPONSE:

Please refer to Attachment 1 to BC Hydro's response to BCUC IR 1.13.3.

13.0 B. FRESHET RATE PROPOSAL

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

On page 23 of Appendix D, BC Hydro states:

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>
> 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.

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

RESPONSE:

Yes. As approved by the BCUC, Network Integrated Transmission Service is the form of transmission service that is reserved to allow BC Hydro to serve its domestic load under the Electric Tariff, including customers taking service under the Freshet Energy Rate.

13.0 B. FRESHET RATE PROPOSAL

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

On page 23 of Appendix D, BC Hydro states:

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

1.13.7.1 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.

RESPONSE:

All customers served under the Freshet Energy Rate take service under BC Hydro's applicable default rate for firm transmission voltage service. BC Hydro's transmission related costs are recovered through the firm service rate.

13.0 B. FRESHET RATE PROPOSAL

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

On page 23 of Appendix D, BC Hydro states:

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

1.13.7.2 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".

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.13.7.

13.0 B. FRESHET RATE PROPOSAL

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

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.

1.13.8 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.

RESPONSE:

The choice to use system storage or imports to serve load (including RS 1892 load) is an economic decision. BC Hydro does not propose to interrupt the RS 1892 non-firm services for economic reasons as described in BC Hydro's response to BCUC IR 1.9.4.

13.0 B. FRESHET RATE PROPOSAL

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

On page 24 of Appendix D, BC Hydro states:

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1.13.9 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.9.4.

13.0 B. FRESHET RATE PROPOSAL

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

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1.13.9 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.

1.13.9.1 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.

RESPONSE:

Please refer to Attachment 1 to BC Hydro's response to BCUC IR 1.13.1 which contains the requested information. Refer specifically to row references 1.13.3.iii and 1.13.3.iv to explain how this comparison is measured.

14.0 B. FRESHET RATE PROPOSAL

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.

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

RESPONSE:

BC Hydro does not plan to continue to monitor and report on load shifting impacts if the proposed Freshet Rate is made permanent.

BC Hydro has monitored and reported on the Freshet Energy Rate four times, covering each of the four years of the Freshet Energy Rate Pilot. BC Hydro considers the results included in these reports to provide conclusive information on the performance of the Freshet Energy Rate over a variety of conditions. Please refer to Appendices D and E of the Application for these reports.

Monitoring and reporting on individual rate schedules is resource intensive, resulting in increased costs for ratepayers, and is not standard practice for all rate schedules. Given the extensive analysis of the Freshet Energy Rate already completed and included as evidence in this proceeding, BC Hydro does not propose to complete additional monitoring and reporting on Freshet Energy Rate net revenues.

14.0 B. FRESHET RATE PROPOSAL

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

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- 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.

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

1.14.1.1 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).

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.14.1 where we explain that BC Hydro does not propose to continue to monitor load shifting impacts.

15.0 B. FRESHET RATE PROPOSAL

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.

1.15.1 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.

RESPONSE:

BC Hydro notes that RS 1892 enrolment is specific to each year of the four year Freshet Rate Pilot and so, for simplicity, has differentiated between existing customers that have, or have not, participated in any year of the Pilot.

Per Table 2 of the Application, there were a total of 105 participants for BC Hydro's October 2018 workshop. The breakdown of participants is shown below.

October 2018 Workshop	# of participants	%
Existing customers that have participated in RS 1892	25	24%
Existing customers that have NOT participated in RS 1892	26	25%
Prospective new customers	30	29%
Interveners and stakeholders	24	23%
Total # of participants	**105**	**100%**

Per Table 3 of the Application, there were a total of 55 participants for BC Hydro's November 2018 workshop. The breakdown of participants is shown below.

November 2018 Workshop	# of participants	%
Existing customers that have participated in RS 1892	17	31%
Existing customers that have NOT participated in RS 1892	8	15%
Prospective new customers	12	22%
Interveners and stakeholders	18	33%
Total # of participants	**55**	**100%**

Per Table 4 of the Application, there were a total of 94 participants for B Hydro's September 2019 workshop. The breakdown of participants is shown below.

September 2019 Workshop	# of participants	%
Existing customers that have participated in RS 1892	33	35%
Existing customers that have NOT participated in RS 1892	42	45%
Prospective new customers	17	18%
Interveners and stakeholders	2	2%
Total # of participants	**94**	**100%**

15.0 B. FRESHET RATE PROPOSAL

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.

1.15.2 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?

RESPONSE:

Yes. Please also refer to BC Hydro's response to BCUC IR 1.15.2.1.

15.0 B. FRESHET RATE PROPOSAL

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.

1.15.2 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?

1.15.2.1 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?

RESPONSE:

Yes, BC Hydro communicated preliminary Year 4 results, including ratepayer impacts, for the Freshet Rate Pilot in its September 2019 Workshops and all subsequent customer and stakeholder engagements prior to filing its Year 4 Evaluation Report with the BCUC on October 31, 2019 as part of its Application. BC Hydro confirms that these Year 4 results (and a draft of the Application) were provided in advance of any party submitting a letter of support.

For reference, the figure below shows slide 25 from BC Hydro's September 2019 Workshop materials. It shows the revenue loss for Year 4 and describes the unique system conditions which characterized the 2019 freshet period.

YEAR 4 RESULTS: RATEPAYER IMPACT

Year 1 (2016)	Forced Export	Market 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)	Forced Export	Market 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)	Forced Export	Market 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**

Year 4 (2019)	Forced Export	Market Import	System Basin	Ratepayer benefit
May	$ 45	$ (107)	$ (275)	$ (337)
June	$ 65	$ (91)	$ (55)	$ (81)
July	$ -	$ (94)	$ (31)	$ (125)
	$ 110	**$ (292)**	**$ (361)**	**$ (543)**

- **Exceptionally low 18/19 winter inflows**
- **Exceptionally low reservoir levels**
- **Weak 2019 freshet inflows**
- **High system marginal prices**
- **Significant increase in # of market import days**

15.0 B. FRESHET RATE PROPOSAL

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.

1.15.2 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?

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

RESPONSE:

Prior to filing the Application, BC Hydro did not separately communicate these results to any other customers and stakeholders that did not attend the September 2019 workshops.

16.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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."

1.16.1 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.

RESPONSE:

The impact of the IER Pilot was based on the 46 weather sequences used in the Energy Studies, and 40 of these weather sequences showed a positive ratepayer impact.

16.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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."

1.16.2 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 all ratepayers over the pilot period.

RESPONSE:

Confirmed.

17.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

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

RESPONSE:

Revenues under RS 1893 are not expected to vary with a change in reservoir inflows.

Ratepayer impact associated with RS 1893 depends on the system marginal value when the incremental sales are made. The system marginal value is based on inflows, market price, future load, and the elevation of the major reservoirs.

Please refer to BC Hydro's response to BCUC IR 1.16.1 where we describe that 40 of the 46 weather sequences showed a positive ratepayer impact. Each of the sequences has a different inflow.

17.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

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

RESPONSE:

Not confirmed. Please refer to BC Hydro's response to BCUC IR 1.7.3.1 for an explanation of the use of historical data to forecast an ensemble of future reservoir inflows.

17.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

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

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

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.3.1.

17.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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

1.17.2.2 If not, please explain why not.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.7.3.1.

17.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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:

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1.17.3 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?

RESPONSE:

Any financial gains or losses of the IER Pilot will accrue to all ratepayers.

18.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

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

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.6.1.

18.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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:

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

1.18.1.1 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.6.1.

18.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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1.18.2 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).

RESPONSE:

The incremental RS 1893 energy sales are expected to have a negligible impact on the items listed above. The expected sales of 266 GWh per year is about 0.5 per cent of the expected load, and far less than the variation in system inflows.

18.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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:

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

RESPONSE:

In the event of an unscheduled plant outage resulting in a generation constraint, BC Hydro and the customer will follow the terms and conditions regarding curtailment described in the Special Conditions of Rate Schedule 1893, as shown in Appendix C of the Application. The relevant special conditions are also copied below.

> **2. BC Hydro agrees to provide Electricity under this Rate Schedule to the extent that it has energy and capacity to do so. BC Hydro may refuse Service under this Rate Schedule in circumstances where BC Hydro does not have sufficient energy or capacity. For greater certainty, BC Hydro will not be**

required to construct a System Reinforcement under Electric Tariff Supplement Nos. 6 or 88 to provide Service under this Rate Schedule.

3. In order for a Customer to be eligible to take Electricity under this Rate Schedule:

(a) The Customer must satisfy BC Hydro that it can reduce its load to its Monthly Reference Demand within one hour of receiving notice to reduce its load from BC Hydro; and

…

4. If a Customer fails to reduce load to its Monthly Reference Demand in accordance with a notice received from BC Hydro: (a) the Customer will be charged 150% of the Energy Charge applicable to the hour for all RS 1893 Energy supplied during the period that the Customer failed to reduce its load as determined by BC Hydro; and (b) BC Hydro may, at its discretion, cancel the Customer's service under this Rate Schedule. If a Customer's service is cancelled under this subsection, BC Hydro may require the Customer to install load control relays and associated telecommunications equipment at its facilities, at the Customer's cost, and provide BC Hydro with real-time control of these relays before the Customer is again eligible to take service under this Rate Schedule.

19.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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. For greater certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.19.1 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)?

RESPONSE:

The conditions under which RS 1892 and RS 1893 service could be withdrawn are for planned and unplanned transmission and generation constraints.

19.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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. For greater certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.19.1 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)?

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

RESPONSE:

BC Hydro confirms that imports may be used to serve customers under the IER pilot. BC Hydro is obliged to provide service to the extent it has sufficient energy and capacity available.

19.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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. For greater certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.19.2 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".

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.9.4.

19.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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. For greater certainty, BC Hydro does not propose to interrupt these non-firm services for economic reasons. [Emphasis added]

1.19.3 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.

RESPONSE:

For non-firm interruptible transmission voltage rate schedules, BC Hydro's right to curtail is the same. However, there may be differences in the procedures related to interruption of service as specified in each different rate schedule.

For example, under Special Condition No. 4 of RS 1891 for Shore Power service, BC Hydro may dispatch a power line technician or other work to operate the switchgear for each connect and disconnect of Eligible Vessels. This procedure does not apply to any other transmission voltage non-firm rate schedule. In contrast, RS 1853 (IPP Station Service), RS 1880 (Standby and Maintenance Service) and RS 1892 (Freshet Energy Rate) do not specify any procedures for interruption or for curtailment, whereas RS 1893 (Incremental Energy Rate) does.

Please refer to BC Hydro's response to BCUC IR 1.18.2.1 for the special conditions regarding curtailment under RS 1893.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.20.1 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.

RESPONSE:

The requested Excel spreadsheet is provided as Attachment 1 to this response.

BC Hydro
Power smart

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(Accessible by opening the Attachments Tab in Adobe)

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

Scenario Analysis

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

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> 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.

1.20.2 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.

RESPONSE:

The requested Excel spreadsheet is provided as Attachment 1 to this response.

BC Hydro
Power smart

REFER TO LIVE SPREADSHEET MODEL

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20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

Scenario Analysis

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

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>
> 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.

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

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.11.1.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.
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> 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.

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

1.20.3.1 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.

RESPONSE:

BC Hydro expects that the evaluation of the ratepayer impact for the IER Pilot will be done using the same methodology (e.g., Condition Nos. 1, 2, 3) as was done for evaluating the ratepayer impact of the Freshet Rate Pilot.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.20.4 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.

RESPONSE:

Under the terms of the proposed RS 1893, BC Hydro could not 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.

As described in the proposed Special Condition No. 2 of RS 1893 included in Appendix C of the Application, BC Hydro agrees to provide service under this rate schedule only to the extent it has available energy and capacity to do so.

Please also refer to BC Hydro's response to BCUC IR 1.9.4.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.
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> 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.

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

RESPONSE:

Market purchases from Powerex may or may not be used to serve incremental load. It depends on the price of the market purchases, the marginal resource condition and the system marginal price at the time of the incremental load.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

Scenario Analysis

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

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> - 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.

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

1.20.5.1 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.20.5.

For an example calculation of the impact under the marginal resource Condition No. 2, system minimum generation with imports, please refer to rows 9 and 10 on both tabs of Attachment 1 to BC Hydro's response to BCUC IR 1.20.1.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.
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> - 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.

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

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

RESPONSE:

Network Integrated Transmission Service (NITS) is the form of transmission service that is reserved to allow BC Hydro to serve all of its domestic load under the Electric Tariff, irrespective of the source of supply, including customers taking service under the Incremental Energy Rate.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

Scenario Analysis

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

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> 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.

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

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

1.20.5.2.1 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.

RESPONSE:

All customers served under the proposed Incremental Energy Rate take service under a firm service rate, either RS 1823 or RS 1828 as applicable, for their baseline load. BC Hydro's NITS costs are recovered through the firm service rate.

20.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.
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>
> 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.

1.20.6 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.11.1. In that response we describe the rationale for using the system marginal value to assess the energy cost of serving an incremental load under RS 1893 and also explain that Mid-C prices are an input into BC Hydro's Energy Studies which determine our system marginal values.

BC Hydro is unable to provide the comparison of the system marginal values against the daily Mid-C price over the last ten years in the time provided. To develop the data set would require going back in daily files to pull out the basin prices. This process would be manual and would be a significant amount of work. Furthermore, BC Hydro does not compare or correlate historic Mid-C prices against its system marginal value because doing so serves no operational purpose as we do not expect them to be the same.

BC Hydro does not make its basin prices or system marginal values public as they are outputs from the energy studies and could be used by third parties to help calibrate a model of BC Hydro's system and its potential import and export requirements. Enabling parties to predict BC Hydro's import and export requirements could impact BC Hydro's ability to optimize its system which could in turn harm ratepayers. As a result, BC Hydro does not want to provide this highly sensitive commercial information at all but would provide it to the BCUC on a confidential basis.

BC Hydro assumes that the purpose of this information request is to estimate the potential economic impacts of RS 1893 to all ratepayers, by comparing revenues which are proposed to be based on Mid-C market prices, to BC Hydro's costs, as approximated by BC Hydro's system marginal values. Based on this assumption, BC Hydro respectfully submits that the appropriate way to compare revenues with approximated costs is by using the methodologies that BC Hydro has applied for the Freshet Energy Rate (described in section 3.1.1.2 of Appendix D – Freshet Rate Final Evaluation Report), and extending that methodology to the full year as we commit to do so in our evaluation of RS 1893.

The proposed RS 1893 evaluation criteria and reporting is described in section 5.7 of the Application. BC Hydro is amenable to the BCUC and Intervener feedback on the scope of the evaluation.

21.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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[1] 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.

1.21.1 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

[1] 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.

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.

RESPONSE:

BC Hydro expects that total RS 1893 revenue (including the adder) will be higher than system marginal value on some days and lower than system marginal value on others. Illustrative calculations are shown in the table below for a sample week under Condition No. 3 with all values in Canadian dollars. For further examples please see the attachments to BC Hydro's responses to BCUC IRs 1.20.1, 1.20.2, and BCOAPO IR 1.26.2.

In all cases under Condition No. 3, the daily revenue over-recovery or under-recovery for net daily RS 1893 energy sales arises from the difference between the Mid-C index price (plus adder) and the system marginal value on the given day.

Illustrative RS 1893 Calculations: Sample Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Totals
Net RS 1893 energy sales volume in HLH (MWh)	600	600	600	600	600	600	0	
Mid-C index price in HLH ($/MWh)	$ 30	$ 32	$ 34	$ 36	$ 38	$ 40	$ -	
Energy charge adder ($/MWh)	$ 7	$ 7	$ 7	$ 7	$ 7	$ 7	$ -	
Total RS 1893 energy charge ($/MWh)	$ 37	$ 39	$ 41	$ 43	$ 45	$ 47	$ -	
System Marginal Value in HLH ($/MWh)	$ 40	$ 40	$ 40	$ 40	$ 40	$ 40	$ -	
Unit energy price difference: ($/MWh)	$ (3)	$ (1)	$ 1	$ 3	$ 5	$ 7	$ -	
Revenue gain/(loss) for RS 1893 HLH energy sales ($)	**$ (1,800)**	**$ (600)**	**$ 600**	**$ 1,800**	**$ 3,000**	**$ 4,200**	**$ -**	**$7,200**
Net RS 1893 energy sales volume in LLH (MWh)	300	300	300	300	300	300	900	
Mid-C index price in LLH ($/MWh)	$ 20	$ 21	$ 22	$ 23	$ 24	$ 25	$ 25	
Energy charge adder ($/MWh)	$ 7	$ 7	$ 7	$ 7	$ 7	$ 7	$ 7	
Total RS 1893 energy charge ($/MWh)	$ 27	$ 28	$ 29	$ 30	$ 31	$ 32	$ 32	
System Marginal Value in LLH ($/MWh)	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	$ 30	
Unit energy price difference: ($/MWh)	$ (3)	$ (2)	$ (1)	$ -	$ 1	$ 2	$ 2	
Revenue gain/(loss) for RS 1893 LLH energy sales ($)	**$ (900)**	**$ (600)**	**$ (300)**	**$ -**	**$ 300**	**$ 600**	**$ 1,800**	**$ 900**
Total daily net RS 1893 energy sales (MWh)	900	900	900	900	900	900	900	
Total revenue gain/(loss) for RS 1893 energy sales ($)	**$ (2,700)**	**$ (1,200)**	**$ 300**	**$ 1,800**	**$ 3,300**	**$ 4,800**	**$ 1,800**	**$8,100**

For the provision of RS 1893 service, a net revenue gain represents an over-recovery of BC Hydro's marginal energy costs. Conversely, a net revenue loss represents an under-recovery of BC Hydro's marginal energy costs.

On a forecast annual basis, BC Hydro expects that forecast RS 1893 net revenue (including the adder) will be $1.3 million. Please refer to Table 9 in the Application. As such, BC Hydro considers that forecast RS 1893 revenue will be sufficient to recover its forecast marginal cost of energy for providing RS 1893 service.

21.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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[1] 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.

[1] 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.

1.21.2 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.

RESPONSE:

BC Hydro has not used price elasticity for modelling customer response to the Incremental Energy Rate. As such, BC Hydro is unable to quantify how doing so may affect the results.

Directionally, BC Hydro does not expect that using price elasticity would improve the accuracy of our estimate of customer response to RS 1893. This is because price elasticity assumes that a customer's price response is continuous, i.e. each percentage change in price results in a fixed percentage change in electricity usage. In contrast, customers taking service under RS 1892 have exhibited a more binary price response. Customers generally take RS 1892 energy when the price is below a predetermined acceptable level (described as a strike price in the Application), and reduce their usage to baseline levels if the price exceeds that level.

21.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

Reference: ECONOMIC JUSTIFICATION AND RATEPAYER IMPACTS Exhibit B-1, pp. 75–76

Energy Charge Adder Modelling Assumptions

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> 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.

[1] 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.

1.21.3 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).[2]

RESPONSE:

The strike price is intended to reflect the notional RS 1893 price at which a participant customer will voluntarily elect to reduce its take of incremental energy under RS 1893 to baseline levels to avoid incurring an energy charge for RS 1893 energy purchases that might otherwise be deemed uneconomic by the customer.

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

21.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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:

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>
> 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.

[1] 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.

1.21.4 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).

RESPONSE:

For greater certainty, the $55/MWh "strike price" is not part of RS 1893 and is not a BC Hydro price. It represents a notional price point communicated to BC Hydro by customers during consultation where, all else being equal, the customer might seek to curtail incremental energy use to baseline levels to avoid incurring an energy charge that they consider to be uneconomic.

It is BC Hydro's understanding that customers consider the notional $55/MWh strike price to approximate the average unit price of RS 1823 Tier 1 energy (currently $45.35/MWh), plus the RS 1823 demand charge (currently $8.695/kVA). This notional pricing consideration is similar for the two customers taking service under RS 1828.

21.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

Reference: ECONOMIC JUSTIFICATION AND RATEPAYER IMPACTS Exhibit B-1, pp. 75–76

Energy Charge Adder Modelling Assumptions

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> 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.

[1] 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.

1.21.5 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.

RESPONSE:

Confirmed. This is also equivalent to 'system marginal value'.

22.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.22.1 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.

RESPONSE:

For expected incremental load net revenue, the difference between Option 2A and Option 1A is $0.16 million and the difference between Option 2A and Option 1B is $0.13 million.

The expected net revenue difference is a function of the energy charge adder applied to the forecast of incremental energy load in non-freshet months. More revenue is forecast to be collected with an energy charge adder of $8/MWh than with an energy charge adder of $7/MWh.

In the Application, BC Hydro sought to balance feedback from the Association of Major Power Customers (AMPC) and customers who requested that the energy charge adder be priced lower and that the adder price be flat (rather than shaped) across non-freshet months for simplicity.

BC Hydro proposed Option 2A in the Application in consideration of this feedback and the revenue differences between the modelled alternatives.

22.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.22.2 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.

RESPONSE:

The adder changes the total RS 1893 price that the customer will see for incremental load. For example, when the adder is $1/MWh higher, the RS 1893 energy price is $1/MWh higher and vice versa.

In all six adder scenarios modelled, BC Hydro used a notional strike price of $55/MWh to represent the price point at which the customer would curtail its incremental load to baseline levels.

When the total RS 1893 price is higher, due to a higher adder, the notional $55/MWh strike price is triggered more often (i.e., the model assumes that the customer will self-curtail its incremental load to baseline levels on any day priced higher than $55/MWh). Accordingly, a higher RS 1893 energy price will reduce expected incremental load and a lower RS 1893 energy price will increase expected incremental load.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.23.1 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.

RESPONSE:

BC Hydro interprets this question to ask for the Mid-C market price that would result in no impact to the ratepayer under Condition No. 2 when imports are used to serve the RS 1893 load. Please refer to Attachment 1 to this IR response which contains a working Excel spreadsheet that provides examples.

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REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(Accessible by opening the Attachments Tab in Adobe)

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.23.1 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.

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

RESPONSE:

BC Hydro interprets this question to ask for a calculation of the exchange rate that would result in no impact to the ratepayer when the Mid-C price is negative. Please refer to Attachment 1 to this IR response.

Note, an exchange rate that would result in no impact to the ratepayer can only be calculated when the Mid-C price is between -$5.16 and $0 due to the $0/MWh price floor under RS 1893.

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23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

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

RESPONSE:

Potential negative ratepayer impacts from serving RS 1892 and RS 1893 load could be mitigated by raising the energy charge adder.

The proposed adder pricing has been chosen because BC Hydro believes it to be low enough to encourage additional load and high enough that other ratepayers are not negatively impacted in most of the scenarios analyzed.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.23.3 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.

RESPONSE:

BC Hydro manages U.S. foreign exchange risk on a company-wide basis. U.S. foreign exchange risk associated with specified items is managed within a Foreign Exchange (FX) Risk Limit, as identified in BC Hydro's Board-approved Treasury Risk Management Policy. The FX Risk Limit applies to a forward-looking 24-month timeframe and specified U.S. currency exposure items, and is managed using only the approved risk management products as outlined in the Policy.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.4 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.

RESPONSE:

BC Hydro interprets this question to ask for the Mid-C market price that would result in no impact to the ratepayer when basin energy is used to serve RS 1893 load, also known as Condition No. 3.

Attachment 1 to this response contains the requested working Excel spreadsheet. The breakeven point also depends on the system marginal value, so it has been kept constant for the example provided.

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23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.5 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.23.2.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.6 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.

RESPONSE:

The decision to purchase energy from Powerex instead of generating more from the system storage depends on the Threshold Purchase Price under the Transfer Pricing Agreement relative to the price of electricity at Mid-C plus transmission costs plus losses.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.7 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.

RESPONSE:

BC Hydro assumes that 'optimal scenario to serve RS 1893 load' is referring to conditions when other non-participating customers are not negatively affected. As a general statement, the RS 1893 load is expected, on average, to provide non-participating customers benefits while BC Hydro has an operational annual surplus of energy. As the annual surplus decreases, the benefit to non-participating customers will generally decrease, all else being equal.

In operations, the incremental load from RS 1893 would not be treated any differently than other customer load, and therefore BC Hydro does not attribute imports, exports or draft of system storage to any particular load.

The condition that provides the greatest benefit to non-participating customers is Condition No. 1, which typically occurs during the freshet. Non-participating customers would also benefit under Condition No. 3 when system marginal value is less than Mid-C plus the energy charge adder.

Examples of when the system marginal price may be lower than the Mid-C price plus transmission costs on the BPA system include: (1) when the reservoirs are very high, such as after a high inflow period; or (2) when the market price temporarily spikes.

The system marginal values are an output from the Energy Studies, which are not conducted in a spreadsheet-based software and therefore BC Hydro cannot provide a calculation in Excel format.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.8 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.

RESPONSE:

BC Hydro operates its resources as an integrated portfolio to serve the domestic load. As such, any forward electricity purchases, such as under the proposed 2019 Letter Agreement with Powerex, would not be made to serve a specific load.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.9 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.

RESPONSE:

BC Hydro interprets this question to ask for examples of ratepayer impacts under Condition No. 3.

Attachment 1 to this response contains the requested Excel spreadsheet. In Attachment 1, when market prices plus the adder is less than the system marginal value, then there is a negative impact on the ratepayer. When the market price plus adder is greater than the system marginal value, then there is a benefit to the ratepayer.

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23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.10 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.

RESPONSE:

As stated in BC Hydro's response to BCUC IR 1.23.7, BC Hydro does not attribute imports, exports or draft of system storage to any particular load.

When the price is low during the freshet, it is usually economic to import as much electricity as possible. In the event imports are limited by market depth or transmission constraints (i.e., imports are not limited by System Minimum Generation), then RS 1893 incremental load would be served from system storage. In this scenario the incremental load is either offsetting a future export, or will result in a future import. The expected value of the future import or export is reflected in the system marginal value, and the ratepayer impact is the difference between the system marginal value and the RS 1893 rate.

23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.11 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.

RESPONSE:

Holding the daily Mid-C price constant, the Incremental Energy Rate load could not result in a net revenue loss from foregone exports on the same day. This is because the daily RS 1893 price (including adder) for a domestic sale is always higher than the daily delivered export price (net of transmission costs) for a market sale.

However, forgone export at a later date may occur as a result of the Incremental Energy Rate load. The value of this future forgone export is not known at the time

of the IER load; however, the system marginal value incorporates the possibility of those future sales. Under this case there will be a net impact to the ratepayer if the system marginal value is higher than the RS 1893 rate when the Incremental Energy Rate load occurred. Please refer to Attachment 1 of this response for an Excel spreadsheet illustrating this second example.

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23.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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.

1.23.12 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.23.2.

24.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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;

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

RESPONSE:

RS 1893 energy sales are expected to have a negligible impact on reservoir elevations over the next three years. The expected sales of 266 GWh per year, shown in Table 9 on page 77 of the Application, is about 0.5 per cent of the expected load, and far less than the variation in system inflows.

24.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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;

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

RESPONSE:

BC Hydro's surplus over the next three years is approximately 4,000 GWh under average water conditions.[1] The amount of energy sales under the IER Pilot is expected to be negligible compared with the average annual surplus and the annual variation in system inflow plus Independent Power Producer deliveries.

[1] **As taken from BC Hydro's response to BCUC IR 1.15.3, as filed in its Fiscal 2020 to Fiscal 2021 Revenue Requirements Application.**

24.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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;

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

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.24.2.

24.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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;

1.24.4 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.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.3.

24.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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;

1.24.5 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.

RESPONSE:

With respect to Objectives (c) and (n), please refer to BC Hydro's response to BCUC IRs 1.10.3 and 1.24.2.

25.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.25.1 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.

RESPONSE:

Confirmed. Fiscal 2019 consumption is the proposed default period for RS 1893 baseline determination. The conditions that might result in an alternate period being used for RS 1893 baseline determination, or for making RS 1893 baseline adjustments, are described in Special Condition Nos.7, 8 and 9 of RS 1893.

25.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.25.2 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).

RESPONSE:

As applicable, BC Hydro considers the previous year's annual RS 1823 energy consumption in accordance with the criteria set out in TS 74 (CBL Determination Guidelines) for RS 1823 Initial Energy CBL determination (section 3 of TS 74) and for RS 1823 Annual Energy CBL Resets (section 4.3 of TS 74).

Customers served under RS 1828 do not have an RS 1823 Energy CBL, so the provisions of TS 74 do not apply.

There is no Monthly Reference Demand under RS 1823, RS 1828 or TS 74, so the consideration of previous year's consumption does not apply.

25.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.25.2 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).

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

RESPONSE:

BC Hydro understands this question to relate to the interaction of baseline setting provisions as between RS 1893 and RS 1823.

RS 1893 service is only available to eligible RS 1823 and RS 1828 customers.

Since the participating customer must take firm service under RS 1823 to be eligible to take non-firm service under RS 1893, the provisions of TS 74 related to the RS 1823 Energy CBL will continue to apply. Please also refer to BC Hydro's responses to BCUC IR 1.25.2 and BCOAPO IR 1.39.2.

Further, Special Condition No. 9 of RS 1893 is intended to ensure that any RS 1823 Energy CBL adjustment requested by the customer under TS 74 will result in a matching adjustment to the customer's RS 1893 baselines.

Taken together, BC Hydro is of the view that it is appropriate to consider eligible baseline adjustment events (and previous year's consumption, where applicable) under both rates so as to ensure a fair, consistent and transparent outcome for BC Hydro and participant customers.

26.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.26.1 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.

RESPONSE:

Special Condition No. 11 under RS 1893 sets the maximum level of electricity available to customers under RS 1893. This limitation on RS 1893 usage was proposed as an alternative to a 10 MVA minimum size threshold after consultation with customers and AMPC. Both methods seek to mitigate the potential for load

shifting between RS 1823 and RS 1893. The two methods are compared and contrasted below.

<u>10 MVA Minimum Size Threshold</u>

- **This method would provide for a simple and transparent separation of firm and non-firm service. For prospective new customers, it would provide clarity as to the customer's minimum investment in new plant (i.e., 10 MVA) that would be subject to firm electricity service under RS 1823 before any incremental load would be eligible for non-firm service under RS 1893.**
- **However, for new customers, using a fixed threshold could result in all new load greater than 10 MVA being priced under RS 1893 rather than RS 1823. Depending on the size of the incremental load, this could result in a significant load shift for loads in excess of 10 MVA.**
- **In addition, the 10 MVA threshold would exclude approximately 55 per cent of existing RS 1823 customers with loads smaller than 10 MVA from participating. Existing RS 1823 customers provided clear feedback to BC Hydro that this approach would be unfair.**
- **BC Hydro also notes that no transmission service rate schedules have a minimum size threshold.**

<u>Limitation on RS 1893 usage</u>

- **The proposed limitation on RS 1893 usage (Special Condition No. 11 of RS 1893) would apply equally to all RS 1823 customers of any size.**
- **The proposed limitation on RS 1893 usage of 2.0 times historical electricity consumption is intended to enable a customer to optimize production capacity that is idle or under-utilized. For instance, the customer could re-start an idled production line, re-start a piece of shutdown equipment, add a production shift, curtail self-generation, or make more energy intensive product grades. In these circumstances, BC Hydro generally expects that the incremental load would be within the prescribed limitation.**
- **BC Hydro considers that the proposed limitation on RS 1893 usage will help to right-size the customer's baselines during the Billing Year if new load is more than double historical load.**
- **Limitation of RS 1893 usage also involves BC Hydro monitoring each customer's monthly energy use and making baseline adjustments, as applicable. This approach also assists BC Hydro to flag significant and/or unusual increases in RS 1893 energy use that would be assessed under Special Condition No. 8 of RS 1893 to ensure the customer's RS 1893**

baselines are set appropriately to reflect normal expected RS 1823 electricity usage.

27.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.27.1 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.

RESPONSE:

BC Hydro expects that a customer with self-generation would typically choose to remain with RS 1893 service and not switch to RS 1880 service under one or more of the following circumstances and in no specific order:

- **Where the applicable RS 1893 energy price is lower than the RS 1880 price during the period of generator curtailment;**
- **Where the RS 1893 Monthly Reference Demand reflects the customer's normal monthly site operations and electricity purchases from BC Hydro, net of normal monthly self-generation output used for self-supply;**
- **Where site operations staff prefer the certainty of managing site generation to a fixed Monthly Reference Demand under RS 1893, rather than a dynamic 30 minute HLH Reference Demand under RS 1880;**
- **Where the Period of Use for generator curtailment occurs in LLH;**
- **Where the Monthly Reference Demand under RS 1893 is lower than the HLH Reference Demand that would be determined under RS 1880 prior to the Period of Use;**
- **Where there is no expected risk of Energy CBL reset under TS 74 (whether on a unique site or aggregated site basis) by remaining with RS 1893 service; and**
- **To avoid cancellation of RS 1893 service for the remainder of the Billing Year pursuant to Special Condition No. 12 of RS 1893.**

27.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

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

RESPONSE:

BC Hydro's rationale is that the customer should not be allowed to switch back and forth between RS 1893 pricing and RS 1880 pricing for each event of generator curtailment, based on whichever service is priced lower during the Billing Year.

28.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.28.1 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.

RESPONSE:

BC Hydro is proposing to file an evaluation report in fall 2023.

28.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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

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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.

1.28.1 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.

1.28.1.1 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.

RESPONSE:

Not applicable. BC Hydro is not proposing to file annual reports.

28.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.28.1 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.

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

RESPONSE:

The proposed IER Pilot reporting time frame for the evaluation report is fall 2023.

The Freshet Energy Rate Pilot included: (i) preliminary evaluation reports for Year 1 in fall 2016 and for Year 2 in fall 2017; and (ii) a final evaluation report, including an evaluation of Year 3, in fall 2018. BC Hydro also included an evaluation report for Year 4, as Appendix E to the Application.

BC Hydro is of the view that a single final evaluation report filed in fall 2023 would be more useful for stakeholders since the results would be covering three full fiscal years of the pilot.

BC Hydro does not support annual reporting for the IER Pilot due to its resource intensity and low regulatory efficiency.

28.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.28.2 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.

RESPONSE:

BC Hydro will use some of the same key success measures used in the Freshet Rate evaluations for the evaluation of the IER Pilot. These include:

- **Estimate of the costs and benefits of the IER Pilot. This will be determined on an overall ratepayer basis;**
- **Estimate of participant benefit based on the unit cost reduction of incremental electricity (and any other measures identified by participant customers);**
- **Estimate of incremental energy sales and revenue;**
- **Assessment of whether risk mitigation measures such as the energy charge adder were sufficient to protect non-participants from harm; and**
- **Assessment of customer participation and satisfaction regarding the rate.**

Please also refer to section 5.7 of the Application.

For the IER Pilot rate to continue, BC Hydro believes that ratepayers should not be harmed and that the rate meets customer needs. These factors will need to be

assessed carefully in any decision to continue the rate. In addition, BC Hydro will need to engage with customers and stakeholders to inform this decision.

28.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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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.

1.28.3 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.

RESPONSE:

BC Hydro will need to review the results of the evaluation and undertake customer and stakeholder consultation to determine whether the IER Pilot should be continued, extended, made permanent, or terminated.

BC Hydro will file an application with the BCUC for approval if it intends to extend the IER Pilot or to make the rate permanent.

28.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.28.3 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.

1.28.3.1 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?

RESPONSE:

BC Hydro is uncertain whether it would be seeking a BCUC review and decision by March 31, 2024 at this time. It will depend on the results of the IER Pilot evaluation and the timing of the customer and stakeholder engagement process.

28.0 C. INCREMENTAL ENERGY RATE PILOT PROPOSAL

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.

1.28.3 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.

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

RESPONSE:

BC Hydro proposes a filing date for the evaluation report of December 13, 2023.