BC Hydro
Power smart

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August 22, 2019

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. 1599004
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Application to Amend Net Metering Service under Rate Schedule (RS) 1289
Responses to Interveners Information Request No. 1

BC Hydro writes in compliance with BCUC Order No. G-144-19 to provide its responses to Interveners Round 1 information requests (**IRs**) as follows:

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

For further information, please contact Chris Sandve at 604-974-4641 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

Fred James
Chief Regulatory Officer

cs/ma

Enclosure

1.0 I. Stakeholder Consultation and Communication

Refers to the following sections in BC Hydro's application:

- Order No. G-100-18, approving 2018 Amendment application on an interim basis. Request for stakeholder engagement on consultation
- Section 1.2 Proposed Amendments Reflect Customer Feedback ….
- Section 2.5 Engagement Survey Results
- Section 5.1 Clarification would Help Prevent Unsafe Connections
- Appendix F, Section 5. Communication and Education
- Appendix F, Section 13. Conclusions

1.1.1 BC Hydro held a webinar (twice) and conducted a follow-up on-line survey. When will BC Hydro be conducting a full customer and stakeholder consultation, as well as a full review of the net metering program, as requested in the interim decision of 2018, to seek advice from users and others with experience and expertise in Net Metering Programs?

RESPONSE:

As discussed in section 7 of the Application, BC Hydro limited the scope of the Application to allow for adequate engagement with stakeholders and customers on the topics in the Application while meeting the requirement to file the Application by April 30, 2019.

BC Hydro will consider the topics discussed in section 7 of the Application as well as other emerging issues and opportunities, as necessary, for future applications. BC Hydro would conduct customer and stakeholder engagement prior to any application with regards to these matters.

1.0 I. Stakeholder Consultation and Communication

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1.1.2 Besides the webinar and on-line survey, how did BC Hydro engage with customers and stakeholders about:

1.1.2.1 Increasing interest in electric vehicles, charging them from the grid and heatpumps?

RESPONSE:

The proposed amendments to RS 1289 primarily focus on changes to the tariff to prevent additional Oversized Generating Facilities from participating in the program and to mitigate cost-shifting from customers in the Program to non-participating customers with regards to Surplus Energy Payments. The Application is not intended to address or fully explore other topics which may be indirectly related to net metering.

As discussed in BC Hydro's response to BCUC IR 1.20.5, the stakeholder consultation that has taken place in relation to the Application is the webinars held on March 18, 2019 and on April 1, 2019 and the Engagement Survey which was completed by April 9, 2019.

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1.1.2 Besides the webinar and on-line survey, how did BC Hydro engage with customers and stakeholders about:

1.1.2.2 Increasing interest of First Nations and other communities in solar energy and net metering?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.2.1.

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1.1.2 Besides the webinar and on-line survey, how did BC Hydro engage with customers and stakeholders about:

1.1.2.3 The need for a transparent review of the net-metering program, with the opportunity for all stakeholders to participate?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.2.1.

1.0 I. Stakeholder Consultation and Communication

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1.1.3 How many FTEs did BC Hydro spend on the year-long review of the net-metering program and engaging with all stakeholders?

RESPONSE:

BC Hydro did not track the staff time required to conduct customer and stakeholder engagement and to prepare the Application. All staff time was accommodated within existing budgets and staffing levels. Beyond staff time, BC Hydro did not incur any other costs related to customer and stakeholder engagement or preparing the Application.

The Program is managed by approximately 3.0 FTEs in the Power Acquisitions and Contract Management Key Business Unit (KBU). As required, support is provided by other KBUs (e.g., Interconnections and Shared Assets KBU, Regulatory and Rates KBU, Legal Services KBU).

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1.1.3 How many FTEs did BC Hydro spend on the year-long review of the net-metering program and engaging with all stakeholders?

1.1.3.1 How much other monies were spent on the review process?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.3.

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1.1.3 How many FTEs did BC Hydro spend on the year-long review of the net-metering program and engaging with all stakeholders?

1.1.3.2 On what specifically?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.3.

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1.1.4 In July 2019, BC Hydro's web page on net-metering is at least a year out-of-date and contains much incorrect information.

1.1.4.1 When will the net-metering web page be updated?

RESPONSE:

BC Hydro's net metering web site contains current information with regards to the applications BC Hydro has submitted to the BCUC for amendments to Rate Schedule 1289.

BC Hydro acknowledges that some of the information on the net metering web site is out-dated (e.g., the number of customers currently in the Program) and expects to update the web site shortly after a decision by the BCUC on the Application.

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1.1.4 In July 2019, BC Hydro's web page on net-metering is at least a year out-of-date and contains much incorrect information.

1.1.4.2 What assurances can BC Hydro give that it will be able to communicate changes to the net- metering program on an ongoing basis?

RESPONSE:

Rate Schedule 1289 is a publicly available tariff and any changes to the Program are filed with and approved by the BCUC. Program updates are posted on BC Hydro's website and email notifications are sent to:

- **Customers in the Program, including those with applications pending, who consented to receive Program updates;**
- **Net Metering contractors and installers; and**
- **Those who signed up to receive email updates on the Program.**

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1.1.5 Section 1.2 states that one reason for the amendments is for safety of the program. In section 5.1 you further clarify that you are actually talking about unauthorized generation and safety to BC Hydro operators, presumably in an outage.

1.1.5.1 Please describe BC Hydro's efforts to communicate this problem to customers in general?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.16.7.1 where we provide details on BC Hydro's actions to increase awareness of unauthorized generation connections.

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1.1.5 Section 1.2 states that one reason for the amendments is for safety of the program. In section 5.1 you further clarify that you are actually talking about unauthorized generation and safety to BC Hydro operators, presumably in an outage.

1.1.5.2 Please explain how this is a problem related to net-metering?

RESPONSE:

BC Hydro has two processes for providing customers with authorization to interconnect generation to the distribution system:

- **The distribution generator interconnection process, which is open to all generation; and**
- **The Net Metering Program for generation that qualifies for the Program.**

The majority of the unauthorized generation is small scale solar PV generation; however, unauthorized generation is a problem regardless of the energy source or generator as it can pose safety issues both during outages and during normal operation.

The proposed changes are intended to clarify that customers are required apply for approval of their generation facilities through the Program.

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1.1.5 Section 1.2 states that one reason for the amendments is for safety of the program. In section 5.1 you further clarify that you are actually talking about unauthorized generation and safety to BC Hydro operators, presumably in an outage.

1.1.5.3 Do you acknowledge that all solar net-metered systems have inverters designed to automatically stop sending energy when the grid is not operating, such as during outages?

RESPONSE:

Not all solar net-metered systems have inverters designed to automatically stop sending energy when the grid is not operating. BC Hydro has received and rejected Net Metering applications that propose inverters which do not meet the protection requirements of the DGTIR-100 (BC Hydro's interconnection requirements).

Inverters certified to CSA C22.2 No. 107.1 for utility interconnection, which are installed in accordance with CSA C22.1 (Canadian Electrical Code) have protection features to cease to energize the grid during outages.

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1.1.5 Section 1.2 states that one reason for the amendments is for safety of the program. In section 5.1 you further clarify that you are actually talking about unauthorized generation and safety to BC Hydro operators, presumably in an outage.

1.1.5.4 Is this not then a problem for those using diesel or gas generators as back-up energy sources during power outages and thus not specifically related to solar net-metering customers?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.5.2.

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1.1.6 What efforts did BC Hydro undertake to ascertain the impact that amending the rate without a public hearing had on customers who were developing projects for RS 1289 net-metering in advance of the April 29th, 2018 application to amend?

RESPONSE:

At the time that BC Hydro submitted the 2018 Amendment Application, BC Hydro believed that immediate limited amendments to Rate Schedule 1289 were required to prevent additional applicants with Oversized Generating Facilities from entering the Program.

BC Hydro requested that the proposed amendments become effective on the same date as the date the 2018 Amendment Application was submitted to:

- **Prevent additional costs from being imposed on non-participating customers; and**
- **Avoid leaving a window of time open that could have prompted a rush of applications to BC Hydro for proposed Oversized Generating Facilities.**

For further discussion, please refer to page 2 of the 2018 Amendment Application, provided as Appendix C of the Application.

BC Hydro was aware that some customers would be impacted by the amendments proposed in the 2018 Amendment Application, but did not have complete information with respect to all potential customer projects that may have been impacted. As discussed above, to avoid a rush of applications, BC Hydro did not inform customers of the proposed amendments in advance of submitting an application to the BCUC.

As discussed on page 7 of the 2018 Amendment Application, BC Hydro estimated that approximately 12 customers with Oversized Generating Facilities were in the

application review process at the time the 2018 Amendment Application was prepared. Three additional applications were submitted immediately prior to BC Hydro's submission of the 2018 Amendment Application and were not captured by this estimate.

Of these 15 applications BC Hydro received prior to April 20, 2018:

- **One customer re-sized their system and was subsequently accepted into the Program;**
- **Ten customers subsequently provided load information to demonstrate that their generation was not oversized, and their applications were accepted; and**
- **Four customers did not provide additional load information and their applications did not proceed through the review process.**

Between April 20, 2018 and June 1, 2018, BC Hydro received an additional 28 applications that did not meet the eligibility requirement that the estimated annual energy output match the estimated annual load. Of these 28 applications:

- **Four customers re-sized their systems and were subsequently accepted into the Program;**
- **Twenty customers subsequently provided load information to demonstrate that their generation was not oversized, and their applications were accepted; and**
- **Four customers did not provide additional load information and their applications did not proceed through the review process.**

In summary, from a total of 43 applications, eight customers did not complete the review process. BC Hydro cannot speculate on the reasons why these customers chose not to submit the requested load information.

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1.1.7 How did BC Hydro inform the BCUC about the impacts to customers who were in the process of developing projects for RS 1289?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.6.

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1.1.8 What compensation mechanisms did BC Hydro propose for customers who face(d) negative impacts from the interim amendment, if in fact BCUC determines a permanent amendment is not appropriate upon public review?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.6.

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1.1.9 BC Hydro's notification on Application to Amend (BCUC B-1 April 2018) states "Applicants are now [underline added] required to size their generation to meet their energy needs". The notification also says "We've submitted an application to the B.C. Utilities Commission to amend the net metering program".

1.1.9.1 Did BC Hydro mean to indicate that the criteria for RS 1289 had changed on April 20, 2018?

RESPONSE:

BC Hydro sent the notification provided on page 40 of Appendix C of the Application concurrently with its submission of the 2018 Amendment Application to the BCUC, because that application was requesting that the BCUC make the proposed amendments effective on the date of our submission. The BCUC approved this request by Order No. G-100-18.

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1.1.10 How many of the applications BC Hydro received for Net Metering RS 1289 were declined before the BCUC Order G-100-18 on June 1, 2018?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.6.

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1.1.11 Were any of these applications delayed or not approved due to sizing?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.1.6.

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1.1.12 Section F concludes with the statement "BC Hydro's Net Metering customers and stakeholders have indicated they are satisfied with the program and it meets their needs". How have you concluded this when you have not conducted a full stakeholder process?

RESPONSE:

The statement referenced in the question is from section 13 (Conclusion) of BC Hydro's Net Metering Evaluation Report No. 4, which is provided as Appendix F of the Application.

Net Metering Evaluation Report No. 4 was submitted to the BCUC on April 26, 2017 in accordance with Order No. G-104-14 which directed BC Hydro to submit a progress report on Rate Schedule 1289 and the micro-Standing Offer Program.

The report, including the statement referenced in question, was informed by a survey distributed to nearly 1,800 stakeholders. The survey is provided on pages 41 to 44 of Appendix F of the Application.

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1.1.13 If net-metering customers are satisfied with the existing program, why are you changing it?

RESPONSE:

BC Hydro recognizes that some existing customers in the Program feel that the Program works well and should not be changed. However, BC Hydro does not believe that the Program should continue without any changes. In particular, as set out in sections 2 and 4 of the Application, changes are required to maintain the Program as a load offset program and to limit cost shifting between participating and non-participating customers with regards to Surplus Energy Payments.

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1.1.14 In Appendix D page 5 BC Hydro has a table titled "Evolution of Net Metering Program". This table is incomplete making no reference to Order No. G-7-15. Why did BC Hydro not include the option of leasing in the stakeholder engagement materials?

RESPONSE:

As discussed in section 1.4.5 of the Application, the BCUC noted in Order No. G-7-15 that RS 1289 may be amended to foster increased participation in the Program by granting eligibility to lessees. Accordingly, in June 2015, BC Hydro applied to amend RS 1289 to allow customers in the Program to own or lease clean or renewable generating facilities. By Order No. G-116-15, the BCUC approved these amendments.

As discussed in section 7 of the Application, BC Hydro limited the scope of the Application to allow for adequate engagement with stakeholders and customers on the topics in the Application while meeting the requirement to file the Application by April 30, 2019.

Accordingly, the stakeholder engagement materials were focused on the specific proposed changes to the Program that BC Hydro was intending to file with the BCUC by April 30, 2019.

As discussed in section 7.1 of the Application, BC Hydro will consider matters related to the leasing opportunities for future applications.

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1.1.15 Please provide the web version of the survey as provided to participants.

RESPONSE:

Attachment 1 to this response provides a copy of the Engagement Survey as provided to participants.

Net Metering Survey

To help inform the April 30th, 2019 Net Metering Application, we invite you to share your views on proposed changes by completing the following short survey.

1. Did you participate in the Net Metering webinar on March 18, 2019?

- ☐ Yes
- ☐ No

2. We need to know a little about who you are so we can better understand your responses. Select all that apply. I'm:

- ☐ a net metering applicant (I have applied but I'm not on the net metering billing yet)
- ☐ a net metering customer (my system is operating and I'm on the net metering billing)
- ☐ an installer/contractor for net metering customers
- ☐ other [please specify]

3. If you are an existing customer, what type of customer are you?

- ☐ residential
- ☐ commercial
- ☐ municipal government
- ☐ First Nation
- ☐ community group
- ☐ school
- ☐ other

4. Please indicate which of the following statements is most applicable to you.

- ☐ Over time, I expect to generate less energy than I consume.
- ☐ Over time, I expect to generate about as much energy as I consume.
- ☐ Over time, I expect to generate more energy than I consume.
- ☐ Not applicable – not a customer

5. What generation technologies do you use or are planning to install? *(allow multiple response)*

- ☐ solar PV
- ☐ hydroelectric
- ☐ wind
- ☐ other [please specify]

The next few questions focus on the proposed changes to the Net Metering program.

6. Addressing Oversized Generation

In April 2018, BC Hydro made interim changes to require new applicants to size their proposed generation so that it is no greater than their electricity consumption. While this change prevents new customers from installing oversized generation, it also created some unintended consequences. For example, under the current rules, a customer who plans to purchase an electric vehicle may not be able to offset their future additional load. To accommodate these customers while maintaining the Net Metering program as a load offset program, BC Hydro is considering changes to this approach.

Of the options below, which one would you prefer?

- ☐ Continue the interim solution and allow flexibility (e.g. allow generation up to 10% higher than anticipated load)
- ☐ No load-to-generation ratio (dependent on other program changes)
- ☐ Other suggestions [please specify]

7. Options for Payment Terms

Under the current net metering tariff, any excess energy credits remaining after a customer's anniversary date (which is the anniversary of BC Hydro's authorization to connect) are paid out every 12 months (the true up period).

a) BC Hydro is considering providing customers with the ability to choose an anniversary date that maximizes the use of credits to offset their consumption.

Which option would you prefer?

- ☐ Set a common anniversary date for all customers (e.g. March 1st for everyone)
- ☐ Allow customers to choose their anniversary date (i.e. individual preference)

b) BC Hydro is considering extending the true-up period or allowing customers to bank their credits. This would provide customers with increased opportunities to use their credits to offset their consumption.

Which option would you prefer?

- ☐ Continue the current 12-month true-up period
- ☐ Extend the true-up period from the current 12-months to 24-months or longer

c) BC Hydro is considering changes to the price customers receive for excess generation so that the price paid would reflect the price that BC Hydro could sell the electricity for on the regional wholesale market. This reflects the principle of the Net Metering program as a load offset

program for customers wishing to offset their consumption and reduce their electricity bills.

Which option would you prefer?

- ☐ Allow customers to bank their credits for 5 years (credits expire after 5 years)
- ☐ Revise the price for excess energy to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market.

8. Grandfathering of Existing Customers

BC Hydro is considering a grandfathering provision for existing net metering customers. Please indicate your support for the following option:
[use 5 point scale from Strongly oppose to Strongly support]

Grandfather existing customers for a period up to 5 years and commit to review the grandfathering provision after the selected term expires.

a) Do you have any additional comments or suggestions about grandfathering for existing customers?
[open end]

9. Are there other comments you would like to provide on the proposed changes to the Net Metering program?
[open end]

Thank you for providing feedback on the Net Metering program.

You may now close the survey.

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1.1.15 Please provide the web version of the survey as provided to participants.

1.1.15.1 Why were participants not given the choice to review their answers to the survey questions prior to submitting their survey?

RESPONSE:

It is not common practice to allow survey respondents to review and/or revise their answers after completing a survey. To address key topics, the survey was designed with relatively straightforward questions and answer options.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.1 Is BC Hydro willing to accept "Community Net Metering" as preferred description for shared renewable energy generators for community electrification?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.2 Why did BC Hydro use a seemingly new definition of Virtual Net Metering used in the Glossary of Terms of Abbreviations Appendix H page v of the application?

RESPONSE:

The definition of "Virtual Net Metering" in Appendix H of the Application refers to how this term has been used in the Application.

For further information with regards to Virtual Net Metering, please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.3 What are the modifications required to accommodate community net metering?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.4 Please provide data on the costs of these modifications?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.4 Please provide data on the costs of these modifications?

1.2.4.1 Has BC Hydro researched how local utilities in BC, such as Nelson and New Westminster allocate their community net metering energy credits on customers' utility bills?

RESPONSE:

BC Hydro is aware that municipal utilities in B.C. offer community net metering, but we have not considered details regarding how these services are offered to customers or how the rates are managed by each of the utilities.

For further information with regards to community net metering, please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.4 Please provide data on the costs of these modifications?

1.2.4.2 What are the barriers to adding Net Metering energy credits to customers' bills in a Community Net Metering scenario?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.5 In the Net Metering Evaluation Report #4, BC Hydro indicates they received requests to support community net metering; in response they have suggested that one customer 'own' the net metering installation and perform the administrative tasks of sharing any energy offsets between the participating customers.

1.2.5.1 When did BC Hydro first receive a community request to support community net metering?

RESPONSE:

BC Hydro first received a request to support community net metering in 2015.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.5 In the Net Metering Evaluation Report #4, BC Hydro indicates they received requests to support community net metering; in response they have suggested that one customer 'own' the net metering installation and perform the administrative tasks of sharing any energy offsets between the participating customers.

1.2.5.1 When did BC Hydro first receive a community request to support community net metering?

1.2.5.1.1 What does BC Hydro mean by "energy offsets"?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.20.1.2.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.5 In the Net Metering Evaluation Report #4, BC Hydro indicates they received requests to support community net metering; in response they have suggested that one customer 'own' the net metering installation and perform the administrative tasks of sharing any energy offsets between the participating customers.

1.2.5.1 When did BC Hydro first receive a community request to support community net metering?

1.2.5.1.2 How is this different, administratively, from the leasing program?

RESPONSE:

Leasing arrangements for Generating Facilities are not part of a program or service offered by BC Hydro. Rather, they are a service which may be provided by third-parties to customers.

Enabling customers to share distributed energy resources (e.g., virtual net metering, aggregate net metering, community net metering) is a potential new service that could be offered by BC Hydro in the future. For further discussion, please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.5 In the Net Metering Evaluation Report #4, BC Hydro indicates they received requests to support community net metering; in response they have suggested that one customer 'own' the net metering installation and perform the administrative tasks of sharing any energy offsets between the participating customers.

1.2.5.1 When did BC Hydro first receive a community request to support community net metering?

1.2.5.1.3 Would this not require additional infrastructure for the 'one customer'?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

2.0 II. Virtual or Community Net Metering

Refers to the following sections in BC Hydro's application:

- Section 7.2. Virtual Net Metering
- Appendix F – Net Metering Evaluation Report No. 4

1.2.5 In the Net Metering Evaluation Report #4, BC Hydro indicates they received requests to support community net metering; in response they have suggested that one customer 'own' the net metering installation and perform the administrative tasks of sharing any energy offsets between the participating customers.

1.2.5.1 When did BC Hydro first receive a community request to support community net metering?

1.2.5.1.4 Who would cover those costs?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.1 How does net metering fit into a larger framework of future energy generation in BC, including how BC Hydro is considering global energy trends in distributed energy resources (DER) (*i.e.* smart water heaters, local micro-grids, battery storage, pumped storage, vehicle-to-grid)?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.4 where we explain that:

- **As of March 1, 2019, the installed capacity of customer Generating Facilities in the Program was 13.39 MW;**
- **To-date, BC Hydro has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning; and**
- **BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan (IRP).**

BC Hydro's next IRP will be informed by data on trends in distributed energy resources, which will be reflected through an update to our resource options inventory. For further information on BC Hydro's resource options inventory, please see: https://www.bchydro.com/toolbar/about/planning-for-our-future/electricity-supply-options.html.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.2 Does BC Hydro account for energy production from net-metering rate payers (current and future) in its Integrated Resource Plans? If so what is the potential for net-metering rate payers to contribute to energy generation if they are not restricted? If this has not been included in Integrated Resource Plans, why not?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.4 where we explain that, to-date, BC Hydro has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning and that BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.3 What penetration of solar photovoltaic production does BC Hydro consider to be a technical challenge to its grid operations? Please explain how that number was derived and what your assumptions were.

RESPONSE:

BC Hydro studies the system impacts of a net metering generator interconnection when:

- **The aggregate amount of existing generation and the generation to be connected is greater than 50 per cent of the minimum feeder segment load;**
- **The short circuit ratio (system short circuit MVA/connected generation MW) is less than seven; or**
- **There are known constraints due to the presence of other generation.**

The intent of these thresholds is to reduce the study requirements for small interconnections. The thresholds are used to determine when a system impact study is required. They are not used to reject applications to the Program.

When conducted, system impact studies may find that impacts can be addressed through minor upgrades or setting changes. Alternatively, the system impact studies may find that impacts require major upgrades, which may not be financially feasible, resulting in the rejection of an application.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.4 In its 2010 report on Smart Metering Infrastructure in BC, BC Hydro justifies smart meters for *creating the foundation for supporting new uses of electricity such as electric vehicles, customer generation and micro-grids*". How has BC Hydro used their smart meters to implement micro- grids?

RESPONSE:

BC Hydro defines a micro-grid as the condition where a portion of the BC Hydro system is energized by one or more power generator facilities and that portion of the system is separated electrically from the rest of the BC Hydro system. This is also known as "planned islanding".

BC Hydro uses Smart Meter historical hourly energy data to determine the size of the feeder section that can be supported by the power generator for planned islanding and uses Smart Meter voltage data to monitor power quality during planned islanding operation.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.5 Please provide an analysis of the implications for the future of BC Hydro electrical generation of declining costs of renewable energy, increasing uses of renewable energy by all modern utilities, technologies that enable distributed energy generation and the technology now available to make better use of renewable energy, and particularly solar energy? This analysis is critical to better understand how the net metering program, which represents less than 0.05% (1850/4 million) of BC Hydro's customer base, fits into the much larger picture of BC Hydro's resource planning.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.3 where we provide a high-level projection of the growth of customer rooftop solar participation in the Program and to BC Hydro's response to BCUC IR 1.18.4 where we explain that BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.6 Please provide an analysis that explains the pros and cons of increased solar energy in BC Hydro's future mix of electrical generation? BC Hydro estimated elsewhere that, in the face of government policy to electrify as much of the economy as possible, more electrical generation is required.

RESPONSE:

Solar is a clean or renewable source of energy that can be situated close to load/customers. However, there are limitations. Specifically:

- **The seasonal profile of solar generation does not match our system demand (i.e., solar generation is highest in the summer while our system peak demand is in the winter).**
- **BC Hydro's system peak occurs in the winter evenings when there is no solar generation.**
- **Solar generation is intermittent (i.e., generates when the sun is shining) and back up supply is required to make it reliable.**
- **Currently, BC Hydro estimates that the costs of solar at the utility scale in British Columbia are higher than other renewable energy sources, such as wind.**

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.7 Has BC Hydro considered the need for increased solar production given projected increasing demand for electricity in the future?

RESPONSE:

As discussed in section 2.1 of the Application, the Program is intended to allow individual customers to meet all or part of their electricity demand. Further, as outlined in BC Hydro's response to BCUC IR 1.18.4, to-date, BC Hydro has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning.

BC Hydro considers options to meet future demand, including solar, through its Resource Options Inventory, which will be updated through BC Hydro's next Integrated Resource Plan.

Further information on BC Hydro's Resource Options Inventory can be found at: https://www.bchydro.com/toolbar/about/planning-for-our-future/electricity-supply-options.html.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.8 Have you considered that restricting solar installations, as this application does, will put a chill on the potential of solar for your future electrical generation needs?

RESPONSE:

The amendments proposed in the Application are not intended to restrict solar installations. Rather, they are intended to support the objectives outlined in section 1.1 of the Application.

As shown in BC Hydro's response to BCUC IR 1.3.1, most customers in the Program do not have Oversized Generating Facilities and receive either no Surplus Energy Payment or minimal Surplus Energy Payments.

Further, as shown in section 1.5 of the Application, participation in the Program has continued to grow following Order No. G-100-18, which allowed BC Hydro to defer the review of all Net Metering applications proposing a generating facility sized to generate an estimated annual energy output greater than the estimated annual load.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.9 BC Hydro states that although water shortages occurred in BC Hydro's reservoirs this spring and summer, their models show no summer water shortages going forward as a result of climate change. What are the assumptions in BC Hydro's models that come to a conclusion differing fundamentally from other climate models?

RESPONSE:

BC Hydro does not make any statements in the Application with regards to its reservoirs or climate change models. BC Hydro does not agree that its projections with regards to climate change are different than other climate change models.

BC Hydro has a partnership with the Pacific Climate Impacts Consortium which produced future projections of hydrologic impacts of climate change in their 2011 study "Hydrologic Impacts of Climate Change in the Peace, Campbell and Columbia Watersheds, British Columbia, Canada".

The analysis for the period 2041 to 2070 projects a small increase to annual average water supply for B.C. Interior watersheds and no significant changes to annual water supply for coastal watersheds while noting seasonal changes in timing of runoff.

The report is available at:
https://www.pacificclimate.org/sites/default/files/publications/Zwiers.HydroImpactsSummary-CampbellPeaceColumbia.Jul2011-SCREEN.pdf.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.10 How will changes in glacier melt affect BC Hydro's reservoirs?

RESPONSE:

Glacier melt outflows in glaciated basins where BC Hydro operates reservoirs have been increasing over the last 50 years and are projected to continue to increase to a peak in the next 10 to 20 years, before starting to decline. The same projections show moderate increases in total runoff (including changes to glacier runoff) to large interior glaciated basins due to projected increases in precipitation as a result of climate change.

Based on simulation with BC Hydro's hydrologic model, the percentage of total system inflows represented by glacier melt over the last three years ranges from 2.7 to 3 to per cent.

For further information, please refer to:

- **Clarke, GKC et al. "Projected deglaciation of western Canada in the twenty-first century" *Nature Geoscience* volume 8, pages 372 to 377 (2015); and**
- **BC Hydro report "Potential impacts of climate change on BC Hydro-managed water resources" (https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/environment-sustainability/environmental-reports/potential-impacts-climate-change-on-bchydro-managed-water-resources.pdf).**

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.11 Please provide an analysis for the potential for solar energy to relieve the need to purchase energy, if predicted summer water shortages in reservoirs occur?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.3.9.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.12 Can BC Hydro explain the Minister of Energy's statement at the Provincial Government Budget debate in May that BC Hydro imported $54.9 M of electricity in March 2019?

RESPONSE:

BC Hydro makes market purchases as required to serve domestic load. Market purchases vary year to year, depending on reservoir inflows, market prices and customer demand.

The Minister's statement referenced in the question was with regards to market purchases that were made in March 2019 due to low water levels. There was a variance between actual and planned imports due to lower than planned water inflows and reservoir storage levels, which constrained hydro generation.

Market purchases for March 2019 were $54.9 million and 950 GWh. For fiscal 2019 overall, market purchases were $125 million and 2,036 GWh, compared to planned amounts of $35.9 million and 934 GWh.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.13 Does BC Hydro, or its trading subsidiary, have any energy purchase contracts that are in any way based on the timing of surplus production of wind or solar from outside the province?

RESPONSE:

BC Hydro does not buy or sell energy outside of B.C., as these trading activities are undertaken by BC Hydro's trading subsidiary, Powerex Corp. The trading activities of, Powerex Corp., including any contracts they may hold with external parties, are commercially sensitive and therefore confidential.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.14 What are BC Hydro's expected load changes due to cooling and refrigeration over the next ten years?

RESPONSE:

BC Hydro's statistically adjusted end use (SAE) forecasting models produce load projections based on the following three end-use categories: heating, cooling and other.

The cooling load projections from the SAE models used to develop BC Hydro's October 2018 Load Forecast (which covered a six-year period from fiscal 2019 to fiscal 2024) are as follows:

- **No changes to the commercial sector cooling load (i.e., remaining flat at approximately 355 GWh per year); and**
- **Increasing residential sector cooling load from approximately 1,285 GWh to 1,304 GWh per year.**

These projections reflect increased efficiency assumptions for various cooling devices (e.g., large and small air conditioners) that are embedded in the SAE models. In addition, BC Hydro makes further adjustments to account for losses, rate impacts and Demand-Side Management savings. However, these adjustments are not done on an end-use specific basis.

Refrigeration is part of the 'other' category which includes various other end uses (e.g., dishwashers, electric dryers, televisions, etc.). Therefore, a separate projection of refrigeration load changes is not available.

3.0 III. Resource Planning

Refers to the following sections in BC Hydro's application:

- Section 9. Current Trends

1.3.15 Is BC Hydro concerned about grid defection if net metering is rendered increasingly unattractive?

RESPONSE:

BC Hydro does not believe that changes to the Program would encourage customers to disconnect from the grid and self-supply.

Customers who choose to participate in the Program are able to accumulate a Generation Account Balance to offset their Net Energy Purchased from BC Hydro and receive a Surplus Energy Payment for any excess generation remaining at their Anniversary Date. Both of these benefits would be unavailable to a customer who decides to disconnect from the grid and self-supply.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.1 What is the annual volume of energy generated by solar net-metering when compared to IPPs, COPs, micro SOPs?

RESPONSE:

BC Hydro is not able to provide total generated energy volumes from customers in the Program because BC Hydro does not separately meter customer Generating Facilities.

In fiscal 2019, the total Standing Offer Program (SOP) generated energy volume was 363,971,727 kWh. This is an aggregate of both SOP and Micro-SOP volumes because there is only one Micro-SOP project and the actual generation volumes of an IPP are considered to be confidential.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.2 Has BC Hydro determined what amount of individual generating capacity would be considered significant?

RESPONSE:

Rate Schedule 1289 currently requires a Generating Facility to have a nameplate rating of not more than 100 kW. BC Hydro is not proposing to change this requirement in the Application. With regards to the Program overall:

- **Please refer to BC Hydro's response to BCUC IR 1.18.1 where we explain that there is not a specific level of cost-shifting that would prompt BC Hydro to propose amendments to further improve cost recovery from Program participants.**
- **Please also refer to BC Hydro's response to BCUC IR 1.18.4 where we explain that BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan.**

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.3 Has BC Hydro considered the studies from academics, utilities and public regulators that have laid to rest the cost-shifting idea and instead demonstrated the net benefit to utilities and all ratepayers of roof-top solar and other forms of distributed solar energy, including community solar? If so please provide the results of that investigation. If not, please explain why you have not investigated this considering that it is an emerging topic of interest to all modern utilities?

RESPONSE:

The amendments proposed in the Application are only intended to address the cost-shifting that occurs between participating and non-participating customers with regards to Surplus Energy Payments. This cost-shifting is quantified in BC Hydro's response to CEC IR 1.7.3.

As discussed in BC Hydro's response to BCUC IR 1.5.1 and shown in BC Hydro's response to BCUC IR 1.5.2, there is additional cost-shifting that that occurs between customers in the Program and non-participating customers that is not addressed by the amendments proposed in the Application.

With regards to the potential benefits of net metering, please refer to BC Hydro's response to BCUC IR 1.18.4 where we explain that:

- **As of March 1, 2019, the installed capacity of customer Generating Facilities in the Program was 13.39 MW;**
- **to-date, BC Hydro has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning; and**

- **BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan.**

As discussed in section 7.3 of the Application, over time, as participation in the Program increases, BC Hydro may be able to recognize certain additional benefits from the Program.

BC Hydro will consider potential amendments to further improve cost recovery from Program participants and to reflect potential benefits from the Program, as necessary, in future applications.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.4 BC Hydro is claiming a lack of fairness for non-net metering customers. In the case of the net-metering program, BC Hydro paid $324,000 to net metered overproducers amounting to 3.24 GWh. Can you please explain how that small amount paid to net-metered customers is unfair?

RESPONSE:

The cost-shifting from customers in the Program to non-participants caused by Surplus Energy Payments can be quantified by the difference between the total Surplus Energy Payments provided and the value of the excess generation received by BC Hydro for those payments.

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why excess generation from customers in the Program should be valued based on the market value and to BC Hydro's response to CEC IR 1.7.3 which quantifies the cost-shifting from customers in the Program to non-participating customers, with regards to Surplus Energy Payments.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.5 Is it fair that BC Hydro paid $86 million annually, since 2012, to high-carbon emitting biomass-derived energy through just four EPAs, representing 754 GWh at 11.5 cents/kWh?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.1 where we explain that Rate Schedule 1289 is a schedule that sets out rates for Service and other terms and conditions, and that, under section 60 of the *Utilities Commission Act*, the BCUC must have due regard to the setting of a rate that is not unjust or unreasonable.

The *Clean Energy Act* defines biomass as a clean or renewable resource. Electricity Purchase Agreements for biomass energy are not rates. They are filed and accepted by the BCUC, in accordance with section 71 of the *Utilities Commission Act*, unless otherwise exempted.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.6 How does the Energy Rate paid to NM overproducers compare to rates paid to IPPs, EPA- holders, and SOP participants?

RESPONSE:

The table below provides a comparison of the current RS 1289 Energy Price, proposed RS 1289 Energy Price, average unit cost of energy acquired under the Standing Offer Program (SOP),[1] and the average unit cost of IPPs and Long-Term Commitments[2] for 2018.[3]

	Price ($/MWh)
Current RS 1289 Energy Price	**99.9**
Proposed RS 1289 Energy Price	**39.9**
IPPs and Long-Term Commitments	**90.7**
Existing SOP	**102.8**

[1] **As shown in BC Hydro's response to INCE IR 1.7.1 provided in Exhibit B-6 of BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application.**

[2] **As shown on line 18 of Schedule 4.0 of Appendix A of BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application.**

[3] **The values for IPP and Long-Term Commitments and Existing SOP are for fiscal 2019 because the majority of the fiscal year period (April 2018 to March 2019) falls in calendar year 2018.**

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.7 How much did BC Hydro spend on residential and industrial PowerSmart in 2018 and what were the respective energy savings?

RESPONSE:

BC Hydro's Demand-Side Management (DSM) expenditures and new incremental energy savings for residential and industrial programs in fiscal 2018 are shown in the table below.

	Fiscal 2018 Expenditures ($ million)	**Fiscal 2018 New Incremental Energy Savings (GWh/year)**
Residential DSM Programs	**11.8**	**41**
Industrial DSM Programs	**20.5**	**130**

Please also refer to BC Hydro's response to BCCSC IR 1.4.8 where we explain that DSM expenditures in a given year result in energy savings that persist for multiple years.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.8 How it is fair that BC Hydro spent $30 million on PowerSmart (in 2010) to save just 78 GWh compared to spending $324,000 for 3.24 GWh in the net metering program?

RESPONSE:

BC Hydro's DSM expenditures are incurred in accordance with expenditure schedules that have been filed with and approved by the BCUC pursuant to section 44.2 of the *Utilities Commission Act*.

The 78 GWh of annual energy savings and $30 million in expenditures referenced in the preamble to the question relate to residential DSM programs, as reported in BC Hydro's Fiscal 2010 Annual Report on DSM Activities.

While $30 million of expenditures were incurred in fiscal 2010, the resulting 78 GWh of energy savings persist for 17 years, on average. No further payments are required to maintain those savings in subsequent years. As shown in Table 4 of BC Hydro's Fiscal 2010 Annual Report on DSM Activities, the levelized utility cost of residential DSM program savings in that year was 2.9 cents/kWh, not including any capacity benefits realized by the DSM activity.

Since the Fiscal 2017 to Fiscal 2019 Revenue Requirements Application, BC Hydro has used the wholesale market price to value DSM energy savings in the utility cost test, as a screen for assessing the cost-effectiveness of DSM.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.9 Please explain how residential sections of the PowerSmart program benefit those who do not own homes and cannot take advantage of the program?

RESPONSE:

BC Hydro has a broad suite of residential offers to create opportunities for customers to participate. Owning a home is not a pre-requisite to participation. The Retail Rebate program, Low Income program and Residential Energy Management Activities all contain offers that are available to both renters and homeowners.

Since the Fiscal 2017 to Fiscal 2019 Revenue Requirements Application, BC Hydro has used the wholesale market price to value DSM energy savings in the utility cost test, as a screen for assessing the cost-effectiveness of DSM. BC Hydro uses this screen so that investments in DSM will lower BC Hydro's overall revenue requirement to the benefit of all customers.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.10 How does BC Hydro plan to sell surplus net-metered solar generated electricity on the regional wholesale market when solar overproduction travels only as far as the nearest demand?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.21.3 where we explain that any excess energy received by BC Hydro at the customer's point of interconnection with the BC Hydro's system is not attributed to a particular use by BC Hydro.

Please also refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.11 Please explain how you consider it fair to net-metered customers when the compensation you propose does not actually reflect the value of the energy, considering that solar energy from net-metered customers travels to the nearest customer and would, therefore, never be sold on the regional wholesale market?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.21.3 where we explain that any excess energy received by BC Hydro at the customer's point of interconnection with the BC Hydro system is not attributed to a particular use by BC Hydro.

Please also refer to BC Hydro's response to BCUC IR 1.10.2 where explain why excess generation from customers in the Program should be valued based on the market value.

4.0 IV. Fairness

Questions in this section relate to the following sections in BC Hydro's application:

- Allocating the benefits and costs of the Program fairly between participating and non-participating customers
- Section 1.2 Improving Fairness Between Participating and Non-Participating Customers
- Section 4. Amendments Will Improve Fairness
- Section 7.3 Broader Costs and Benefits of the Program
- Appendix A

1.4.12 Please explain the fairness to the overwhelming majority of net-metered customers when you are proposing to put a cap on an entire program based on what you consider to be the excessive production by 0.86% of net-metered customers?

RESPONSE:

BC Hydro is not proposing to put a cap on the Program. Please refer to BC Hydro's response to BCUC IR 1.5.3 where we explain that the purpose of limiting the Annual Energy Output to 110 per cent of the estimated Annual Load is to maintain the Program as a load offset program and that the purpose of the proposed amendments to the Energy Price is to limit the cost-shifting associated with Surplus Energy Payments.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.1 BC Hydro highlights that the Clean Energy Act sets out BC's energy objectives which include "to use and foster the development in BC of innovative technologies that support energy conservation and efficiency in the use of clean or renewable resource". Please explain how, in order to meet this requirement of the Clean Energy Act, BC Hydro is adopting use of the latest innovative technologies such as grid-edge technology, distributed energy, community net metering, advances in the efficiency of solar and battery storage?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.4 where we explain that BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in our next Integrated Resource Plan. This would include a review of emerging technologies.

In the Application, BC Hydro is proposing amendments to Rate Schedule 1289. The Electric Tariff defines a Rate Schedule as a schedule that sets out rates for Service and other terms and conditions, as filed with the BCUC from time to time.

As outlined in section 1.3 of the Application, sections 59 to 61 set out the rate setting functions of the BCUC and provide the BCUC with the authority to approve the amendments sought in the Application. Section 60 of the *Utilities Commission Act* specifies that the BCUC must have due regard to the setting of a rate that is not unjust or unreasonable.

The *Clean Energy Act* objective referenced in the preamble to the question is not a requirement. Rather, it is an objective that the BCUC must consider, along with the other energy objectives. As discussed in section 1.3 of the Application, the BCUC has previously determined that that the energy objectives support a focus on economic efficiency criteria in the design of the Net Metering rate and a reduction of any unnecessary economic barriers to the Program.

BC Hydro believes that the amendments proposed in the Application are consistent with this focus. For example, the proposed update to the Energy Price reflects economic efficiency criteria because it sends a price signal that reflects the value of the excess generation to BC Hydro. While the updated Energy Price may reduce the Surplus Energy Payments to some customers in the Program, this amendment is required to mitigate cost shifting between participating and non-participating customers.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.2 With regards to Grid-Edge Technology specifically what is BC Hydro's definition of grid-edge technologies?

RESPONSE:

BC Hydro does not use the term grid-edge technology and there is no industry standard definition for grid-edge technology.

Grid-edge technology is term popularized by the media publications and it is our understanding that this term is used to describe a wide range of technologies on both the utility and customer side of the meter.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.2 With regards to Grid-Edge Technology specifically what is BC Hydro's definition of grid-edge technologies?

1.5.2.1 Please describe BC Hydro's grid-edge programs, including the number of participants per application

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.2.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.2 With regards to Grid-Edge Technology specifically what is BC Hydro's definition of grid-edge technologies?

1.5.2.2 What is the value to the energy systems that grid-edge technologies provide?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.2.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.2 With regards to Grid-Edge Technology specifically what is BC Hydro's definition of grid-edge technologies?

1.5.2.3 How much capital has BC Hydro invested in grid-edge technologies?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.2.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.2 With regards to Grid-Edge Technology specifically what is BC Hydro's definition of grid-edge technologies?

1.5.2.4 Describe BC Hydro's demand response technology programs, including capital investment costs.

RESPONSE:

BC Hydro provided descriptions of its capacity-focused DSM initiatives, including demand response trials, in its response to BCUC IR 1.183.1 in the proceeding for BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application. That response is included as Attachment 1 to this response.

Actual and forecast expenditures on capacity-focused DSM are shown in the table below. These expenditures are part of the DSM portfolio and classified as deferred operating costs.

	F2015 Actual	F2016 Actual	F2017 Actual	F2018 Actual	F2019 Actual	F2020 Forecast	F2021 Forecast
Capacity-focused DSM Expenditures ($ million)	**4.7**	**8.6**	**8.4**	**6.9**	**3.3**	**6.9**	**4.3**

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183.0 R. CHAPTER 10 – DEMAND SIDE MANAGMENT

Reference: DEMAND SIDE MANAGEMENT
Exhibit B-1, Section 10.4.2, pp. 10-21–10-22, Appendix X, p. 3;
BC Hydro F2017-2019 RRA Proceeding, Exhibit B-9,
BCUC IR 192.2, 168.1
Capacity focused DSM

On page 10-21 of the Application, BC Hydro states that "BC Hydro proposed a total budget of $38.6 million for these initiatives from fiscal 2017 to fiscal 2019. This DSM Plan extends that budget to fiscal 2021 but reduces the overall total by 12 per cent to $34 million."

On page 10-22 of the Application, BC Hydro states:

> BC Hydro decided to extend the time period to assess capacity-focused pilots and trial offers due to the complexity of assessing the impacts and value of capacity-focused DSM to BC Hydro's system. This also provides more time to incorporate past learnings into new activities, consider changing technologies and accommodate the long lead times required for some customer projects.

On page 3 of Appendix X to the Application, BC Hydro states:

> Over the fiscal 2020 to fiscal 2022 period, this initiative will identify opportunities to use customer-based, demand-side measures as a resource to manage capacity constraints on the grid. These activities include trials looking at localized demand-side management, behavioural shifting during peak periods, direct control of various technologies, and exploration into the emerging area of Connected Homes and Buildings.

In response to BCUC IR 192.2 in the BC Hydro F2017-2019 RRA proceeding, BC Hydro provided a table outlining planned EM&V activities, which includes a line item for capacity- focused DSM that states that "Fiscal 2017: measurement and verification results and impact evaluations Fiscals 2018 and 2019: To be determined."

In response to BCUC IR 168.1 in the F2017-2019 RRA proceeding, BC Hydro stated that no savings from capacity focused DSM programs were included, as the programs were in the pilot stage, and the savings could not be relied on for planning purposes.

1.183.1 Please report on the progress and results (e.g. capacity savings potential and cost effectiveness) to date, including the results of any evaluations conducted to date.

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RESPONSE:

This response also responds to BCSEA IR 1.38.2, BCSEA IR 1.39.1, CEC IR 1.84.1 and INCE IR 1.6.13.

This response provides a summary of BC Hydro's capacity-focused DSM (CFDSM) initiatives to date, including information on the progress, findings and results of the pilots and trials. We have conducted a number of assessments on initiatives that are either completed or ongoing and these are summarized in this response. Further assessment of initiatives are planned which may include Impact Evaluations on local substation pilots.

Attachment 1 to this response provides a more detailed description of the major CFDSM pilots and trials that are underway or have been completed.

Overview

BC Hydro has undertaken a number of initiatives exploring capacity conservation. The pilots are providing information that will inform the savings potential and cost effectiveness of different technologies and behaviours. Information from the pilots will be used to inform potential opportunities at the distribution system level as well as broader potential resource options to inform the next Integrated Resource Plan.

As noted in BC Hydro's response to BCUC IR 2.317.3 in the Previous Application, the primary purpose of BC Hydro's CFDSM pilot activities was to inform contingency resource plans over the next five to 20 years that anticipated the potential for a larger capacity gap than in the base resource plan. In addition, due to load growth in a number of our 306 substations and the need to expand the capacity of those substations and/or their connected transmission and distribution infrastructure, CFDSM activities could reduce peak loads thereby allowing us to defer capital investments in substation upgrades.

BC Hydro's initial focus was on reducing system-wide peaks, which resulted in a load-curtailment pilot with our large industrial customers served via the transmission system. Work also began on testing technologies and behavioural initiatives at the distribution system level that would provide system-wide benefits. We then began to explore the additional benefits of reducing demand in the distribution system by avoiding upgrades to substations or feeders. Through adaptive management we have moved from tests of individual technologies and behavioural initiatives to more pilots at the substation level. In each technology and behavioural initiative, we were testing the potential for capacity benefits, including customer response and acceptance to the initiative.

CFDSM Objectives

Our objectives for the CFDSM initiatives are to:

1. **Understand the dependability/reliability of capacity-focused programs and technologies applicable to the B.C. market;**
2. **Explore how to build customer acceptance of CFDSM concepts;**
3. **Quantify the impacts of various technologies;**
4. **Investigate how these types of programs should be operationalized within the BC Hydro system; abd**
5. **Investigate whether CFDSM and geo-targeted conservation programs could help alleviate peaks on constrained distribution assets to defer capital investments and allow the connection of new customers in these constrained areas.**

Trials and Pilots

The following list represents the main initiatives completed and underway. For a more detailed description of the initiatives and results, please refer to Attachment 1 to this response.

- **Industrial load curtailment**
- **Residential demand response trials**
  - **Wi-fi auto demand response water heater controllers**
  - **3-element water heaters**
  - **Radio-frequency (mesh) auto demand response water heater controllers**
  - **Residential thermostats – Sinope controllers**
  - **Residential thermostats – NEST**
  - **Peak Saver – opt-in pilot**
  - **Electric thermal storage – ceramic bricks**
  - **Smart electric vehicle charging – single family**
  - **High voltage utility charger – MURB and commercial customers**
- **Commercial and industrial demand response trials**
  - **Commercial and industrial manual demand response**

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- **Small business water heater auto demand response**
- **Industrial load shaping – greenhouse application**
- **Commercial smart charging – electric buses – BC Transit**
- **Commercial smart charging – electric buses**
- **Commercial smart charging – electric vehicle fleet**
- **Commercial smart charging – forklifts and lift trucks (warehousing)**
- **Peak Saver – small and medium business opt-in pilot**
- **Commercial fleet charging – UBC investigation**
- **Marine electrification charging – ferries**
- **Battery storage – industrial peak management**
- **Energy monitors/energy feedback – business customers**

- **Localized demand-side management pilots**
  - **Pineview Substation**
  - **Hope Substation**
  - **Kent Substation**
- **Connected buildings/facilities trials**
  - **Connected home – Alana trial**
  - **Connected home – Smart speaker trial**
  - **Connected home – Powerley trial**
  - **Connected home – CaSA baseboard thermostats**
- **Infrastructure development**
  - **Distributed Energy Resource Management Systems (DERMS)**
  - **Cybersecurity Verification Program (CVP)**

Key Findings

The following summarizes the findings from the range of trials and pilots that our residential, commercial, and industrial customers have participated in. The industrial customers who participated in the initiatives described below are all served via the distribution system.[1]

Program Behaviour

Overall, residential programs behaved as anticipated with respect to producing demand responses. The reliability is approximately 80 per cent for a fleet of direct load control devices, as demonstrated in the water heater test. Communication issues on both the smart meter mesh and customer-owned Wi-Fi / internet caused the reliability to be less than 100 per cent.

Residential Peak Saver participants in small homes such as condos found it more difficult than larger homes to create meaningful savings due to the size of the overall load.

Connected home trials uncovered complexities with the wide range of available technologies. Utility capacity objectives can be delivered through direct load control or behavioural activities utilizing connected home assets and leveraging the energy consumption feedback delivered by smart devices. Connected home automation allows customers to set routines and actions that can automate and amplify their behavioural load shifting results.

Commercial and industrial demand response programs did not show as much participation and impacts as anticipated.

Customer Acceptance

Customer acceptance of the controllers and events was high in the residential sector, with few opt-outs. Customers expressed interest in new technologies and the idea of helping manage load in their community. Residential customers who signed up for the Peak Saver program were highly engaged.

Connected home products were interesting to participants who readily engaged with them. Engagement levels decayed somewhat over time, but remain strong. The Powerley HydroHome trial currently (May) records around six app interactions per household per day (peaking at over ten in winter). Participants overall are positive (68 per cent of users satisfied or very satisfied with the system) with respect to the energy data presentment and smart device control.

[1] **Our industrial customers served via the transmission system have participated in the load curtailment pilots and the key findings from that initiative can be found in the attachment.**

Commercial and industrial customers are more wary, feeling demand response could negatively impact their business. Some customers did not want to touch their building controls, out of concern that things would break. However, some innovators embraced the program and experienced multiple benefits, including earning incentives for their performance, getting better feedback on their operations, and identifying areas of energy efficiency as a by-product of demand response set up and testing.

Commercial and industrial customers are curious about energy storage and interested in how to bring electric vehicle charging and fleets into their businesses. However, cost effectiveness is a primary barrier to energy storage, while range anxiety and cost continue to be barriers to electric vehicle adoption.

Operational Needs

CFDSM programs will require information technology systems to support ongoing customer relationships, contracts and settlement. These programs must maintain ongoing relationships with customers (similar to Team Power Smart).

Baselines, which enable the comparison between what would have happened, absent the program intervention and what actually happened, can be complicated. They need to be clearly defined and consider the customer's operational behaviour and technology available.

Managing a diverse array of demand response resources is challenging and will require information technology solutions, such as a distributed energy resource management system (DERMS) to make larger scale rollouts feasible.

Internal Stakeholders

This is a learning experience for internal stakeholders who are interested in the concepts and want more knowledge to overcome barriers or concerns. Many stakeholders have been very supportive of this concept and moving it forward as a solution to address needs. However, reliability of the resources is critical to grow acceptance. The substation pilots and implementation of DERMS will increase internal planners and system operators confidence in the reliability of CFDSM.

Technology Experience

There were a variety of challenges with technology, which is not surprising given the newness of some of the implementations.

Providing meter data to customers on a timely basis is critical for performance monitoring, payment settlement, and customer feedback. However, experience to-date is that this can be challenging with respect to timeliness, accessibility and completeness. During our initial trials and pilots we developed a solution by

providing a gateway from the meter to the customer's devices that enabled them to see real-time information.

Internet connectable devices are relatively reliable, but cyber security is more challenging. Cyber security will continue to be an ongoing concern for any connected devices. Insecure devices will not be a viable solution and some vendors do not focus their efforts here. Mesh devices proved to be much less reliable and more technically challenging and resource intensive to implement. The process for getting mesh devices onto our system is more difficult than implementing internet connectable solutions. The first-generation mesh devices implemented turned out to not be fully upgradable over the air. All solutions in the future must meet this base requirement.

Devices should be bench tested prior to field deployments. One device had a "bad batch" of internal chips that caused issues after deployment. These had to be replaced in the field.

Some building management systems are not sophisticated enough or are difficult for a building operator to adjust for demand response events. Some are old and some building operators are reluctant to change anything that is operating currently. This could influence either which customers may be eligible for a program or what the program should be offering in terms of programming or technology support.

Recruitment Experience

Commercial and industrial customers may require up to 12 months from initiation to participation in a demand response program. Because CFDSM offers are new, there is a learning and acceptance curve for customers. Some will need slower, low-risk experiences with these types of programs before accepting more sophisticated offers.

Some residential customers are inspired by the idea of contributing to their community, but some do not understand that demand response doesn't reduce their consumption or their bill (except via incentives), despite the program materials stating this. For full program rollouts, information technology support will be required to accept applications at scale and then manage these relationships over the long term.

BC Hydro would need to adjust customer support channels should these programs be rolled out in full (e.g. who does a customer call if a controller or thermostat seemingly breaks or if they have questions about how the program works or if they want to opt-out of a program after a period of time.)

Operational Considerations

Operational systems, processes and staff will need to be put into place to handle large volumes of customer applications, installations, device tracking, performance reporting, and settlement / payment. In addition, some kind of emergency response support may be required to support some devices, in the event of failure (e.g. if a water heater load controller fails and somehow causes the customer to have no hot water). Bring your own device (BYOD) programs may provide less support, but may still receive calls for assistance. BC Hydro will need protocols to handle these issues.

Future program designs should consider how BC Hydro could work with vendors to help fill these roles and provide support to customers.

The pilots to shift load at the substations have the objective of understanding whether CFDSM can defer an upgrade. On an operational basis, BC Hydro does not currently have a method to forecast at the substation level when a peak is being reached. We have developed a model based on forecasted temperatures to assist in when to execute on CFDSM activities.

Residential behaviour programs would benefit from a more sophisticated information technology platform to efficiently and effectively operate the program on a larger scale. The current tools did not allow for easy personalization of messaging, targeted tips, or performance results.

Customer Experience Feedback

Generally residential customers did not find the control events to be disruptive and they liked the opportunity to do something that directly contributes to their local community. Often, participants reported they liked the new technologies involved in each pilot and were an improvement over their previous systems (e.g. thermostats easier to use or program.)

Commercial customers are interested in demand management but need more help to develop solutions to ensure no business disruptions. They also need better performance feedback and assistance to ease into some demand response programs.

Trial Results

We have been able to estimate capacity savings from some individual technologies and behaviours, where trials have been completed; however, in other cases trials are still in progress and savings cannot be estimated yet. The capacity-focused trials involve different end uses, control systems, and approaches to market that have not yet been aggregated to develop program-level savings estimates. Continuation and completion of planned trials, as well as further experience gained through localized capacity initiatives at the substation

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level (combined with DERMS development), are the next steps prior to estimating potential program savings.

Estimated savings from the individual technologies and behaviours which we have quantified to date include:

- **Water heaters: 0.5 kW/unit on average**
- **Thermostats: 1.0 kW/home on average**
- **Residential Peak Saver: 0.3 – 0.4 kW per participant**
- **Connected home Powerley Trial: 0.6 kW to 1.1 kW**
- **Connected home CaSA baseboard thermostat: 0.27 kW to 0.39 kW**
- **Connected thermostat Nest: 0.5 kW to 0.8 kW**
- **Industrial Load Curtailment Pilot: 100 MW to 139 MW**

The pilots are providing information that will inform the savings potential and cost effectiveness of different technologies and behaviours. The results are based on smaller scale pilots that may not translate to broader populations. Information from the pilots will be used to inform potential opportunities at the distribution system level as well as broader potential resource options to inform the next Integrated Resource Plan.

Detailed Description of BC Hydro's Capacity-Focused DSM Pilots and Trials

This attachment provides a detailed description of BC Hydro's capacity-focused DSM pilots and trials. The description of these pilots and trials is structured as follows:

1. **Industrial load curtailment**
2. **Capacity-focused technologies**
   - **A. Residential demand response trials**
   - **B. Commercial and industrial demand response trials**
   - **C. Localized demand-side management pilots**
   - **D. Connected buildings/facilities trials**
   - **E. Infrastructure development**

1. Industrial Load Curtailment Pilot

The initial industrial load curtailment (ILC) pilot ran during the winter and shoulder months of 2015/2016 (Year One) and 2016/2017 (Year Two). It targeted a system level resource that was capable of providing 100 MW for 576 hours of curtailment during those periods. The industrial load curtailment pilot was implemented as two separate one-year commitments with a Request for Proposal (RFP) process before each year commenced. This approach allowed new customers to participate after the initial launch year.

Customers were required to respond to the RFP process by bidding the MW of capacity they were prepared to curtail for a fixed $/MW-year payment. BC Hydro simulated system peak events and called on customers to curtail load for up to 16-hours per day to a total of 576-hours per year. This confirmed the reliability of a customer resource being able to deliver dependable capacity via load curtailment and informed future resource planning requirements.

In Year One, BC Hydro entered into agreements with four large industrial customers. The customers submitted proposals for six separate sites to provide a combined total available curtailment resource of 126 MW of load reduction. In Year Two, the ILC pilot had four customers and seven sites to provide a combined total available curtailment resource of 83 MW of load reduction.

The performance of the ILC pilot is summarized in Tables 1 and 2 below.

Table 1 - ILC pilot performance, Year One

Resources	Committed	Provided	Compliance Rate
Resource 1	65 MW	70 MW	93%
Resource 2	22 MW	23 MW	100%
Resource 3	22 MW	28 MW	100%
Resource 4	17 MW	18 MW	100%
Total	126 MW	139 MW	93%

Table 2 - ILC pilot performance, Year Two

Resources	Committed	Provided	Compliance Rate
Resource 1	33 MW	46 MW	100%
Resource 3	22 MW	23 MW	100%
Resource 4	16 MW	15 MW	89%
Resource 5a	2 MW	3 MW	100%
Resource 5b	10 MW	13 MW	89%
Total	83 MW	100 MW	89%

Results of Year One and Year Two Pilots

The average event compliance rate is shown in the tables above. In Year One, the rate was 93%. The compliance rate in Year Two was slightly lower at 89%. On an hourly basis the compliance rate would be higher. Every participant carried a margin in load to ensure compliance. The average reduction provided by each participant is also shown in the tables above. The margin is larger for participants with loads that are more variable. It was important to test the response in BC as our program requirements for duration and total number of hours are unique compared to other jurisdictions.

The primary function of the Year One and Year Two pilots was to test the ability of customers to provide significant load reduction for periods of time that could compare to our next built resource. The results were generally positive, however, in any formal program we would have to ensure we contracted more potential curtailment than needed to overcome the potential for non-compliance. During the pilot, some customers exceeded their committed bids, thereby reducing the impact of those that were non-compliant; however, this may not be sufficiently reliable for planning purposes. Feedback from customers was focused on the requirement to provide 16-hour for the full 36 days (576 hours) and whether that would be representative of a program moving forward.

Year Three Pilot

During 2017, we discussed whether we could adapt the load curtailment pilot and extend our learnings. Year One and Year Two pilots were successful in determining the reliability of load curtailment as a planning resource to meet winter system peaks. It was determined that we could test new concepts not considered in Year One and Year Two by extending the pilot to a third year, such as an operational component. We used Year Three to test and understand a 'competitive' or 'market based' load curtailment pricing structure, from both the operational and planning resource perspectives.

Year Three pricing was separated into two components: performance (operations) and availability (planning). This was to gain an understanding of how the market (transmission voltage customers) would respond and perform based on a revised pricing structure and value determination for capacity.

Customers would be called on to curtail load when BC Hydro had system peak events that coincided with positive market opportunities for dispatching BC Hydro assets, rather

than the simulated events in Year One and Year Two. We wanted to test the market in terms of the market setting the price they required to be available to curtail the MW they would make available for curtailment events, as follows:

- **The load curtailment performance price was set at a level competitive with the operating cost of other resource options during winter peak periods. This would allow for load curtailment to be utilized (i.e. called) by operations during peak periods.**
- **The load curtailment availability price could then be discovered by allowing customers to bid the availability price they expected to receive, in addition to the curtailment amount (i.e. MW) they could provide. This would allow for a cost curve to be developed and compared to other capacity resource options from a planning perspective.**

The performance payment was set at $50 per MWh (for the four consecutive hours per day of curtailment). This was priced competitively based on other options BC Hydro would have to meet peak load requirements on a winter peak day. Curtailment was limited to 72-hours over the 3-month period (a maximum of 18 event days x 4-hour events). Setting the performance price (and total of number of potential curtailment events) allowed customers to bid their capacity available and availability price.

We selected customer bids based on the lowest to highest total $/MW price (including performance plus availability payment). Bids were selected within the budget for the program. We accepted multiple bids per customer and each was considered independently. BC Hydro entered agreements for Year Three with four large customers, at six separate sites, to pilot the development of a resource that could provide reliable demand response in four-hour blocks with same day notification.

Results of Year Three Pilot

During the three months of the pilot, we called on the customers for curtailment six times. The targeted curtailment amounts were met for four out of six events. Even though there were issues during two of the events, the concept of having distinct availability and performance payments was considered a success, from both a customer and BC Hydro perspective and would form the basis for any load curtailment program going forward. There were some communication problems during Year Three that would be corrected during a full program and thereby reduce the likelihood of non-performance.

2. Capacity-Focused Technologies

BC Hydro has investigated a range of technologies and program designs across sectors that provide benefit to system-wide capacity needs and localized constraints.

In-progress pilots are continuing to completion to determine results and incorporate findings to inform potential new program offers for localized DSM.

The detailed findings from the major projects completed or underway follow below and are grouped into five categories:

- **Residential demand response trials**
- **Commercial and industrial demand response trials**
- **Localized demand-side management pilots**

- **Connected buildings/facilities trials**
- **Infrastructure development**

A. Residential Demand Response Trials

This category includes trials of new technologies and behavioural approaches with residential customers to understand if they are acceptable to the customer and technically reliable/viable. Once proven, these technologies could potentially be used to meet system or local needs.

Wi-Fi auto demand response (DR) water heater controllers

- **Status: Launched in November 2014, completed.**
- **Description: This demonstration project tested Wi-Fi water heater controllers (nine households for the first year, 25 households in the second and third years) using the customer's internet connection.**
- **Results: Demand reduction of 0.5 kW/unit (average).**

Three element water heaters

- **Status: launched in November 2014, completed.**
- **Description: This demonstration project involved the installation and testing of three element water heaters. A standard electric water heater has two 3800W elements for heating. The three element water heater has 3800W top, 3000W middle and 800W bottom, allowing temperature stratification within the tank, such that only the bottom water needs to be heated.**
- **Results: No noticeable difference in overall demand shifting from the three element water heaters compared to standard water heaters.**

Radio-frequency (Mesh) auto DR water heater controllers

- **Status: Launched in November 2015, completed.**
- **Description: This demonstration project utilized the BC Hydro smart meter mesh network to provide communication to the water heater controllers.**
- **Results: Demand reduction of 0.5 kW/unit (average). The challenge with this technology was that due to technical and/or software problems only 50% of devices participated in any single event. This product has not been recommended for any further program design until vendors can demonstrate higher connectivity rates and reliability.**

Residential thermostats – Sinope controllers

- **Status: Initiated in fiscal 2017, completed.**
- **Description: The project involved installing baseboard programmable communicating thermostats (PCTs) and water heater load control devices manufactured by Sinope, a Canadian company. The devices were configured to**

connect to the vendor's web application server for customers, which allows the customer to program and control their PCT from the web or smart phone, and also directly from the PCT.

- **Results: Demand reduction of 1.0 kW/home (average).**

Peak Saver – Opt-in pilot

- **Status: Launched Fall 2016, completed.**
- **Description: This is a behavioural or peak time demand response rebate program. Customers sign up ahead of time and are then notified day-ahead of upcoming curtailment events. Customers earn financial incentives based on the amount of load reduction they create during each event, in comparison to a calculated baseline. Although not direct load control, the program is very low cost to implement and operate.**
- **Results: Demand reduction of 0.3 to 0.4 kW/participant. There were 3,500 participants in fiscal 2018 and approximately 5,000 in fiscal 2019 winter season.**

Connected thermostats – NEST

- **Status: Launched September 2016, completed**
- **Description: In partnership with Nest, BC Hydro ran a demand response trial using Nest thermostats in the Okanagan. The trial followed the standard Nest Rush Hour rewards program format, and operated across both heating and cooling seasons. Participants were provided with a $25 incentive to participate. Three hour event windows were used consistently across the seasons. Pre-heating and pre-cooling were always used, but BC Hydro was not in control of set point adjustments, this was managed by the Nest DR system**
- **Results: A total of 1,400 participants were involved over four seasons (winters of 2016, and 2017, and summers of 2017 and 2018). Overall, customers were positive about their trial experience and the impact on comfort levels was not seen as a major concern. Morning events were slightly preferred to PM events and comfort level changes were noticed by 63% of participants, mainly in the second hour of an event, suggesting three hour events might be too long. However only 10% claim to be dissatisfied with comfort levels overall. Summer demand response impacts average 0.6 kW per event. Winter demand response impacts average between 0.5-0.8 kW reductions per event.**

Smart water heater load control – Aquanta controller

- **Status: Initiated July 2018, ongoing for two winter seasons.**
- **Description: This project proposes a test of a smart water heater controller to determine whether learning modes and temperature insight can provide greater peak reductions while still serving occupant needs. The project will install 100 load controllers on existing electric hot water heaters on south Vancouver Island. Learning modes will be observed uninterrupted to compare to baseline operation initially. Demand response events will also be enacted to determine whether these**

devices outperform prior "dumb" units. The project will be operated for two winter seasons to ensure a range of data and scenarios are captured.

- **Results: To be determined in 2020 after completion of the second year.**

Electric thermal storage – ceramic bricks

- **Status: Initiated in February 2018, ongoing.**
- **Description: Electric thermal storage (ETS) is one option for helping to manage the peaks that traditional electric heating systems can create on the grid. ETS is not a new technology and has been quite common in Europe for over 30 years.**
- **Modern ETS units work by heating ceramic bricks to a high temperature and then releasing this heat slowly over time, as the home requires, in order to maintain a comfortable temperature for occupants. The charging of these bricks can be done in off-peak hours (such as overnight) and then slowly released over the course of the day.**
- **Results: We are planning to complete the test during the winter of fiscal 2020. The preliminary result from last winter is not favourable because of the level of disruption to install the ceramic bricks.**

Smart electric vehicle (EV) charging – single family

- **Status: Initiated in May 2017, completed.**
- **Description: The project involved EV owners in single family residential settings. Communicating level 2 electric vehicle supply equipment (EVSE) or charging stations replaced existing level 2 stations installed in each home. This allowed for signals to be sent to the EVSE to enact various smart charging tactics such as randomization of charging times, charge-by settings, decreased power charging etc.**
- **Results: 50 single family residences participated in the pilot that ran over two winters (fiscal 2018 and fiscal 2019). Preliminary results will be available later in 2019.**

High voltage utility charger – MURB and Commercial customers

- **Status: Launched September 2017, ongoing.**
- **Description: Current challenges for potential EV owners who live in multi-unit residential buildings include charger and related infrastructure costs as well as the need to disaggregate metered electricity consumption between EV charging and the building's common facilities (i.e., non-EV loads). An integrated charger, and a metering and billing solution would potentially alleviate these concerns. We will be testing the ability to control the timing of the charge.**
- **Results: Plan is to install 60 chargers in locations in the Lower Mainland. Roll out has been delayed due to testing. Expectations are the pilot will run during the winter of 2019 with results being available later in 2020.**

B. Commercial and Industrial Demand Response (DR) Trials

This category includes the investigation and testing of new technologies for small to medium-sized industrial and commercial customers to understand if they are reliable as part of a future demand response program.

Commercial and Industrial manual DR

- **Status: Launched November 2014, completed.**
- **Description: This demonstration project involved customers manually shutting off equipment in their facility for the duration of the events, and then turning the equipment back on. Since each participant would have different operations and equipment, it was determined that the simplest method to determine demand response potential within the business sector was the manual option.**
- **Results: The results were variable, primarily due to the voluntary nature of the load control. Customers were requested to manually shut off equipment during an event and then turn the equipment back on at the conclusion of the event. During the first year there was only one customer enrolled - this rose to eight in the second year and 14 in the third year. The events in the second and third year had participation rates of 65% and 60% respectively.**

Small business water heater auto DR

- **Status: Launched November 2015, ongoing.**
- **Description: The goal is to determine whether smart water heater controllers deliver demand reduction in small and medium businesses and understand how small and medium business owners may interact with their water heater or if they change their behaviour given greater visibility into their usage.**
- **Results: Program is expected to continue through the winter of fiscal 2020.**

Industrial load shaping – Greenhouse

- **Status: Launched February 2018, ongoing.**
- **Description: This project will involve capacity management by shifting the greenhouse operations (lights and ventilation) outside of evening peak periods.**
- **Results: During the winter of 2018, the greenhouse was able to shift the times that their lights were turned on to hours before sunrise rather than after sunset during BC Hydro's evening peak, which would have been normal activity. Due to the incremental nature of the load growth at this site, we were unable to conduct a full test of this initiative. The customer has agreed to participate during the winter of fiscal 2020 and full results will be available in 2020**

Commercial smart charging – electric buses – BC Transit

- **Status: Initiated February 2018, ongoing.**
- **Description: The demonstration project will include managed charging implementations, demand response program participation, comparing battery powered buses from major manufacturers, etc. It seeks to test ways to make the**

charging load more flexible, in time and quantity with respect to demand on the grid.

- **Results: The trial with the first bus manufacturer has been completed. The model tested was capable of servicing 94% of all routes in Victoria with one charge per day at the depot. There is an opportunity to deploy demand response by shifting charging periods. Timing of further tests depends on coordination between BC Hydro, BC Transit, and bus manufacturers.**

Commercial smart charging – electric buses

- **Status: Initiated August 2018, completed.**
- **Description: This project investigated the impact of bus charging on building energy infrastructure and potential consumption. The initial project will involve an engineering study of the infrastructure required, the load impacts to the facility the buses are charging from, potential metering solutions for the host building to calculate cost of charging and outline the requirements for bi-directional charging.**
- **Results: Confirmed use of high voltage power to 18 charging stations in two locations were estimated, including substation upgrades, AC transformer purchases and installation.**

Commercial smart charging – electric vehicle fleet

- **Status: Initiated March 2018, completed.**
- **Description: The City of Vancouver purchased 20 electric vehicles, to be housed at a single site. They were interested in partnering with BC Hydro to explore smart charging in the following areas:**
  - **addressing building electric panel capacity constraints**
  - **managing demand charges**
  - **providing flexibility to the grid, in the form of participation in utility demand response programs**
  - **understanding connected buildings, by integrating electric vehicle charging with overall building management systems**
- **The project was implemented in two phases: 1) design, installation and testing of communicating charging stations, and 2) integration of charging system into on-site building management system, and design and run smart charging experiments to manage demand.**
- **Results: Initial results show that there is potential for inclusion in any potential demand response program. From the customer perspective, demand charge savings could be significant and load management did not impact vehicle usability.**

Commercial smart charging – forklifts and lift trucks

- **Status: Initiated October 2018, ongoing.**

- **Description: The objective of this pilot is to: understand the impacts of fleet charging on the various levels of electrical systems; test various charging scenarios to understand the capabilities and limitations of smart charging equipment and infrastructure; and test customer acceptance of demand management on long-duration business operations.**
- **Results: Pilot is ongoing at two grocery warehouses involving up to 60 forklifts. No results as of yet.**

Peak Saver – small and medium business

- **Status: Initiated October 2018, ongoing.**
- **Description: The original Peak Saver project was aimed exclusively at residential customers. The dynamic of creating commercial customer participation is expected to be significantly different. Most commercial customers are constrained in how they can continue to run their businesses while reducing load that will not have a negative impact on tenants/occupants/customers.**
- **Results: The first pilot targeting Commercial customers was in the Hope area during the winter of 2018 in support of the localized demand-side management pilots. Plans are to expand the pilot to determine potential for future use.**

Commercial fleet charging – UBC

- **Status: Initiated August 2018, ongoing.**
- **Description: This project will explore the integration of charging infrastructure to building management systems to optimize energy use, and investigate reshaping the charging profile of existing infrastructure. The project will utilize existing UBC buildings and smart charging infrastructure that UBC is installing on campus, along with UBC's existing electric vehicle fleet.**
- **Results: Still in development, the project will explore the integration of charging infrastructure to building management systems to optimize energy use, and investigate the charging profile of existing infrastructure.**

Marine electrification – Ferries

- **Status: Launched in September 2018, ongoing.**
- **Description: The initial step toward marine electrification requires plug-in hybrid vessels, with on-board energy storage integrated with the propulsion system. Passenger and coastal cargo ferries dock for minutes, requiring a fast ship-to-shore connection to recharge at each terminal. The operations profile of a given route determines the size of the hybrid vessel. The size of the on-board energy storage system could be limited by the grid capacity at the terminal locations on the route, coupled with the ability to effectively connect to shore power.**
- **Results: Still in development, this pilot will investigate options to potentially charge plug-in hybrid vessels using shore connections. It will include investigating battery-based energy storage to augment charging options.**

Battery storage – industrial peak management

- **Status: Initiated January 2019, ongoing.**
- **Description: This project will involve studying and installing a 100-kW battery to explore the capabilities of managed or smart charging as a capacity solution.**
- **Results: Still in development. This pilot will allow us to understand the costs and benefits of battery storage in a small industrial setting and quantify the impact of load management on peak loads.**

Energy monitors / energy feedback – business customers

- **Status: Initiated in December 2018, ongoing.**
- **Description: Energy monitoring has been piloted with residential customers as part of the Home Energy Monitor pilot and with a small number of industrial customers. Energy monitoring is one option for customers to monitor their electricity consumption in real time. An energy monitoring device provides direct access to energy information by connecting wirelessly to the Zigbee radio in the smart meter. This trial proposes to test this technology on a small scale with 100 business customers in order to understand the technical requirements in a commercial setting, customer impacts and behavioural changes that my result from real-time energy monitoring.**
- **Results: No direct load shifting is expected from this pilot but it may support load shifting through other programs. This pilot will focus on collecting data in real time and streaming to a smart phone or tablet for monitoring and analysis.**

C. Localized DSM Pilots

This category tests the ability of localized DSM to defer local transmission and distribution investments and the value in doing so. Localized DSM initiatives leverage the capacity-focused DSM options that are being investigated as well as other DSM initiatives. Localized DSM initiatives can include: increased community awareness and training activities, additional energy efficiency incentives, capacity-focused behaviour offers, demand response technologies including residential water heater controls, and a commercial and industrial demand response offer.

Pineview substation

- **Status: Launched fiscal 2018, ongoing.**
- **Description: The Pineview substation in Prince George was identified as a potential good candidate for localized DSM. As a winter peaking substation, the Pineview load shape is heavily influenced by the outdoor air temperature (impacting residential space heating) and industrial production by a large sawmill and a chemical manufacturer. There are loads from all three customer sectors in this area.**

- **Results: In the first year we were able to contract planned industrial load curtailments. However, residential and commercial/industrial uptake of program offers has been slower than anticipated. Pilot will continue in the winter of fiscal 2020.**

Hope substation

- **Status: Launched fiscal 2019, ongoing.**
- **Description: The Hope substation is nearing its firm capacity limits and customer loads cannot easily be off-loaded to adjacent substations. This substation has loads from all customer sectors, but differs in that it has a large percentage of load from the residential sector.**
- **Results: To-date we are slightly behind on our participation target. One large industrial load was contracted for load curtailment. Results of the first year will be available this summer. It is planned to continue this pilot in the winter of fiscal 2020.**

Kent substation

- **Status: Launched fiscal 2019, ongoing.**
- **Description: This pilot focuses on a single distribution feeder from the Kent substation which is at capacity. The customer base is mostly residential with a small amount of commercial accounts. There are no industrial accounts on the feeder.**
- **Results: Results for the winter of fiscal 2019 will be available in the summer of 2019. It is planned to continue this pilot in the winter of fiscal 2020.**

D. Connected Buildings/Facilities Trials

This category includes trials on a variety of different partnership models with technology providers and retailers/manufacturers to understand what works best for our customers and BC Hydro. The trials are also testing BC Hydro's ability to implement capacity focused initiatives either through direct load control or behavioural/semi behavioural messaging. Smart home technology is changing the way customers manage their homes, and BC Hydro plans to leverage this to mitigate any capacity related impacts.

Connected Home – Alana trial

- **Status: Launched April 2019, ongoing.**
- **Description: This trial will measure customer interest in a BC Hydro branded smart home energy management app (Alana) that provides energy management functionality/features that can be used to replace current third party smart home user interfaces. This is different from other offerings being tested as it is a user interface that can be applied over existing smart home assets. This solution allows BC Hydro to provide capacity management functionality (Behavioural DR, Direct Control DR) through the app using devices that already exist in the home.**

The app provides customers with the energy usage feedback and smart home control they are looking for.

- **Results: The recruitment of up to 500 participants utilizing a BC Hydro branded smart home energy management app (Alana) is underway.**

<u>Connected Home – Smart Speaker trial</u>

- **Status: Launched December 2018, ongoing.**
- **Description: We have developed a smart speaker skill that enables users to analyse their energy usage via their smart speaker. Both Google and Alexa are being tested. The speaker provides energy usage insights into how and when energy is being used in the home, and provides advice on how to reduce consumption. This has potential in behavioural capacity management activities. Over time, the speaker integration will be able to control devices, providing customers with both the information and the means to shift load and manage energy usage. Results: Usage levels (the number of times the 540 participants interrogate the speaker) has averaged 368 per week since inception. Customers require regular communication to remind them of the speaker functionality. While it is still early in the trial, the level of activity indicates it may be a useful tool for customer energy literacy in addition to smart home control**

<u>Connected Home – Powerley trial</u>

- **Status: Launched October 2016, ongoing.**
- **Description: BC Hydro customers with electric air source heat pumps and/or electric baseboards are participating in a trial where they receive a BC Hydro branded app that can control space heating, lighting, plug loads and can monitor and disaggregate their electricity use. All equipment connects to a 'smart hub' controlled by the BC Hydro app which can be accessed from their smartphone/tablet at home or remotely. The app provides energy usage feedback to users and the ability for BC Hydro to perform direct load control DR on space heaters and water heaters. The trials consists of three sub groups; customers who received all the smart home equipment (providing live energy data and device control), customers who only received a smart hub (providing live energy data) and customers who only received the app (providing 1 day old hourly energy data). The trial is investigating the impact the 3 levels of involvement have on engagement and energy conservation levels, as well as the propensity for customers to move between levels through the purchase of equipment.**
- **Results: 32 heat pump customers, 88 baseboard customers, 43 Hub only homes, and 34 App only homes participated. Indications are that energy savings are in the 5-7% range, with load shifting capability between 0.6 to 1.1 kW. Customers had strong engagement with the system despite the limited nature of the connected products that are available for the customer to test/connect. The trial continues and the number of participants will be increased.**

Connected Home – CaSA baseboard thermostats

- **Status: Launched July 2016, ongoing.**
- **Description: Space and water heating are two primary users of energy in a home. In electrically heated homes, there is an opportunity for capacity reductions through meaningful control of electric baseboards. Communicating line voltage thermostats (CLVTs), such as CaSA, are relatively new to the market. This CaSA trial tests the vendor's DR platform. The trial in 2018/2019 was operated in conjunction with Canmet/NRCan to test enhanced DR signal and event shaping to increase load shifting capability without impacting user comfort**
- **Results: Overall customers who have reliable thermostats enjoy the connected functionality; there are very few concerns regarding privacy or utility involvement. Wi-Fi performance in certain building types is unreliable. Units in multi-family buildings with concrete walls and multiple levels have had the most issues with reliability unless modern mesh Wi-Fi routers are utilised. Demand response impacts range from 0.27 kW to 0.39 kW. Energy conservation impact figures are between 5-10% reduction. The trial also found that the CaSA user interface does not meet customer expectations; a true app version is needed.**

E. Infrastructure Development

This category includes the investigation and implementation of information technology (IT) solutions to allow BC Hydro to better manage a diverse and large group of demand response assets, and the investigation of enhanced analytics for program design, savings reporting and data requirements.

Distributed Energy Resource Management Systems (DERMS)

- **Status: Initiated in July 2018, ongoing.**
- **Description: BC Hydro has been conducting trial projects to test various demand response technologies and program designs in the field across all customer sectors. Currently, the trials utilize disparate software and/or vendor-managed tools and interventions to manage each resource. A DERMS system can manage the various demand response activities as if they were a single resource thereby allowing for better coordination and simplification of load management solutions for our Grid Operations department. The objective of this pilot is to demonstrate the system and test its integration.**
- **Results: Request for Proposal for a DERMS system has been issued on April 13, 2019.**

Cybersecurity Verification Program (CVP)

- **Status: Initiated in F2018, ongoing.**
- **Description: One of the key consumer concerns regarding the internet of things and the connected home is the fear of privacy breaches and cyber security breaches. There are three main areas of cyber security risk:**
  - **breaches that cause customer impacts (data loss/malicious interference);**

- **breaches that cause utility impacts (attacks on the grid/loads connected to the grid that can cause grid impacts); and**
- **breaches that impact the internet at large.**

There is currently no single cybersecurity standard in place that adequately addresses these three risk areas. Accordingly, we are working with industry and piloting a new CSA Cybersecurity Verification Program (CVP) that addresses these risks.

- **Results: work with industry is underway, the CVP program has been tested with 6 vendors, and is now being developed into the CSA –T-200 standard. Approval from the Standards Council of Canada was granted in January 2019 to proceed with the development of a bi-national standard. The Canadian Standards Association has entered the T-200 Cyber standard documentation into the 30 day public review stage of the standards development process.**

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.3 BC Hydro show that the rate of growth of the net-metering program has been increasing since 2015 and in 2019 resulted in a total exceeding 1800 net-metered customers. Please provide information on how this growth in net-metered customers compares to annual increases in BC Hydro residential customers in this period?

RESPONSE:

The following table provides a comparison of the annual growth in BC Hydro's Residential customer accounts to the annual growth in BC Hydro's net-metered customer accounts.

Fiscal Year	Annual Growth in Residential Customer Accounts (%)	Annual Growth in Net-Metered Customer Accounts (%)
F2015	**1.10**	**39.20**
F2016	**1.35**	**52.03**
F2017	**1.44**	**44.90**
F2018	**1.53**	**43.66**
F2019	**1.63**	**43.29**

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

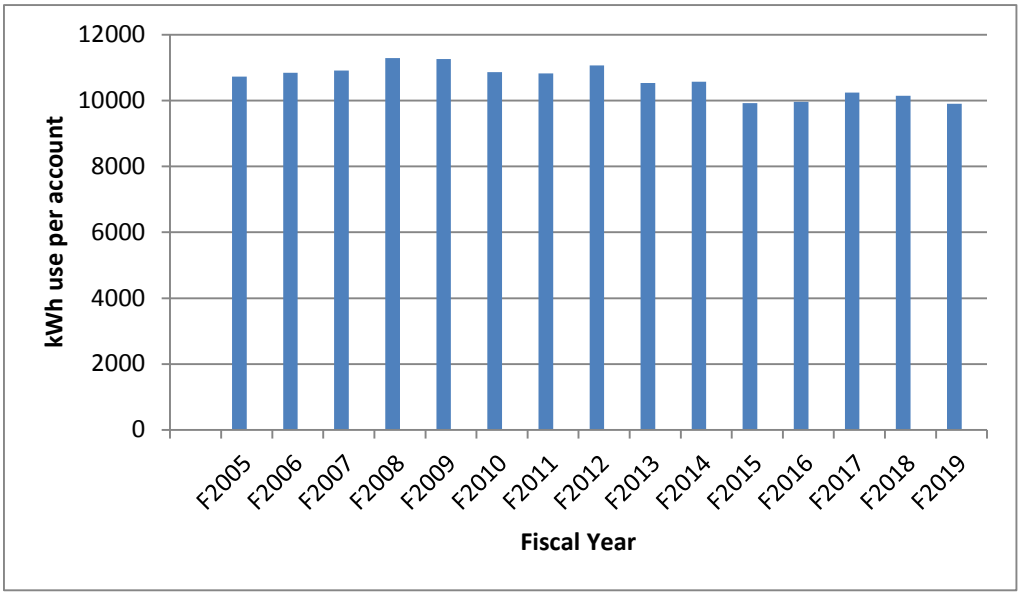
- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.4 Please provide a chart that shows by year since 2005 the kWh used by new BC Hydro residential accounts.

RESPONSE:

RESPONSE:

The following chart shows the annual average kWh used by BC Hydro residential customers for fiscal 2005 through fiscal 2019. BC Hydro is not able to separate the consumption for new customers each year.



5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.5 Section 4 BC Hydro discusses the price that should be paid for surplus energy. Has BC Hydro done any broader analysis on costs and benefits, including economic, environmental and social impacts of increased distributed energy generation?

RESPONSE:

BC Hydro has not conducted an analysis of the economic, environmental and social impacts of increased distributed energy generation. As discussed in BC Hydro's response to BCUC IR 1.18.4, BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan.

Please also refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why excess generation from customers in the Program should be valued based on the market value.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.6 Please provide analysis on how distributed energy generation, using community solar and/or roof-top solar would affect

RESPONSE:

This answer also responds to BCCSC IRs 1.5.6.1, 1.5.6.2, 1.5.6.3, 1.5.6.4, 1.5.6.5, 1.5.8.1, 1.5.8.2, 1.5.8.3 and 1.5.8.4.

As discussed in BC Hydro's response to BCUC IR 1.18.4, to-date, BC Hydro has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning.

The installed capacity of customer Generating Facilities in the Program was 13.39 MW as of March 1, 2019. In contrast, the total generation capacity on the BC Hydro system, including BC Hydro's hydroelectric resources and Independent Power Producers, is approximately 17,800 MW.

In addition, as explained in BC Hydro's response to BCUC IR 1.14.2.1 generation from residential customers in the Program does not coincide with BC Hydro's peak demand period or the residential class non-coincident peak period.

Further, all Generating Facilities are required to have anti-islanding protection and will disconnect in the event of an outage. Anti-islanding protection is necessary to prevent power quality issues and reduce the risk of safety hazards.

Accordingly, BC Hydro expects that energy from customers in the Program would have a negligible, if any, impact with regards to energy security, disaster risk reduction, pressure on infrastructure, greenhouse gas emissions, climate change related issues, service during outages, support for black start operations, voltage and frequency regulation and the demand curves from solar, wind, micro hydro and biomass generators.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.6 Please provide analysis on how distributed energy generation, using community solar and/or roof-top solar would affect

1.5.6.1 energy security

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.6 Please provide analysis on how distributed energy generation, using community solar and/or roof-top solar would affect

1.5.6.2 disaster risk reduction

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.6 Please provide analysis on how distributed energy generation, using community solar and/or roof-top solar would affect

1.5.6.3 pressure on infrastructure

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.6 Please provide analysis on how distributed energy generation, using community solar and/or roof-top solar would affect

1.5.6.4 greenhouse gas emissions from your operations

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.6 Please provide analysis on how distributed energy generation, using community solar and/or roof-top solar would affect

1.5.6.5 responses to climate change related issues?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.7 Please describe the analysis BC Hydro has done to determine cost savings that Distributed Generators provide to the electricity system?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.14.2.1 where we explain that Generation from residential customers in the Program provides energy value only and does not result in any avoided demand-related costs.

Please also refer to BC Hydro's response to BCUC IR 1.5.1, where we explain how cost shifting between customers in the Program and non-participants occurs.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.8 Please provide the results of BC Hydro's analysis on how distributed generation:

1.5.8.1 Affects demand curves from solar, wind, micro-hydro and biomass generators

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.8 Please provide the results of BC Hydro's analysis on how distributed generation:

1.5.8.2 Can provide electric service during outages

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.8 Please provide the results of BC Hydro's analysis on how distributed generation:

1.5.8.3 Can provide support for black start operations

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.8 Please provide the results of BC Hydro's analysis on how distributed generation:

1.5.8.4 Supports voltage and frequency regulation

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.6.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.9 Please provide your analysis on projections on current and future costs separating transmission, distribution and generation. Please include any assumptions that you have made to derive those projections.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.2 where we provide an analysis of cost-shifting between customers in the Program and non-participating customers.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.10 Please submit the information and marketing materials for the smart metering program that mention that "smart meters will enable small scale electricity generation by customers and communities".

RESPONSE:

This answer also responds to BCCSC IR 1.5.10.1.

BC Hydro's Smart Metering Infrastructure Program Business Case is available at: https://app.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/smart-metering/smi-program-business-case.pdf.

Benefits related to customer generation are discussed on pages 1, 8, 20, 21, 30 and 39 of the Business Case.

Benefits related to micro-grids are discussed on pages 1, 8, 20, 30 and 40 of the Business Case.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.10 Please submit the information and marketing materials for the smart metering program that mention that "smart meters will enable small scale electricity generation by customers and communities".

1.5.10.1 Please include materials that reference "micro-grids".

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.10.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.11 How has BC Hydro enabled small-scale electricity generation by communities?

RESPONSE:

The Program originates from the 2002 Energy Plan and is designed for customers who install a Generating Facility to generate electricity for their own use. It is not a program designed to enable small-scale generation by communities.

Please also refer to BC Hydro's response to CEC IR 1.22.1 where we explain that trends in distributed energy resources will inform BC Hydro's next Integrated Resource Plan.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.12 What does BC Hydro consider to be the "energy services" as required by the Utilities Act?

RESPONSE:

The *Utilities Commission Act,* section 1(1) defines "service" as including:

> **"(a) the use and accommodation provided by a public utility,**
>
> **(b) a product or commodity provided by a public utility, and**
>
> **(c) the plant, equipment, apparatus, appliances, property and facilities employed by or in connection with a public utility in providing service or a product or commodity for the purposes in which the public utility is engaged and for the use and accommodation of the public."**

The *Utilities Commission Act* and its regulations do not define the term "energy service".

BC Hydro's Electric Tariff also includes a number of definitions of service types. The Electric Tariff is available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/tariff-filings/electric-tariff/bchydro-electric-tariff.pdf.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.13 Does BC Hydro consider customer choice of generator source of electrical energy to be an energy service requirement in the Utilities Act?

RESPONSE:

No, BC Hydro does not consider customer choice of generator source of electrical energy to be an energy service requirement under the *Utilities Commission Act*. Under the Electric Tariff, BC Hydro does not offer customers a service option that allows them to choose the generation source of the electricity they purchase.

Please also refer to BC Hydro's response to BCCSC IR 1.5.12 where we provide the definition of "service" under the *Utilities Commission Act*.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.14 Does BC Hydro consider access to energy at emergency centres to be an "energy service" during grid disruptions?

RESPONSE:

"Service" is defined in the BC Hydro Electric Tariff as "[t]he provision by BC Hydro of Electricity to a Premises". When emergency centres or other BC Hydro customers receive Electricity from BC Hydro, they receive Service in accordance with the terms and conditions of the Tariff, any applicable rate schedule(s), and any applicable Electric Tariff supplement.

BC Hydro's Electric Tariff describes a number of service types. However, BC Hydro's Electric Tariff has no rate schedule or service provisions that apply specifically or exclusively to emergency centres. Most emergency centres are likely General Service customers.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.15 What are the voltages that Net Metering customers use to interconnect with the grid?

RESPONSE:

Net Metering customers interconnect to the grid at their service voltage.

BC Hydro standard Primary Voltages are 12 kV, 25 kV, and 34 kV. BC Hydro standard Secondary Voltages are 347/600 V and 120/208 V three-phase, and 120/240V single-phase.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.16 Is any of BC Hydro's Net Metering generation transformed to transmission voltages and sent to other areas of the province or the mid-C wholesale market?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.21.3, where we explain that BC Hydro's system is managed as a whole and that energy received by a customer is not attributed to a particular use.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.17 How much generation from third-party owned, non-Net Metering generators, or IPPs is transmitted to other area of the province or into the wholesale market?

RESPONSE:

BC Hydro's system is managed as a whole and BC Hydro resources, whether they are BC Hydro owned generating facilities or owned by a third-party such as IPP, are not attributed to a particular use by BC Hydro.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.18 Can BC Hydro confirm that there is a program to interconnect distributed generators with no annual load cap?

RESPONSE:

BC Hydro has an interconnection process that allows Customers to interconnect generators but this process is for load displacement purposes only and does not have an associated energy price.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.18 Can BC Hydro confirm that there is a program to interconnect distributed generators with no annual load cap?

1.5.18.1 What is the associated energy price?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.18.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.19 How many micro-SOPs EPAs were signed?

RESPONSE:

The public version of the response has been redacted to maintain confidentiality. The un-redacted version of the response is being made available to the BCUC only to protect the Independent Power Producer's commercial interests.

One Micro-Standing Offer Program Electricity Purchase Agreement has been executed. The generating facility is solar photovoltaic and the total estimated energy is approximately [redacted] per year.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.19 How many micro-SOPs EPAs were signed?

1.5.19.1 What are the generation sources?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.19.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.19 How many micro-SOPs EPAs were signed?

1.5.19.2 What is the total annual volume?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.5.19.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.20 Does BC Hydro consider that it has been successful at removing the barriers to small scale generation? Please give a detailed answer.

RESPONSE:

BC Hydro has reduced barriers to customers seeking to net meter. For example, in response to Directive No. 14 in Order No. G-57-12, BC Hydro proposed and received BCUC approval to increase the nameplate capacity limit for a Generating Facility from 50 kW to 100 kW. This change was intended to reduce barriers to customers seeking to net meter, including indigenous communities, government agencies and municipalities.

In addition, as discussed in section 1.5 of the Application, the Program continues to grow and has been growing at a more significant rate in recent years.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.21 Is BC Hydro aware of PG&E's Community Wildfire Safety Program called Public Safety Power Shutoff (PSPS) development in California where power is proactively shut down in high wind, dry fuel, and low humidity conditions to prevent fires from live powerlines?

RESPONSE:

Yes, BC Hydro is aware of PG&E's Public Safety Power Shutoff Program, which is one of the programs they use to prevent and combat wildfires in their service territory. Further information on PG&E's wildfire safety programs can be found at: https://www.pge.com/pge_global/common/pdfs/safety/emergency-preparedness/natural-disaster/wildfires/Wildfire-Safety-Plan.pdf.

5.0 V. Distributed Energy Resources (DER)

Refers to the following sections in BC Hydro's application:

- Section 1.3 – Support a Focus on Economic Efficiency
- Section 1.5 – Net Metering Growing at a More Significant Rate in Recent Years
- Section 4 – Amendments Will Improve Fairness Between Participating and Non-Participating Customers
- Section 11. Distributed Energy Update

1.5.22 Does BC Hydro have any customer survey information about public acceptance or preference for local energy generation? Please provide any information available.

RESPONSE:

BC Hydro has not collected any survey information from its customers on public acceptance or preference for local energy generation.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.1 BC Hydro proposes to decrease the energy price from 9.99 cents per kWh to an amount that reflects the regional wholesale market. Given that net-metered solar travels a minimum distance to the nearest demand site what is the justification for choosing the wholesale rate over the retail rate you charge the customer, who actually receives the net-metered solar energy generated?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.21.3.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.2 In Section 1.2 BC Hydro state that these amendments will be beneficial for customers in the Program. Although we agree that the change in reconciliation date will streamline the system while simplifying billing for BC Hydro, can you please elaborate on any benefits these changes will have to Net-Metering customers?

RESPONSE:

As discussed further in section 3 of the Application, the proposed amendments with regards to the Anniversary Date will benefit customers in the Program by providing those customers with increased opportunities to apply their Generation Account Balance to reduce their net energy purchased from BC Hydro.

Assuming that the Energy Price is less than the rate paid by the customer under their applicable Rate Schedule, an optimized Anniversary Date allows the customer to maximize their financial benefit from the Program.

For a calculation of the benefits to the customer from an optimized Anniversary Date in the hypothetical case shown in Table 6 of the Application, please refer to BC Hydro's response to CEC IR 1.10.1.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.3 Section 1.2 states that you are preventing oversizing of solar facilities. Can you explain why you want to prevent oversizing of facilities when they could be providing excess non-emitting energy to you in the spring and summer, when you actually needed to import energy in 2019?

RESPONSE:

BC Hydro believes that the purpose of the Program is to be a load offset program that provides customers with opportunities to offset their own load. The Program is not intended to allow customers to generate energy with the objective of selling that energy to BC Hydro, similar to an IPP.

Please refer to BC Hydro's response to BCCSC IR 1.3.12 with regards to market purchases in fiscal 2019.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.4 Section 1.2 in reference to preventing oversizing solar facilities, please provide information on the volume of imported electricity in the spring of 2019?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.3.12 where we provide market electricity purchase information for fiscal 2019, and explain that BC Hydro makes market purchases, as required, to serve domestic load.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.5 How much money did BC Hydro make on the transmission of the imported electricity?

RESPONSE:

BC Hydro transmits electricity on its Transmission system in accordance with its Long Term Point to Point and Network Integration Transmission Service rates, which are based on the Transmission Revenue Requirement cost of service that is approved through BC Hydro's revenue requirements applications. BC Hydro's cost-of-service studies classify transmission costs as 100 per cent capacity/demand, with no energy component.

The Transmission Revenue Requirement determination includes an allowed Return on Equity. BC Hydro's Return on Equity for its entire Transmission system is forecast to be $236.1 million for fiscal 2020 and $232.3 million for fiscal 2021. No portion of the Transmission system Return on Equity is specifically associated with electricity imports because electricity imports are of energy and the Transmission System Return on Equity is based on capacity.

Accordingly, the Transmission System Return on Equity is largely independent of the amount of energy used by BC Hydro customers, and there is no incremental cost or Return on Equity in the Transmission Revenue Requirement from electricity imports.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.6 How much of the imported electricity was lost in transmission and distribution?

RESPONSE:

BC Hydro has not quantified line losses for imported electricity transmitted from the market to the B.C.-U.S. border. Depending upon where the energy is sourced and transported through, any imported electricity would incur line losses from one or many transmission service providers.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.7 How many of the 5 customers receiving surplus energy payment of $28,000 to $74,000 (Table 5, Section 2.2) are net-metered customers using solar photovoltaics?

RESPONSE:

All five customers who received a Surplus Energy Payment between $28,000 and $74,000 in fiscal 2018 have hydroelectric Generating Facilities.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.8 In Section 2.2 you highlight that oversized generating facilities are similar to an IPP. If these 5 customers had been accepted as IPPs or fallen into the now cancelled SOP program, what rates would they be receiving for their generated energy?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.4.6 where we provide the average unit cost of energy acquired under the Standing Offer Program (SOP), and the average unit cost of IPPs and Long-Term Commitments for 2018.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.9 Please demonstrate how BC Hydro has accounted for net-metering in its revenue requirements in the F2017-2019 period and in the F2020 meeting? If it is not accounted for, how is this application for a change in net metering rate relevant to BC Hydro's bottom line?

RESPONSE:

The update to the Energy Price is intended to address cost-shifting between customers in the Program and non-participants with regards to Surplus Energy Payments. For further information, please refer to BC Hydro's response to BCUC IR 1.5.1.

For fiscal 2017 to fiscal 2019, actual Surplus Energy Payments were allocated to Corporate Costs and funded through BC Hydro's unallocated funds budget. For fiscal 2020 and fiscal 2021, actual Surplus Energy Payments will be deferred to the Non-Heritage Deferral Account as cost of energy for recovery from ratepayers.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.10 What would the implications be to BC Hydro's revenue if the net metering program were not changed, and remained as was prior to the 2018 interim decision of BCUC?

RESPONSE:

BC Hydro's revenues are not impacted by the proposed amendments because Surplus Energy Payments are a cost to BC Hydro. For further information, please refer to BC Hydro's response to BCCSC IR 1.6.9.

The cost-shifting from customers in the Program to non-participants caused by Surplus Energy Payments can be quantified by the difference between the total Surplus Energy Payments provided and the value of the excess generation received by BC Hydro for those payments. Further information is provided in BC Hydro's response to CEC IR 1.7.3.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.11 What is the total percentage rate increase that BC Hydro will require to cover cost-shift to non- net-metered customers? How does this compare to percentage rate increases required for other reasons, including smart meter infrastructure, Site C, PowerSmart and damage from severe weather events?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.7.3 where we quantify the cost-shifting with regards to Surplus Energy Payments.

Rate impacts with regards to capital projects, demand side management and severe weather events depend on the expenditure amount as well as how those expenditures are recovered in rates.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
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- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
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1.6.12 Please explain the "postage stamp" rate concept.

RESPONSE:

BC Hydro's rates are designed to recover costs primarily through postage stamp rates. Postage stamp rates are a method of cost allocation where customers in the same rate class on BC Hydro's interconnected system receive the same rate, regardless of the specific cost of serving each customer.

6.0 VI. Surplus Energy Rates

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1.6.13 In relation to options to address oversized generating facilities, has BC Hydro done any analysis of how excess solar would dovetail with BC generation *versus* demand in BC? If so please provide the analysis. If not why not?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.14.2.1 where we explain that generation from residential customers in the Program is delivered to BC Hydro primarily in the daytime, during the summer and shoulder season, and consequently, does not coincide with BC Hydro's peak demand period or the residential class non-coincident peak period.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
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- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
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1.6.14 Why does BC Hydro not consider the many advantages of increasing solar input in their mix of overall generating capacity, as do many other utilities around the world?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.3.7 where we explain that BC Hydro considers options to meet future demand, including solar, through its Resource Options Inventory and to BC Hydro's response to BCCSC IR 1.3.6 where we discuss the advantages and disadvantages of solar generation.

6.0 VI. Surplus Energy Rates

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1.6.15 In Section 2.6 you provide a jurisdictional review. However, you only selected 8 facilities. Why didn't you expand your jurisdictional review to consider the way that some utilities are embracing solar energy?

RESPONSE:

Seven of the eight utilities selected for the Jurisdictional Review are Canadian utilities, which provides a useful benchmark of BC Hydro's Net Metering Program compared to other programs in Canada.

Xcel Energy in Colorado was included in the Jurisdictional Review because it operates within the Western interconnection and has comparable residential electricity rates to BC Hydro. Colorado is also actively pursuing the use of renewable energy resources to meet its climate objectives.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

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1.6.16 What questions did you consider in your review? Was it comprehensive? Please provide the results beyond what you have supplied in this application.

RESPONSE:

BC Hydro explored five program features through the Jurisdictional Review:

- **Generating Facility Requirements (does the utility place specific requirements on the customer's generating facility, such as a limit to Annual Energy Output in relation to Annual Load?);**
- **Anniversary Date (what is the anniversary date for customer accounts and are customers offered the option of selecting their own date?);**
- **Period between Surplus Energy Payments (how long is the period of time where credits may accrue?);**
- **Energy Price for Surplus Energy Payments (what is the price paid for surplus energy credits or do credits expire?); and**

- **Grandfathering (for utilities that recently made changes to their program, were existing customers grandfathered or did the new rules apply to all net metering customers?).**

In some cases, BC Hydro collected additional information on topics not considered within the Application (such as other program fees, additional charges, and connection requirements). BC Hydro did not include this information in the Jurisdictional Review as it was not related to the proposed amendments in the Application.

BC Hydro also considered collecting information on meter aggregation (e.g., virtual net metering), but found only a few jurisdictions that offered such programs. As BC Hydro is not proposing to offer virtual net metering at this time and because there are only a limited number of other jurisdictions offering these programs, we determined that it would be premature to collect this information as part of the Application.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
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1.6.17 What was the net-metering penetration percentage for the utilities surveyed in the jurisdictional review?

RESPONSE:

BC Hydro did not ask the utilities surveyed in the Jurisdictional Review to provide information on net-metering penetration percentage. However, the following utilities voluntarily provided the number of participants in their net metering programs when contacted by BC Hydro:

- **FortisBC: 395 participants as of March 2019;**
- **SaskPower: 1,019 participants as of December 2017;**
- **Newfoundland Power: five participants as of April 2019;**
- **Hydro Quebec: 140 (no as of date provided); and**
- **HydroOne: 154,148 participants as of March 2019.**

6.0 VI. Surplus Energy Rates

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1.6.18 Please provide evidence to support the statement that "oversized generation facilities" are of "immediate" concern? Please put this evidence in the context of total electrical generation in BC and of total surplus electrical generation in BC?

RESPONSE:

As discussed on page 7 of the 2018 Amendment Application, provided as Appendix C of the Application:

- **BC Hydro was receiving an increased number of applications with oversized generating facilities where customers with minimal historical or anticipated annual load requirements were proposing a generating facility with an estimated annual energy output that far exceeded their anticipated load requirements; and**
- **The impact of these oversized generating facilities was being reflected in the Surplus Energy Payment amounts. In 2017, six customers received approximately $220,000 with individual Surplus Energy Payment amounts ranging from $10,000 to $60,000 per customer.**

BC Hydro's immediate concern was that Oversized Generating Facilities were not consistent with the intent of the Program and that Rate Schedule 1289 did not, at the time, provide BC Hydro with the discretion to deny such applications.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
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1.6.19 In Section 4 BC Hydro argues that the price should reflect the short-term run price because it is unpredictable. Yet you are able to predict, fairly accurately, how much energy each customer will receive. Why then can't you predict how much they will sell back to the grid based on their capacity?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we provide the reasons why BC Hydro believes that excess generation from customers in the Program should be based on the market value and explain that, to-date, BC Hydro has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
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1.6.20 Solar energy production fluctuates in the short-term, based on daily weather patterns, but is rather consistent over the long-term. Why then wouldn't you value it as a long-term resource?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why BC Hydro believes that excess generation from customers in the Program should be valued based on the market value.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

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1.6.21 Has BC Hydro investigated the studies by various US Utility Commissions concluding that the value of rooftop solar is usually - and most times considerably – higher than the retail rate? If not, why not?

RESPONSE:

BC Hydro is aware of a number of the studies proposed or underway in U.S. jurisdictions to value the costs and benefits of distributed solar resources from the perspective of the grid. According to the North Carolina Clean Energy Technology Center, 28 "value of solar" studies were proposed, pending or decided in 2017 alone.

Value of solar studies take a variety of analytical approaches and the valuation of distributed solar (for example, whether it is higher or lower than the retail rate) can vary widely, depending on the analytical approach.

For example, one study of the value of solar in Montana[1] suggested the value of solar to be between $0.035 and $0.046/kWh, while another study in Maryland[2] suggested the value of solar to be between $0.31 and $0.41/kWh.

The U.S. National Association of Regulatory Utility Commissioners (NARUC) published a review of current analytical practices,[3] and generalized the range of approaches into four categories. A finding in the report conclusion reads:

> **"The review of non-regulatory studies in Section 4 found that a value of resilience has been calculated and applied to analyze DER investments in several different contexts and using several different methods. However, none of the four methods analyzed is a strong fit with the criteria used to evaluate their usefulness to regulators and regulatory decision-making."**

Please also refer to BC Hydro's response to BCCSC IR 1.4.3 where we explain that, to-date, BC Hydro has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning and that, over time, as participation in the Program increases, BC Hydro may be able to recognize certain additional benefits from the Program.

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1 http://leg.mt.gov/content/Committees/Interim/2017-2018/Energy-and-Telecommunications/Meetings/May-2018/Tab%206-NorthWestern%20NEM%20Report.pdf.

2 http://www.psc.state.md.us/wp-content/uploads/MD-Costs-and-Benefits-of-Solar-Draft-for-stakeholder-review.pdf.

3 https://pubs.naruc.org/pub/531AD059-9CC0-BAF6-127B-99BCB5F02198.

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1.6.22 In Section 4 you argue that because net-metered customers are not required to sell their excess energy to BC Hydro you don't consider their excess energy a supply side resource. Is the amount of surplus energy that net-metered customers sell back to BC Hydro really so variable that you cannot consider it surplus energy? After all, you have been able to provide data, by year, on how much surplus energy you receive from net metered customers.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why BC Hydro believes that excess generation from customers in the Program should be valued based on the market value.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

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- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.23 In Section 6 you propose to maintain the price of 9.99 cents/kWh for customers with accepted applications as of April 20, 2018, for 5 years. However, the BC Hydro web-page on net-metering claims that the payback for solar is 23 years. If this is true, why then would the grandfathering time be cut short to 5 years and not extended to 23 years?

RESPONSE:

The information on BC Hydro's website related to a payback period for solar is provided for illustrative purposes only. As discussed in BC Hydro's response to BCUC IR 1.15.5, Rate Schedule 1289 provides no guaranteed payback period for any generation investments that may be made by a customer in the Program.

Under the revised tariff proposed in the Application, customers in the Program would continue to benefit from offsetting their own load and accumulating a Generation Account Balance to apply against subsequent bill(s) and would continue to receive a Surplus Energy Payment at the Energy Price for any remaining balance at their Anniversary Date.

As discussed in section 1.4 of the Application, the Energy Price has been updated multiple times since the Program was established. Rate Schedule 1289 does not

provide assurance on the stability of terms and conditions, including the Energy Price. In addition, by Order No. G-63-18, the BCUC approved changes to FortisBC's energy price under its net metering tariff with no transitional provisions for existing customers.

That said, BC Hydro is proposing a five-year transitional Energy Price to mitigate the impact of the proposed update to the Energy Price to existing customers in the Program. Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain the rationale for a five-year transition period.

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1.6.24 What is the justification for drastically decreasing the rate paid to solar net metered customers, who produce their excess energy in summer, when BC Hydro has to purchase energy on the wholesale market, while IPP customers, who produce peak energy at times when BC Hydro does not need additional input, receive, on average 9.1 cents/kWh in 2018 (BC Hydro Annual Report 2018)?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

Please also refer to BC Hydro's response to BCUC IR 1.14.2.1 where we explain that generation from residential customers in the Program does not coincide with BC Hydro's peak demand period or the residential class non-coincident peak period.

As discussed in BC Hydro's response to BCCSC IR 1.5.1 Rate Schedule 1289 is a schedule that sets out rates for Service and other terms and conditions, and, under section 60 of the *Utilities Commission Act*, the BCUC must have due regard

to the setting of a rate that is not unjust or unreasonable. Rates are subject to change as approved by the Commission.

Electricity Purchase Agreements with Independent Power Producers are not rates, but are commercial agreements as between BC Hydro and IPP project proponents. They are filed and accepted by the BCUC, in accordance with section 71 of the *Utilities Commission Act*, unless otherwise exempted, and are not subject to change except as provided under the terms of the agreement.

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1.6.25 In Section 6.3 BC Hydro discuss maintaining the interim price for 5 years for customers who net- metered prior to April 20, 2018. Please clarify what you are proposing for customers who were net-metered prior to April 20, 2018, but expanded their systems after that date? Are they grandfathered too?

RESPONSE:

BC Hydro is proposing that the transitional Energy Price apply to all customers with accepted applications as of April 20, 2018. This would include customers who expanded their Generating Facility after April 20, 2018, provided that the expansion met the eligibility requirements of the Program.

6.0 VI. Surplus Energy Rates

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- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.26 With reference to Appendix F, Section 9.1.1 Leasing Solar Equipment, explains how BC Hydro has reduced the barriers to enter into leasing arrangements with companies like VREC, but that they have only one customer who has taken advantage of leasing.

1.6.26.1 Has BC Hydro explored why the uptake of leasing agreement is so poor?

RESPONSE:

BC Hydro has not explored why customers are not interested leasing arrangements with third parties.

Regardless of whether a customer owns the Generating Facility or leases it from a third party, the value to the customer from participating in the Program is generally based on the economics of being able to offset their own consumption.

6.0 VI. Surplus Energy Rates

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1.6.26 With reference to Appendix F, Section 9.1.1 Leasing Solar Equipment, explains how BC Hydro has reduced the barriers to enter into leasing arrangements with companies like VREC, but that they have only one customer who has taken advantage of leasing.

1.6.26.2 Please provide an analysis of the net-metering rate for surplus energy required to make leasing arrangements attractive.

RESPONSE:

BC Hydro has not conducted an analysis of the Energy Price required to make leasing arrangements attractive. As the Program is intended to be a load offset Program, BC Hydro believes that the primary financial consideration for customers with regards to leases or capital investments to participate in the Program should be the value they expect to receive from the ability to offset their own consumption.

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
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1.6.27 How much has BC Hydro spent on consultations with First Nations for generation and transmission customers?

RESPONSE:

The public version of the response has been redacted to maintain confidentiality over commercially sensitive information.

The following table provides the total annual labour costs charged to generation and transmission projects by employees in BC Hydro's Indigenous Relations Key Business Unit as well as payments to First Nations with Consultation Capacity Funding Agreements. The amounts exclude labour costs for employees outside the Indigenous Relations Key Business Unit, and costs for contract labour, which are not considered material.

	F2017 Actual ($ million)	F2018 Actual ($ million)	F2019 Actual ($ million)
Total Costs	[redacted]	[redacted]	[redacted]

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

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- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
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- Section 7.3 Broader Costs and Benefits
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1.6.27 How much has BC Hydro spent on consultations with First Nations for generation and transmission customers?

1.6.27.1 How much has BC Hydro spent on benefit agreements with First Nations for generation and transmission projects?

RESPONSE:

The public version of the response has been redacted to maintain confidentiality over commercially sensitive information.

The following table provides the total annual payments to First Nations related to Impact Benefit Agreements for generation and transmission projects from fiscal 2017 to fiscal 2019.

	F2017 Actual ($ million)	F2018 Actual ($ million)	F2019 Actual ($ million)
Total Payments	[redacted]	[redacted]	[redacted]

6.0 VI. Surplus Energy Rates

Questions in this section relate to the following sections in BC Hydro's application:

- Surplus Energy Payments
- Sections 1.2 Proposed Amendments Reflect Customer Feedback and Will Maintain Program Intent, Fairness, Simplicity and Safety
- Section 1.5 Net Metering Growing at a More Significant Rate in Recent Years
- Section 2.2 In Fiscal Year 2018 Five Customer Received 75% of Total Surplus Energy Payments
- Section 2.4 Options to Address Oversized Generating Facilities
- Section 2.6 Jurisdiction Review … Regarding size of a customer's Generating Facility
- Section 4. Amendments will improve fairness
- Section 4.2 To Reflect Value Received, Energy Price Should Reflect the Short-Run Price, Not the Long-Run Price
- Section 6 Transitional Energy Price Mitigates Impact to Existing Customers
- Section 7.3 Broader Costs and Benefits
- Appendix F, Section 9.1 Leasing Solar Equipment

1.6.27 How much has BC Hydro spent on consultations with First Nations for generation and transmission customers?

1.6.27.2 How much has BC Hydro spent on benefit agreements for Net Metering generators?

RESPONSE:

BC Hydro does not have any benefit agreements with customers in the Program.

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F. Section 9. Recovery of Infrastructure Costs

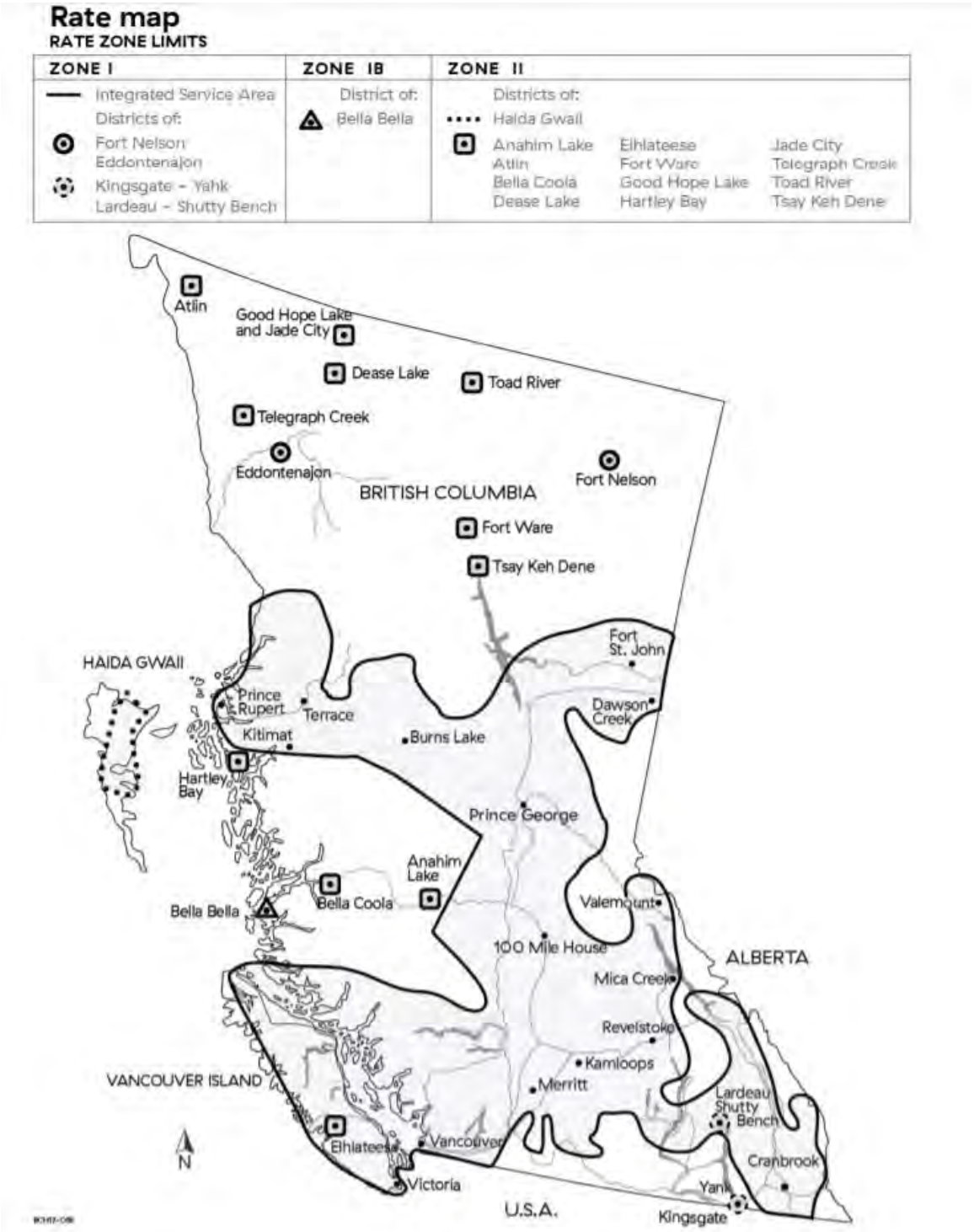
1.7.1 Please provide a map indicating the Non-Integrated Areas where you would like to have the option to restrict new generation by net-metering? Please indicate how many applications have been turned down because they are in non-integrated areas?

RESPONSE:

The Non-Integrated Areas are Zone IB and Zone II shown on the rate zone map in section 1.3 of the Electric Tariff, which is provided below.

Applications are accepted in the Non-Integrated Areas unless they cannot be accommodated due to system constraints.

To-date, one application in the Non-Integrated Areas has been rejected due to system constraints.


Rate map
RATE ZONE LIMITS
ZONE I
Integrated Service Area
Districts of:
Fort Nelson
Eddontenajon
Kingsgate - Yahk
Lardeau - Shutty Bench
ZONE IB
District of:
Bella Bella
ZONE II
Districts of:
Haida Gwaii
Anahim Lake
Atlin
Bella Coola
Dease Lake
Elhlateese
Fort Ware
Good Hope Lake
Hartley Bay
Jade City
Telegraph Creek
Toad River
Tsay Keh Dene
Atlin
Good Hope Lake and Jade City
Dease Lake
Toad River
Telegraph Creek
Eddontenajon
BRITISH COLUMBIA
Fort Nelson
Fort Ware
Tsay Keh Dene
HAIDA GWAII
Prince Rupert
Terrace
Kitimat
Burns Lake
Hartley Bay
Fort St. John
Dawson Creek
Prince George
Anahim Lake
Bella Coola
Bella Bella
Valemount
100 Mile House
ALBERTA
Mica Creek
Revelstoke
Kamloops
Merritt
VANCOUVER ISLAND
Lardeau Shutty Bench
Elhlateese
Vancouver
Victoria
Cranbrook
Yahk
Kingsgate
U.S.A.
N

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F. Section 9. Recovery of Infrastructure Costs

1.7.2 Please provide an analysis of how the uncertainty created by continually returning to the BCUC for changes in this program affects the needs for customers to have certainty for their own planning purposes.

RESPONSE:

As outlined in section 1.4 of the Application, BC Hydro has submitted seven applications to amend RS 1289 since it was originally established in March 2004. Many of these applications have been filed in response to emerging issues or opportunities identified by customers or by the BCUC. For example, by Order No. G-57-12, the BCUC directed BC Hydro to consider and consult on the Capacity Limit and following that consultation, BC Hydro submitted an application to the BCUC to increase the Capacity Limit. As the Program continues to grow, it is necessary to periodically re-evaluate and amend the Program as conditions change.

As discussed in BC Hydro's response to BCUC IR 1.15.1, BC Hydro has proposed a transitional Energy Price to mitigate the impact of updating the Energy Price to existing customers in the Program by providing notice to those customers.

As discussed in BC Hydro's response to BCUC IR 1.15.5, enrolment in the Program does not entail any contractual agreement that provides assurance with regards to cost recovery or the Energy Price.

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F.
Section 9. Recovery of Infrastructure Costs

1.7.3 Please provide an analysis of the effects of putting a cap on net metering, as this application effectively does, impacts the emerging job market for solar energy suppliers and installers in British Columbia.

RESPONSE:

The proposed amendments in the Application do not put a cap on the Program. As outlined in section 1.5 of the Application, participation in the Program continues to grow.

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F.
Section 9. Recovery of Infrastructure Costs

1.7.4 Please provide an analysis of the savings to BC Hydro from the net metering program, considering that the cost of infrastructure is borne by the net metered customer and does not require BC Hydro to borrow funds.

RESPONSE:

BC Hydro does not realize any savings from customers in the Program providing the capital investment required for their Generating Facilities. Rather, as explained in BC Hydro's response to BCUC IR 1.5.1, the Program results in cost-shifting from customers in the Program to non-participating customers.

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F. Section 9. Recovery of Infrastructure Costs

1.7.5 In Section 7.3 you say that you will come back, in a future application, to improve cost recovery from program participants. How are you valuing the energy you currently receive?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 with regards to the value of excess generation from customers in the Program and to BC Hydro's response to BCUC IRs 1.5.1 and 1.5.2 with regards to cost recovery from customers in the Program.

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F. Section 9. Recovery of Infrastructure Costs

1.7.6 How is BC Hydro planning to avoid putting a chill on the net-metering program when you indicate that you will continually return to BCUC for amendments?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.7.2.

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F. Section 9. Recovery of Infrastructure Costs

1.7.7 Please provide a chart of the costs and benefits of applying to BCUC for continual changes to a small program, such as net-metering, compared to the costs and benefits of allowing the program to grow unobstructed? Is there actually a net benefit to restricting the program compared to the costs of applying for restrictions?

RESPONSE:

BC Hydro's costs related to this proceeding are primarily labour costs for staff involved with conducting customer and stakeholder engagement, preparing the Application and responding to information requests. All of this staff time has been accommodated within existing budgets and staffing levels.

BC Hydro does not believe that the costs of a regulatory proceeding should prevent the advancement of proposed amendments to maintain the Program as a load offset program and to limit cost shifting between participating and non-participating customers with regards to Surplus Energy Payments.

7.0 VII. Business Planning

Questions in this section relate to the following sections in BC Hydro's application: Section 5.3. … Rejection of Certain Applications

Section 7. Issues to be Considered in a Future Application Appendix F. Section 9. Recovery of Infrastructure Costs

1.7.8 In Appendix F, Section 9, BC Hydro refers to the possibility of returning to BCUC with recovery of infrastructure costs. Will BC Hydro then also consider recovery costs to net-metered customers for their investments?

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 1.15.5, enrolment in the Program does not entail any contractual agreement that provides assurance with regards to cost recovery or the Energy Price.

As discussed in BC Hydro's response to BCUC IR 1.15.1, BC Hydro has proposed a transitional Energy Price to mitigate the impact of the update to the Energy Price to existing customers in the Program.

8.0 VIII. Net Metering Evaluation

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix F. Net Metering Evaluation Report No. 4

1.8.1 In your analysis of the net-metering program did you consider Aggregate Net Metering, where a single customer who owns multiple accounts applies Energy Credits generated at one location to co-located facilities on separate accounts owned by the same customer? Please provide the results of that analysis. If not why not?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

8.0 VIII. Net Metering Evaluation

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix F. Net Metering Evaluation Report No. 4

1.8.2 Have you reviewed Aggregate Net Metering Programs from other jurisdictions? Please provide the results of that analysis.

RESPONSE:

BC Hydro has not reviewed Aggregate Net Metering Programs from other jurisdictions. For further discussion with regards to Aggregate Net Metering, please refer to BC Hydro's response to CEC IR 1.22.1.

8.0 VIII. Net Metering Evaluation

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix F. Net Metering Evaluation Report No. 4

1.8.3 Does BC Hydro in any way aggregate multiple accounts when billing or in other communications with clients who own multiple services using multiple meters? If yes, please explain how information about these accounts is communicated to and aggregated for customers?

RESPONSE:

A customer's bill may contain information about multiple accounts; however, as discussed further in BC Hydro response to BCSEA IR 1.19.1, a customer cannot aggregate multiple accounts under the Program.

8.0 VIII. Net Metering Evaluation

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix F. Net Metering Evaluation Report No. 4

1.8.4 Does BC Hydro retain the solar renewable energy credit (SREC) or other renewable energy credits for net-metered generation?

RESPONSE:

Rate Schedule 1289 requires that a Generating Facility "utilizes biogas, biomass, geothermal heat, hydro, solar, ocean, wind or other energy resources or technologies defined as a "clean or renewable resource" in the *Clean Energy Act* (as updated from time to time) to generate Electricity."

At this time, Rate Schedule 1289 is silent with respect to whether BC Hydro retains any environmental attributes which may be associated with the customer's generation.

8.0 VIII. Net Metering Evaluation

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix F. Net Metering Evaluation Report No. 4

1.8.5 Does BC Hydro or Powerex sell renewable energy credits? If so, what is the value of these credits. If they are not sold, what is done with the credits?

RESPONSE:

BC Hydro does not sell renewable energy credits. Powerex undertakes the sale of environmental attributes in the export market; however, information on Powerex's commercial transactions is commercially sensitive and therefore, confidential. BC Hydro understands that there is uncertainty on long-term value for environmental attributes.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.1 How have you defined public interest?

RESPONSE:

The BCUC is obliged to set electricity rates that meet the legal standard set out in section 58 to 61 of the *Utilities Commission Act*. That standard is commonly referred to as the "just and reasonable" standard. Generally, just and reasonable rates are those that are justified on cost-of-service or other economic criteria, regardless of whether they may serve some other public policy objective. Rates that are just and reasonable are in the public interest.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.2 Do you agree that it is in the public interest for BC Hydro to be concerned with quickly reducing the carbon footprint of its operations in the face of the emerging climate crisis?

RESPONSE:

BC Hydro's Annual Service Plan Report tracks BC Hydro's performance against the *Clean Energy Act* objective to generate at least 93 per cent of the electricity in British Columbia from clean or renewable resources. In fiscal 2019, BC Hydro's result on this performance measure was 97.8 per cent.

Please also refer to BC Hydro's response to BCCSC IR 1.5.6 where we explain why BC Hydro expects that energy from customers in the Program would have a negligible, if any, impact with regards to greenhouse gas emissions and climate change related issues.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.3 How have you accommodated the mandate letter to the Minister of Energy and Mines and Petroleum Products that BC Hydro is to provide community benefits?

RESPONSE:

The Mandate Letter from the Minister of Energy, Mines and Petroleum Resources to BC Hydro, dated February 21, 2019, includes the following reference with respect to community benefits:

> **Continue to deliver planed capital projects on time and on budget to maintain the reliability of the system, while providing community benefits and training and apprenticeship opportunities.**

As the Net Metering Program is not a capital project, BC Hydro's view is that this reference to "community benefits" does not apply to the Program.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.4 Where is BC Hydro's analysis showing that its large generating facilities do not have the same continuous and substantial release of methane and carbon dioxide as other large hydro-energy projects around the world?

RESPONSE:

BC Hydro cooperated with Hydro Quebec (Tremblay et al.) in a coordinated sampling of GHG flux measurements from reservoirs, natural lakes and rivers in British Columbia, Quebec, Manitoba, Ontario and Newfoundland. This study is available at:
https://www.researchgate.net/publication/228810337_The_issue_of_grenhouse_gases_from_hydroelectric_reservoirs_from_boreal_to_tropical_regions.

The study found that the range of net emissions from B.C. reservoirs is similar to natural lakes in B.C. and is less than other regions of Canada. It also found that in reservoirs older than ten years in boreal and semi-arid regions, GHG emissions are similar to those of natural lakes, and in tropical regions, the time to return to natural values may be longer depending on the water quality conditions.
BC Hydro's largest reservoirs are in boreal and sub-boreal regions of B.C.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.5 Does BC Hydro have any data for methane releases during and after turbine passage and from draw-down areas for any of their reservoirs/generating stations?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.9.1.4.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.6 Is not in the public interest to encourage adoption of solar energy, which is non-emitting, with BC Hydro not incurring any capital expenditures?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.9.1.1 where we explain that just and reasonable rates are in the public interest and that generally, just and reasonable rates are those that are justified on cost-of-service or other economic criteria, regardless of whether they may serve some other public policy objective.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.7 Please provide an analysis on how an increase in the use of solar energy in BC Hydro's electrical generation mix could offset the greenhouse gas emissions from BC Hydro's large legacy and new hydro generation facilities.

RESPONSE:

Both solar generation and hydro generation are considered clean or renewable resources under the *Clean Energy Act*.

The environmental assessment for Site C included a comparison of lifecycle GHG emissions and showed that utility scale solar photovoltaic emits, on average, 50 g CO2e/kWh. By comparison, Site C is estimated to emit 10.5 g CO2e/KWh on average.

Please also refer to BC Hydro's response to BCCSC IR 1.9.1.4 for information on the low greenhouse gas emissions from BC Hydro's generation facilities.

9.0 IX. Public Interest

Questions in this section relate to the following sections in BC Hydro's application:

- - Appendix A

1.9.1 You indicate that this application is in the public interest.

1.9.1.8 Does BC Hydro have a stated preference for utility owned generation rather than third party owned? If so, what are the reasons for this preference?

RESPONSE:

BC Hydro does not have a preference between utility or third-party ownership of new generation resources.

1.0 Reference: Exhibit B-2, page 1 (lines 21-26)
Exhibit B-2, Appendix E, pages 1-2

1.1.1 Who was invited to participate in the Webinar?

RESPONSE:

The webinars were open to any interested party who wished to participate. The invitation to register for the webinars was posted on BC Hydro's website and distributed to approximately 2,700 recipients via e-mail, including:

- **Customers in the Program, including those with applications pending, who consented to receive Program updates;**
- **Interveners and interested parties involved in previous regulatory proceedings with respect to the Program;**
- **Net Metering contractors and installers; and**
- **Those who signed up to receive e-mail updates on the Program.**

1.0 Reference: Exhibit B-2, page 1 (lines 21-26)
Exhibit B-2, Appendix E, pages 1-2

1.1.2 How were potentially interested stakeholders made aware that the webinar was taking place?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.1.

1.0 Reference: Exhibit B-2, page 1 (lines 21-26)
Exhibit B-2, Appendix E, pages 1-2

1.1.3 Who was invited to participate in the on-line survey?

RESPONSE:

The Engagement Survey was open to the public, announced to participants in both webinars and posted on BC Hydro's web site. In addition, BC Hydro distributed the survey to approximately 2,700 recipients via e-mail, including:

- **Customers in the Program, including those with applications pending, who consented to receive Program updates;**
- **Interveners and interested parties involved in previous regulatory proceedings with respect to the Program;**
- **Net Metering contractors and installers; and**
- **Those who signed up to receive e-mail updates on the Program.**

1.0 Reference: Exhibit B-2, page 1 (lines 21-26)
Exhibit B-2, Appendix E, pages 1-2

1.1.4 How were potentially interested stakeholders made aware that the on-line survey was taking place?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.3.

1.0 Reference: Exhibit B-2, page 1 (lines 21-26)
Exhibit B-2, Appendix E, pages 1-2

1.1.5 How many of the survey respondents did not have a direct interest in net metering (i.e., they were not a current net metering customer, a pending net metering customer or a consultant/developer involved with net metering)?

RESPONSE:

As shown in Figure E-2 of Appendix E of the Application, the Engagement Survey asked participants "Which of the following best describes your interest in Net Metering". Participants were provided with the following options:

- **A net metering applicant (I have applied but I'm not on the net metering billing yet);**
- **A net metering customer (my system is operating and I'm on the net metering billing);**
- **An installer/contractor for net metering customers; and**
- **Other – please specify.**

"Other" was selected by 23 per cent of Engagement Survey participants. Most of these participants provided written comments indicating that they were either interested in becoming a net metering customer, a supporter of net metering or a consultant/developer involved with net metering.

1.0 Reference: Exhibit B-2, page 1 (lines 21-26)
Exhibit B-2, Appendix E, pages 1-2

1.1.6 Were any efforts made to specifically seek the input of customers or other parties that did not have a direct interest/stake in net metering (i.e., non-participating customers/stakeholders)?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.1.3 where we explain who was invited to participate in the Engagement Survey.

2.0 Reference: Exhibit B-1, page 4 (lines 14-16) and page 15 (Table 3)

1.2.1 How many customers had "accepted" applications as of April 20, 2018?

RESPONSE:

As of April 20, 2018, there were 1,525 customers with accepted applications.

Once an application is accepted by BC Hydro, there are additional steps prior to the authorization of the connection of the project to BC Hydro's grid.

The information provided in Table 3 of the Application reflects the number of customers connected to BC Hydro's grid and receiving service under Rate Schedule 1289 as of March 1, 2019. The applications for some of the customers included in Table 3 of the Application were accepted after April 20, 2018.

2.0 Reference: Exhibit B-1, page 4 (lines 14-16) and page 15 (Table 3)

1.2.2 Please provide a breakdown of the customers with "accepted" applications as of April 20, 2018 by nameplate capacity (i.e., similar to Table 3).

RESPONSE:

As of April 20, 2018, there were 1,525 customers with accepted applications. As discussed in BC Hydro's response to BCOAPO IR 1.2.1, once an application is accepted by BC Hydro, there are additional steps prior to the authorization of the connection of the project to BC Hydro's grid.

The table below provides a breakdown of the customers with accepted applications as of April 20, 2018 by nameplate capacity.

Nameplate Capacity	Number of Applications	% of Applications
<=5	831	55
>5, <=10	486	32
>10, <=25	151	10
>25, <=50	36	2
>50	21	1
Total applications	1525	100
Total capacity (MW)	11.63	

3.0 Reference: Exhibit B-1, page 4 (line 22) to page 5 (line 2)
Exhibit B-1, Appendix B-Blacklined

1.3.1 Throughout the application BC Hydro makes reference to the "proposed amendments" or the "amendments". Please clarify whether the references to "proposed amendments" and "amendments" include: a) just the additional amendments BC Hydro is now proposing to the current RS 1289, approved on an interim basis June 1, 2018 as set out in Appendix B or b) also the amendments approved on an interim basis by the BCUC on June 1, 2018.

RESPONSE:

The proposed amendments in the Application are intended to replace the amendments approved on an interim basis by the BCUC on June 1, 2018. BC Hydro is requesting approval of the proposed amendments shown in the revised tariff pages included in Appendix B of the Application.

Please refer to Attachment 1 to BC Hydro's response to BCSEA IR 1.15.1 for a blackline that more clearly shows BC Hydro's proposed amendments to Rate Schedule 1289.

3.0 Reference: Exhibit B-1, page 4 (line 22) to page 5 (line 2)
Exhibit B-1, Appendix B-Blacklined

1.3.2 If the latter, please provide a blacklined version of RS 1289 showing all of the proposed amendments, including those approved on an interim basis in Order G-100-18.

RESPONSE:

Attachment 1 to this response provides a blackline version of Rate Schedule 1289 that compares the proposed Rate Schedule 1289 (Appendix B of the Application) with Rate Schedule 1289 prior to the amendments approved on an interim basis by Order No. G-100-18.

6. OTHER

RATE SCHEDULE 1289 – NET METERING SERVICE

Availability

For any Residential Service Customer and for any General Service Customer who~~:~~:¶

1. installs a Generating Facility to generate electricity to serve all or part of their ~~e~~Electricity requirements~~.~~ on the Customer's Premises, and¶
2. has had their Net Metering Application for Service under this Rate Schedule accepted by BC Hydro in writing and has received Interconnection Approval. ~

With the consent of BC Hydro, Customers taking Service under other Rate Schedules may be admitted to Service under this Rate Schedule, provided that BC Hydro is satisfied that the metering, billing and other requirements of this Rate Schedule can be met.¶

~~"Generating Facility" for purposes of this Rate Schedule means a generating facility, including fuel cells and energy recovery generation, that:~~

¶

Applicable in All Rate Zones.¶

Rate¶

Energy Charge:¶

Charges for the Customer's Net Consumption will be in accordance with the Rate Schedule under which the Customer is receiving Service from BC Hydro.¶

Energy Price:¶

For all Electricity represented by the Generation Account Balance remaining in the Customer's Generation Account at any Anniversary Date, BC Hydro will pay:¶

(a) Customers with an accepted Net Metering Application from April 21, 2018 or later:¶

a price calculated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year.¶

(b) Customers with an accepted Net Metering Application from on or before April 20, 2018: ¶

a transitional Energy Price of 9.99 ¢ per kWh. This transitional Energy Price will expire on April 30, 2024. After April 30, 2024, all Customers receiving Service under this Rate Schedule will be paid the Energy Price described in (a), above.¶

Definitions ¶

1. Anniversary Date ¶

   The Anniversary Date is March 1st or such other date chosen by the Customer in the manner described in this Rate Schedule.¶

2. Annual Energy Output ¶

   The Annual Energy Output is the calculated annual energy output for a Generating Facility that will be calculated as follows:¶

   Generating Facility's nameplate rating in kilowatts x capacity factor x 365 days x 24 hours, where the capacity factor is:¶

   - 10 per cent for photovoltaic;¶
   - 20 per cent for biogas, thermal and wind;¶
   - 30 per cent for fuel cell; and¶
   - 40 per cent for hydro. ¶

   For inverter based Generating Facilities, the nameplate rating for a Generating Facility is the total capacity of the inverters (AC capacity).¶

3. Annual Load ¶

   The Annual Load is the estimated annual Electricity requirements on the Customer's Premises, calculated based on:¶

   (a) The total kilowatt hours of Electricity supplied by BC Hydro to the Customer's Point of Delivery based on the Customer's billing data from the 12 consecutive months immediately preceding BC Hydro's receipt of the Customer's Net Metering Application;¶

   (b) if 12 consecutive months of billing data is not available, an estimate of the annual Electricity requirements, supported by the Customer's billing data to the date of the Customer's Net Metering Application and other relevant Customer information satisfactory to BC Hydro in its sole discretion; and¶

(c) if the Customer provides BC Hydro with evidence of the purchase of new equipment, such as an electric vehicle, for use on the Customer's Premises, BC Hydro may increase the Customer's estimated Annual Load by the estimated amount of Electricity that the new equipment is expected to require, as determined by BC Hydro in its sole discretion.¶

4. DGTIR-100 ¶

DGTIR-100 is BC Hydro's *Distributed Generation Technical Interconnection Requirements – 100 kW and Below*" ~~(DGTIR-100)~~.¶

5. Generation Account ¶

The Generation Account is an account established by BC Hydro for a Customer on the first billing period following the date ~~a~~the Customer commences taking Service under this Rate Schedule.¶

6. Generation Account Balance ¶

The Generation Account Balance is the Electricity represented by credits in a Customer's Generation Account. ¶

7. Generating Facility ¶

Generating Facility for the~~"Generating Facility" for~~ purposes of this Rate Schedule means a generating facility, including fuel cells and energy recovery generation, that:

(a) ~~1.~~ Utilizes biogas, biomass, geothermal heat, hydro, solar, ocean, wind or other energy resources or technologies defined as a "clean or renewable resource" in the Clean Energy Act (as updated from time to time) to generate ~~e~~Electricity;¶

(b) ~~2.~~ Has a nameplate rating of not more than 100 kilowatts; and ¶

(c) ~~3.~~ Is owned or leased by the Customer and is located on the same parcel of land as the Customer's Premises for which Service is being provided under any of the Rate Schedules described above, or on an adjacent parcel of land owned or leased by the Customer, and is connected to the same Point of Delivery as the Customer's Premises being served under any of the Rate Schedules described above,¶¶ and includes all wiring, protection~~-~~ isolation devices, disconnect switches, and other equipment and facilities on the Customer's side of the Point of Delivery.¶

~~For clarity, where the Customer leases the Generating Facility from a third party or retains a third party to install, operate and maintain the Generating Facility on its behalf, then as~~

~~between the Customer and BC Hydro, the Customer will remain responsible for any obligations under all terms and conditions of Service, including applicable Rate Schedules, BC Hydro's DGTIR-100, and other applicable interconnection requirements to the same extent as if the Customer owns, installs, operates and maintains the Generating Facility itself.~~¶

~~**Applicable in**~~¶

~~All Rate Zones.~~¶

~~**Rate**~~¶

~~**Energy Charge:**~~¶

~~Charges for Net Energy consumed by the Customer will be in accordance with the Rate Schedule under which the Customer is receiving Service from BC Hydro.~~¶

~~**Energy Price**~~¶

8. Interconnection Approval¶

   BC Hydro's approval of the interconnection of the Generating Facility to the BC Hydro system and the commencement of operation of the Generating Facility.¶

9. Net Consumption ¶

   Net Consumption is the Net Energy that is positive because BC Hydro supplies more Electricity to the Customer than the Electricity delivered.¶

10. Net Energy ¶

    Net Energy is the difference between the Electricity supplied by BC Hydro to the Customer during the billing period and the Electricity delivered from the Generating Facility to BC Hydro's system during the billing period.¶

11. Net Generation ¶

    Net Generation is the Net Energy that is negative because the Customer delivers more Electricity from the Generating Facility to BC Hydro's system than the Customer receives in Electricity from BC Hydro during the billing period.¶

12. Net Metering Application ¶

    The Net Metering Application is the Customer's application to receive Service under this Rate Schedule, to expand the generating capacity of their Generating Facility, or to modify their Generating Facilty.¶

13. Net Metering Site Acceptance Verification Fee ¶

The Net Metering Site Acceptance Verification Fee is the fee set out in section 11 (Schedule of Standard Charges) of the Terms and Conditions of the Electric Tariff.¶¶

Net Metering Application and Interconnection Approval ¶

1. Customers wishing to receive Service under this Rate Schedule must submit a Net Metering Application to BC Hydro. The Customer must not interconnect or commence operation of a Generating Facility before receiving:¶

   (a) BC Hydro's written acceptance of the Net Metering Application, and¶

   (b) Interconnection Approval.¶

2. A Customer receiving Service under this Rate Schedule may change their Anniversary Date in the Net Metering Application or by request to BC Hydro. BC Hydro will accept one request to change the Anniversary Date per Customer.¶

3. BC Hydro will asses the proposed Generating Facility described in the Net Metering Application. Specifically:.¶

   (a) for Generating Facilities with a nameplate rating of less than or equal to five kilowatts, BC Hydro will not assess the Customer's Annual Load or require a Customer to submit load data or load estimates in their Net Metering Application, and¶

   (b) for Generating Facilities with nameplate rating of greater than five kilowatts, the Generating Facility's Annual Energy Output must not exceed 110 per cent of the Annual Load.¶

4. BC Hydro may determine that a site acceptance verification is required. In that case:¶

   (a) the Customer will be notified;¶

   (b) BC Hydro will inspect the installation of the Generating Facility and may require the Customer to supply additional information and~~/or~~ provide access to the Customer's Generating Facility to carry out additional inspections, as described in the DGTIR-100 or other interconnection requirements applicable to the Generating Facility, and¶

   (c) the Customer must pay the Net Metering Site Acceptance Verification Fee.¶

5. The Customer will submit a copy of the final inspection report or approval issued by the governmental authority having jurisdiction to inspect and approve the installation.

and any additional information that may be requested by BC Hydro. BC Hydro will provide a decision on Interconnection Approval with reasonable promptness following BC Hydro's receipt of any final inspection reports, applicable government approvals and requested information.¶

6. A Customer will begin receiving Service under this Rate Schedule on the date identified in BC Hydro's written Interconnection Approval.¶

7. In BC Hydro's sole discretion, BC Hydro may reject any Net Metering Application where:¶

   (a) BC Hydro considers that the information provided in the Net Metering Application is insufficient or inconsistent with the terms of this Rate Schedule, the DGTIR-100 or other applicable interconnection requirements;¶

   (b) the Customer has submitted false or misleading information to BC Hydro in the Net Metering Application or other information requested by BC Hydro;¶

   (c) the Customer has a prior history of non-compliance with this Rate Schedule; or¶

   (d) BC Hydro's system cannot accommodate the connection of the Customer's Generating Facility due to existing or expected system, safety, financial or technical constraints.

8. ~~For all electricity represented by the Generation Credit Balance remaining in the Customer's Generation Account at any Anniversary Date, BC Hydro will pay 9.99 ¢ per kWh.~~ Where BC Hydro has accepted the Customer's Net Metering Application, this acceptance will expire 18 months from the date BC Hydro accepted the Customer's Net Metering Application if the Customer has not received Interconnection Approval. The Customer may then submit a new Net Metering Application.

Metering

1. ~~Inflows of~~ Electricity supplied from the BC Hydro system to the Customer, and ~~outflows of electricity~~ Electricity delivered from the Customer's Generating Facility to the BC Hydro system, will ~~normally~~ be determined by means of a ~~single meter capable of measuring flows of electricity in both directions.¶¶2. Alternatively, if BC Hydro determines that flows of electricity in both directions cannot be reliably determined by a single meter, or that dual metering will be more cost-effective, BC Hydro may require that separate meters be installed to measure inflows and outflows of electricity.~~ Smart Meter or Radio-Off Meter.¶

ACCEPTED:_____

ORDER NO._____

_____

COMMISSION SECRETARY

2. ~~3.~~ The Customer will install, at ~~its~~their cost, the meter base and any wiring, poles, protection-isolation devices, disconnect switches, and other equipment and facilities on the Customer's side of the Point of Delivery as required under ~~BC Hydro's "Distributed Generation Technical Interconnection Requirements – 100 kW and Below" (**DGTIR-100**)~~DGTIR-100 or other interconnection requirements applicable to the Generating Facility. BC Hydro will supply and install the Metering Equipment and make the final connections.¶

¶

~~4. Any Metering Equipment required for purposes of this Rate Schedule will be in addition to any meters with demand measurement capability (if applicable) required under the Rate Schedule under which the Customer is receiving Service from BC Hydro.~~

Billing

Determination of the Customer's bill will be as follows: ¶

1. Meter reading and billing frequency will be in accordance with the Rate Schedule under which the Customer is receiving Service from BC Hydro.¶

2. At the end of each billing period BC Hydro will determine the ~~"~~Net Energy~~"~~ applicable for that billing period~~, defined as the difference between the Electricity supplied by BC Hydro to the Customer during the billing period and the electricity delivered from the Generating Facility to BC Hydro's system during the billing period~~.¶

3. If ~~Net Energy is positive~~there is Net Consumption, then BC Hydro will apply any credits in the Generation Account Balance to the Net Consumption until the Net Consumption amount is reduced to zero. If the Customer's Generation Account Balance has insufficient credits to reduce the Net Consumption to zero, BC Hydro will bill the Customer for the ~~Net Energy consumed by the Customer during the billing period, subject to the application of any generation credits then in the Customer's~~remaining Net Consumption.¶

4. If there is Net Generation ~~Account, as described in item 5 below.¶¶4. If Net Energy is negative~~, BC Hydro will credit the ~~Net Energy amount to the~~ Customer's Generation Account~~, as described in item 5 below, and~~ with the Net Generation.¶

5. Every billing period, BC Hydro will bill the Customer ~~only~~ for the Basic Charge and Demand Charge (if applicable) under the Rate Schedule under which the Customer is receiving Service from BC Hydro.¶

¶

~~5. Beginning with the first billing period following the date a Customer commences taking Service under this Rate Schedule, BC Hydro will establish a Generation Account for that Customer. If Net Energy is negative for that billing period, BC Hydro will credit the Net Energy amount to the Customer's Generation Account. BC Hydro will likewise follow this procedure for successive billing periods, except that if for any billing period Net Energy is positive, any credit balance then in the Customer's Generation Account will be applied to the positive Net Energy amount for that billing period until the Net Energy amount is reduced to zero.¶~~

6. BC Hydro will follow this procedure, and will notify the Customer of amounts credited and debited to the Customer's Generation Account and of ~~the remaining credit balance (if any) in the~~any Generation Account~~,~~ Balance on the bill rendered by BC Hydro for each billing period, until the ~~end of the sixth billing period, in the case of Customers being billed bi-monthly, or until the end of the twelfth billing period, in the case of Customers being billed monthly (Anniversary Date)~~Anniversary Date.~~-~~¶

7. At the Anniversary Date, ~~BC Hydro will credit any negative Net Energy amount for that billing period to the Generation Account, or apply any credits in the Generation Account to any positive Net Energy amount for that billing period, in the same manner as for prior billing periods.¶¶7. If any credit balance ("Generation Account Balance") remains in the Generation Account following the procedures set forth in item 6~~if a Customer has a Generation Account Balance, BC Hydro will be deemed to have purchased that amount of ~~e~~Electricity from the Customer, and will be obliged to pay the Customer for that ~~e~~Electricity at the Energy Price ~~determined in accordance with the Rate provision of this Rate Schedule,~~ and the Generation Account Balance will revert to zero.¶

8. The procedures ~~set forth~~described above will apply in each succeeding 12~~-~~month period and at each succeeding Anniversary Date for ~~so~~as long as the Customer continues to take Service under this Rate Schedule. ¶

9. If Service under this Rate Schedule is Terminated ~~prior to any Anniversary Date~~, the billing procedures ~~set forth~~described above will be applied as of the date of Termination instead of the Anniversary Date. In that event, BC Hydro will pay the amount owing in respect of any ~~credit balance in the~~ Generation Account Balance to the Customer within 45 days of the date of Termination, subject to any rights of deduction or set-off BC Hydro may have.¶

ACCEPTED:_____

ORDER NO._____

_____

COMMISSION SECRETARY

10. ~~9.~~ In no case will any ~~credit balance in the~~ Generation Account Balance have any cash value or be convertible to cash, except as provided above~~. If the amount determined to be owing to the Customer at any Anniversary Date as set forth in item 7 above is equal to or less than the charges BC Hydro anticipates are likely to be billed to the Customer during the six month period following the Anniversary Date, BC Hydro may withhold the amount owing and credit it against charges owing by the Customer for future billing periods. If the amount determined to be owing is greater than the charges BC Hydro anticipates are likely to be billed to the Customer during the six month period following the Anniversary Date, BC Hydro will pay the amount owing to the Customer within 45 days of the Anniversary Date~~.

Special Conditions

1. Subject to the provisions of Rate Schedule 1289, any other applicable Rate Schedule(s) under which the Customer is from time to time receiving Service from BC Hydro and other applicable provisions of BC Hydro's Electric Tariff, BC Hydro will supply Electricity to, and accept delivery of ~~e~~Electricity from, the Customer at the Point of Delivery.¶

¶

~~2. BC Hydro will act with reasonable promptness to perform any inspections and/or give any approvals that it is authorized or required to give under the terms and conditions of Service, and will not unreasonably withhold or delay the giving of its consent in any case where its consent is required.¶~~

¶

~~3. To receive Service under this Rate Schedule, the Customer must submit the required application. For Generating Facilities having a rated generating capacity of greater than five kilowatts, and for which BC Hydro determines that a site acceptance verification is required, the Customer must also pay the Net Metering Site Acceptance Verification Fee as set out in section 11 (Schedule of Standard Charges) of the Terms and Conditions of the Electric Tariff.¶~~

2. ~~4. In addition, a~~A Customer who (a) utilizes a synchronous generator, (b) takes Service at a Primary Voltage and/or (c) utilizes a Generating Facility with a nameplate rating greater than 50 kilowatts, will pay all associated incremental costs for connection of the Customer's Generat~~or~~ing Facility as set out in Terms and Conditions section 9.7 (Generating Facility Connections (Distributed Generation)).¶

3. ~~5.~~ The ~~Customer must not commence parallel operation of its Generating Facility until written approval has been provided to it by BC Hydro. Written approval will normally be provided by BC Hydro within 14 days following BC Hydro's receipt of~~ a copy of the ~~final inspection report or approval issued by the governmental authority having jurisdiction to inspect and approve the installation. Where Customer has been notified that inspection and acceptance by BC Hydro's Field Services – Protection and Control Department will also be required before~~ the Generating Facility ~~will be accepted for parallel operation, BC Hydro's approval will normally be provided within 14 days following the date of inspection and acceptance. BC Hydro~~ may require the Customer to supply additional information and~~/or~~ provide access to the Customer's Generating Facility to carry out additional inspections, as ~~set forth in BC Hydro's DGTIR-100 or other interconnection requirements applicable to the Generating Facility.¶¶6.~~ Customer will design, install, operate and maintain the Generating Facility, and all ancillary facilities on the Customer's side of the Point of Delivery in accordance with all governmental laws and regulations from time to time applicable, and BC Hydro's DGTIR-100 or other interconnection requirements applicable to the Generating Facility. Customers will obtain and maintain any required governmental authorizations and/or permits required for the installation and operation of the Generating Facility. The Generating Facility will meet all applicable safety and performance standards, including the codes and standards identified in BC Hydro's DGTIR-100 or other interconnection requirements applicable to the Generating Facility. The Customer will be responsible for the safe and proper operations of the Generating Facility consistent with the requirements of the regulations of the *Safety Standards Act*. BC Hydro, acting reasonably, may from time to time prescribe additional requirements which in its judgment are required for the safety of its system.¶

4. ~~7. The Customer will at all times operate the Generating Facility in accordance with applicable governmental standards and requirements, and any manufacturer's instructions, and will further comply with BC Hydro standards and requirements from time to time in effect relating to parallel operation of independent net metering installations with its system.~~ The Customer will promptly notify BC Hydro of any malfunction or breakdown of the Generating Facility that could constitute a safety hazard or reasonably be expected to cause disturbance or damage to BC Hydro's system.¶¶

5. Where the Customer leases the Generating Facility from a third party or retains a third party to install, operate and maintain the Generating Facility on its behalf, then as between the Customer and BC Hydro, the Customer will remain responsible for any

obligations under all terms and conditions of Service, including applicable Rate Schedules, ~~BC Hydro's~~ DGTIR-100, and other applicable interconnection requirements to the same extent as if the Customer owns, installs, operates and maintains the Generating Facility itself.¶

6. ~~8.~~ The Customer will not operate the Generati~~o~~ng Facility so as to generate ~~e~~Electricity at a rate greater than 110~~%~~ per cent of the nameplate rating of the Generating Facility, and will not add to or modify the Generating Facility without ~~the prior written consent of~~ Interconnection Approval.¶

7. BC Hydro may suspend or Terminate the Customer's Service under this Rate Schedule if the Customer fails to comply with this Rate Schedule.¶

8. ~~9.~~ Service under this Rate Schedule is conditional on the continuance of Service to the Customer under any of the Rate Schedules described under the Availability section above, and is further conditional on the Customer being billed monthly or bi-monthly under BC Hydro's regular billing plan. ¶

9. If Service under the applicable Rate Schedule is suspended or Terminated for any reason, or if the Customer ceases to be billed under BC Hydro's regular billing plan, Service under this Rate Schedule will be deemed to have automatically been suspended or Terminated concurrent with suspension or Termination of Service under the applicable Rate Schedule, or change to a different billing plan, as applicable.¶

10. If Service under this Rate Schedule is suspended or Terminated for any reason, ~~and~~ BC Hydro ~~considers it necessary in its discretion for the~~may requirethe Customer~~'s Generating Facility to be re-inspected and approved~~ to obtain a new Interconnection Approval prior to resuming ~~parallel operation with BC Hydro's system, the Customer will pay the costs that BC Hydro estimates that it will incur for the re-inspection and approval~~operation of the Generating Facility.¶

¶

~~11. If the Customer voluntarily Terminates Service under this Rate Schedule, the Customer will not be eligible to again take Service under this Rate Schedule for a period of 12 months from the date of Termination, unless BC Hydro otherwise consents.¶~~

11. ~~12.~~ BC Hydro will have the right to require the Customer to interrupt (including, if so specified by BC Hydro, by means of physical disconnection or lock-out~~,~~) or reduce the output of ~~its~~their Generating Facility whenever:

(a) ~~—~~BC Hydro deems such action necessary, in its sole judgment, to permit BC Hydro to construct, install, maintain, repair, replace, remove, investigate, or inspect any of its equipment or any part of its electric system; or

(b) ~~—~~BC Hydro determines in its sole judgment, that curtailment, interruption, or reduction of the Customer's electrical generation is otherwise necessary due to emergencies, forced outages, force majeure, safety hazards, possible damage to or disturbance of its electric system, or compliance with prudent electrical practices.¶

12. ~~13.~~ Notwithstanding any other provision of this Rate Schedule, in any of the events or circumstances mentioned in Special Condition No. 1~~2~~0, BC Hydro will have the right:

(a) ~~———~~To require the Customer to immediately disconnect the Generating Facility from BC Hydro's system; and

(b) ~~_~~To itself immediately disconnect the Generating Facility from the BC Hydro system if the Customer is either not available or fails to act, and such disconnection is deemed necessary by BC Hydro.¶

13. ~~14.~~ ~~_~~Whenever feasible BC Hydro will give the Customer reasonable advance notice that interruption or reduction in deliveries may be required, or that disconnection of the Generating Facility from BC Hydro's system may be required, but the failure of BC Hydro to give such notice will not invalidate any action taken by BC Hydro under any of the Special Conditions in Rate Schedule 1289.¶

14. ~~15.~~ ~~_~~If BC Hydro in its discretion deems it necessary to require the Customer to interrupt or disconnect ~~its~~the Generating Facility from BC Hydro's system, or for BC Hydro to itself effect the interruption or disconnection of the Generating Facility from its system, as provided in Rate Schedule 1289, or such interruption occurs as a result of suspension or Termination of Service to the Customer in accordance the provisions of Rate Schedule 1289, then except to the extent caused by the wilful misconduct or gross negligence of BC Hydro, its servants or agents, BC Hydro and its servants or agents will not be liable to the Customer for any loss or damage whatsoever resulting from the exercise of such rights by BC Hydro.¶

15. ~~16.~~ ~~_~~BC Hydro will have the right to enter the Customer's Premises at all reasonable hours, without notice to the Customer, to inspect the Customer's protective devices and read, inspect and/or test meters, or to disconnect the Generating Facility. Nothing in ~~the foregoing terms and conditions~~this Rate Schedule will limit or ~~otherwise~~ affect any

rights of entry to the Customer's Premises that BC Hydro may have under any other sections of the Electric Tariff or any other agreement with the Customer.¶

Rate Rider

The Deferral Account Rate Rider as set out in Rate Schedule 1901 applies to all charges payable under this Rate Schedule, before taxes and levies.

4.0 Reference: Exhibit B-1, page 6 (lines 22-23)

1.4.1 Please confirm that "future applicants to the Program" are those who applied after April 20, 2018. If not, please explain who are considered "future applicants".

RESPONSE:

Not confirmed.

As discussed in BC Hydro's response to BCUC IR 1.1.1, Order No. G-100-18 allowed BC Hydro to defer the review of all Net Metering applications proposing a generating facility sized to generate an estimated annual energy output greater than the estimated annual load.

The statement "the amendments would apply only to future applicants to the Program and would have no impact on existing customers in the Program" specifically relates to preventing Oversized Generating Facilities, as outlined in section 2 of the Application.

Accordingly "future applicants to the Program" are those customers who:

- **Had their application deferred in accordance with Order No. G-100-18; or**
- **Had submitted an application after the effective date of the proposed tariff in the Application.**

4.0 Reference: Exhibit B-1, page 6 (lines 22-23)

1.4.2 The Application states that "the amendments …. would have no impact on existing customers in the program". Will existing customers be affected by the amendments that: a) allow customers to choose their Anniversary Date; b) revise the price for excess energy or c) revise the Special Conditions portion of RS 1289 (per Appendix B-Blacklined, pages 13-17)?

RESPONSE:

The statement in the Application that "the amendments would have no impact on existing customers in the Program" refers to the proposed amendments to prevent Oversized Generating Facilities, outlined in section 2 of the Application.

Existing and future customers in the Program would be affected by the amendments that allow customers to choose their Anniversary Date. BC Hydro expects these proposed amendments to have a beneficial impact on customers in the Program. For more information, please refer to BC Hydro's response to BCCSC IR 1.6.2.

Existing and future customers in the Program would also be affected by the proposed update to the Energy Price. To mitigate the impact of the update to the Energy Price to existing customers in the Program, BC Hydro has proposed a five-year transitional Energy Price. For further information, please refer to BC Hydro's response to BCUC IR 1.15.1.

The updates to the Special Conditions section of RS 1289 are only intended to improve clarity and readability.

4.0 Reference: Exhibit B-1, page 6 (lines 22-23)

1.4.2 The Application states that "the amendments …. would have no impact on existing customers in the program". Will existing customers be affected by the amendments that: a) allow customers to choose their Anniversary Date; b) revise the price for excess energy or c) revise the Special Conditions portion of RS 1289 (per Appendix B-Blacklined, pages 13-17)?

1.4.2.1 If yes, please reconcile with the statement that existing customers will not be impacted.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.4.2.

5.0 Reference: Exhibit B-1, page 14 (Table 2), page 15 (Table 3) and page 17, (Table 5)
Exhibit B-1, page 22 (lines 14-16)
Exhibit B-1, Appendix B-Blacklined, page 4

1.5.1 Please provide a revised version of Table 2 with an additional column that indicates the percentage of F2018 surplus payments made to customers of each generation type.

RESPONSE:

The table below provides the Surplus Energy Payments in fiscal 2018 for each generation type.

Generation Type	Number of Customers	% of Customers (%)	Total Surplus Energy Payment ($)	% of Total Surplus Energy Payments (%)
Solar Photovoltaic	**237**	**95.18**	**65,102**	**20.07**
Hydro	**11**	**4.42**	**259,014**	**79.86**
Wind	**0**	**0.00**	**0**	**0.00**
Wind and Photovoltaic	**0**	**0.00**	**0**	**0.00**
Hydro and Photovoltaic	**1**	**0.40**	**242**	**0.07**
Biogas	**0**	**0.00**	**0**	**0.00**
Total	**249**	**100**	**324,358**	**100**

5.0 Reference: Exhibit B-1, page 14 (Table 2), page 15 (Table 3) and page 17, (Table 5)
Exhibit B-1, page 22 (lines 14-16)
Exhibit B-1, Appendix B-Blacklined, page 4

1.5.2 Please provide a revised version of Table 3 with an additional column that indicates the percentage of F2018 surplus payments made to customers of each generation type.

RESPONSE:

BC Hydro understands this question to be referring to Table 5 of the Application, and not Table 3 of the Application, as it is Table 5 that includes fiscal 2018 information on Surplus Energy Payments.

Please refer to BC Hydro response to BCUC IR 1.3.2 where we provide information on the Surplus Energy Payments for Solar PV generation (includes wind, wind and PV and biogas) and for hydroelectric generation.

5.0 Reference: Exhibit B-1, page 14 (Table 2), page 15 (Table 3) and page 17, (Table 5)
Exhibit B-1, page 22 (lines 14-16)
Exhibit B-1, Appendix B-Blacklined, page 4

1.5.3 Has BC Hydro considered that the part of reason for surplus payments is that factors used (per Appendix B) to determine the output of a customer's proposed generation facility may be too low and not appropriate?

RESPONSE:

The Annual Energy Output calculation used to limit the size of a Generating Facility was introduced on an interim basis effective April 20, 2018 by BCUC Order No. G-100-1. The range of Surplus Energy Payments shown in Table 5 of the Application are for fiscal 2018. Customers who received Surplus Energy Payments in fiscal 2018 were not subject to the Annual Energy Output calculation using a fixed capacity factor.

Most of the customers who applied to the Program after April 20, 2018, have not yet reached a full in-service year and have not yet received a Surplus Energy Payment. Accordingly, BC Hydro does not yet have sufficient data to review the fixed capacity factors used to estimate Annual Energy Output.

The purpose of the Annual Energy Output definition is not to prevent Surplus Energy Payments, but to support the objective of maintaining the Program as a load offset program. The definition provides a simple and transparent way to estimate Annual Energy Output.

BC Hydro expects that some customers who applied to the Program on or after April 20, 2018 will still receive Surplus Energy Payments going forward. These payments may be due to the use of fixed capacity factors or may be due to variations in the customer's load. In order to mitigate the cost-shifting associated with Surplus Energy Payments, BC Hydro is proposing to update the Energy Price so that it reflects the value of the energy to non-participating customers.

Please also refer to BC Hydro's response to BCUC IR 1.6.2 where we state that, for BC Hydro, using a fixed capacity factor for each generation type minimizes administrative burden and costs and supports a consistent and transparent calculation of Annual Energy Output.

5.0 Reference: Exhibit B-1, page 14 (Table 2), page 15 (Table 3) and page 17, (Table 5)
Exhibit B-1, page 22 (lines 14-16)
Exhibit B-1, Appendix B-Blacklined, page 4

1.5.3 Has BC Hydro considered that the part of reason for surplus payments is that factors used (per Appendix B) to determine the output of a customer's proposed generation facility may be too low and not appropriate?

1.5.3.1 If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.5.3.

5.0 Reference: Exhibit B-1, page 14 (Table 2), page 15 (Table 3) and page 17, (Table 5)
Exhibit B-1, page 22 (lines 14-16)
Exhibit B-1, Appendix B-Blacklined, page 4

1.5.4 Has BC Hydro undertaken any review or reassessment of the capacity factors assumed to be associated with various types of generation (per Appendix B)?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.5.3.

5.0 Reference: Exhibit B-1, page 14 (Table 2), page 15 (Table 3) and page 17, (Table 5)
Exhibit B-1, page 22 (lines 14-16)
Exhibit B-1, Appendix B-Blacklined, page 4

1.5.4 Has BC Hydro undertaken any review or reassessment of the capacity factors assumed to be associated with various types of generation (per Appendix B)?

1.5.4.1 If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.5.3.

5.0 Reference: Exhibit B-1, page 14 (Table 2), page 15 (Table 3) and page 17, (Table 5)
Exhibit B-1, page 22 (lines 14-16)
Exhibit B-1, Appendix B-Blacklined, page 4

1.5.4 Has BC Hydro undertaken any review or reassessment of the capacity factors assumed to be associated with various types of generation (per Appendix B)?

1.5.4.2 If yes, what analysis has been undertaken and what are the results?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.5.3.

6.0 Reference: Exhibit B-1, page 22 (lines 14-16 and 22-24)

Preamble: The Application proposes to "Allow customers to size their Generating Facility to have an estimated Annual Energy Output up to 110 per cent of their estimated Annual Load". The Application also proposes to "Exempt Generating Facilities with a capacity size of 5 kW or less from the requirement to have an estimated Annual Energy Output no greater than 110 per cent of the customer's estimated Annual Load"

1.6.1 What is the basis for selecting 5 kW as the generating capacity size below which BC Hydro will not assess the Customer's Annual Load or require a Customer to submit load data or load estimates in their Net Metering Application.

RESPONSE:

Rate Schedule 1289 stipulates that a Generating Facility cannot have a generating capacity size greater than 100 kW. The proposed amendments would stipulate that for Generating Facilities with a generating capacity size of greater than 5 kW, the Generating Facility's Annual Energy Output must not exceed 110 per cent of the Annual Load.

Approximately half of the applications to the Program have a generating capacity size of less than 5 kW. In BC Hydro's view, 5 kW strikes an appropriate balance between providing a simplified process for a large number of potential customers with small facilities and providing a safeguard against the installation of generating facilities that are sized to be significantly greater than a customer's load.

6.0 Reference: Exhibit B-1, page 22 (lines 14-16 and 22-24)

Preamble: The Application proposes to "Allow customers to size their Generating Facility to have an estimated Annual Energy Output up to 110 per cent of their estimated Annual Load". The Application also proposes to "Exempt Generating Facilities with a capacity size of 5 kW or less from the requirement to have an estimated Annual Energy Output no greater than 110 per cent of the customer's estimated Annual Load"

1.6.2 For each of the calendar years 2017 and 2018, please provide a schedule that breaks down, by generating facility size (using the same ranges as in Table 5), the amount of surplus energy (kWh) banked by RS 1289 customers.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.3.1.

7.0 Reference: Exhibit B-1, page 31 (lines 19-23)
Exhibit B-1, Appendix B-Clean, page 5

1.7.1 For each of the calendar years 2017 and 2018 please provide a schedule that sets out the amount of surplus energy banked by RS 1289 customers in each month of the year.

RESPONSE:

BC Hydro credits a customer's Generation Account for net energy on a monthly basis. The credits in the Generation Account are used by the customer to offset energy consumption on subsequent bill(s). The table below provides an approximation of the net energy credits in kWh recorded in customer Generation Accounts on a monthly basis for calendar years 2017 and 2018.

No dollar value is attributed to credits recorded in a customer's Generation Account. However, once per year, at the customer's Anniversary Date, if there is a balance remaining beyond what can be applied to a customer's bill, a Surplus Energy Payment is made to the customer for that remaining balance. While a customer's Anniversary Date can be at any time of the year, customers do not receive Surplus Energy Payments on a monthly or bi-monthly basis.

Net Energy Credits in kWh for Calendar Years 2017 and 2018

Month	2017	2018
January	216,193	192,979
February	225,409	197,745
March	111,867	206,553
April	408,223	287,742
May	318,248	459,367
June	390,332	636,924
July	504,168	722,356
August	466,641	432,957
September	404,758	563,887
October	197,739	388,945
November	234,297	259,438
December	187,537	174,027
Total	3,665,412	4,522,920

7.0 Reference: Exhibit B-1, page 31 (lines 19-23)
Exhibit B-1, Appendix B-Clean, page 5

1.7.2 For 2018 please provide a schedule of monthly surplus energy broken **d**own by generating facility size (using the same ranges as in Table 5).

RESPONSE:

Table 5 of the Application provides the Surplus Energy Payments made on annual basis, in dollars, using representative ranges. BC Hydro does not track Surplus Energy Payments on monthly basis.

Please refer to BC Hydro's response to BCOAPO IR 1.7.1 where we provide a schedule that sets out the amount of surplus energy banked by RS 1289 customers in each month of the year for calendar years 2017 and 2018.

7.0 Reference: Exhibit B-1, page 31 (lines 19-23)
Exhibit B-1, Appendix B-Clean, page 5

1.7.3 If an existing RS 1289 customer who has already "chosen" an Anniversary Date installs addition generation, will that customer have a one-time option to revise the Anniversary date?

RESPONSE:

No, BC Hydro would accept one request to change the Anniversary Date per customer. Installing additional generation capacity would not provide a customer with the opportunity to make an additional request.

8.0 Reference: Exhibit B-1, pages 39-40

1.8.1 For each of the calendar years 2016-2018 please provide a schedule that sets out for each of the 12 months in the year, the daily average Mid-C price for the month converted to Canadian dollars using the average exchange rate from the Bank of Canada for the month.

RESPONSE:

Attachment 1 to this response provides a schedule, for calendar years 2016 to 2018, that sets out the daily average Mid-C price for each month, converted to Canadian dollars, using the average exchange rate from the Bank of Canada for that month.

	Mid-C price	FX Rate[1,2]	Mid-C price
	Nominal USD/MWh	CAD/USD	Nominal CAD/MWh
Jan-16	$22.4	1.419	$31.7
Feb-16	$16.3	1.379	$22.5
Mar-16	$11.5	1.322	$15.2
Apr-16	$9.6	1.283	$12.3
May-16	$12.5	1.295	$16.2
Jun-16	$19.1	1.289	$24.6
Jul-16	$26.7	1.305	$34.8
Aug-16	$30.3	1.299	$39.4
Sep-16	$26.2	1.310	$34.4
Oct-16	$21.3	1.326	$28.2
Nov-16	$17.2	1.345	$23.2
Dec-16	$29.8	1.335	$39.7
Jan-17	$30.0	1.319	$39.6
Feb-17	$20.8	1.311	$27.2
Mar-17	$10.7	1.339	$14.4
Apr-17	$8.1	1.344	$10.8
May-17	$10.6	1.361	$14.5
Jun-17	$9.5	1.330	$12.7
Jul-17	$26.1	1.269	$33.1
Aug-17	$40.7	1.261	$51.3
Sep-17	$30.0	1.228	$36.8
Oct-17	$25.3	1.261	$31.8
Nov-17	$24.8	1.277	$31.7
Dec-17	$25.5	1.277	$32.6
Jan-18	$21.5	1.243	$26.7
Feb-18	$17.5	1.259	$22.0
Mar-18	$19.5	1.293	$25.2
Apr-18	$14.4	1.273	$18.3
May-18	$7.1	1.287	$9.1
Jun-18	$11.5	1.313	$15.1
Jul-18	$52.9	1.313	$69.5
Aug-18	$55.7	1.304	$72.6
Sep-18	$27.3	1.304	$35.6
Oct-18	$41.1	1.301	$53.4
Nov-18	$49.6	1.320	$65.5
Dec-18	$49.2	1.343	$66.1

Notes:

1. Monthly Bank of Canada Exchange Rates for 2016 based on daily Bank of Canada Exchange Rates from https://www.bankofcanada.ca/rates/exchange/legacy-noon-and-closing-rates/
2. Monthly Bank of Canada Exchange Rates for 2017 and 2018 from https://www.bankofcanada.ca/rates/exchange/monthly-exchange-rates/

8.0 Reference: Exhibit B-1, pages 39-40

1.8.2 Based on current tariffs and loss factors, what would be the impact of adjusting for line losses and wheeling charges on the Energy Price used for surplus payments?

RESPONSE:

The current Bonneville Power Administration (BPA) wheeling rate is USD $5.16/MWh. Line losses are 1.9 per cent of kWh delivered per the BP 18 rate schedule. Further details on this rate schedule are available at the following links:

https://www.bpa.gov/Finance/RateInformation/RatesInfoTransmission/FY18-19/2018%20Rate%20Schedule%20Summary.pdf.

https://www.bpa.gov/Finance/RateInformation/RatesInfoTransmission/FY18-19/Formula%20Rate%20Summary_FY18-19.pdf.

https://www.bpa.gov/transmission/Doing%20Business/Tariff/Documents/bpa_oatt.pdf.

The table below provides the Energy Price with and without an adjustment for line losses and wheeling charges. A range of theoretical annual average Mid-C market prices are shown and an exchange rate of 1.3 USD/CAD is assumed.

Theoretical Annual Average Mid-C Price (USD/MWh)	Energy Price (Proposed Approach) (CAD/MWh)	Energy Price (With Adjustments for Line Losses and Wheeling) (CAD/MWh)	Difference (CAD/MWh, %)	
(A)	(B) = A x Exchange Rate	(C) = [A x (1-0.019) – 5.16] x Exchange Rate	(D) = C – B (CAD/MWh)	(E) = D/B (%)
10.00	13.00	6.05	(6.96)	-54
30.00	39.00	31.55	(7.45)	-19
50.00	65.00	57.06	(7.94)	-12
70.00	91.00	82.56	(8.44)	-9

9.0 Reference: Exhibit B-1, page 43
Exhibit B-1, Appendix B-Clean, page 5

1.9.1 Is the technical assessment referred to on page 43 of the Application (lines 3-10) the same as the site acceptance verification referred to in Appendix B?

RESPONSE:

No, the technical assessment on page 43 of the Application is an assessment of the system impacts of the generator interconnection and is completed prior to BC Hydro's acceptance of a Net Metering Application. The assessment is done to determine if there are any system constraints that may make the project unfeasible and if any BC Hydro equipment upgrades are required. System constraints are discussed further in section 9.1.3 of Appendix F of the Application.

The site acceptance verification fee (item 13 in the Definitions section of the revised tariff pages, on page 4 of Appendix B of the Application) is with regards to an assessment completed after the Generating Facility is installed. The assessment verifies that the Generating Facility is installed as described in the Net Metering Application and that the testing described in the DGTIR-100 (Table D.2 for Inverter based systems or Table D.3 for induction or synchronous generators) has been successfully completed.

9.0 Reference: Exhibit B-1, page 43
Exhibit B-1, Appendix B-Clean, page 5

1.9.1 Is the technical assessment referred to on page 43 of the Application (lines 3-10) the same as the site acceptance verification referred to in Appendix B?

1.9.1.1 If not, please explain what the difference is.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.9.1.

9.0 Reference: Exhibit B-1, page 43
Exhibit B-1, Appendix B-Clean, page 5

1.9.1 Is the technical assessment referred to on page 43 of the Application (lines 3-10) the same as the site acceptance verification referred to in Appendix B?

1.9.1.2 If not, is there a separate charge for the "technical assessment"? If so, what is it and if not, why not?

RESPONSE:

Yes, the technical assessment cost is separate from the site acceptance verification fee.

Section 9.7 of the Terms and Conditions of the Electric Tariff describes the charges for interconnecting a Generating Facility. BC Hydro pays study costs, including the technical assessment, for a typical net metering customer project application with a nameplate capacity of up to 50 kW.

Customers must pay the associated incremental costs (if any), in the following circumstances:

- **The Customer utilizes a synchronous generator;**
- **The Customer takes Service at a Primary Voltage; and/or**
- **The Customer utilizes a Generating Facility with a nameplate capacity of greater than 50 kW.**

9.0 Reference: Exhibit B-1, page 43
Exhibit B-1, Appendix B-Clean, page 5

1.9.1 Is the technical assessment referred to on page 43 of the Application (lines 3-10) the same as the site acceptance verification referred to in Appendix B?

1.9.1.3 If yes, please reconcile the fact that: a) according to BC Hydro's Terms and Conditions of the Electric Tariff the Net Metering Site Acceptance Verification Fee is only applicable to Generators Above 5 kW with b) the statement in the Application that "all Program applications received from customers in Non-Integrated Areas receive a technical review". Does this mean that customers in NIA with generating capacity of less than 5 kW undergo a technical review but do not pay any fees for the review?

RESPONSE:

Customers on the integrated system and customers in the Non-Integrated Areas are subject to the same fees. Please refer to BC Hydro's response to BCOAPO IR 1.9.1 where we explain that the technical assessment is not the same as the site verification and to BC Hydro's response to BCOAPO IR 1.9.1.2 where we describe the charges for interconnecting a Generating Facility.

10.0 Reference: Exhibit B-1, page 44 (lines 17-20) and page 45 (lines 5-17)

1.10.1 Based on 2018 calendar year data, please provide a table that sets out the surplus payments received by RS 1289 customers as a percentage of their total bill annual charges from BC Hydro based on the Rate Schedule under which the customer receives Service from BC Hydro broken down by number of customers (e.g., Number of customer for which surplus payment represents 0-2% of their annual bill, 2-5% of annual bill, 5-10% of annual bill and > 10% of annual bill)

RESPONSE:

The table below provides a breakdown of customers in the Program in fiscal 2018 by the percentage that their Surplus Energy Payment represents of their total annual charges (excluding any Surplus Energy Payment which would have been applied to the customer's bill on the Anniversary Date).

Surplus Energy Payment / total annual charges	Number of customers
0% (no Surplus Energy Payment)	**1,079**
>0% and <=10%	**62**
>10% and <=100%	**108**
>100% and <=500%	**48**
>500% and <=1,000%	**14**
>1,000% and <=9,000%	**12**
>20,000%	**5**
Total	**1,328**

10.0 Reference: Exhibit B-1, page 44 (lines 17-20) and page 45 (lines 5-17)

1.10.2 Overall, is it BC Hydro's view that updating the Energy Price may have a material impact on the total amount an RS 1289 customer is required to pay BC Hydro taking into account the bill received based on the Rate Schedule under which the customer receives Service from BC Hydro? If yes, please explain why.

RESPONSE:

Updating the Energy Price does not change the amount that a RS 1289 customer is required to pay to BC Hydro for Service. Rather, it changes the amount of a customer's Surplus Energy Payment. A customer only receives a Surplus Energy Payment if they have a Generation Account Balance remaining after offsetting their consumption (i.e., at their Anniversary Date, their bill for the billing period is zero).

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain the rationale for a five-year transition period.

Please also refer to BC Hydro's response to BCUC IR 1.3.1 which shows that, in fiscal 2018, most customers in the Program (81.25 per cent) received no Surplus Energy Payment and only 40 customers received a Surplus Energy Payment greater than $500.

10.0 Reference: Exhibit B-1, page 44 (lines 17-20) and page 45 (lines 5-17)

1.10.3 Has BC Hydro analyzed whether the amendments would impact the typical payback time for existing customers to recover their initial investment in distributed generation?

RESPONSE:

BC Hydro has not conducted an analysis of the impact of the proposed amendments on the typical payback period for existing customers in the Program.

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain why it is not possible to know whether, and to what extent, the changes proposed in the Application may prevent the recovery of a customer's initial capital investment over time.

10.0 Reference: Exhibit B-1, page 44 (lines 17-20) and page 45 (lines 5-17)

1.10.3 Has BC Hydro analyzed whether the amendments would impact the typical payback time for existing customers to recover their initial investment in distributed generation?

1.10.3.1 If yes, please proved details.

RESPONSE:

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

10.0 Reference: Exhibit B-1, page 44 (lines 17-20) and page 45 (lines 5-17)

1.10.3 Has BC Hydro analyzed whether the amendments would impact the typical payback time for existing customers to recover their initial investment in distributed generation?

1.10.3.2 If not, why not?

RESPONSE:

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

11.0 Reference: Exhibit B-1, page 47

1.11.1 For rate design changes that will materially impact customers, BC Hydro has frequently phased-in the change over a number of years. Rather than maintain the Energy Price existing rate for 5 years and then decreasing it in "one step", did BC Hydro consider phasing in the change over a number of years?

RESPONSE:

Yes, BC Hydro considered phasing-in the difference between the current Energy Price and the proposed Energy Price. BC Hydro decided to propose a five-year transitional Energy Price because phasing in the difference would:

- **Result in a more immediate impact to existing customers in the Program; and**
- **Be more complicated to administer as under BC Hydro's proposed approach, the Energy Price would change each year.**

As discussed in BC Hydro's response to BCUC IR 1.15.1, BC Hydro believes that the proposed five-year transitional Energy Price strikes the right balance between transitioning to an Energy Price that more fairly allocates the benefits and costs of the Program between participating and non-participating customers and mitigating the impact of the change to existing customers in the Program by providing notice to those customers.

11.0 Reference: Exhibit B-1, page 47

1.11.1 For rate design changes that will materially impact customers, BC Hydro has frequently phased-in the change over a number of years. Rather than maintain the Energy Price existing rate for 5 years and then decreasing it in "one step", did BC Hydro consider phasing in the change over a number of years?

1.11.1.1 If yes, please provide BC Hydro's assessment as to why the proposed approach was considered preferable.

RESPONSE:

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

11.0 Reference: Exhibit B-1, page 47

1.11.1 For rate design changes that will materially impact customers, BC Hydro has frequently phased-in the change over a number of years. Rather than maintain the Energy Price existing rate for 5 years and then decreasing it in "one step", did BC Hydro consider phasing in the change over a number of years?

1.11.1.2 If not, please comment on whether or not such an approach would be preferable.

RESPONSE:

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

11.0 Reference: Exhibit B-1, page 47

1.11.2 Is it fair to say that most survey respondents who advocated maintaining the current Energy Price (as opposed to decreasing it) were RS 1289 customers?

RESPONSE:

BC Hydro did not require survey respondents to provide personal information and therefore, we cannot provide a definitive answer to this question. That said, as shown in section 1.2.2 of Appendix E of the Application, more than 60 per cent of survey respondents indicated that they were existing customers.

12.0 Reference: Exhibit B-1, page 50 (lines 9-12)
Exhibit B-1, Appendix F, pages 18 & 19 of 53

1.12.1 Please update the Tables on pages 18 and 19 of Appendix F to include F2017 and F2018.

RESPONSE:

The updated tables are provided below to include fiscal 2017 and fiscal 2018. The fiscal 2017 Energy credits amount is an estimate only and is based on actual data and some extrapolated estimates.

	F2012	F2016	F2017	F2018
Number of NM customers	**154**	**640**	**923**	**1,328**
Total installed generation capacity, MW	**0.9**	**3.8**	**5.94**	**9.14**
BC Hydro delivered to Net Metering customers, MWh	**29,545**	**163,543**	**95,602**	**109,686**
Energy credits, MWh*	**107**	**2,748**	**3,701**	**5,727**

*** Generation delivered to BC Hydro over and above the customer's load at the time of delivery and applied against the customer's energy charges.**

	F2012	F2013	F2014	F2015	F2016	F2017	F2018
Number of NM customers who received Surplus Energy Payment	**13**	**14**	**24**	**63**	**104**	**167**	**249**
Surplus energy, MWh**	**529**	**763**	**850**	**1,651**	**1,722**	**2,621**	**3,247**

**** Any excess Energy Credits (surplus energy) at the customer's anniversary date is paid at the Energy Price. The surplus energy purchases would include some energy delivered in the previous fiscal year.**

12.0 Reference: Exhibit B-1, page 50 (lines 9-12)
Exhibit B-1, Appendix F, pages 18 & 19 of 53

1.12.2 Please provide an assessment of the cost shifting between participating and non-participating customer based on the number of customers and cost for F2018. In doing so please take into account: a) the costs per part (1), b) the revenues received from verification fees, and c) the difference in the value of Surplus Energy based on 9.99 cents per kWh and the Mid-C price, adjusted for wheeling charges and losses.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.2 where we provide a quantitative analysis of cost-shifting between customers in the Program and non-participants.

1.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, p.19

The following questions explore whether, in the event that the Commission approves a new Energy Price based on the value of annual net excess generation to BC Hydro, there needs to be a ban on new intentional Oversized Generation. These questions assume that the 100 kW maximum generator size and the Interconnection Approval requirement remain in place.

1.1.1 Please confirm, or otherwise explain, that BC Hydro seeks Commission approval, subject to transition provisions, to both (a) reduce the Energy Price to a level that reflects the value of annual net excess generation to BC Hydro and (b) make permanent the interim bar on accepting new applications to participate in the Net Metering Program by customers who propose intentional annual net excess generation ("Oversized Generating Facilities").

RESPONSE:

Confirmed. With regards to the interim amendments proposed in the 2018 Amendment Application, BC Hydro has proposed adjustments to provide additional flexibility, as outlined in section 2.7 of the Application.

1.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, p.19

The following questions explore whether, in the event that the Commission approves a new Energy Price based on the value of annual net excess generation to BC Hydro, there needs to be a ban on new intentional Oversized Generation. These questions assume that the 100 kW maximum generator size and the Interconnection Approval requirement remain in place.

1.1.2 If the Energy Price is approved at a level that reflects the value of annual net excess generation to BC Hydro then does BC Hydro agree that there would be no cost-shifting rationale for barring new applicants for net metering that have intentional annual net excess generation? If not, why not?

RESPONSE:

If the requested update to the Energy Price is approved, cost-shifting is mitigated but it is not eliminated.

As discussed in section 4.7 of the Application, to sell electricity into the Mid-Columbia market, BC Hydro incurs costs to deliver the electricity, which have not been included in BC Hydro's proposed methodology to calculate the Energy Price. These costs would become more significant if additional Oversized Generating Facilities were allowed under the Program.

Please also refer to BC Hydro's response to BCUC IR 1.5.3 where we explain why, assuming the Energy Price reflects the value BC Hydro's receives from excess generation, there would still be a need to limit the size of a customer's Generating Facility.

1.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, p.19

The following questions explore whether, in the event that the Commission approves a new Energy Price based on the value of annual net excess generation to BC Hydro, there needs to be a ban on new intentional Oversized Generation. These questions assume that the 100 kW maximum generator size and the Interconnection Approval requirement remain in place.

1.1.3 If the Energy Price is approved at a level that reflects the value of annual net excess generation to BC Hydro then does BC Hydro agree that there would be no need to bar new applicants for net metering who have intentional annual net excess generation? If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.1.2.

1.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, p.19

The following questions explore whether, in the event that the Commission approves a new Energy Price based on the value of annual net excess generation to BC Hydro, there needs to be a ban on new intentional Oversized Generation. These questions assume that the 100 kW maximum generator size and the Interconnection Approval requirement remain in place.

1.1.4 If the Energy Price is approved at a level that reflects the value of annual net excess generation to BC Hydro, and if there was no new bar to new applicants for net metering who have intentional annual net excess generation, then does BC Hydro agree there would be no need to (a) create definitions of "Annual Energy Output" and "Annual Load," (b) vet net metering applications for intentional annual net excess generation, and (c) conduct post-approval reassessment of "Annual Energy Output" and "Annual Load"?

RESPONSE:

The purpose of the definitions of Annual Energy Output and Annual Energy Load in BC Hydro's proposed RS 1289 tariff is to prevent Oversized Generating Facilities. As discussed in BC Hydro's response to BCSEA IR 1.1.2, BC Hydro believes that there would still be a need to limit the size of a customer's Generating Facility if the Energy Price reflects the value BC Hydro receives from excess generation.

1.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, p.19

The following questions explore whether, in the event that the Commission approves a new Energy Price based on the value of annual net excess generation to BC Hydro, there needs to be a ban on new intentional Oversized Generation. These questions assume that the 100 kW maximum generator size and the Interconnection Approval requirement remain in place.

1.1.4 If the Energy Price is approved at a level that reflects the value of annual net excess generation to BC Hydro, and if there was no new bar to new applicants for net metering who have intentional annual net excess generation, then does BC Hydro agree there would be no need to (a) create definitions of "Annual Energy Output" and "Annual Load," (b) vet net metering applications for intentional annual net excess generation, and (c) conduct post-approval reassessment of "Annual Energy Output" and "Annual Load"?

1.1.4.1 Does BC Hydro agree that this would meet the need to provide increased flexibility regarding the size of a Customer's Generating Facility to enable participation by customers, for example, with premises built to the Passive House building standard who have relatively low Annual Load, customers expecting to purchase an EV in the future, and customers whose energy use and behaviours may change in the future? [Reference: Application, p.19]

RESPONSE:

BC Hydro has proposed adjustments to increase flexibility regarding the size of a customer's Generating Facility while maintaining the intent of the Program as a load offset program. These adjustments are set out in section 2.7 of the Application and are reflected in the definition of "Annual Load" and the Net Metering Application and Interconnection Approval section of the revised tariff pages provided in Appendix B of the Application.

Please also refer to BC Hydro's response to BCSEA IR 1.1.2 where we explain why there would still be a need to limit the size of a customer's Generating Facility if the Energy Price reflects the value BC Hydro receives from excess generation.

1.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, p.19

The following questions explore whether, in the event that the Commission approves a new Energy Price based on the value of annual net excess generation to BC Hydro, there needs to be a ban on new intentional Oversized Generation. These questions assume that the 100 kW maximum generator size and the Interconnection Approval requirement remain in place.

1.1.5 Would BC Hydro agree that if the Energy Price is approved at a level that reflects the value of annual net excess generation to BC Hydro, and if there was no new bar to new applicants for net metering who have intentional annual net excess generation, then customers would be able to make their own assessment of the value, financial and otherwise, to them of investing in new Oversized Generation taking into account their own predictions of their future load and future generation?

RESPONSE:

BC Hydro expects that a customer would always make their own assessment of the value, financial or otherwise, to them of investing in an asset related to their premises.

As discussed in BC Hydro's response to BCSEA IR 1.1.2, BC Hydro believes that there would still be a need to limit the size of a customer's Generating Facility if the Energy Price reflects the value BC Hydro receives from excess generation.

2.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, s. 2.4, "Options to Address Oversized Generating Facilities"; s.2.7, "Proposed Amendments Would Prevent Oversized Generating Facilities and Support Program Intent, Fairness and Flexibility"

BCSEA disputes BC Hydro's claim that the Engagement Survey results support BC Hydro's proposal to both permanently ban new intentional annual NEG with certain flexibility provisions and to reduce the Energy Price.

BC Hydro states in the Application that the results of the Engagement Survey support BC Hydro's proposals regarding new Oversized Generation and reduction of the Energy Price. BC Hydro states on page 23 that its proposals are supported by the fact that:

"43 per cent of Engagement Survey participants supported the proposal of maintaining the amendments included in the 2018 Amendment Application, with additional changes to provide greater flexibility, compared to the alternative proposal of having no requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price." [underline added]

The two specific options offered in the Survey (in addition to "Other Suggestions") were:

- Make the amendments proposed in the 2018 Amendment Application [ban on new intentional annual NEG] ongoing, with adjustments to provide greater flexibility to customers.
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price. [Application, p.19]

1.2.1 Would BC Hydro agree that the logic of the two options presented in the Engagement Survey is that each option provides a different way to address new Oversized Generation while also achieving the "greater flexibility to [NM] customers" that BC Hydro acknowledges is necessary: the first option finalizes the ban but retains the 9.99 cent/kWh Energy Price, while the second option eliminates the ban but reduces the Energy Price?

RESPONSE:

Yes, BC Hydro would agree. However, as discussed in BC Hydro's response BCUC IR 1.5.3, we believe there would still be a need to limit the size of a

customer's Generating Facility, even if the Energy Price reflects the value BC Hydro receives from the excess generation.

The statement on page 23 of the Application that "43 per cent of the Engagement Survey participants supported the proposal of maintaining the amendments included in the 2018 Amendment Application, with additional changes to provide greater flexibility, compared to the alternative proposal of having no requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price" was only intended to describe preferences from Engagement Survey participants between those two options.

2.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, s. 2.4, "Options to Address Oversized Generating Facilities"; s.2.7, "Proposed Amendments Would Prevent Oversized Generating Facilities and Support Program Intent, Fairness and Flexibility"

BCSEA disputes BC Hydro's claim that the Engagement Survey results support BC Hydro's proposal to both permanently ban new intentional annual NEG with certain flexibility provisions and to reduce the Energy Price.

BC Hydro states in the Application that the results of the Engagement Survey support BC Hydro's proposals regarding new Oversized Generation and reduction of the Energy Price. BC Hydro states on page 23 that its proposals are supported by the fact that:

"43 per cent of Engagement Survey participants supported the proposal of maintaining the amendments included in the 2018 Amendment Application, with additional changes to provide greater flexibility, compared to the alternative proposal of having no requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price." [underline added]

The two specific options offered in the Survey (in addition to "Other Suggestions") were:

- Make the amendments proposed in the 2018 Amendment Application [ban on new intentional annual NEG] ongoing, with adjustments to provide greater flexibility to customers.
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price. [Application, p.19]

1.2.1 Would BC Hydro agree that the logic of the two options presented in the Engagement Survey is that each option provides a different way to address new Oversized Generation while also achieving the "greater flexibility to [NM] customers" that BC Hydro acknowledges is necessary: the first option finalizes the ban but retains the 9.99 cent/kWh Energy Price, while the second option eliminates the ban but reduces the Energy Price?

1.2.1.1 Would BC Hydro agree that this interpretation is supported by the statement on page 23, lines 12-16 that describes the first option in contradistinction to the second option: "compared to the alternative proposal of having no requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price"?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.2.1.

2.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, s. 2.4, "Options to Address Oversized Generating Facilities"; s.2.7, "Proposed Amendments Would Prevent Oversized Generating Facilities and Support Program Intent, Fairness and Flexibility"

BCSEA disputes BC Hydro's claim that the Engagement Survey results support BC Hydro's proposal to both permanently ban new intentional annual NEG with certain flexibility provisions and to reduce the Energy Price.

BC Hydro states in the Application that the results of the Engagement Survey support BC Hydro's proposals regarding new Oversized Generation and reduction of the Energy Price. BC Hydro states on page 23 that its proposals are supported by the fact that:

"43 per cent of Engagement Survey participants supported the proposal of maintaining the amendments included in the 2018 Amendment Application, with additional changes to provide greater flexibility, compared to the alternative proposal of having no requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price." [underline added]

The two specific options offered in the Survey (in addition to "Other Suggestions") were:

- Make the amendments proposed in the 2018 Amendment Application [ban on new intentional annual NEG] ongoing, with adjustments to provide greater flexibility to customers.
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price. [Application, p.19]

1.2.2 Would BC Hydro agree that in the Application BC Hydro does not propose either the first or the second option set out in the Engagement Survey: rather, BC Hydro proposes both a permanent ban on new intentional annual NEG (with certain flexibility provisions) and a reduction in the Energy Price?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.2.1.

2.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, s. 2.4, "Options to Address Oversized Generating Facilities"; s.2.7, "Proposed Amendments Would Prevent Oversized Generating Facilities and Support Program Intent, Fairness and Flexibility"

BCSEA disputes BC Hydro's claim that the Engagement Survey results support BC Hydro's proposal to both permanently ban new intentional annual NEG with certain flexibility provisions and to reduce the Energy Price.

BC Hydro states in the Application that the results of the Engagement Survey support BC Hydro's proposals regarding new Oversized Generation and reduction of the Energy Price. BC Hydro states on page 23 that its proposals are supported by the fact that:

"43 per cent of Engagement Survey participants supported the proposal of maintaining the amendments included in the 2018 Amendment Application, with additional changes to provide greater flexibility, compared to the alternative proposal of having no requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price." [underline added]

The two specific options offered in the Survey (in addition to "Other Suggestions") were:

- Make the amendments proposed in the 2018 Amendment Application [ban on new intentional annual NEG] ongoing, with adjustments to provide greater flexibility to customers.
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price. [Application, p.19]

1.2.3 Would BC Hydro agree that the first option (supported by 43%) implies that in this option there would be no reduction in the Energy Price, or that it is at least unclear whether respondents selecting this option understood that they were supporting both a ban on Oversized Generation with flexibility and a reduction in the Energy Price?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.2.1.

2.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, s. 2.4, "Options to Address Oversized Generating Facilities"; s.2.7, "Proposed Amendments Would Prevent Oversized Generating Facilities and Support Program Intent, Fairness and Flexibility"

BCSEA disputes BC Hydro's claim that the Engagement Survey results support BC Hydro's proposal to both permanently ban new intentional annual NEG with certain flexibility provisions and to reduce the Energy Price.

BC Hydro states in the Application that the results of the Engagement Survey support BC Hydro's proposals regarding new Oversized Generation and reduction of the Energy Price. BC Hydro states on page 23 that its proposals are supported by the fact that:

"43 per cent of Engagement Survey participants supported the proposal of maintaining the amendments included in the 2018 Amendment Application, with additional changes to provide greater flexibility, compared to the alternative proposal of having no requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price." [underline added]

The two specific options offered in the Survey (in addition to "Other Suggestions") were:

- Make the amendments proposed in the 2018 Amendment Application [ban on new intentional annual NEG] ongoing, with adjustments to provide greater flexibility to customers.
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price. [Application, p.19]

1.2.4 Would BC Hydro agree that the results of the Engagement Survey do not support BC Hydro's proposal to both finalize the ban and reduce the Energy Price?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.2.1.

3.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No. 4, Figure 3, Barriers [pdf p. 205]

Figure 3 of BC Hydro's Net Metering Evaluation Report No. 4 shows that 40% of respondents to BC Hydro's survey of customers, installers and other stakeholders identified the 9.99¢/kWh Energy Price as being a barrier to participating in the NM program.

1.3.1 Does BC Hydro anticipate that reducing the Energy Price would lead to fewer applications for participation in the NM program? If so, by how much?

RESPONSE:

Overall, BC Hydro does not anticipate that reducing the Energy Price would adversely impact the number of applications submitted to the Program.

Participation in the Program has continued to grow since BCUC Order No. G-100-18 which allowed BC Hydro to defer the review of all Net Metering applications proposing a generating facility sized to generate an estimated annual output greater than estimated annual load. In addition, as shown in BC Hydro's response to BCUC IR 1.3.1, the vast majority of customers in the Program received no Surplus Energy Payment in fiscal 2018 and of those customers who did receive a Surplus Energy Payment, most received a payment of less than $500.

The Application proposes amendments to prevent Oversized Generating Facilities. Specifically, customers with a Generating Facility that has a nameplate rating greater than 5 kW, must not have an Annual Energy Output greater than 110 per cent of the Annual Load. Under this requirement, potential new customers in the Program would be expected to receive either no Surplus Energy Payment or minimal Surplus Energy Payments and should not consider the Energy Price to be a determining factor for their participation in the Program.

3.0 A. Proposed Ban on New Intentional Oversized Generation

Topic: New Intentional Oversized Generation
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No. 4, Figure 3, Barriers [pdf p. 205]

Figure 3 of BC Hydro's Net Metering Evaluation Report No. 4 shows that 40% of respondents to BC Hydro's survey of customers, installers and other stakeholders identified the 9.99¢/kWh Energy Price as being a barrier to participating in the NM program.

1.3.2 If the Commission approves BC Hydro's proposed reduction of the Energy Price, what actions would BC Hydro take to counter any negative impact on the number of applications for participation in the NM program?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.3.1.

4.0 B. Purpose of Net Metering Program

Topic: Purpose of Net Metering Program
Reference: Application, Exhibit B-1, p.2

BC Hydro says that "The [Net Metering] Program is designed for customers who install a Generating Facility to generate electricity for their own use." BC Hydro also acknowledges that prior to April 2018 it did approve some applications for participation in the Net Metering Program by customers with intentional annual net excess generation.

1.4.1 Would BC Hydro agree that the purpose of the Net Metering Program prior to April 2018 is more important to the transition provisions if the Application is approved than it is to whether or not new intentional Oversized Generation should be banned permanently?

RESPONSE:

BC Hydro believes that the Program should be maintained as a load offset program and this objective is the primary reason that BC Hydro has proposed amendments to prevent Oversized Generating Facilities.

5.0 B. Purpose of Net Metering Program

Topic: Purpose of Net Metering Program
Reference: Application, Exhibit B-1; BC's CleanBC Plan[1]

BC's 2018 CleanBC Plan states on page 56:

"**Utilities.** BC Hydro and FortisBC have a long history of partnering with people and communities to help conserve energy and switch to cleaner options. For example, FortisBC offers rebates on high-efficiency appliances, equipment and more. Meanwhile, BC Hydro has 900 customers on its net metering program, which allows them to generate their own electricity and sell what they don't use back to BC Hydro. As we move forward with CleanBC, utilities will continue to support, encourage and enable the transition to clean energy as we ensure their policies align with the Province's electrification goals and emission reduction targets." [p.56, underline added]

1.5.1 Does BC Hydro agree that the CleanBC Plan characterizes BC Hydro's Net Metering Program as a positive example of a measure to support, encourage and enable the transition to clean energy, aligned with the Province's electrification goals and emission reduction targets?

RESPONSE:

Yes. Through Phase Two of the Comprehensive Review, BC Hydro is working with the Government of B.C. to determine how to support the Government's electrification goals with clean energy while continuing to keep rates affordable for our customers.

1 https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_2018-bc-climate-strategy.pdf

5.0 B. Purpose of Net Metering Program

Topic: Purpose of Net Metering Program
Reference: Application, Exhibit B-1; BC's CleanBC Plan[1]

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"**Utilities.** BC Hydro and FortisBC have a long history of partnering with people and communities to help conserve energy and switch to cleaner options. For example, FortisBC offers rebates on high-efficiency appliances, equipment and more. Meanwhile, BC Hydro has 900 customers on its net metering program, which allows them to generate their own electricity and sell what they don't use back to BC Hydro. As we move forward with CleanBC, utilities will continue to support, encourage and enable the transition to clean energy as we ensure their policies align with the Province's electrification goals and emission reduction targets." [p.56, underline added]

1.5.2 Does BC Hydro agree that where the CleanBC Plan says the Net Metering program enables participants "to generate their own electricity and sell what they don't use back to BC Hydro" the sales of electricity to BC Hydro include annual net excess generation?

RESPONSE:

The CleanBC Plan summarized the Net Metering Program applicable at the time the plan was released. As BC Hydro moves forward in supporting and encouraging the transition to clean energy, our current programs may change to reflect changing circumstances.

[1] https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_2018-bc-climate-strategy.pdf

5.0 B. Purpose of Net Metering Program

Topic: Purpose of Net Metering Program
Reference: Application, Exhibit B-1; BC's CleanBC Plan[1]

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"**Utilities.** BC Hydro and FortisBC have a long history of partnering with people and communities to help conserve energy and switch to cleaner options. For example, FortisBC offers rebates on high-efficiency appliances, equipment and more. Meanwhile, BC Hydro has 900 customers on its net metering program, which allows them to generate their own electricity and sell what they don't use back to BC Hydro. As we move forward with CleanBC, utilities will continue to support, encourage and enable the transition to clean energy as we ensure their policies align with the Province's electrification goals and emission reduction targets." [p.56, underline added]

1.5.3 Does BC Hydro agree that the Commission should take the CleanBC Plan into consideration in determining the Energy Price and whether new intentional annual NEG should be allowed under the Net Metering Program?

RESPONSE:

Government policy is one of many factors the BCUC may take into consideration when evaluating an application. Examples of additional factors include the Bonbright rate design principles such as fair appointment of costs among customers and efficient price signals. Please refer to BC Hydro's response to BCUC IR 1.9.1 where we discuss the alignment of BC Hydro's proposed change to the Energy Price with each of the Bonbright rate design principles.

1 https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_2018-bc-climate-strategy.pdf

6.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 4.1, 4.2; Exhibit A-5, BCUC IR 5.3 to BC Hydro

BC Hydro proposes to change the reference for the Energy Price from the SOP price to the market price. BC Hydro justifies this proposed change as reducing cost-shifting and reducing unfairness between NM participants and non-participant customers.

In BCUC IR 5.3, the Commission asks BC Hydro to "confirm, or explain otherwise, that the purpose of the proposed changes to the tariff to limit Annual Energy Output to the Annual Load is to limit cost-shifting."

1.6.1 Please confirm, or otherwise explain, that BC Hydro's proposed change to the reference for the Energy Price is intended to address only the value for money aspect of the NM Energy Price and that the change is not intended to address any cost of service factors (other than the value of annual NEG if that is considered a cost of service factor).

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 1.5.1, the amendments proposed in the Application are intended to address cost-shifting that occurs between customers in the Program and non-participating customers with regards to Surplus Energy Payments.

6.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 4.1, 4.2; Exhibit A-5, BCUC IR 5.3 to BC Hydro

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1.6.1.1 If the proposed change to the reference for the Energy Price is intended to address cost of service factors other than the value for money aspect of the Energy Price, then please explain what these cost of service factors are and why they would be appropriately recovered only from the minority of NM participants who have annual NEG.

RESPONSE:

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

6.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 4.1, 4.2; Exhibit A-5, BCUC IR 5.3 to BC Hydro

BC Hydro proposes to change the reference for the Energy Price from the SOP price to the market price. BC Hydro justifies this proposed change as reducing cost-shifting and reducing unfairness between NM participants and non-participant customers.

In BCUC IR 5.3, the Commission asks BC Hydro to "confirm, or explain otherwise, that the purpose of the proposed changes to the tariff to limit Annual Energy Output to the Annual Load is to limit cost-shifting."

1.6.2 If not addressed in the response to BCUC IR 5.3, please define exactly what type(s) of (asserted) cost-shifting the proposed change to the Energy Price is intended to address.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.3.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

BC Hydro states on pdf p. 18 of the Application:

"In February 2007, the Government of B.C. released the 2007 Energy Plan: The BC Energy Plan: A Vision for Clean Energy Leadership. Policy Action No. 11 stated that BC Hydro would be directed to establish a Standing Offer Program (**SOP**) to purchase electricity from small, clean power projects at a set price, based on the prices paid in BC Hydro's most recent energy call. It further stated that the Energy Price should be generally consistent with the SOP price. Accordingly:

- In October 2008, BC Hydro submitted an application to the BCUC to increase the Energy Price from 5.40 to 8.16 cents per kWh. In January 2009, by Order No. G-4-09, the BCUC approved the proposed increase to the Energy Price; and
- In September 2011, BC Hydro submitted an application to the BCUC to increase the Energy Price from 8.16 to 9.99 cents per kWh. In May 2012, by Order No. G-57-12, the BCUC approved the proposed increase to the Energy Price."

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"Section 15 of the *Clean Energy Act* states that BC Hydro must establish and maintain a standing offer program to acquire electricity from eligible facilities, except in the prescribed circumstances. In February 2019, following the Comprehensive Review of BC Hydro (**Comprehensive Review**), which updated the prescribed circumstances, BC Hydro indefinitely suspended the SOP." [underline added]

1.7.1 Does BC Hydro consider that energy under an SOP electricity purchase agreement is contractually firm? Is there a penalty for non-delivery of energy under a typical SOP EPA?

RESPONSE:

Energy delivered under a Standing Offer Program (SOP) Electricity Purchase Agreement (EPA) is not contractually firm energy. There is no penalty for non-delivery of energy under a SOP EPA.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.2 Please confirm, or otherwise explain, that BC Hydro includes SOP energy as a supply resource for planning purposes.

RESPONSE:

Confirmed.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.3 Would BC Hydro agree that the provision in the 2007 Energy Plan that the NM Energy Price should be generally consistent with the SOP price took into account any differences in energy delivery obligations between NM annual NEG and SOP energy? If not, why not?

RESPONSE:

The 2007 Energy Plan does not discuss the differences in energy deliveries as between Net Metering customers and IPPs in the Standing Offer Program. BC Hydro is not aware of any differences that may have been taken into account.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.4 Is it BC Hydro's view that the provision in the 2007 Energy Plan that the Net Metering Energy Price should be generally consistent with the SOP price is no longer operative? If so, why?

RESPONSE:

As stated in BC Hydro's response to BCUC IR 1.10.1, now that the Standing Offer Program has been indefinitely suspended, the Energy Price should be re-evaluated and updated to align with the value BC Hydro receives from excess generation.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.5 Please confirm in more detail how the first phase of the Comprehensive Review of BC Hydro (February 2019 report) updated the prescribed circumstances concerning the standing offer program required by section 15 of the *Clean Energy Act*.

RESPONSE:

Section 15 of the *Clean Energy Act* states that BC Hydro must establish and maintain a standing offer program to acquire electricity from eligible facilities, except in the prescribed circumstances.

As part of the Comprehensive Review, the Government of B.C. issued B.C. Reg. 23/2019 to specify a new prescribed circumstance. The effect of the Regulation is that BC Hydro is not obligated to maintain the Standing Offer Program while the cumulative capacity of facilities under the program exceeds 100 MW. Through the Standing Offer Program, BC Hydro has contracted with facilities totalling more than 170 MW of nameplate capacity.

In accordance with the regulation, BC Hydro has indefinitely suspended the Standing Offer Program.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.6 Please confirm, or otherwise explain, that the Comprehensive Review of BC Hydro Phase One Report does not contemplate, or result in, any change to the energy price in existing electricity purchase agreements under the SOP.

RESPONSE:

Confirmed.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.7 Please confirm, or otherwise explain, that the Comprehensive Review of BC Hydro Phase One Report is silent regarding both the Net Metering Energy Price and the 2007 Energy Plan's provision that the NM Energy Price should be generally consistent with the energy price for SOP EPAs.

RESPONSE:

Net Metering was not considered within the scope of Phase One of the Comprehensive Review of BC Hydro. However, distributed generation is one of the topics included within the scope of Phase Two of the Comprehensive Review, which was recently announced by the Government of B.C. As the review is ongoing, BC Hydro cannot speculate as to what will be included in the final report.

For additional information regarding the scope of Phase Two of the Comprehensive Review, please refer to the Terms of Reference at: https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/electricity/bc-hydro-review-phase-2.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.8 In BC Hydro's view, what conclusions, if any, can be drawn from the Comprehensive Review of BC Hydro Phase One Report regarding existing NM participants with annual net excess generation, existing SOP EPAs, and the 2007 Energy Plan's provision that the NM Energy Price should be generally consistent with the energy price for SOP EPAs. Please provide references to the Report if applicable.

RESPONSE:

As stated in BC Hydro's response to BCUC IR 1.10.1, now that the Standing Offer Program has been indefinitely suspended, the Energy Price should be re-evaluated and updated to align with the value BC Hydro receives from excess generation.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.9 Please provide an update on whether and how the Net Metering Program is or will be addressed in the second phase of the Comprehensive Review of BC Hydro.

RESPONSE:

Please refer to BC Hydro response to BCSEA IR 1.7.7.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.9 Please provide an update on whether and how the Net Metering Program is or will be addressed in the second phase of the Comprehensive Review of BC Hydro.

1.7.9.1 In the second phase of the Comprehensive Review of BC Hydro, will the consideration of Net Metering include the NM Energy Price?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.7.7.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

BC Hydro states on pdf p. 18 of the Application:

"In February 2007, the Government of B.C. released the 2007 Energy Plan: The BC Energy Plan: A Vision for Clean Energy Leadership. Policy Action No. 11 stated that BC Hydro would be directed to establish a Standing Offer Program (**SOP**) to purchase electricity from small, clean power projects at a set price, based on the prices paid in BC Hydro's most recent energy call. It further stated that the Energy Price should be generally consistent with the SOP price. Accordingly:

- In October 2008, BC Hydro submitted an application to the BCUC to increase the Energy Price from 5.40 to 8.16 cents per kWh. In January 2009, by Order No. G-4-09, the BCUC approved the proposed increase to the Energy Price; and
- In September 2011, BC Hydro submitted an application to the BCUC to increase the Energy Price from 8.16 to 9.99 cents per kWh. In May 2012, by Order No. G-57-12, the BCUC approved the proposed increase to the Energy Price."

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1.7.9 Please provide an update on whether and how the Net Metering Program is or will be addressed in the second phase of the Comprehensive Review of BC Hydro.

1.7.9.2 If so, will the consideration be limited to the Energy Price for new NM participants or will it include the Energy Price for existing NM participants?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.7.7.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.10 If the Energy Price for existing and/or new NM participants will be addressed in the second phase of the Comprehensive Review of BC Hydro, then does BC Hydro expect to consider additional changes to the Energy Price for existing or new NM participants when the second phase is completed? If so:

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.7.7.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.10 If the Energy Price for existing and/or new NM participants will be addressed in the second phase of the Comprehensive Review of BC Hydro, then does BC Hydro expect to consider additional changes to the Energy Price for existing or new NM participants when the second phase is completed? If so:

1.7.10.1 Would successive changes to the NM Energy Price be undesirable from a rate stability and customer acceptance perspective?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.12.6.1 where we explain that an annual update to the Energy Price, as proposed in the Application, appropriately balances rate stability and customer acceptance and understanding against the objective of reflecting the value of the energy to non-participating customers.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.10 If the Energy Price for existing and/or new NM participants will be addressed in the second phase of the Comprehensive Review of BC Hydro, then does BC Hydro expect to consider additional changes to the Energy Price for existing or new NM participants when the second phase is completed? If so:

1.7.10.2 Would there be merit in deferring consideration of any changes to the Energy Price until after the results of the second phase of the Comprehensive Review of BC Hydro are known?

RESPONSE:

No, BC Hydro does not believe that there would be merit in deferring consideration of any changes to the Energy Price until after the results of Phase Two of the Comprehensive Review are known.

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.11 Can BC Hydro confirm that the prices under existing SOP EPAs will not be reduced as a consequence of the second phase of the Comprehensive Review of BC Hydro?

RESPONSE:

Existing Electricity Purchase Agreements (EPAs) under the Standing Offer Program (SOP) are commercial arrangements as between BC Hydro and an IPP project proponent, and we expect that the pricing terms of these existing agreements would not be impacted by future government policy.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.12 Does BC Hydro anticipate that net metering as supply-side and demand-side resources will be addressed in the 2021 Integrated Resource Plan?

RESPONSE:

Yes. As discussed in BC Hydro's response to BCUC IR 1.18.4, BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan.

BC Hydro's next Integrated Resource Plan will be informed by an updated resource options inventory which will reflect data on trends in distributed energy resources as well as the recommendations from Phase Two of the Government of B.C.'s Comprehensive Review of BC Hydro.

For further information on BC Hydro's existing resource options inventory, please refer to: https://www.bchydro.com/toolbar/about/planning-for-our-future/electricity-supply-options.html.

7.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 1.4.3, "2007 Energy Plan and Subsequent Applications Increased Energy Price" [pdf p. 18]; section 4.6, "Evaluation Report Committed to Updating Energy Price" [pdf p. 44]

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1.7.12 Does BC Hydro anticipate that net metering as supply-side and demand-side resources will be addressed in the 2021 Integrated Resource Plan?

1.7.12.1 If so, would there be merit in deferring consideration of any changes to the Energy Price until the Commission review of BC Hydro's 2021 IRP?

RESPONSE:

No, BC Hydro does not believe that there would be merit in deferring consideration of any changes to the Energy Price until the BCUC's review of BC Hydro's 2021 Integrated Resource Plan.

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

8.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 4.2; 2007 Energy Plan[1]

BC Hydro states on page 34 of the Application:

"The link between the SOP price and the Energy Price is based on the premise that the [NM] Energy Price should reflect a long-run value instead of a short-run value. BC Hydro believes that this premise is incorrect and should be re-considered." [underline added]

The 2007 Energy Plan states on page 10:

"The price offered in the standing offer contract would be based on the prices paid in the most recent BC Hydro energy call. This will provide small electricity suppliers with more certainty, bring small power projects into the system more quickly, and help achieve government's goal of maintaining a secure electricity supply. As well, BC Hydro will offer the same price to those in BC Hydro's Net Metering Program who have a surplus of generation at the end of the year."

1.8.1 Does BC Hydro agree that the 2007 Energy Plan took the same approach to the SOP price and the NM annual NEG price:

(a) both prices would be based on the prices paid in the most recent BC Hydro energy call,
(b) both prices were intended to incent new clean small power projects, and
(c) neither price was to "reflect a long-run value instead of a short-run value"?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.1 where we explain that:

- **The Energy Price has historically been consistent with the policy direction provided in the 2007 Energy Plan that the Energy Price be generally consistent with the price paid under BC Hydro's Standing Offer Program (SOP); and**

[1] https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/bc_energy_plan_2007.pdf.

- **In BC Hydro's view, now that the SOP has been indefinitely suspended, the SOP price should no longer be used as a basis for the Energy Price and the Energy Price should be re-evaluated and updated to align with the value BC Hydro receives from excess generation.**

Please also refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

8.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 4.2; 2007 Energy Plan[1]

BC Hydro states on page 34 of the Application:

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1.8.2 Please comment on the proposition that what has changed since the issuance of the 2007 Energy Plan is the long-run value of new supply to BC Hydro (which has declined), and not the merits of the principle that the NM Energy Price should be generally consistent with the SOP price.

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.8.1.

1 https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/bc_energy_plan_2007.pdf

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

"RS 1289 does not impose any delivery obligations on customers in the Program. This means that customers in the Program are not obligated to send any energy to BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term."

1.9.1 What are the delivery obligations under an SOP EPA?

RESPONSE:

There are no contractual energy delivery obligations required of an IPP project under the Standing Offer Program.

As discussed in BC Hydro's response to BCUC IR 1.10.2, BC Hydro has not determined the degree to which aggregate generation from customers in the Program can be relied upon over the long-term and, to date, has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long term planning.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

"RS 1289 does not impose any delivery obligations on customers in the Program. This means that customers in the Program are not obligated to send any energy to BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term."

1.9.2 Please confirm, or otherwise explain, that the contractually non-firm nature of annual NEG from Net Metering was understood when the 2007 Energy Plan said that the NM Energy Price should be generally consistent with the SOP price.

RESPONSE:

BC Hydro does not know what the Government of B.C. may have understood when drafting the 2007 Energy Plan.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

"RS 1289 does not impose any delivery obligations on customers in the Program. This means that customers in the Program are not obligated to send any energy to BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term."

1.9.3 Please confirm, or otherwise explain, that for planning purposes BC Hydro uses concepts such as Effective Load Carrying Capacity to model the contribution of intermittent supply resources to the system.

RESPONSE:

BC Hydro confirms that for planning purposes we use concepts such as Effective Load Carrying Capacity to model the contribution of intermittent supply resources to the system.

Please also refer to BC Hydro's response to BCUC IR 1.11.2 where we explain why BC Hydro does not consider generation from customers in the Program, on an aggregate basis, to provide capacity benefits.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

"RS 1289 does not impose any delivery obligations on customers in the Program. This means that customers in the Program are not obligated to send any energy to BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term."

1.9.4 Please confirm, or otherwise explain, that BC Hydro is able to model for planning purposes the non-firm energy component of EPAs.

RESPONSE:

Confirmed.

As discussed in BC Hydro's response to BCUC IR 1.10.2, BC Hydro has not determined the degree to which aggregate generation from customers in the Program can be relied upon over the long-term and, to date, has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long term planning.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

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1.9.5 Please confirm, or otherwise explain, that BC Hydro uses the concepts of persistence and measure life to model the contribution of DSM savings to the system even though in many cases DSM participants are not contractually obligated to maintain the DSM measure or the load avoided by the DSM measure.

RESPONSE:

BC Hydro uses persistence assumptions to reflect the length of time that the energy and capacity benefits resulting from DSM activities last.

Persistence assumptions reflect the median length of time DSM measures are in place and operating, and account for the fact that some may be removed early, while others may last longer. Persistence assumptions are informed by numerous research studies that are widely accepted in the DSM industry, and are used by utilities to inform long-term planning.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

"RS 1289 does not impose any delivery obligations on customers in the Program. This means that customers in the Program are not obligated to send any energy to BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term."

1.9.6 Would BC Hydro agree that in general contractually non-firm resources are not excluded from consideration in the long-term planning process: rather, contractually non-firm resources may have different system benefits than contractually firm resources for planning purposes?

RESPONSE:

BC Hydro agrees that, in general, contractually non-firm resources are not excluded from consideration in the long-term planning process. However, not all of the energy from the non-firm resources can necessarily be relied upon for planning purposes.

As discussed in BC Hydro's response to BCUC IR 1.10.2, BC Hydro has not determined the degree to which aggregate generation from customers in the Program can be relied upon over the long-term and, to date, has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

"RS 1289 does not impose any delivery obligations on customers in the Program. This means that customers in the Program are not obligated to send any energy to BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term."

1.9.7 Would BC Hydro agree that the main reason that energy from the Net Metering program is not considered a supply resource for planning purposes is that the energy volume is so small at the present time?

RESPONSE:

Yes. As discussed in BC Hydro's response to BCUC IR 1.10.2, BC Hydro has not determined the degree to which aggregate generation from customers in the Program can be relied upon over the long-term and, to date, has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long-term planning.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

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1.9.8 Would BC Hydro agree that if the potential volume of energy from NM NEG was large enough to be material for planning purposes then NM NEG could be analyzed as a supply resource for planning purposes using appropriate discounting for its contractually non-firm status?

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 1.18.4, BC Hydro has not determined the degree to which aggregate generation from customers in the Program can be relied upon over the long-term and, to date, has not considered the potential energy contribution from customers in the Program to be sufficiently large to include in our long term planning. BC Hydro intends to review its assumptions with regards to the growth and inclusion of Net Metering in resource planning in its next Integrated Resource Plan.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

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1.9.9 What practical difference does it make to BC Hydro's position on the appropriate Energy Price (for annual NEG) whether the price reflects long-term value or short-term value? Isn't it BC Hydro's view that while it is in an energy surplus position the long-term value of new energy resources is the same as the short-term value?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

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1.9.9.1 If the Energy Price was based on the reference energy price for renewal of long-term EPAs, what would be the Energy Price?

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 1.10.5, BC Hydro has recently adopted the market price as a conservative interim assumption for evaluating energy during surplus and deficit periods.

For the renewal of Electricity Purchase Agreements, BC Hydro uses a forecast market price with adjustments for evaluating energy. For simplicity and because the Energy Price applies to energy already received by BC Hydro, we are proposing to use a historical average market price, based on the previous calendar year. Please refer to BC Hydro's response to BCUC IR 1.12.4 where we show that this approach provides a reasonable approximation of the value of excess generation received by BC Hydro.

9.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.34

"RS 1289 does not impose any delivery obligations on customers in the Program. This means that customers in the Program are not obligated to send any energy to BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term."

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1.9.9.2 Please confirm, or otherwise explain, that BC Hydro currently uses the regional wholesale energy market as the basis for determining the avoided cost of energy for the benefit/cost evaluation of DSM savings that have estimated persistence in the range of ten to twenty years.

RESPONSE:

Confirmed. BC Hydro uses the wholesale market price to value DSM energy savings when calculating the Utility Cost Test benefit-cost ratio.

10.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 4.2, p.35 [pdf p. 41]

"It is important to recognize that the current design of the Program, which allows customers to apply a Generation Account Balance towards future consumption, means that energy received from the Program is valued at both the retail rate and the Energy Price.

While valuing energy received from the Program at the retail rate is not economic and does not reflect its actual value as a short-run resource, BC Hydro believes that this approach is necessary to support the intent of the Program and is consistent BCUC's determination that limited cost-shifting is warranted to support the implementation of net metering, given the relatively small size of the Program at this time. However, setting the Energy Price on a long-run basis, when the energy received only has a short-run value, goes beyond limited cost-shifting and does not represent a fair value to non-participating customers." [underline added]

1.10.1 Would BC Hydro agree that the clause "energy received from the Program is valued at both the retail rate and the Energy Price" would be clearer if it said energy received from the NM program is implicitly valued at the retail rate except for annual net excess generation which is expressly valued at the Energy Price.

RESPONSE:

Yes, BC Hydro would agree that the revised statement provided in the question is clearer.

10.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, section 4.2, p.35 [pdf p. 41]

"It is important to recognize that the current design of the Program, which allows customers to apply a Generation Account Balance towards future consumption, means that energy received from the Program is valued at both the retail rate and the Energy Price.

While valuing energy received from the Program at the retail rate is not economic and does not reflect its actual value as a short-run resource, BC Hydro believes that this approach is necessary to support the intent of the Program and is consistent BCUC's determination that limited cost-shifting is warranted to support the implementation of net metering, given the relatively small size of the Program at this time. However, setting the Energy Price on a long-run basis, when the energy received only has a short-run value, goes beyond limited cost-shifting and does not represent a fair value to non-participating customers." [underline added]

1.10.2 Would BC Hydro agree that the financial value (to BC Hydro) of Net Metering that does not produce NEG should not be a factor in determining the appropriate Energy Price in the current proceeding?

RESPONSE:

Yes, BC Hydro would agree.

Please refer to BC Hydro's response to BCUC IR 1.5.1 where we explain the way that cost-shifting between customers in the Program and non-participating customers occurs and that the amendments proposed in the Application are only intended to address cost-shifting with regards to Surplus Energy Payments.

Please also refer to BC Hydro's response to BCUC IR 1.10.2, where we explain why it is appropriate to value excess generation from customers in the Program based on market price.

11.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.39; Figure 7 Historical Energy Price by Calendar Year Using BC Hydro's Proposed Approach (cents per kWh)

"BC Hydro proposes a simple approach where the Energy Price would be updated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year." [p.39]

1.11.1 Please confirm, or otherwise explain, that BC Hydro proposes that in determining the Energy Price no adjustments would be made to the average market price to take into account, for example, line losses, wheeling fees, renewable energy credits, and high-load/low-load hours. If confirmed, please provide the rationale. If not confirmed, please explain the proposed adjustments.

RESPONSE:

The only adjustment to the average Mid-C market price, under BC Hydro's proposed approach, is a conversion to Canadian dollars.

As discussed in section 4.7 of the Application, to maintain a simple approach and to recognize the BCUC's previous determination that limited cost-shifting is warranted to support the implementation of net metering, BC Hydro is not proposing any further adjustments.

11.0 C. Energy Price

Topic: Energy Price
Reference: Application, Exhibit B-1, p.39; Figure 7 Historical Energy Price by Calendar Year Using BC Hydro's Proposed Approach (cents per kWh)

"BC Hydro proposes a simple approach where the Energy Price would be updated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year." [p.39]

1.11.2 Please provide a table showing the prices illustrated in Figure 7.

RESPONSE:

The table below provides the historical Energy Price by calendar year, using BC Hydro's proposed approach, as shown in Figure 7 of the Application.

Calendar Year	Historical Energy Price using BC Hydro's Proposed Approach (2018 CAD cents per kWh)
2008	**7.7**
2009	**4.4**
2010	**4.0**
2011	**2.7**
2012	**2.2**
2013	**3.7**
2014	**4.0**
2015	**3.2**
2016	**2.8**
2017	**2.9**
2018	**4.0**

12.0 C. Energy Price

Topic: Alternatives to Revised Energy Price
Reference: Application, Exhibit B-1, section 4.4, p.36

BC Hydro states:

"As shown in Figure 6 below, the Engagement Survey Results indicate that a slight majority (53 per cent) of participants support revising the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market compared to an alternative of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire." [p.36, pdf p.42, underline added]

1.12.1 Would BC Hydro agree that the Engagement Survey Results shown in Figure 6 indicate that the respondents were about equally divided in their stated preference for either one or the other of the only two options presented?

RESPONSE:

The survey results show that there was a slight preference among respondents for the option to revise the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market over the option of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire.

12.0 C. Energy Price

Topic: Alternatives to Revised Energy Price
Reference: Application, Exhibit B-1, section 4.4, p.36

BC Hydro states:

"As shown in Figure 6 below, the Engagement Survey Results indicate that a slight majority (53 per cent) of participants support revising the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market compared to an alternative of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire." [p.36, pdf p.42, underline added]

1.12.2 Please confirm, or otherwise explain, that the Engagement Survey required respondents to choose a response to each question before being able to move to the next question.

RESPONSE:

Confirmed. BC Hydro followed the common survey practice of requiring a response to each question before moving to subsequent questions. Only the last two questions, which were open-ended, did not require a response.

12.0 C. Energy Price

Topic: Alternatives to Revised Energy Price
Reference: Application, Exhibit B-1, section 4.4, p.36

BC Hydro states:

"As shown in Figure 6 below, the Engagement Survey Results indicate that a slight majority (53 per cent) of participants support revising the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market compared to an alternative of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire." [p.36, pdf p.42, underline added]

1.12.3 Please confirm, or otherwise explain, that the question for which results are provided in Figure 6 offered no 'none of the above' choice.

RESPONSE:

Confirmed.

13.0 D. Transitional Provisions

Topic: **Transition Provisions**
Reference: Application, Exhibit B-1, s.6.3, Proposed Transitional Energy Price Mitigates Impact to Existing Customers

1.13.1 What factors did BC Hydro take into account in deciding that five years is an appropriate length for the transition period associated with the proposed change in the Energy Price?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain the rationale for a five-year transition period.

13.0 D. Transitional Provisions

Topic: **Transition Provisions**
Reference: Application, Exhibit B-1, s.6.3, Proposed Transitional Energy Price Mitigates Impact to Existing Customers

1.13.2 In BC Hydro's view, do the Bonbright principles apply to the proposal to revise the Energy Price for existing NM participants? If so, please provide a table evaluating the proposal according to each of the Bonbright principles. If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.9.1 where we provide a discussion of the alignment of BC Hydro's proposed change to the Energy Price with each of the Bonbright rate design principles referenced in BCUC Order No. G-45-11.

13.0 D. Transitional Provisions

Topic: **Transition Provisions**
Reference: Application, Exhibit B-1, s.6.3, Proposed Transitional Energy Price Mitigates Impact to Existing Customers

1.13.3 More specifically, in BC Hydro's view, is it appropriate to consider the proposed revision to the Energy Price in terms of bill impacts? If so, please discuss how the proposed five-year deferral of the proposed revision to the Energy Charge mitigates bill shock. If not, why not?

RESPONSE:

The five-year period for the transitional Energy Price provides notice to existing customers in the Program to help mitigate the impact of the update to the Energy Price.

As explained in BC Hydro's response to BCUC IR 1.15.6.1, BC Hydro believes that the implementation process for the proposed update to the Energy Price should consider the concerns of existing customers and balance those concerns against the objective of fairly allocating the benefits and costs of the Program between participating and non-participating customers.

13.0 D. Transitional Provisions

Topic: **Transition Provisions**
Reference: Application, Exhibit B-1, s.6.3, Proposed Transitional Energy Price Mitigates Impact to Existing Customers

1.13.4 BC Hydro recognizes that existing NM customers with annual net excess generation have incurred significant capital investments in their generation facilities [p.47]. Please provide any quantitative analysis BC Hydro has conducted or received regarding the capital investments in generation facilities by NM participants who would be affected by the proposed reduction in the Energy Price.

RESPONSE:

BC Hydro has not undertaken an analysis to determine the level of capital investment made by customers in the Program.

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain the rationale for proposing a five-year transition period and to BC Hydro's response to BCUC IR 1.15.5 where we confirm that enrolment in the Program does not entail any contractual agreement that provides assurance on the cost recovery of capital investments by the customer.

13.0 D. Transitional Provisions

Topic: **Transition Provisions**
Reference: Application, Exhibit B-1, s.6.3, Proposed Transitional Energy Price Mitigates Impact to Existing Customers

1.13.5 What is the average length of electricity purchase agreements under the SOP?

RESPONSE:

The terms available for Electricity Purchase Agreements under the Standing Offer Program ranged from 10 to 40 years with an average contract term of approximately 30 years for projects with executed Electricity Purchase Agreements.

13.0 D. Transitional Provisions

Topic: Transition Provisions
Reference: Application, Exhibit B-1, s.6.3, Proposed Transitional Energy Price Mitigates Impact to Existing Customers

1.13.6 If the Commission approves a change in the Energy Price, would it be feasible to implement a transition provision in which the existing Energy Price (i.e., 9.99 cents/kWh) remains in effect for existing Net Metering customers (at the decision date) for a period of time equivalent to the average length of SOP EPAs?

RESPONSE:

It would not be appropriate to use a transition period for the Energy Price that is based on the average contract term for projects with executed Electricity Purchase Agreements (EPAs) under the Standing Offer Program (SOP).

The Net Metering Program is not an energy procurement program. Unlike an EPA which is a commercial instrument, Rate Schedule 1289 is a rate as approved under the *Utilities Commission Act* that is subject to change as approved by the BCUC. As discussed in BC Hydro's response to BCUC IR 1.15.5, enrolment in the Program does not entail a contractual agreement between BC Hydro and the customer that provides assurance on the stability of terms and conditions, including the Energy Price.

As stated in BC Hydro's response to BCSEA IR 1.13.5, the average length of a SOP EPA is approximately 30 years. Maintaining a transitional Energy Price for this period would not be appropriate because it would:

- **Inhibit BC Hydro's ability to respond to changing conditions to the benefit of all customers;**
- **Be unfair to non-participating customers and new customers in the Program as it would perpetuate the cost-shifting with regards to Surplus Energy Payments to existing customers;**
- **Be inconsistent with the objectives of the Program, as set out in section 1.1 of the Application; and**
- **Add an administrative burden to BC Hydro.**

13.0 D. Transitional Provisions

Topic: **Transition Provisions**
Reference: Application, Exhibit B-1, s.6.3, Proposed Transitional Energy Price Mitigates Impact to Existing Customers

1.13.7 If the Commission approves a change in the Energy Price, what are BC Hydro's views on whether the length of the transition period for the existing Energy Price for existing NM providers of annual NEG should be based on the length of a typical existing SOP EPA?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.13.6.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.1 Please confirm, or otherwise explain, that customers in Non-Integrated Areas are eligible to participate in the Net Metering Program if they meet the interconnection requirements.

RESPONSE:

Confirmed.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.2 Please confirm that BC Hydro used $300/MWh (F2015$) as the avoided energy cost in the cost-effectiveness tests for DSM in the Non-Integrated Areas in the F2020-F2022 DSM Plan.

RESPONSE:

Confirmed.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.2 Please confirm that BC Hydro used $300/MWh (F2015$) as the avoided energy cost in the cost-effectiveness tests for DSM in the Non-Integrated Areas in the F2020-F2022 DSM Plan.

1.14.2.1 What is $300/MWh (F2015$) in F2020$?

RESPONSE:

$300/MWh in fiscal 2015 dollars equates to $331/MWh in fiscal 2020 dollars.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.3 Please confirm that in the F2020-F2022 DSM Plan BC Hydro uses the wholesale market price of energy as the reference point for the avoided cost of energy in analyzing the benefit/cost of DSM for the Integrated System.

RESPONSE:

In the Fiscal 2020 to Fiscal 2022 DSM Plan, BC Hydro used the wholesale market price to value DSM energy savings in the integrated system, when calculating the Utility Cost Test benefit-cost ratio.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.4 Please identify any conceptual or practical (e.g., adjustments) differences between the use of the wholesale market price of energy as the reference point for (a) benefit/cost analysis of DSM in the Integrated System and (b) the Energy Price for new intentional annual net excess generation under the NM Program.

RESPONSE:

As BC Hydro has recently adopted the market price as a conservative interim assumption for evaluating energy during surplus and deficit periods, it is appropriate to use Mid-C market prices for both the Utility Cost Test benefit/cost analysis of DSM in the Integrated System, and the Energy Price for Surplus Energy Payments under the Program.

To evaluate long-term DSM benefits in the Utility Cost Test, BC Hydro uses forward Mid-C price forecasts, in order to match the price with the forecast benefits.

Please refer to BC Hydro's response to BCUC IR 1.12.4 where explain how the proposed approach to setting the Energy Price provides a reasonable approximation of the value of excess generation from customers in the Program.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.5 Would BC Hydro agree that for Net Metering projects in Non-Integrated Areas the appropriate reference point for the Energy Price would be the avoided cost of energy used for DSM benefit/cost analysis in Non-Integrated Areas? If not, why? (For the response to this question, please assume that NM projects in NIAs meet the technical review referred to in section 9.1.4 of the Net Metering Evaluation Report No.4.)

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.14.10.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.6 Please provide a table showing the NIA unit cost of energy for F2017 to F2021 in $/MWh, actual, forecast and plan (reference: F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189).

RESPONSE:

The following table replicates the information shown in line 11 of Schedule 4 of Appendix A of BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, in the requested format.

As noted in the preamble to the question, the unit energy costs represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load.

Cost of Energy - Unit Cost ($/MWh)	**F2017**		**F2018**		**F2019**		**F2020**	**F2021**
	RRA	**Actual**	**RRA**	**Actual**	**RRA**	**Forecast**	**Plan**	**Plan**
Non-Integrated Area	**209.6**	**211.8**	**229.4**	**231.0**	**258.9**	**238.9**	**268.4**	**280.9**

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.7 Please confirm, or otherwise explain, that the unit cost of energy for Non-Integrated Areas for F2017 to F2021 is uniformly above 20 cents/kWh.

RESPONSE:

Confirmed. Please refer to BC Hydro's response to BCSEA IR 1.14.6 which provides the unit energy costs for the NIA for fiscal 2017 to fiscal 2021.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.8 Please confirm, or otherwise explain, that the marginal supply resource in NIAs is generally diesel generation. Please confirm, or otherwise explain, that clean or renewable NM generation in NIAs would generally displace diesel generation and thereby reduce GHG emissions in the Province.

RESPONSE:

Generally, for the Non-Integrated Areas, the marginal energy source is diesel generation.

There are 14 non-integrated areas and each specific non-integrated area will have different available resources. Of these 14 non-integrated areas, six are either primarily, or in part, served by clean or renewable resources and eight are only served from diesel resources. In addition, all of the non-integrated areas have diesel resources in place for reliability reasons.

If new generation resources are added to non-integrated areas that are only served from diesel resources, then those new resources would displace the diesel resources. For those non-integrated areas that are served in part by diesel resources and in part by clean or renewable resources, the new resources may not displace the diesel resources.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.9 Does BC Hydro agree that the regional wholesale market is not an apt reference for the value to BC Hydro of annual net excess generation by Net Metering participants in Non-Integrated Areas? If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.14.10.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.10 In BC Hydro's view, what is the appropriate methodology for determining the Energy Price for net excess generation in Non-Integrated Areas?

RESPONSE:

This answer also responds to BCSEA IRs 1.14.5, 1.14.9, 1.14.11, 1.14.12, 1.14.13, 1.14.13.1 and 1.14.14.

BC Hydro has used the same Energy Price for customers in the Non-Integrated Areas (NIA) as for customers connected to the integrated system to support Program simplicity and ease of administration. BC Hydro believes this approach is reasonable and appropriate because:

- **As outlined in section 1.1 of the Application, one of BC Hydro's objectives for the Program is to "Maintain the Program as a load offset program so that customers can generate their own electricity to reduce their supply from BC Hydro." BC Hydro is not seeking to encourage customers to sell energy to BC Hydro on a consistent basis, similar to an IPP.**

- **While the value to BC Hydro of excess energy from net metering customers in the NIA in will be different than the value of excess energy from net metering customers in the integrated system, the complexity of developing a NIA energy value (either for individual NIA communities or for NIA communities as a whole) outweighs any benefits to BC Hydro. In fiscal 2018, there were 14 NIA customers who participated in the Program and of these customers, only two received a Surplus Energy Payment.**

- **Each of the 14 NIA communities has different generating characteristics and system needs which means that it would not be possible to develop a single Energy Price that reflects the characteristics and system needs of all NIA communities.**

- **As discussed in BC Hydro's response to BCSEA IR 1.14.8, some NIA communities are either fully or partly supplied with clean or renewable resources. Additional excess energy from customers in the Program in these communities would not necessarily reduce diesel consumption and could potentially result in increased costs for ratepayers, depending on the specifics of a particular community.**

- **For each of the NIA communities, BC Hydro must balance the energy generated with the energy used at all times. As the NIA systems are small, they are more easily impacted by any new generation. BC Hydro limits net metering generation in the NIA and may reject applications so that reliability is not compromised.**

- **For those NIA communities that are primarily served from diesel resources, much of the diesel consumption generally occurs in the winter when a system has peak loads. As shown in BC Hydro's response to BCUC IR 1.14.2, BC Hydro receives minimal generation outflow from customers in the Program during the winter peak months because most customers in the Program have solar Generating Facilities which have low generation output in the winter. This generation profile is problematic because it means that BC Hydro could have significant excess energy in a NIA during the summer months and the system may not be able to accommodate this energy. In this case, energy received from customers in the Program would have either no benefit or a limited diesel reduction benefit.**

- **There may be better choices to reduce diesel consumption in a NIA, such as DSM or energy contracts tailored to the community's needs. For example, DSM projects can contribute to a reduction in diesel generation and can reduce load throughout the year, including during peak winter periods.**

Attachment 1 to this response provides BC Hydro's response to ZONE II RPG IR 1.4.1 from BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, where we describe BC Hydro's past and ongoing efforts on diesel reduction in the Non-Integrated Areas (NIAs), and BC Hydro's ongoing work to develop an approach to diesel reduction.

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British Columbia Hydro & Power Authority **Fiscal 2020 to Fiscal 2021 Revenue Requirements Application**	**Exhibit: B-6**

4.0 Topic: Cost of Energy - NIA

Reference: Exhibit B-1 Application, Section 4.3.3, page 4-12.

In support of CleanBC, and BC Hydro's clean energy commitment, we actively look for opportunities to displace diesel generation with clean or renewable resources in Non-Integrated Area communities when it is cost-effective to do so.

1.4.1 How is BC Hydro seeking opportunities to displace diesel generation with clean or renewable resources in the NIA?

RESPONSE:

This response also addresses Zone II IRs 1.4.1.1, 1.4.1.2, 1.5.2.1.1, 1.16.1, and 1.16.1.1.

BC Hydro has undertaken a number of current and historical initiatives that reduce diesel generation in the Non-Integrated Areas (NIA). These include:

- **Demand-side management programs, as described in Section 10.2.4 of the Application and Section 5.5 of Appendix X to the Application;**
- **Connection of remote communities to the integrated BC Hydro grid, to allow for the provision of clean electricity to these communities, as was done with the Southern St'at'imc as part of BC Hydro's Remote Community Electrification program (please refer to BC Hydro's response to BCSEA IR 1.4.1 for additional discussion of the Remote Community Electrification program);**
- **BC Hydro's Net Metering Program is available in the Non-Integrated Areas;**
- **BC Hydro's ownership and operation of the hydro facility at Clayton Falls; and**
- **Contracting with IPPs for the delivery of energy from clean or renewable hydro or biomass electricity generating facilities. Specifically, in the past five years BC Hydro has:**
  - **Entered into an EPA with the Kwadacha First Nation for a biomass facility which would reduce diesel use in the community of Fort Ware.**

- **Made a submission[1] to the BCUC to set a rate for service from the Ocean Falls facility to BC Hydro, which if granted would continue to avoid the need for substantial diesel generation in the community of Bella Bella and the surrounding area.**

As opportunities have arisen, BC Hydro has explored other generation options as proposed by a community and/or a developer on an individual basis. In addition to these current and historical initiatives, BC Hydro is developing a more comprehensive approach to cost-effectively reduce the amount of diesel used for electricity generation in the NIA, in support of Indigenous and community interests and needs, greenhouse gas reduction efforts, and the objectives in the Government of B.C.'s CleanBC plan. BC Hydro's work aims to support the four pillars of action for remote community diesel reduction, as described in Section 2.2.3 of the CleanBC report[2]:

- **Support communities to develop expertise and experience in energy efficiency and clean generation;**
- **Retrofit existing homes and buildings to make them highly energy efficient;**
- **Develop renewable heating systems, including heat pump technology and district energy systems; and**
- **Implement renewable energy projects to offset all or most remaining diesel generation, including rooftop solar photovoltaic and community-scale renewable systems.**

As part of these efforts, BC Hydro is engaging with Indigenous and non-Indigenous communities about their interests and needs, examining efforts in other jurisdictions, and reviewing technically and commercially feasible options, while also ensuring that BC Hydro manages costs and risks to the customer.

The work to develop an approach to diesel reduction as described above is ongoing. The documentation of this work is not expected to be available until it is completed, anticipated for later in fiscal 2020. In the interim, BC Hydro will continue to work with Indigenous and non-Indigenous communities to understand their needs and interests and look at potential solutions.

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1 https://www.bcuc.com/ApplicationView.aspx?ApplicationId=628

2 For the full CleanBC report please see https://blog.gov.bc.ca/app/uploads/sites/436/2019/02/CleanBC_Full_Report_Updated_Mar2019.pdf

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.11 Has BC Hydro examined what would be the Energy Prices for annual net excess generation in Non-Integrated Areas, based on a 'value to BC Hydro' approach? If so, please provide the results. If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.14.10.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

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"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.12 Does BC Hydro have any evidence to show that 9.99 cents/kWh for net excess annual generation in Non-Integrated Areas is a price that exceeds the value to BC Hydro? If so, please provide the evidence. If not, would it be reasonable to exclude Net Metering in Non-Integrated Areas from BC Hydro's proposed change to the Energy Price and proposed ban on new intentional net excess generation?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.14.10.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

In BCUC IR 1.185.1 in the F2020-F2021 RRA proceeding, BC Hydro was asked to provide the LRMC (long-run marginal cost) used for the cost-effectiveness tests for Demand-Side Management in the Non-Integrated Areas. BC Hydro's response states:

"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.13 Is BC Hydro reluctant to have a different NM Energy Price for Non-Integrated Areas than for the Integrated System?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.14.10.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

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"For the purposes of DSM program cost-effectiveness in the NIA, we used $300/MWh (Fiscal 2015$) as the avoided energy cost. This value represents a high-level proxy of the diesel generation fuel costs across the NIA.

Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.13 Is BC Hydro reluctant to have a different NM Energy Price for Non-Integrated Areas than for the Integrated System?

1.14.13.1 If so, is this because there are few if any NM participants in an NIA that have annual net excess generation?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.14.10.

14.0 E. Non-Integrated Areas

Topic: Non-Integrated Areas
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No.4, section 9.1.4, "Non-Integrated Areas"; BC Hydro F2020-F2021 Revenue Requirement Application (RRA), Exhibit B-5, BC Hydro Response to BCUC IR 1.185.1, pdf p.2062; F2020-F2021 RRA, Exhibit B-1, Appendix A, Schedule 4.0, Line 19, pdf p.1189

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Diesel generation is generally the marginal energy source for the NIA. For simplicity, we are assuming that any energy savings from DSM activities in the NIA would displace the need for incremental diesel generation.

The unit energy costs for the NIA in fiscal 2020 and fiscal 2021, as shown in Schedule 4.0 of Appendix A of the [F2020-F2021 Revenue Requirement] Application, represent weighted-average values of the cost of IPP energy and BC Hydro's diesel fuel costs, to meet the NIA load."

1.14.14 Would BC Hydro agree that, going forward, new NM Generating Facilities with intentional NEG in NIAs that receive an Energy Price designed specifically for NIAs could be an attractive approach to displacing diesel generation and GHG emissions and to fostering community development and reconciliation with First Nations? (Please assume for this question that Generating Facilities would meet the Interconnection Requirements and maximum generator size limit.)

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.14.10.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.1 Please provide a table describing proposed tariff changes as discussed in the body of the Application, and a description of the corresponding changes in the tariff pages. Include a change from "interim" to "permanent."

RESPONSE:

BC Hydro recognizes that the blackline provided in Appendix B of the Application may have made it difficult to identify BC Hydro's proposed amendments to Rate Schedule 1289.

Attachment 1 to this response provides a revised blackline that more clearly identifies the amendments that BC Hydro is seeking in the Application.

Attachment 2 to this response provides a table describing BC Hydro's proposed amendments to Rate Schedule 1289.

BC Hydro seeks to replace the interim amendments approved by BCUC Order No. G-100-18 with the proposed amended Rate Schedule 1289 provided as Appendix B of the Application.

For a blackline showing a comparison between the proposed amendments to Rate Schedule 1289 in the Application and Rate Schedule 1289 before the interim amendments were approved by BCUC Order No. G-100-18, please refer to Attachment 1 to BC Hydro's response to BCOAPO IR 1.3.2.

6. OTHER

RATE SCHEDULE 1289 – NET METERING SERVICE

Availability ¶

For any Residential Service Customer and for any General Service Customer who:

1. installs a Generating Facility to generate electricity to serve all or part of their ~~e~~Electricity requirements on the Customer's Premises, and
2. has ~~an Annual Load that is equal to or exceeds the Generating Facility's Annual Energy Output.~~ had their Net Metering Application for Service under this Rate Schedule accepted by BC Hydro in writing and has received Interconnection Approval. -

With the consent of BC Hydro, Customers taking Service under other Rate Schedules may be admitted to Service under this Rate Schedule, provided that BC Hydro is satisfied that the metering, billing and other requirements of this Rate Schedule can be met. ¶

~~In addition, this Rate Schedule 1289 is available to those Customers receiving Service under this Rate Schedule as of April 20, 2018, and those Customers whose applications have been accepted by BC Hydro in writing, prior to and including April 20, 2018, as meeting the criteria of a simple or complex distributed generator as defined in BC Hydro's "Distributed Generation Technical Interconnection Requirements – 100 kW and Below."¶~~

~~"Annual Energy Output" means~~¶

¶

Applicable in All Rate Zones.¶¶

Rate¶

Energy Charge:¶

Charges for the Customer's Net Consumption will be in accordance with the Rate Schedule under which the Customer is receiving Service from BC Hydro.¶

Energy Price:¶

For all Electricity represented by the Generation Account Balance remaining in the Customer's Generation Account at any Anniversary Date, BC Hydro will pay:¶

(a) Customers with an accepted Net Metering Application from April 21, 2018 or later:¶

a price calculated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year.¶

(b) Customers with an accepted Net Metering Application from on or before April 20, 2018: ¶

a transitional Energy Price of 9.99 ¢ per kWh. This transitional Energy Price will expire on April 30, 2024. After April 30, 2024, all Customers receiving Service under this Rate Schedule will be paid the Energy Price described in (a), above.¶

Definitions ¶

1. Anniversary Date ¶

The Anniversary Date is March 1st or such other date chosen by the Customer in the manner described in this Rate Schedule.¶

2. Annual Energy Output ¶

The Annual Energy Output is the calculated annual energy output for a Generating Facility ~~and~~that will be calculated as follows:

Generating Facility's nameplate rating in kilowatts x capacity factor x 365 days x 24 hours, where the capacity factor is:

- 10 per cent for photovoltaic;
- 20 per cent for biogas, thermal and wind;
- 30 per cent for fuel cell; and
- 40 per cent for hydro. ¶

For inverter based Generating Facilities, ~~¶and where~~ the nameplate rating for ~~an~~a Generating Facility is the total capacity of the inverters (AC capacity).¶

3. Annual Load ¶

The Annual Load is the estimated annual Electricity requirements on the Customer's Premises, calculated based on:

(a) ~~"Annual Load" means the~~The total kilowatt hours of ~~e~~Electricity supplied by BC Hydro to the Customer's Point of Delivery based on the Customer's billing data from the 12 consecutive months immediately preceding BC Hydro's receipt of the Customer's ~~application; or~~ Net Metering Application;¶

(b) if 12 consecutive months of billing data is not available, ~~BC Hydro may accept~~ an estimate of the ~~Annual Load~~annual Electricity requirements, supported by the Customer's billing data to the date of the Customer's Net Metering Application and~~/or~~ other relevant Customer information satisfactory to BC Hydro in its sole discretion; and¶

(c) if the Customer provides BC Hydro with evidence of the purchase of new equipment, such as an electric vehicle, for use on the Customer's Premises, BC Hydro may increase the Customer's estimated Annual Load by the estimated amount of Electricity that the new equipment is expected to require, as determined by BC Hydro in its sole discretion.¶

4. DGTIR-100 ¶

DGTIR-100 is BC Hydro's *Distributed Generation Technical Interconnection Requirements – 100 kW and Below*.¶

5. Generation Account ¶

The Generation Account is an account established by BC Hydro for a Customer on the first billing period following the date ~~a~~the Customer commences taking Service under this Rate Schedule.¶

6. Generation Account Balance ¶

The Generation Account Balance is the Electricity represented by credits in a Customer's Generation Account.

7. ~~"~~Generating Facility~~"~~ ¶

Generating Facility for the purposes of this Rate Schedule means a generating facility, including fuel cells and energy recovery generation, that:

(a) ~~1.~~ Utilizes biogas, biomass, geothermal heat, hydro, solar, ocean, wind or other energy resources or technologies defined as a "clean or renewable resource" in the Clean Energy Act (as updated from time to time) to generate ~~e~~Electricity;

(b) ~~2.~~ Has a nameplate rating of not more than 100 kilowatts; and

(c) ~~3.~~ Is owned or leased by the Customer and is located on the same parcel of land as the Customer's Premises for which Service is being provided under any of the Rate Schedules described above, or on an adjacent parcel of land owned or leased by the Customer, and is connected to the same Point of Delivery as the Customer's Premises being served under any of the Rate Schedules described

above,¶ and includes all wiring, protection~~-~~ isolation devices, disconnect switches, and other equipment and facilities on the Customer's side of the Point of Delivery.¶

8. Interconnection Approval¶

   BC Hydro's approval of the interconnection of the Generating Facility to the BC Hydro system and the commencement of operation of the Generating Facility.¶

9. Net Consumption ¶

   Net Consumption is the Net Energy that is positive because BC Hydro supplies more Electricity to the Customer than the Electricity delivered.¶

10. Net Energy ¶

    Net Energy is the difference between the Electricity supplied by BC Hydro to the Customer during the billing period and the Electricity delivered from the Generating Facility to BC Hydro's system during the billing period.¶

11. Net Generation ¶

    Net Generation is the Net Energy that is negative because the Customer delivers more Electricity from the Generating Facility to BC Hydro's system than the Customer receives in Electricity from BC Hydro during the billing period.¶

12. Net Metering Application ¶

    The Net Metering Application is the Customer's application to receive Service under this Rate Schedule, to expand the generating capacity of their Generating Facility, or to modify their Generating Facilty.¶

13. Net Metering Site Acceptance Verification Fee ¶

    The Net Metering Site Acceptance Verification Fee is the fee set out in section 11 (Schedule of Standard Charges) of the Terms and Conditions of the Electric Tariff.¶

Net Metering Application and Interconnection Approval ¶

1. Customers wishing to receive Service under this Rate Schedule must submit a Net Metering Application to BC Hydro. The Customer must not interconnect or commence operation of a Generating Facility before receiving:¶

   (a) BC Hydro's written acceptance of the Net Metering Application, and¶

   (b) Interconnection Approval.¶

2. A Customer receiving Service under this Rate Schedule may change their Anniversary Date in the Net Metering Application or by request to BC Hydro. BC Hydro will accept one request to change the Anniversary Date per Customer.¶

3. BC Hydro will asses the proposed Generating Facility described in the Net Metering Application. Specifically:.¶

   (a) for Generating Facilities with a nameplate rating of less than or equal to five kilowatts, BC Hydro will not assess the Customer's Annual Load or require a Customer to submit load data or load estimates in their Net Metering Application, and¶

   (b) for Generating Facilities with nameplate rating of greater than five kilowatts, the Generating Facility's Annual Energy Output must not exceed 110 per cent of the Annual Load.

4. ~~For clarity, where the Customer leases the Generating Facility from a third party or retains a third party to install, operate and maintain the Generating Facility on its behalf, then as between the Customer and BC Hydro, the Customer will remain responsible for any obligations under all terms and conditions of Service, including applicable Rate Schedules, BC Hydro's DGTIR-100, and other applicable interconnection requirements to the same extent as if the Customer owns, installs, operates and maintains the Generating Facility itself.~~BC Hydro may determine that a site acceptance verification is required. In that case:¶

~~Applicable in All Rate Zones.¶~~

~~Rate **Energy Charge:**¶~~

~~Charges for Net Energy consumed by the Customer will be in accordance with the Rate Schedule under which the Customer is receiving Service from BC Hydro.¶~~

~~**Energy Price:**¶~~

~~For all electricity represented by the Generation Credit Balance remaining in the Customer's Generation Account at any Anniversary Date, BC Hydro will pay 9.99 ¢ per kWh.~~¶

   (a) the Customer will be notified;¶

   (b) BC Hydro will inspect the installation of the Generating Facility and may require the Customer to supply additional information and~~/or~~ provide access to the Customer's Generating Facility to carry out additional inspections, as described in the DGTIR-100 or other interconnection requirements applicable to the Generating Facility, and¶

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(c) the Customer must pay the Net Metering Site Acceptance Verification Fee.¶

5. The Customer will submit a copy of the final inspection report or approval issued by the governmental authority having jurisdiction to inspect and approve the installation, and any additional information that may be requested by BC Hydro. BC Hydro will provide a decision on Interconnection Approval with reasonable promptness following BC Hydro's receipt of any final inspection reports, applicable government approvals and requested information.¶

6. A Customer will begin receiving Service under this Rate Schedule on the date identified in BC Hydro's written Interconnection Approval.¶

7. In BC Hydro's sole discretion, BC Hydro may reject any Net Metering Application where:¶

   (a) BC Hydro considers that the information provided in the Net Metering Application is insufficient or inconsistent with the terms of this Rate Schedule, the DGTIR-100 or other applicable interconnection requirements;¶

   (b) the Customer has submitted false or misleading information to BC Hydro in the Net Metering Application or other information requested by BC Hydro;¶

   (c) the Customer has a prior history of non-compliance with this Rate Schedule; or¶

   (d) BC Hydro's system cannot accommodate the connection of the Customer's Generating Facility due to existing or expected system, safety, financial or technical constraints.¶

8. Where BC Hydro has accepted the Customer's Net Metering Application, this acceptance will expire 18 months from the date BC Hydro accepted the Customer's Net Metering Application if the Customer has not received Interconnection Approval. The Customer may then submit a new Net Metering Application.¶

Metering

1. ~~Metering Inflows of~~ Electricity supplied from the BC Hydro system to the Customer, and ~~outflows of electricity~~ Electricity delivered from the Customer's Generating Facility to the BC Hydro system, will ~~normally~~ be determined by means of a ~~single meter capable of measuring flows of electricity in both directions~~Smart Meter or Radio-Off Meter.¶

~~2. Alternatively, if BC Hydro determines that flows of electricity in both directions cannot be reliably determined by a single meter, or that dual metering will be~~

~~more cost-effective, BC Hydro may require that separate meters be installed to measure inflows and outflows of electricity.~~

2. ~~3.~~ The Customer will install, at ~~its~~their cost, the meter base and any wiring, poles, protection-isolation devices, disconnect switches, and other equipment and facilities on the Customer's side of the Point of Delivery as required under ~~BC Hydro's "Distributed Generation Technical Interconnection Requirements – 100 kW and Below" (**DGTIR-100**)~~DGTIR-100 or other interconnection requirements applicable to the Generating Facility. BC Hydro will supply and install the Metering Equipment and make the final connections.¶

~~4. Any Metering Equipment required for purposes of this Rate Schedule will be in addition to any meters with demand measurement capability (if applicable) required under the Rate Schedule under which the Customer is receiving Service from BC Hydro.~~

Billing ¶

Determination of the Customer's bill will be as follows:

1. Meter reading and billing frequency will be in accordance with the Rate Schedule under which the Customer is receiving Service from BC Hydro.

2. At the end of each billing period BC Hydro will determine the ~~"~~Net Energy~~"~~ applicable for that billing period~~, defined as the difference between the Electricity supplied by BC Hydro to the Customer during the billing period and the electricity delivered from the Generating Facility to BC Hydro's system during the billing period~~.

3. If ~~Net Energy is positive, BC Hydro will bill the Customer for the Net Energy consumed by the Customer during the billing period, subject to the application of any generation credits then in the Customer's Generation Account, as described in item 5 below.~~there is Net Consumption, then BC Hydro will apply any credits in the Generation Account Balance to the Net Consumption until the Net Consumption amount is reduced to zero. If the Customer's Generation Account Balance has insufficient credits to reduce the Net Consumption to zero, BC Hydro will bill the Customer for the remaining Net Consumption.

4. ~~If~~ there is Net ~~Energy is negative~~Generation, BC Hydro will credit the ~~Net Energy amount to the~~ Customer's Generation Account~~, as described in item 5 below, and~~ with the Net Generation.¶

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COMMISSION SECRETARY

5. Every billing period, BC Hydro will bill the Customer ~~only~~ for the Basic Charge and Demand Charge (if applicable) under the Rate Schedule under which the Customer is receiving Service from BC Hydro.¶~~5. Beginning with the first billing period following the date a Customer commences taking Service under this Rate Schedule, BC Hydro will establish a Generation Account for that Customer. If Net Energy is negative for that billing period, BC Hydro will credit the Net Energy amount to the Customer's Generation Account. BC Hydro will likewise follow this procedure for successive billing periods, except that if for any billing period Net Energy is positive, any credit balance then in the Customer's Generation Account will be applied to the positive Net Energy amount for that billing period until the Net Energy amount is reduced to zero.~~

6. BC Hydro will follow this procedure, and will notify the Customer of amounts credited and debited to the Customer's Generation Account and of ~~the remaining credit balance (if any) in the~~any Generation Account~~,~~ Balance on the bill rendered by BC Hydro for each billing period, until the ~~end of the sixth billing period, in the case of Customers being billed bi-monthly, or until the end of the twelfth billing period, in the case of Customers being billed monthly (Anniversary Date)~~Anniversary Date.~~-~~¶

7. At the Anniversary Date, ~~BC Hydro will credit any negative Net Energy amount for that billing period to the Generation Account, or apply any credits in the Generation Account to any positive Net Energy amount for that billing period, in the same manner as for prior billing periods.¶7. If any credit balance ("Generation Account Balance") remains in the Generation Account following the procedures set forth in item 6~~if a Customer has a Generation Account Balance, BC Hydro will be deemed to have purchased that amount of ~~e~~Electricity from the Customer, and will be obliged to pay the Customer for that ~~e~~Electricity at the Energy Price ~~determined in accordance with the Rate provision of this Rate Schedule,~~ and the Generation Account Balance will revert to zero.

8. The procedures ~~set forth~~described above will apply in each succeeding 12~~-~~ month period and at each succeeding Anniversary Date for ~~so~~as long as the Customer continues to take Service under this Rate Schedule. ¶

9. If Service under this Rate Schedule is Terminated ~~prior to any Anniversary Date~~, the billing procedures ~~set forth~~described above will be applied as of the date of Termination instead of the Anniversary Date. In that event, BC Hydro will pay the amount owing in respect of any ~~credit balance in the~~ Generation Account Balance to the Customer within

45 days of the date of Termination, subject to any rights of deduction or set-off BC Hydro may have.

10. ~~9.~~ In no case will any ~~credit balance in the~~ Generation Account Balance have any cash value or be convertible to cash, except as provided above. ~~If the amount determined to be owing to the Customer at any Anniversary Date as set forth in item 7 above is equal to or less than the charges BC Hydro anticipates are likely to be billed to the Customer during the six month period following the Anniversary Date, BC Hydro may withhold the amount owing and credit it against charges owing by the Customer for future billing periods. If the amount determined to be owing is greater than the charges BC Hydro anticipates are likely to be billed to the Customer during the six month period following the Anniversary Date, BC Hydro will pay the amount owing to the Customer within 45 days of the Anniversary Date.~~

~~1.~~ Special Conditions ¶

1. Subject to the provisions of Rate Schedule 1289, any other applicable Rate Schedule(s) under which the Customer is from time to time receiving Service from BC Hydro and other applicable provisions of BC Hydro's Electric Tariff, BC Hydro will supply Electricity to, and accept delivery of ~~e~~Electricity from, the Customer at the Point of Delivery.¶

~~2. BC Hydro will act with reasonable promptness to perform any inspections and/or give any approvals that it is authorized or required to give under the terms and conditions of Service, and will not unreasonably withhold or delay the giving of its consent in any case where its consent is required.¶~~

~~3. To receive Service under this Rate Schedule, the Customer must submit the required application. For Generating Facilities having a rated generating capacity of greater than five kilowatts, and for which BC Hydro determines that a site acceptance verification is required, the Customer must also pay the Net Metering Site Acceptance Verification Fee as set out in section 11 (Schedule of Standard Charges) of the Terms and Conditions of the Electric Tariff.~~

2. ~~4. In addition, a~~A Customer who (a) utilizes a synchronous generator, (b) takes Service at a Primary Voltage and/or (c) utilizes a Generating Facility with a nameplate rating greater than 50 kilowatts, will pay all associated incremental costs for connection of the Customer's Generat~~or~~ing Facility as set out in Terms and Conditions section 9.7 (Generating Facility Connections (Distributed Generation)).¶

~~5. The Customer must not commence parallel operation of its Generating Facility until written approval has been provided to it by BC Hydro. Written approval will normally be provided by BC Hydro within 14 days following BC Hydro's receipt of a copy of the final inspection report or approval issued by the governmental authority having jurisdiction to inspect and approve the installation. Where Customer has been notified that inspection and acceptance by BC Hydro's Field Services – Protection and Control Department will also be required before the Generating Facility will be accepted for parallel operation, BC Hydro's approval will normally be provided within 14 days following the date of inspection and acceptance. BC Hydro may require the Customer to supply additional information and/or provide access to the Customer's Generating Facility to carry out additional inspections, as set forth in BC Hydro's DGTIR-100 or other interconnection requirements applicable to the Generating Facility.~~

3. ~~6.~~ The Customer will design, install, operate and maintain the Generating Facility, and all ancillary facilities on the Customer's side of the Point of Delivery in accordance with all governmental laws and regulations from time to time applicable, and BC Hydro's DGTIR-100 or other interconnection requirements applicable to the Generating Facility. Customers will obtain and maintain any required governmental authorizations and/or permits required for the installation and operation of the Generating Facility. The Generating Facility will meet all applicable safety and performance standards, including the codes and standards identified in BC Hydro's DGTIR-100 or other interconnection requirements applicable to the Generating Facility. The Customer will be responsible for the safe and proper operations of the Generating Facility consistent with the requirements of the regulations of the *Safety Standards Act*. BC Hydro, acting reasonably, may from time to time prescribe additional requirements which in its judgment are required for the safety of its system.

4. ~~7. The Customer will at all times operate the Generating Facility in accordance with applicable governmental standards and requirements, and any manufacturer's instructions, and will further comply with BC Hydro standards and requirements from time to time in effect relating to parallel operation of independent net metering installations with its system.~~ The Customer will promptly notify BC Hydro of any malfunction or breakdown of the Generating Facility that could constitute a safety hazard or reasonably be expected to cause disturbance or damage to BC Hydro's system.¶

5. Where the Customer leases the Generating Facility from a third party or retains a third party to install, operate and maintain the Generating Facility on its behalf, then as between the Customer and BC Hydro, the Customer will remain responsible for any

obligations under all terms and conditions of Service, including applicable Rate Schedules, ~~BC Hydro's~~ DGTIR-100, and other applicable interconnection requirements to the same extent as if the Customer owns, installs, operates and maintains the Generating Facility itself.

6. ~~8.~~ The Customer will not operate the Generati~~o~~ng Facility so as to generate ~~e~~Electricity at a rate greater than 110~~%~~ per cent of the nameplate rating of the Generating Facility, and will not add to or modify the Generating Facility without ~~the prior written consent of~~ Interconnection Approval.¶

7. BC Hydro may suspend or Terminate the Customer's Service under this Rate Schedule if the Customer fails to comply with this Rate Schedule.

8. ~~9.~~ Service under this Rate Schedule is conditional on the continuance of Service to the Customer under any of the Rate Schedules described under the Availability section above, and is further conditional on the Customer being billed monthly or bi-monthly under BC Hydro's regular billing plan. ¶

9. If Service under the applicable Rate Schedule is suspended or Terminated for any reason, or if the Customer ceases to be billed under BC Hydro's regular billing plan, Service under this Rate Schedule will be deemed to have automatically been suspended or Terminated concurrent with suspension or Termination of Service under the applicable Rate Schedule, or change to a different billing plan, as applicable.

10. ~~—~~If Service under this Rate Schedule is suspended or Terminated for any reason, ~~and~~ BC Hydro ~~considers it necessary in its discretion for the~~may requirethe Customer~~'s Generating Facility to be re-inspected and approved~~ to obtain a new Interconnection Approval prior to resuming ~~parallel operation with BC Hydro's system, the Customer will pay the costs that BC Hydro estimates that it will incur for the re-inspection and approval~~operation of the Generating Facility.¶

~~11. If the Customer voluntarily Terminates Service under this Rate Schedule, the Customer will not be eligible to again take Service under this Rate Schedule for a period of 12 months from the date of Termination, unless BC Hydro otherwise consents.~~

11. ~~12.~~ BC Hydro will have the right to require the Customer to interrupt (including, if so specified by BC Hydro, by means of physical disconnection or lock-out~~,~~) or reduce the output of ~~its~~their Generating Facility whenever:

(a) ~~—~~BC Hydro deems such action necessary, in its sole judgment, to permit BC Hydro to construct, install, maintain, repair, replace, remove, investigate, or inspect any of its equipment or any part of its electric system; or

(b) ~~—~~BC Hydro determines in its sole judgment, that curtailment, interruption, or reduction of the Customer's electrical generation is otherwise necessary due to emergencies, forced outages, force majeure, safety hazards, possible damage to or disturbance of its electric system, or compliance with prudent electrical practices.

12. ~~13.~~ ~~——~~Notwithstanding any other provision of this Rate Schedule, in any of the events or circumstances mentioned in Special Condition No. 1~~2~~0, BC Hydro will have the right:

(a) ~~————~~To require the Customer to immediately disconnect the Generating Facility from BC Hydro's system; and

(b) To itself immediately disconnect the Generating Facility from the BC Hydro system if the Customer is either not available or fails to act, and such disconnection is deemed necessary by BC Hydro.

13. ~~14.~~ Whenever feasible BC Hydro will give the Customer reasonable advance notice that interruption or reduction in deliveries may be required, or that disconnection of the Generating Facility from BC Hydro's system may be required, but the failure of BC Hydro to give such notice will not invalidate any action taken by BC Hydro under any of the Special Conditions in Rate Schedule 1289.

14. ~~15.~~ If BC Hydro in its discretion deems it necessary to require the Customer to interrupt or disconnect ~~its~~the Generating Facility from BC Hydro's system, or for BC Hydro to itself effect the interruption or disconnection of the Generating Facility from its system, as provided in Rate Schedule 1289, or such interruption occurs as a result of suspension or Termination of Service to the Customer in accordance the provisions of Rate Schedule 1289, then except to the extent caused by the wilful misconduct or gross negligence of BC Hydro, its servants or agents, BC Hydro and its servants or agents will not be liable to the Customer for any loss or damage whatsoever resulting from the exercise of such rights by BC Hydro.

15. ~~16.~~ BC Hydro will have the right to enter the Customer's Premises at all reasonable hours, without notice to the Customer, to inspect the Customer's protective devices and read, inspect and/or test meters, or to disconnect the Generating Facility. Nothing in ~~the foregoing terms and conditions~~this Rate Schedule will limit or ~~otherwise~~

affect any rights of entry to the Customer's Premises that BC Hydro may have under any other sections of the Electric Tariff or any other agreement with the Customer.¶

Rate Rider ¶

The Deferral Account Rate Rider as set out in Rate Schedule 1901 applies to all charges payable under this Rate Schedule, before taxes and levies.

Description of Miscellaneous Tariff Changes

Unless otherwise stated, the proposed changes to RS 1289 described below as “minor amendments” are intended to improve clarity.

Section/Paragraph	Description of Proposed Change to RS 1289
Availability	
Paragraphs 1-4	Minor amendments.
Paragraph 5	Deleted. No longer required.
Paragraph 6	Moved to Definitions.
Paragraph 7	Moved to Definitions.
Paragraph 8 (including subparagraphs 1-4)	Moved to Definitions.
Applicable In	
Rate	
Paragraph 1	Minor amendment.
Paragraph 2	Deleted
NEW Paragraph 2	Replaced paragraph 2 with new Energy Price including method of calculating annual price and transitional Energy Price.
NEW Definitions	
NEW Paragraph 1 - Anniversary Date	New definition. Replaces description of “Anniversary Date” in Billing, paragraph 6. See Chapter 3 of the Application.
NEW Paragraph 2 - Annual Energy Output	Minor amendment.
NEW Paragraph 3 - Annual Load	Definition replaces interim definition of Annual Load on Page 6-2. See Chapter 2 of the Application
NEW Paragraph 4 - DGTIR-100	Definition moved from Metering paragraph 3.
NEW Paragraph 5 - Generation Account	New definition.

NEW Paragraph 6 - Generation Account Balance	Definition moved from paragraph 7 of Billing and restated.
NEW Paragraph 7 - Generating Facility	Minor amendments.
NEW Paragraph 8 - Interconnection Approval	New definition.
NEW Paragraph 9 - Net Consumption	New definition. Currently described in RS 1289 as negative Net Energy.
NEW Paragraph 10 - Net Energy	New definition replaces definition in Billing paragraph 2.
NEW Paragraph 11 - Net Generation	New definition. Currently described in RS 1289 as positive Net Energy.
NEW Paragraph 12 - Net Metering Application	New definition.
NEW Paragraph 13 - Net Metering Site Acceptance Verification Fee	New definition of existing term in RS 1289.
NEW Net Metering Application and Interconnection Approval	
NEW Paragraph 1	
NEW Paragraph 2	See Chapter 3 of the Application.
NEW Paragraph 3	See section 2.7 of the Application. Replaces interim amendments approved by BCUC Order G-100-18.
NEW Paragraphs 4 and 5	Replaces Special Conditions paragraphs 3 and 5.
NEW Paragraph 6	
NEW Paragraph 7	See section 5.3 of the Application.
NEW Paragraph 8	See section 5.3 of the Application.
Metering	
Paragraph 1	See section 5.2 of the Application.

Paragraph 2	Deleted. No longer required.
Paragraph 3	Definition of “DGTIR-10” moved to definitions section.
Paragraph 4	Deleted. No longer required.
Billing	
Paragraph 1	
Paragraph 2	Definition of “Net Energy” moved to definitions section.
Paragraph 3	Changes to incorporate new definitions.
Paragraph 4	Changes to incorporate new definitions. Basic Charge and Demand Charge language moved to paragraph 5.
NEW Paragraph 5	Demand Charge and Basic Charge language inserted. Redundant language deleted as process is reflected in paragraph 3.
Paragraph 5	Minor amendments. Renumbered as paragraph 6.
Paragraph 6	Minor amendments to reflect definitions. Renumbered as paragraph 7.
Paragraph 7	Minor amendments. Renumbered as paragraph 8.
Paragraph 8	Minor amendments. Renumbered as paragraph 9.
Paragraph 9	Deletes language regarding BC Hydro withholding of Surplus Energy Payments owing as this does not reflect BC Hydro’s current practice and may cause confusion for NM customers. Renumbered as paragraph 10.
Special Conditions	
Paragraph 1	Minor amendments
Paragraph 2	Deleted. Concepts reflected in Net Metering Application and Interconnection Approval section.
Paragraph 3	Deleted. Concepts reflected in Net Metering Application and Interconnection Approval section.
Paragraph 4	Minor amendments. Renumbered as paragraph 2.
Paragraph 5	Deleted. Concepts reflected in Net Metering Application and Interconnection Approval section and simplified.
Paragraph 6	Minor amendments. Renumbered as paragraph 3.

Paragraph 7	Redundant language deleted. Renumbered as paragraph 4.
NEW Paragraph 5	Replaces paragraph 4 of “Generating Facility” on Page 6-3.
Paragraph 8	Minor amendment. Renumbered as paragraph 6.
NEW Paragraph 7	Adds right to Terminate Service under RS 1289 for failure to comply with the Rate Schedule.
Paragraph 9	Renumbered as paragraph 8. Second half of paragraph moved to new paragraph 9.
NEW Paragraph 9	
Paragraph 10	Minor amendments.
Paragraph 11	Deleted. No longer required.
Paragraph 12	Renumbered as paragraph 11.
Paragraph 13	Renumbered as paragraph 12.
Paragraph 14	Renumbered as paragraph 13
Paragraph 15	Renumbered as Paragraph 14.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.2 Please explain the Net Metering Site Acceptance Verification Fee. Is it a new fee, or a new name for an existing fee? What is the rationale for the fee? What is the basis for the size of the fee?

RESPONSE:

The Net Metering Site Acceptance Verification Fee has been in place since 2004 and has not changed. The fee is based on actual costs incurred by BC Hydro, to a maximum of $600, for an on-site inspection test of distributed generating facilities with capacity above 5 kW. The costs include:

- **Labour costs for a BC Hydro Protection and Control Technician to visit the customer site, complete the acceptance check, and return to the office;**
- **Vehicle related costs; and**
- **Administration costs.**

The BCUC approved the Net Metering Site Acceptance Verification Fee by Order No. G-26-04.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.3 Please confirm that the capacity factors for calculating Annual Energy Output are moved but not changed.

RESPONSE:

Confirmed.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.3 Please confirm that the capacity factors for calculating Annual Energy Output are moved but not changed.

1.15.3.1 When were the capacity factors introduced? What was their original purpose? Has that purpose changed with the 2018 interim approval of the ban on new intentional annual NEG?

RESPONSE:

The original purpose of the capacity factors was to estimate annual energy production for different generation sources.

As discussed in BC Hydro's response to BCUC IR 1.6.1:

- **The capacity factors are based on research completed for BC Hydro's 2005 Resource Options Report and were included in the 2008 Net Metering Re-pricing Application, the Fiscal 2011 Net Metering Evaluation Report and Application to Amend Rate Schedule 1289 and the 2018 Amendment Application.**
- **The purpose of the capacity factors used in the Annual Energy Output calculation is to provide a simple and transparent calculation of Annual Energy Output for all customers taking service under Rate Schedule 1289.**

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.3 Please confirm that the capacity factors for calculating Annual Energy Output are moved but not changed.

1.15.3.2 How accurate are the capacity factors in the Tariff? Please confirm, or otherwise explain, that if the capacity factor overestimates the actual performance of the Generating Facility then the approved maximum size of a Generation Facility would be below the size that would meet the interim (and proposed permanent) intention to bar new intentional annual NEG (subject to the proposed 110% allowance for Generation Facilities greater than 5 kW).

RESPONSE:

Generally, the capacity factors in the tariff underestimate the actual Annual Energy Output of a customer's Generating Facility.

Please refer to BC Hydro's response to BCUC IR 1.6.2 where we explain that using a fixed capacity factor supports a consistent and transparent calculation of Annual Energy Output and that the actual capacity factors will vary based on site conditions.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.3 Please confirm that the capacity factors for calculating Annual Energy Output are moved but not changed.

1.15.3.3 Is an applicant allowed to provide evidence that their particular Generating Facility will have an actual capacity factor below the deemed capacity factors in the Tariff?

RESPONSE:

For the purpose of calculating the estimated Annual Energy Output, Rate Schedule 1289 does not allow for the use of a capacity factor other than the fixed capacity factors provided in the tariff.

Please refer to BC Hydro's response to BCUC IR 1.6.2 where we explain that using a fixed capacity factor for each generation type supports the objective of offering a streamlined and transparent process for participation.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.4 Regarding the definition of Annual Load, is the addition of paragraph (c) regarding purchase of new equipment such as an electric vehicle the only proposed change?

RESPONSE:

No. The following provides a blackline of the differences between the definition of Annual Load approved on an interim basis, effective April 20, 2018, and the definition proposed in the Application.

The un-amended text is shown in black, new text is underlined, and deleted text is strikethrough.

3. Annual Load

The Annual Load is the estimated annual Electricity requirements on the Customer's Premises, calculated based on:

(a) ~~"Annual Load" means the~~The total kilowatt hours of e~~E~~lectricity supplied by BC Hydro to the Customer's Point of Delivery based on the Customer's billing data from the 12 consecutive months immediately preceding BC Hydro's receipt of the Customer's ~~application; or~~ Net Metering Application;

(b) if 12 consecutive months of billing data is not available, ~~BC Hydro may accept~~ an estimate of the ~~Annual Load~~annual Electricity requirements, supported by the Customer's billing data to the date of the Customer's Net Metering Application and~~/or~~ other relevant Customer information satisfactory to BC Hydro in its sole discretion; and

(c) if the Customer provides BC Hydro with evidence of the purchase of new equipment, such as an electric vehicle, for use on the Customer's Premises, BC Hydro may increase the Customer's estimated Annual Load by the estimated amount of Electricity that the new equipment is expected to require, as determined by BC Hydro in its sole discretion.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.4 Regarding the definition of Annual Load, is the addition of paragraph (c) regarding purchase of new equipment such as an electric vehicle the only proposed change?

1.15.4.1 Please confirm, or otherwise explain, that the effect of paragraph (c) of the definition of Annual Load is that after a NM participant purchases an electric vehicle their Annual Load could be increased prospectively (without waiting for 12 months of incremental load due to the EV) and the participant could increase the size of their Generating Facility at that time, but that the only proposed accommodation in terms of the maximum size of the Generating Facility for an NM participant or applicant who intends to purchase an EV in the future is the proposed 110% factor in proposed section 3(b) for BC Hydro's assessment of a NM application where the Generating Facility has a nameplate capacity of greater than 5 kW.

RESPONSE:

Confirmed. For further discussion, please refer to BC Hydro's response to BCUC IR 1.7.3.

In responding to this question, BC Hydro noticed that the response to BCUC IR 1.7.3 incorrectly refers to subsection (b) of paragraph 3 of the Definitions section. The correct reference is to subsection (c) of paragraph 3 of the Definitions section.

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.5 Please providing a table explaining both the *status quo* and the proposed tariff provisions regarding review and acceptance of an application for participation in the Net Metering Program [pdf p.67 and p.81].

RESPONSE:

The table below outlines the revisions proposed to Rate Schedule 1289 with regards to the review and acceptance of an application under the Program.

For further details, please also refer to Attachment 1 of BC Hydro's response to BCSEA IR 1.15.1.

New definition.	**12. Net Metering Application** **The Net Metering Application is the Customer's application to receive Service under this Rate Schedule, to expand the generating capacity of their Generating Facility, or to modify their Generating Facility.**
	Net Metering Application and Interconnection Approval (New section)
New paragraph.	**1. Customers wishing to receive Service under this Rate Schedule must submit a Net Metering Application to BC Hydro. The Customer must not interconnect or commence operation of a Generating Facility before receiving:** **(a) BC Hydro's written acceptance of the Net Metering Application, and** **(b) Interconnection Approval.**
New paragraph as described in Chapter 3 of the Application.	**2. A Customer receiving Service under this Rate Schedule may change their Anniversary Date in the Net Metering Application or by request to BC Hydro. BC Hydro will accept one request to change the Anniversary Date per Customer.**

New paragraph as discussed in section 2.7 of the Application.	**3. BC Hydro will assess the proposed Generating Facility described in the Net Metering Application. Specifically:** **(a) for Generating Facilities with a nameplate rating of less than or equal to five kilowatts, BC Hydro will not assess the Customer's Annual Load or require a Customer to submit load data or load estimates in their Net Metering Application, and** **(b) for Generating Facilities with nameplate rating of greater than five kilowatts, the Generating Facility's Annual Energy Output must not exceed 110 per cent of the Annual Load.**
New paragraphs. These proposed paragraphs 4 and 5 will replace current Special Conditions, paragraphs 3 and 5 regarding site acceptance verification and interconnection.	**4. BC Hydro may determine that a site acceptance verification is required. In that case:** **(a) the Customer will be notified;** **(b) BC Hydro will inspect the installation of the Generating Facility and may require the Customer to supply additional information and provide access to the Customer's Generating Facility to carry out additional inspections, as described in the DGTIR-100 or other interconnection requirements applicable to the Generating Facility, and** **(c) the Customer must pay the Net Metering Site Acceptance Verification Fee.** **5. The Customer will submit a copy of the final inspection report or approval issued by the governmental authority having jurisdiction to inspect and approve the installation, and any additional information that may be requested by BC Hydro. BC Hydro will provide a decision on Interconnection Approval with reasonable promptness following BC Hydro's receipt of any final inspection reports, applicable government approvals and requested information.**
New paragraph	**6. A Customer will begin receiving Service under this Rate Schedule on the date identified in BC Hydro's written Interconnection Approval.**
New paragraph as described in section 5.3 of the Application.	**7. In BC Hydro's sole discretion, BC Hydro may reject any Net Metering Application where:** **(a) BC Hydro considers that the information provided in the Net Metering Application is insufficient or inconsistent with the terms of this Rate Schedule, the DGTIR-100 or other applicable interconnection requirements;** **(b) the Customer has submitted false or misleading information to BC Hydro in the Net Metering Application or other information requested by BC Hydro;** **(c) the Customer has a prior history of non-compliance with this Rate Schedule; or** **(d) BC Hydro's system cannot accommodate the connection of the Customer's Generating Facility due to existing or expected system, safety, financial or technical constraints.**

New paragraph as described in section 5.3 of the Application.	**8. Where BC Hydro has accepted the Customer's Net Metering Application, this acceptance will expire 18 months from the date BC Hydro accepted the Customer's Net Metering Application if the Customer has not received Interconnection Approval. The Customer may then submit a new Net Metering Application.**

15.0 F. Tariff Pages

Topic: Proposed revisions to tariff pages
Reference: Application, Exhibit B-1, Appendix B, Rate Schedule 1289-Revision 2

It is difficult to identify the proposed revisions to RS 1289 because the Black-lined version shows existing text that has been moved as having been deleted in the old location and added in the new location.

1.15.5 Please providing a table explaining both the *status quo* and the proposed tariff provisions regarding review and acceptance of an application for participation in the Net Metering Program [pdf p.67 and p.81].

1.15.5.1 Are the requirements in this section of the tariff applicable after BC Hydro has accepted an application and the Generating Facility has been installed? What happens if a NM customer's load declines substantially after their Generating Facility has been accepted and installed?

RESPONSE:

As stated in BC Hydro's response to BCUC IR 1.7.1, the requirements are assessed upon enrolment and upon an application by the customer to expand the generating capacity of their Generating Facility or modify their Generating Facility.

As stated in BC Hydro's response to BCUC IR 1.7.4, the proposed tariff does not allow BC Hydro to take any action if an existing customer's energy consumption decreases.

16.0 F. Tariff Pages

Topic: Interconnection agreement requirement
Reference: Application, Exhibit B-1, s.5.1, "5.1 Clarification Would Help Prevent Unsafe Connections"; Appendix F, Net Metering Evaluation Report No.4, s.9.1.6, "Unauthorized Generator Connections"; Appendix B, Revised Tariff Pages Clean and Black-Lined

BC Hydro states on pages 41-42 of the Application:

"As explained in section 9.1.6 of the Evaluation Report, some BC Hydro customers have installed generation at their residences or businesses without BC Hydro's knowledge or approval. This unauthorized generation may pose a safety hazard to BC Hydro employees and other customers, and can negatively impact power quality and reliability."

BC Hydro is proposing an amendment to clarify that generation connections are not permitted except through an interconnection agreement or through the Net Metering Program.

1.16.1 Please identify the amendment in the Tariff Pages that clarifies that generation connections are not permitted except through an interconnection agreement or through the Net Metering Program.

RESPONSE:

BC Hydro clarifies that the proposed amendment to Rate Schedule 1289 is only with respect to customers in the Program.

Please refer to paragraph 1 of the Net Metering Application and Interconnection Approval section of the proposed Rate Schedule 1289, provided as Appendix B of the Application, which states that:

> **Customers wishing to receive Service under this Rate Schedule must submit a Net Metering Application to BC Hydro. The Customer must not interconnect or commence operation of a Generating Facility before receiving:**
>
> **(a) BC Hydro's written acceptance of the Net Metering Application, and**
>
> **(b) Interconnection Approval.**

Please also refer to BC Hydro's response to BCSEA IR 1.16.3 where we explain when a customer requires authorization from BC Hydro to install a generation facility.

16.0 F. Tariff Pages

Topic: Interconnection agreement requirement
Reference: Application, Exhibit B-1, s.5.1, "5.1 Clarification Would Help Prevent Unsafe Connections"; Appendix F, Net Metering Evaluation Report No.4, s.9.1.6, "Unauthorized Generator Connections"; Appendix B, Revised Tariff Pages Clean and Black-Lined

BC Hydro states on pages 41-42 of the Application:

"As explained in section 9.1.6 of the Evaluation Report, some BC Hydro customers have installed generation at their residences or businesses without BC Hydro's knowledge or approval. This unauthorized generation may pose a safety hazard to BC Hydro employees and other customers, and can negatively impact power quality and reliability."

BC Hydro is proposing an amendment to clarify that generation connections are not permitted except through an interconnection agreement or through the Net Metering Program.

1.16.2 For clarity, please confirm, or otherwise explain, that unauthorized connection of generation is a topic that extends beyond the Net Metering Program as such. (E.g., a customer making an unauthorized connection of generation may have no intention of participating in the NM Program.)

RESPONSE:

Confirmed.

16.0 F. Tariff Pages

Topic: Interconnection agreement requirement
Reference: Application, Exhibit B-1, s.5.1, "5.1 Clarification Would Help Prevent Unsafe Connections"; Appendix F, Net Metering Evaluation Report No.4, s.9.1.6, "Unauthorized Generator Connections"; Appendix B, Revised Tariff Pages Clean and Black-Lined

BC Hydro states on pages 41-42 of the Application:

"As explained in section 9.1.6 of the Evaluation Report, some BC Hydro customers have installed generation at their residences or businesses without BC Hydro's knowledge or approval. This unauthorized generation may pose a safety hazard to BC Hydro employees and other customers, and can negatively impact power quality and reliability."

BC Hydro is proposing an amendment to clarify that generation connections are not permitted except through an interconnection agreement or through the Net Metering Program.

1.16.3 Please briefly describe the circumstances in which a customer requires authorization from BC Hydro to install their own generation behind their meter with no intention to provide power to the BC Hydro system.

RESPONSE:

All of BC Hydro's distribution connected customers require authorization from BC Hydro before connecting an electricity generator to BC Hydro's distribution system, regardless of whether the customer wishes to participate in the Program or supply electricity to BC Hydro. Section 84 of the Canadian Electrical Code (CSA C22.1) applies to the installation of generation at a customer site that is interconnected to a utility system (i.e., supply authority system). Rule 84-00 states that "*The interconnection arrangements shall be in accordance with the requirements of the supply authority*" which, for BC Hydro, means that BC Hydro's authorization is required for generator interconnection.

For example, if a customer wishes to connect an electricity generator to their remote, off-grid cabin that is located far from utility lines, the customer does not require BC Hydro's authorization to connect. If, on the other hand, a customer receives electricity from BC Hydro and wishes to install an electricity generator that will connect to their service and operate in parallel, the generator will be connected to BC Hydro's system and must be authorized.

17.0 G. Other topics

Topic: Customer communication and education
Reference: Application, Exhibit B-1, Appendix F, Net Metering Evaluation Report No. 4, pdf p.183

"While we continue our efforts to highlight and promote the Net Metering program, we understand there is still more that could be done. Based on feedback from our survey, BC Hydro is considering three further actions:

- Host or participate in more workshops, webinars, and community events;
- Periodically include advertisement of the Net Metering program on BC Hydro bill for all eligible customers; and
- Continue to work with municipalities and local governments to provide support and education on the benefits of net metering.

1.17.1 What is the current status of BC Hydro's implementation of further efforts to highlight and promote the Net Metering program?

RESPONSE:

BC Hydro continues to promote the Program on its external website and work with customers interested in the Program. As shown in BC Hydro's response to BCUC IR 1.3.5, the Program has experienced considerable growth over the past five years.

18.0 G. Other topics

Topic: Jurisdictional review
Reference: Application, Exhibit B-1, Jurisdictional Review, Appendix G, Table G-1 Jurisdictional Review Findings

1.18.1 Regarding Epcor, please clarify:

1.18.1.1 Does the description mean that Annual Energy Output must not exceed Annual Load?

RESPONSE:

EPCOR (as well as Hydro Quebec) require the Annual Energy Output to match the Annual Load, on an estimated basis. For customers that meet this requirement, actual Energy Output may exceed actual Annual Load from time to time.

18.0 G. Other topics

Topic: Jurisdictional review
Reference: Application, Exhibit B-1, Jurisdictional Review, Appendix G, Table G-1 Jurisdictional Review Findings

1.18.1 Regarding Epcor, please clarify:

1.18.1.2 Does Epcor have monthly billing?

RESPONSE:

The information that BC Hydro collected with regards to EPCOR, through its Jurisdictional Review, was based on publicly available information only and did not include the details requested in the question.

18.0 G. Other topics

Topic: Jurisdictional review
Reference: Application, Exhibit B-1, Jurisdictional Review, Appendix G, Table G-1 Jurisdictional Review Findings

1.18.1 Regarding Epcor, please clarify:

1.18.1.3 On a given bill, does Epcor show a charge for current period gross energy (if any) to the customer and a payment (to the NM customer) for net surplus (if any) to the utility in the preceding period?

RESPONSE:

The information that BC Hydro collected with regards to EPCOR, through its Jurisdictional Review, was based on publicly available information only and did not include the details requested in the question.

18.0 G. Other topics

Topic: Jurisdictional review
Reference: Application, Exhibit B-1, Jurisdictional Review, Appendix G, Table G-1 Jurisdictional Review Findings

1.18.1 Regarding Epcor, please clarify:

1.18.1.4 How does Epcor implement the principle that "Annual Energy Output must match (or not exceed) Annual Load", (a) at the new application for NM participation stage, and (b) where an existing NM customer produces net annual surplus (for whatever reason)?

RESPONSE:

The information that BC Hydro collected with regards to EPCOR, through its Jurisdictional Review, was based on publicly available information only and did not include the details requested in the question.

18.0 G. Other topics

Topic: Jurisdictional review
Reference: Application, Exhibit B-1, Jurisdictional Review, Appendix G, Table G-1 Jurisdictional Review Findings

1.18.2 Regarding Hydro One, please clarify:

1.18.2.1 Does the existence of a Generation Account Balance mean that Hydro One provides a credit in kWh for net excess supply to the utility in the preceding month (or a billing period)?

RESPONSE:

HydroOne allows excess generation credits to carry over for 12 months. If a credit has not been applied against the customer's consumption after this period, it expires.

No payment is provided for any credits that have not been used after 12 months (i.e., the Anniversary Date for a credit is one year after the month in which it was generated).

For example, a credit earned in June of one year will expire in June of the following year, with no payment provided, if it has not been applied against the customer's consumption before that time.

18.0 G. Other topics

Topic: Jurisdictional review
Reference: Application, Exhibit B-1, Jurisdictional Review, Appendix G, Table G-1 Jurisdictional Review Findings

1.18.2 Regarding Hydro One, please clarify:

1.18.2.2 Was does it mean that the Anniversary Date is "Based on the month that the Generation Account Balance accumulates"? Is this a rolling concept? Does "No Surplus Energy Payment" mean that kWh credits in the Generation Account 'disappear'?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.18.2.1.

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.1 Please explain how the Net Metering Program currently handles situations in which a customer has multiple meters on the same account, or multiple accounts.

RESPONSE:

A customer applying to the Program is required to provide an account number and the applicable meter number associated with the customer's Premises at which the proposed Generating Facility is to connect. A customer cannot aggregate multiple accounts under the Program.

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.1 Please explain how the Net Metering Program currently handles situations in which a customer has multiple meters on the same account, or multiple accounts.

1.19.1.1 Can a NM participant's Energy Credit can be applied only to the customer's invoice for consumption at the same meter behind which the customer's generation is located?

RESPONSE:

Yes. For further information, please refer to BC Hydro's response to BCSEA IR 1.19.1.

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.1 Please explain how the Net Metering Program currently handles situations in which a customer has multiple meters on the same account, or multiple accounts.

1.19.1.2 Can a NM participant's Energy Credit can be applied to consumption on a different meter but only where the meter is part of the same account?

RESPONSE:

Where there are multiple meters associated with a Customer's account, Net Energy is calculated using the electricity:

- **Supplied by BC Hydro to the Customer; and**
- **Delivered from the Generating Facility to BC Hydro's system during the billing period registered by each meter associated with the Customer's account.**

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.1 Please explain how the Net Metering Program currently handles situations in which a customer has multiple meters on the same account, or multiple accounts.

1.19.1.3 Please confirm, or otherwise explain, that a NM customer cannot have an Energy Credit (in kWh) from one account applied to a different account held by the same customer.

RESPONSE:

Confirmed.

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.2 Please confirm that BC Hydro has received suggestions that the Net Metering Program should allow a participant to aggregate more than one account held by the same customer so that the customer's NM energy credits can be applied to more load and thereby enable the customer to benefit from a larger generation facility (up to the 100 kW maximum) without creating intentional annual net excess generation.

RESPONSE:

Confirmed.

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.3 Does BC Hydro agree that if aggregation was allowed in the NM Program then customers with multiple accounts could consider larger NM generation facilities without involving intentional annual net excess generation?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.4 What is BC Hydro's position regarding aggregation in the NM Program?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.19.1 where we explain that a customer cannot aggregate multiple accounts under the Program and to BC Hydro's response to CEC IR 1.22.1 where we explain that BC Hydro has not determined how or whether Virtual Net Metering, Aggregate Net Metering or Community Net Metering will be offered by BC Hydro in the future.

19.0 G. Other topics

Topic: Aggregation
Reference: Application, Exhibit B-1

1.19.5 Please briefly explain the difference between aggregation in Net Metering and virtual net metering.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

20.0 G. Other topics

Topic: Virtual Net Metering
Reference: Application, Exhibit B-1, s.9.1.5, Virtual Net Metering, [pdf p. 201]

"While we have received several requests to support this type of program [Virtual Net Metering], we have responded to these requests by suggesting that one customer "own" the net metering installation and perform the administrative task of sharing any energy offsets between the participating customers."

1.20.1 Is it BC Hydro's view that the response it has given to several requests for Virtual Net Metering is a viable approach for consideration going forward? If so:

RESPONSE:

BC Hydro's response to requests for Virtual Net Metering recognizes that, under the current tariff, customers may pursue and administer their own financial arrangements with regards to shared net metering projects. The details of any such arrangements would be determined by the customers involved and not by BC Hydro.

20.0 G. Other topics

Topic: Virtual Net Metering
Reference: Application, Exhibit B-1, s.9.1.5, Virtual Net Metering, [pdf p. 201]

"While we have received several requests to support this type of program [Virtual Net Metering], we have responded to these requests by suggesting that one customer "own" the net metering installation and perform the administrative task of sharing any energy offsets between the participating customers."

1.20.1 Is it BC Hydro's view that the response it has given to several requests for Virtual Net Metering is a viable approach for consideration going forward? If so:

1.20.1.1 Please explain the concept in more detail.

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.20.1.

20.0 G. Other topics

Topic: Virtual Net Metering
Reference: Application, Exhibit B-1, s.9.1.5, Virtual Net Metering, [pdf p. 201]

"While we have received several requests to support this type of program [Virtual Net Metering], we have responded to these requests by suggesting that one customer "own" the net metering installation and perform the administrative task of sharing any energy offsets between the participating customers."

1.20.1 Is it BC Hydro's view that the response it has given to several requests for Virtual Net Metering is a viable approach for consideration going forward? If so:

1.20.1.2 Does "energy offsets" refer to energy credits applied to the account of the NM installation owner from one billing period to the next?

RESPONSE:

The term "energy offsets" refers to crediting customers for the excess energy produced by their share of the net metering project.

20.0 G. Other topics

Topic: Virtual Net Metering
Reference: Application, Exhibit B-1, s.9.1.5, Virtual Net Metering, [pdf p. 201]

"While we have received several requests to support this type of program [Virtual Net Metering], we have responded to these requests by suggesting that one customer "own" the net metering installation and perform the administrative task of sharing any energy offsets between the participating customers."

1.20.1 Is it BC Hydro's view that the response it has given to several requests for Virtual Net Metering is a viable approach for consideration going forward? If so:

1.20.1.3 Does "the administrative task of sharing any energy offsets between the participating customers" mean that the NM installation owner would calculate the financial value of the energy credits (based on the customer's retail rate), divide this amount according to the participants' shares, and then make a dollar payment to each participant? Or does it mean that the NM installation owner would notify BC Hydro of the portion of the owner's energy credit (in kWh) that should be applied (in kWh) to the invoices of the respective participants?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.20.1.

20.0 G. Other topics

Topic: Virtual Net Metering
Reference: Application, Exhibit B-1, s.9.1.5, Virtual Net Metering, [pdf p. 201]

"While we have received several requests to support this type of program [Virtual Net Metering], we have responded to these requests by suggesting that one customer "own" the net metering installation and perform the administrative task of sharing any energy offsets between the participating customers."

1.20.1 Is it BC Hydro's view that the response it has given to several requests for Virtual Net Metering is a viable approach for consideration going forward? If so:

1.20.1.4 Would BC Hydro agree that this approach would be more of an investment mechanism a customer could use to finance their own NM generation facility than a "virtual net metering" concept in which participants can obtain an energy credit in kWh on their own electricity bill?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.20.1 for further information on the suggestion referenced in the preamble to the question and to BC Hydro's response to CEC IR 1.22.1 for further discussion on Virtual Net Metering.

20.0 G. Other topics

Topic: Virtual Net Metering
Reference: Application, Exhibit B-1, s.9.1.5, Virtual Net Metering, [pdf p. 201]

"While we have received several requests to support this type of program [Virtual Net Metering], we have responded to these requests by suggesting that one customer "own" the net metering installation and perform the administrative task of sharing any energy offsets between the participating customers."

1.20.2 What are BC Hydro's next steps in considering "potential additional measures to support virtual net metering for a future application" [p.49]? How soon can an application for approval of virtual net metering be expected?

RESPONSE:

As discussed in BC Hydro's response to BCSEA IR 1.7.12, BC Hydro's next Integrated Resource Plan will be informed by an updated resource options inventory which will reflect data on trends in distributed energy resources as well as the recommendations from Phase Two of the Government of B.C.'s Comprehensive Review of BC Hydro.

Further discussion with regards to virtual net metering is provided in BC Hydro's response to CEC IR 1.22.1.

21.0 G. Other topics

Topic: Past practice
Reference: Exhibit E-2, Letter of Comment

1.21.1 In the past, did BC Hydro sign agreements with net metering customers to pay 9.99 cents/kWh (or any other price) for annual net excess generation? What is BC Hydro's current practice in this regard?

RESPONSE:

No. BC Hydro's terms and conditions for net metering service have been, and continue to be, included within Rate Schedule 1289.

21.0 G. Other topics

Topic: Past practice
Reference: Exhibit E-2, Letter of Comment

1.21.2 In the past, did BC Hydro give new entrants to the net metering program reason to expect that the price for annual net excess generation would not diminish in the future? What is BC Hydro's current practice in this regard? Please provide copies of any information materials addressing this point that BC Hydro provides to prospective or existing NM participants.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.21.1.

21.0 G. Other topics

Topic: Past practice
Reference: Exhibit E-2, Letter of Comment

1.21.3 What is BC Hydro's response to the suggestion that power it receives from a net metering customer is provided to other BC Hydro customers, for example on the NM customer's feeder line, and is not exported by BC Hydro?

RESPONSE:

Energy generated by a net metering customer is first used to offset the customer's load. Any excess energy is received by BC Hydro at the customer's point of interconnection with the BC Hydro system. As BC Hydro's system is managed as a whole, the excess energy received from the customer is not attributed to a particular use by BC Hydro.

21.0 G. Other topics

Topic: Past practice
Reference: Exhibit E-2, Letter of Comment

1.21.4 What is BC Hydro's response to the suggestion that the price it pays for annual NEG from a net metering customer should be equivalent to the retail price paid by customers on the same feeder line as the net metering customer?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

Excess generation from customers in the Program is not the same product as the service received by a customer from BC Hydro. For example, among other things, excess generation from customers in the Program is not a firm and continuous service and does not include transmission and distribution services that are included in BC Hydro's tariff rates.

21.0 G. Other topics

Topic: Past practice
Reference: Exhibit E-2, Letter of Comment

1.21.5 What is BC Hydro's response to the suggestion that BC Hydro's payment of 9.99 cents/kWh for annual NEG from net meter customer adds clean power to the system for zero cost to BC Hydro ratepayers?

RESPONSE:

BC Hydro does not agree with this assertion.

Please refer to BC Hydro's response to BCUC IR 1.5.1 where we discuss how cost shifting between customers in the Program and non-participating customers occurs and to BC Hydro's response to BCUC IR 1.5.2 where we provide a cost-shifting analysis.

The proposed update to the Energy Price is intended to only address the cost-shifting with regards to Surplus Energy Payments.

22.0 G. Other topics

Topic: Constrained areas
Reference: Application, Exhibit B-1, section 5.3, "Proposed Amendments Allowing Termination and Rejection of Certain Applications Would Provide Clarity and Support Safety and Simplicity"; Appendix F, Net Metering Evaluation Report No.4

BC Hydro states on pages 42-43 of the Application:

"As explained in section 9.1.3 of the Evaluation Report, certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators injecting energy back into the grid. Additional generation at these locations, even from small projects in the Program, could require the replacement of substation transformers."

BC Hydro states on page 27 of the NM Evaluation Report No.4 (pdf p.200):

"Certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators that are injecting energy back into our grid. BC Hydro has had to signal to Independent Power Producers (**IPPs**) and potential Net Metering customers that we need to carefully manage the number and size of the generation being installed in some areas on our grid. At this time, the majority of these constraints are caused by larger IPPs that inject power into the distribution grid and are not the result of a high penetration of Net Metering customers.

If more generation is added at these locations, even small Net Metering projects could require the replacement of substation transformers. BC Hydro is currently reviewing individual Net Metering applications on a case by case basis at certain substations and is contemplating either rejecting applications, or in some cases, limiting project sizes to reduce power injection into the grid to avoid overloading equipment. This review involves undertaking a thorough technical assessment of all generation applications, including Net Metering applications received for projects located in a constrained area and determining an available generation capacity for the area. While all Net Metering project applications require acceptance from BC Hydro to proceed, BC Hydro may decide to amend the language in RS 1289 to more clearly state that BC Hydro has the ability to reject a project application of any size or complexity if it triggers substantial costs not recoverable by RS 1289 or creates safety and/or risk to BC Hydro's system."

1.22.1 Please describe the areas that are considered constrained in relation to new NM participation. What proportion of BC Hydro's substations is involved? Are the constrained areas mostly remote, or are urban locations also affected?

RESPONSE:

Please refer to BC Hydro's response to BCCSC IR 1.3.3 where we explain the thresholds under which BC Hydro studies the system impacts of a net metering generator interconnection and that these thresholds are used to determine when a system impact study is required. They are not used to reject applications to the Program.

Additional reviews are being conducted for applications that affect approximately 7 per cent of BC Hydro's distribution substations. Specifically, applications affecting all non-integrated area substations are reviewed as well as applications that affect the following integrated area substations:

- **Fraser Valley East - Hope (HOP)**
- **Wahleach (WAH)**
- **Boston Bar (BBR)**
- **Spuzzum (SZM)**
- **Northeast - Portage Pass (PPS)**
- **Thompson Shuswap - Valemount (VLM)**
- **Lower Mainland North - Pemberton (PEM)**
- **Vancouver Island – Tahsis Village (TSV)**

The substation locations are shown on BC Hydro's transmission map which can be accessed at the following link:
https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/suppliers/transmission-system/maps/transplt.pdf.

22.0 G. Other topics

Topic: Constrained areas
Reference: Application, Exhibit B-1, section 5.3, "Proposed Amendments Allowing Termination and Rejection of Certain Applications Would Provide Clarity and Support Safety and Simplicity"; Appendix F, Net Metering Evaluation Report No.4

BC Hydro states on pages 42-43 of the Application:

"As explained in section 9.1.3 of the Evaluation Report, certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators injecting energy back into the grid. Additional generation at these locations, even from small projects in the Program, could require the replacement of substation transformers."

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"Certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators that are injecting energy back into our grid. BC Hydro has had to signal to Independent Power Producers (**IPPs**) and potential Net Metering customers that we need to carefully manage the number and size of the generation being installed in some areas on our grid. At this time, the majority of these constraints are caused by larger IPPs that inject power into the distribution grid and are not the result of a high penetration of Net Metering customers.

If more generation is added at these locations, even small Net Metering projects could require the replacement of substation transformers. BC Hydro is currently reviewing individual Net Metering applications on a case by case basis at certain substations and is contemplating either rejecting applications, or in some cases, limiting project sizes to reduce power injection into the grid to avoid overloading equipment. This review involves undertaking a thorough technical assessment of all generation applications, including Net Metering applications received for projects located in a constrained area and determining an available generation capacity for the area. While all Net Metering project applications require acceptance from BC Hydro to proceed, BC Hydro may decide to amend the language in RS 1289 to more clearly state that BC Hydro has the ability to reject a project application of any size or complexity if it triggers substantial costs not recoverable by RS 1289 or creates safety and/or risk to BC Hydro's system."

1.22.2 Is the problem specific to constraints due to the number and size of generators that are injecting energy back into the grid, as distinct from constraints due to local load potentially exceeding substation capacity?

RESPONSE:

The constraints are related to generators injecting power into the grid (e.g., reverse power flow through the distribution feeder devices and substation transformers) and are not related to constraints due to local load exceeding substation capacity.

22.0 G. Other topics

Topic: Constrained areas
Reference: Application, Exhibit B-1, section 5.3, "Proposed Amendments Allowing Termination and Rejection of Certain Applications Would Provide Clarity and Support Safety and Simplicity"; Appendix F, Net Metering Evaluation Report No.4

BC Hydro states on pages 42-43 of the Application:

"As explained in section 9.1.3 of the Evaluation Report, certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators injecting energy back into the grid. Additional generation at these locations, even from small projects in the Program, could require the replacement of substation transformers."

BC Hydro states on page 27 of the NM Evaluation Report No.4 (pdf p.200):

"Certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators that are injecting energy back into our grid. BC Hydro has had to signal to Independent Power Producers (**IPPs**) and potential Net Metering customers that we need to carefully manage the number and size of the generation being installed in some areas on our grid. At this time, the majority of these constraints are caused by larger IPPs that inject power into the distribution grid and are not the result of a high penetration of Net Metering customers.

If more generation is added at these locations, even small Net Metering projects could require the replacement of substation transformers. BC Hydro is currently reviewing individual Net Metering applications on a case by case basis at certain substations and is contemplating either rejecting applications, or in some cases, limiting project sizes to reduce power injection into the grid to avoid overloading equipment. This review involves undertaking a thorough technical assessment of all generation applications, including Net Metering applications received for projects located in a constrained area and determining an available generation capacity for the area. While all Net Metering project applications require acceptance from BC Hydro to proceed, BC Hydro may decide to amend the language in RS 1289 to more clearly state that BC Hydro has the ability to reject a project application of any size or complexity if it triggers substantial costs not recoverable by RS 1289 or creates safety and/or risk to BC Hydro's system."

1.22.3 Does BC Hydro see the situation of areas constrained due to the injection of energy into the grid being one that will continue to grow? Has the situation become, or will it likely become, a significant obstacle to new participation in the Net Metering Program?

RESPONSE:

Most of the existing constraints are due to large distribution connected Independent Power Producers (IPPs). At this time, BC Hydro expects that relatively few additional IPPs will connect to the distribution system in the near future. Accordingly, BC Hydro does not expect the number of constrained substations to increase significantly.

22.0 G. Other topics

Topic: Constrained areas
Reference: Application, Exhibit B-1, section 5.3, "Proposed Amendments Allowing Termination and Rejection of Certain Applications Would Provide Clarity and Support Safety and Simplicity"; Appendix F, Net Metering Evaluation Report No.4

BC Hydro states on pages 42-43 of the Application:

"As explained in section 9.1.3 of the Evaluation Report, certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators injecting energy back into the grid. Additional generation at these locations, even from small projects in the Program, could require the replacement of substation transformers."

BC Hydro states on page 27 of the NM Evaluation Report No.4 (pdf p.200):

"Certain areas of the BC Hydro electrical grid are becoming constrained due to the number and size of generators that are injecting energy back into our grid. BC Hydro has had to signal to Independent Power Producers (**IPPs**) and potential Net Metering customers that we need to carefully manage the number and size of the generation being installed in some areas on our grid. At this time, the majority of these constraints are caused by larger IPPs that inject power into the distribution grid and are not the result of a high penetration of Net Metering customers.

If more generation is added at these locations, even small Net Metering projects could require the replacement of substation transformers. BC Hydro is currently reviewing individual Net Metering applications on a case by case basis at certain substations and is contemplating either rejecting applications, or in some cases, limiting project sizes to reduce power injection into the grid to avoid overloading equipment. This review involves undertaking a thorough technical assessment of all generation applications, including Net Metering applications received for projects located in a constrained area and determining an available generation capacity for the area. While all Net Metering project applications require acceptance from BC Hydro to proceed, BC Hydro may decide to amend the language in RS 1289 to more clearly state that BC Hydro has the ability to reject a project application of any size or complexity if it triggers substantial costs not recoverable by RS 1289 or creates safety and/or risk to BC Hydro's system."

1.22.4 Where areas of the grid are constrained due to the injection of energy locally, what steps does BC Hydro take in addition to reviewing proposed new NM projects? Is preventing new NM projects likely to be a solution?

RESPONSE:

As discussed in BC Hydro's response to BCCSC IR 1.3.3, system impact studies may find that impacts can be addressed through minor upgrades or setting changes. Alternatively, the system impact studies may find that impacts require major upgrades, which may not be financially feasible, resulting in the rejection of an application.

1.0 Application Screening Process

Reference: G-100-18, Application to Amend Rate Schedule {1289) for Net Metering Service

As per Order Number G-100-18, "On April 20, 2018, BC Hydro filed an application to seek approval from the BCUC to amend RS 1289 so that RS 1289 was no longer available to customers proposing a generating facility with an estimated annual energy output greater than their estimated annual load" (2018 Amendment Application). The intent was to limit annual excess generation payouts in response to participants operating as independent generation facilities.

The proposed application screening processes increases complexity in the application phase, does not address expected load increases or new builds and diminishes opportunities for Community Solar. The limits on load sizing are extraneous when paired alongside additional net metering amendments (anniversary date, true-up period and market rate). Removal of the application screening process in conjunction with applying other amendments reduces red tape while still decreasing the amount of annual payouts.

1.1.1 If the new market price and anniversary date are accepted, could BC Hydro eliminate the application screening process?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.3 where we explain that if the Energy Price more accurately reflected the value of excess generation to BC Hydro, there would still be a need to limit the size of a customer's Generating Facility in order to maintain the Program as a load offset program.

The proposed Amendments regarding the Anniversary Date would benefit customers in the Program and are not related to the Program eligibiligy requirements.

With regards to the concerns raised in the preamble to the question, BC Hydro has proposed amendments to increase the flexibility and efficiency of the application process. These proposed amendments are outlined in section 2.7 of the Application.

2.0 True-up Period

Reference: BC Hydro Application to Amend Rate Schedule (1289) for Net Metering Service

Currently, the true-up period in British Columbia is 12 months long. In Saskatchewan, the Net Metering program has put in place a 36-month true-up period. The longer the period, the longer the credits are valid for.

BC Hydro's current 12 month true-up period is not well suited with other modifications, increases potential of annual payouts, and restricts energy reimbursements for participants. The Application under RS 1289 noted, "an extension of the period of time between Surplus Energy Payments (eg. From the current 12 months to 24 months) would also provide customers with increased opportunities and flexibility to apply their generation account balance to reduce their net energy purchase from BC Hydro". In order to reach BC Hydro goals of "improving fairness between participants and nonparticipants", simple alterations such as the true-up period are essential.

Participant's who have irregular utility demand benefit greatly from an increase in the true-up period. For example, a homeowner that decides to go on vacation for the winter months. Their unused banked credits from that winter would payout on March 1st. But, if the true-up period extends to 36 months, the participant can utilize those additional credits over the following winter seasons. This compensates for irregular usage and increases fairness for participants.

1.2.1 Could BC Hydro extend the true-up period to 24 to 36 months?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.5 where we explain why BC Hydro did not to propose a longer true-up period (e.g., up to 24 months or a longer period, such as 36 months) in the Application.

3.0 Market Energy Price

Reference: BC Hydro Application to Amend Rate Schedule (1289) for Net Metering Service

The market energy price is the rate at which participants receive payouts on their anniversary date each true-up period. Based upon the previous standing offer program price, that rate was 9.99 cents per kWH. BC Hydro commented, decreasing the payout rate "would improve fairness between participating and non-participating customers because the energy price used to determine Surplus Energy Payments would provide compensation to customers in the program, at a price that reflects the value of energy to non-participating customers". Creating fairness between participants and nonparticipants is a priority for all parties involved as it ensures the longevity of the program. The intent of net metering is to utilize reimbursements in the form of banked energy credits instead of receiving cash payouts. In most cases where the generation is sized equal to load, all the credits banked in high generation periods will be used in low generation periods. Reducing the annual payout to the market energy price will not affect these customers.

However, the Application states, "These amendments would prevent additional Oversized Generating Facilities, maintain the intent of the Program as a way for customers to offset their electricity consumption and would support fairness and flexibility". By changing the market price, potential participants are restricted. Siting, sizing and capital constraints create limitations for some customers. Those customers would, under the current Net Metering program, look to invest in a centralized system. Then, relying on annual excess generation payouts as a means to distribute energy savings over to each customer who invested in the central system. The proposed reduction in the annual payout rate will reduce fairness and flexibility for customers wanting to utilize a central system. For example, communities and homes in shaded areas may lack the sun exposure for private systems on each residence. The ability to utilize nearby areas better suited for PV, such as a field, or a large community building may allow these customers to participate in the program. Multi-family dwellings with restricted roof areas may be able to use solar parking structures as a centralized system to offset their consumption. Capital constraints are solved through economies of scale; a participant may not be able to afford a private system but could afford a portion as part of a community system, as practiced by the Nelson Solar Garden.

Virtual Net Metering (VNM) injects low-risk, high-reward investment into the economy while solving issues of siting, sizing and capital that individual systems face. A VNM Program would create opportunities for communities and co-operatives that cannot participate within the recent amendments proposed by BC Hydro. Alterations to the anniversary date and an extension of the period to utilize kWH credits force excess generation payouts would be a minimum. The intention of the original Net Metering program would continue to be met utilizing

VNM, while opening up opportunities for all BC Hydro customers to participate. Most provinces and states in North America have community solar programs in place or in design, giving an opportunity for BC Hydro to align with other jurisdictions.

First Nations Communities are a primary example of customers requiring a VNM program, as they have commonly shared loads, individual residences and sizeable areas suitable for PV systems. The T'Sou-ke First Nations, located in Sooke, British Columbia, utilize a 75kW PV system on a number of their community buildings. Their PV system overproduces and the community receives annual compensation from their excess credits. With VNM, community members could utilize surplus energy credits against individual energy bills instead of receiving monetary payouts.

1.3.1 Would BC Hydro allow current oversized generation customers into a VNM pilot program?

RESPONSE:

The amendments intended to prevent Oversized Generating Facilities and maintain the Program as a way for customers to offset their electricity consumption, outlined in section 2.7 of the Application, would apply only to future applicants to the Program and would have no impact on existing customers in the Program. With regards to the Energy Price, BC Hydro is proposing a five-year transitional Energy Price for existing customers, as discussed further in BC Hydro's response to BCUC IR 1.15.1.

Please refer to BC Hydro's response to CEC IR 1.22.1, where we explain that BC Hydro has not determined how or whether Virtual Net Metering, Aggregate Net Metering or Community Net Metering will be offered by BC Hydro in the future.

3.0 Market Energy Price

Reference: BC Hydro Application to Amend Rate Schedule (1289) for Net Metering Service

The market energy price is the rate at which participants receive payouts on their anniversary date each true-up period. Based upon the previous standing offer program price, that rate was 9.99 cents per kWH. BC Hydro commented, decreasing the payout rate "would improve fairness between participating and non-participating customers because the energy price used to determine Surplus Energy Payments would provide compensation to customers in the program, at a price that reflects the value of energy to non-participating customers". Creating fairness between participants and nonparticipants is a priority for all parties involved as it ensures the longevity of the program. The intent of net metering is to utilize reimbursements in the form of banked energy credits instead of receiving cash payouts. In most cases where the generation is sized equal to load, all the credits banked in high generation periods will be used in low generation periods. Reducing the annual payout to the market energy price will not affect these customers.

However, the Application states, "These amendments would prevent additional Oversized Generating Facilities, maintain the intent of the Program as a way for customers to offset their electricity consumption and would support fairness and flexibility". By changing the market price, potential participants are restricted. Siting, sizing and capital constraints create limitations for some customers. Those customers would, under the current Net Metering program, look to invest in a centralized system. Then, relying on annual excess generation payouts as a means to distribute energy savings over to each customer who invested in the central system. The proposed reduction in the annual payout rate will reduce fairness and flexibility for customers wanting to utilize a central system. For example, communities and homes in shaded areas may lack the sun exposure for private systems on each residence. The ability to utilize nearby areas better suited for PV, such as a field, or a large community building may allow these customers to participate in the program. Multi-family dwellings with restricted roof areas may be able to use solar parking structures as a centralized system to offset their consumption. Capital constraints are solved through economies of scale; a participant may not be able to afford a private system but could afford a portion as part of a community system, as practiced by the Nelson Solar Garden.

Virtual Net Metering (VNM) injects low-risk, high-reward investment into the economy while solving issues of siting, sizing and capital that individual systems face. A VNM Program would create opportunities for communities and co-operatives that cannot participate within the recent amendments proposed by BC Hydro. Alterations to the anniversary date and an extension of the period to

utilize kWH credits force excess generation payouts would be a minimum. The intention of the original Net Metering program would continue to be met utilizing VNM, while opening up opportunities for all BC Hydro customers to participate. Most provinces and states in North America have community solar programs in place or in design, giving an opportunity for BC Hydro to align with other jurisdictions.

First Nations Communities are a primary example of customers requiring a VNM program, as they have commonly shared loads, individual residences and sizeable areas suitable for PV systems. The T'Sou-ke First Nations, located in Sooke, British Columbia, utilize a 75kW PV system on a number of their community buildings. Their PV system overproduces and the community receives annual compensation from their excess credits. With VNM, community members could utilize surplus energy credits against individual energy bills instead of receiving monetary payouts.

1.3.2 Could BC Hydro implement a VNM program by December 31, 2019?

RESPONSE:

No, BC Hydro could not implement a Virtual Net Metering Program by December 31, 2019. For further discussion on Virtual Net Metering, please refer to BC Hydro's response to CEC IR 1.22.1.

3.0 Market Energy Price

Reference: BC Hydro Application to Amend Rate Schedule (1289) for Net Metering Service

The market energy price is the rate at which participants receive payouts on their anniversary date each true-up period. Based upon the previous standing offer program price, that rate was 9.99 cents per kWH. BC Hydro commented, decreasing the payout rate "would improve fairness between participating and non-participating customers because the energy price used to determine Surplus Energy Payments would provide compensation to customers in the program, at a price that reflects the value of energy to non-participating customers". Creating fairness between participants and nonparticipants is a priority for all parties involved as it ensures the longevity of the program. The intent of net metering is to utilize reimbursements in the form of banked energy credits instead of receiving cash payouts. In most cases where the generation is sized equal to load, all the credits banked in high generation periods will be used in low generation periods. Reducing the annual payout to the market energy price will not affect these customers.

However, the Application states, "These amendments would prevent additional Oversized Generating Facilities, maintain the intent of the Program as a way for customers to offset their electricity consumption and would support fairness and flexibility". By changing the market price, potential participants are restricted. Siting, sizing and capital constraints create limitations for some customers. Those customers would, under the current Net Metering program, look to invest in a centralized system. Then, relying on annual excess generation payouts as a means to distribute energy savings over to each customer who invested in the central system. The proposed reduction in the annual payout rate will reduce fairness and flexibility for customers wanting to utilize a central system. For example, communities and homes in shaded areas may lack the sun exposure for private systems on each residence. The ability to utilize nearby areas better suited for PV, such as a field, or a large community building may allow these customers to participate in the program. Multi-family dwellings with restricted roof areas may be able to use solar parking structures as a centralized system to offset their consumption. Capital constraints are solved through economies of scale; a participant may not be able to afford a private system but could afford a portion as part of a community system, as practiced by the Nelson Solar Garden.

Virtual Net Metering (VNM) injects low-risk, high-reward investment into the economy while solving issues of siting, sizing and capital that individual systems face. A VNM Program would create opportunities for communities and co-operatives that cannot participate within the recent amendments proposed by BC Hydro. Alterations to the anniversary date and an extension of the period to utilize kWH credits force excess generation payouts would be a minimum. The intention of the original Net Metering program would continue to be met utilizing

VNM, while opening up opportunities for all BC Hydro customers to participate. Most provinces and states in North America have community solar programs in place or in design, giving an opportunity for BC Hydro to align with other jurisdictions.

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1.3.3 Would BC Hydro be willing to consult with CanSIA and the industry on the structure for the VNM program?

RESPONSE:

As discussed in BC Hydro's response to CEC IR 1.22.1, BC Hydro has not determined how or whether Virtual Net Metering, Aggregate Net Metering or Community Net Metering will be offered by BC Hydro in the future. If these options are explored, BC Hydro would expect to engage with interested parties, including CanSIA and the industry.

1.0 Reference: Exhibit B-1, page 11

The BCUC also made a number of determinations with regards to cost-shifting and the appropriate balance of fairness between participating and non-participating customers. The BCUC stated:

> "The Commission believed that the potential for cost-shifting would be limited by the low expected participation and the 50 kW limit on generation capacity. However, given the expected low uptake and a 50 kW limit, the Commission believed it was a fair and acceptable trade-off against potential cost-shifting for BC Hydro to propose a rate for purchase of net excess generation at an anniversary date of net metering service interconnection. The Commission considered that it would be fair if net metering customers were compensated for the value BC Hydro receives from net excess generation."

1.1.1 Does BC Hydro believe that cost-shifting has occurred? Please explain and, if so, quantify.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.1 where we discuss how cost shifting between customers in the Program and non-participating customers occurs and to BC Hydro's response to BCUC IR 1.5.2 where we provide a cost-shifting analysis.

The proposed update to the Energy Price is intended to only address the cost-shifting with regards to Surplus Energy Payments.

1.0 Reference: Exhibit B-1, page 11

The BCUC also made a number of determinations with regards to cost-shifting and the appropriate balance of fairness between participating and non-participating customers. The BCUC stated:

> "The Commission believed that the potential for cost-shifting would be limited by the low expected participation and the 50 kW limit on generation capacity. However, given the expected low uptake and a 50 kW limit, the Commission believed it was a fair and acceptable trade-off against potential cost-shifting for BC Hydro to propose a rate for purchase of net excess generation at an anniversary date of net metering service interconnection. The Commission considered that it would be fair if net metering customers were compensated for the value BC Hydro receives from net excess generation."

1.1.2 Please discuss and quantify how the low uptake and 50kW limit would mitigate the potential for cost-shifting with a proposed rate for purchase of net excess generation at an anniversary date for interconnection.

RESPONSE:

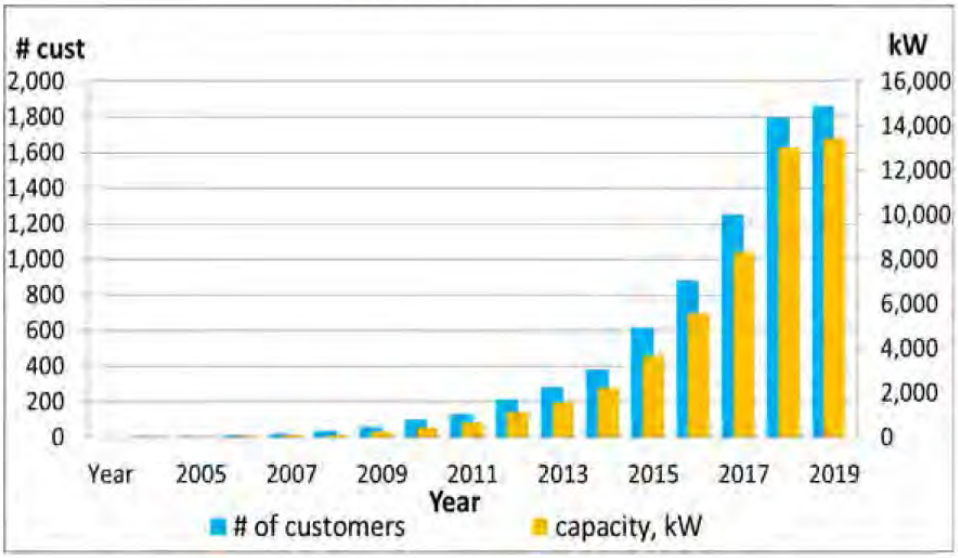
To the extent that the terms and conditions of RS 1289 cause cost-shifting, low up-take and a capacity limit help to mitigate the extent of cost-shifting that actually occurs. BC Hydro notes that the current capacity limit for a Generating Facility in the Program is 100 kW and that the BCUC's statement referenced in the preamble to the question was made in 2004 when projections for participation in the Program were not as high as they are today.

Please refer to BC Hydro's response to BCUC IR 1.5.1 where we explain how cost-shifting between customers in the Program and non-participating customers occurs and to BC Hydro's response to BCUC IR 1.5.2 where we provide a quantitative cost-shifting analysis.

2.0 Reference: Exhibit B-1, page 8 and page 14

As explained in section 1, in the Application, BC Hydro is requesting approval from the BCUC to amend RS 1289 which provides Net Metering Service to BC Hydro's residential and commercial customers.

Figure 2 Net Metering Program Growth (2004 to 2019)



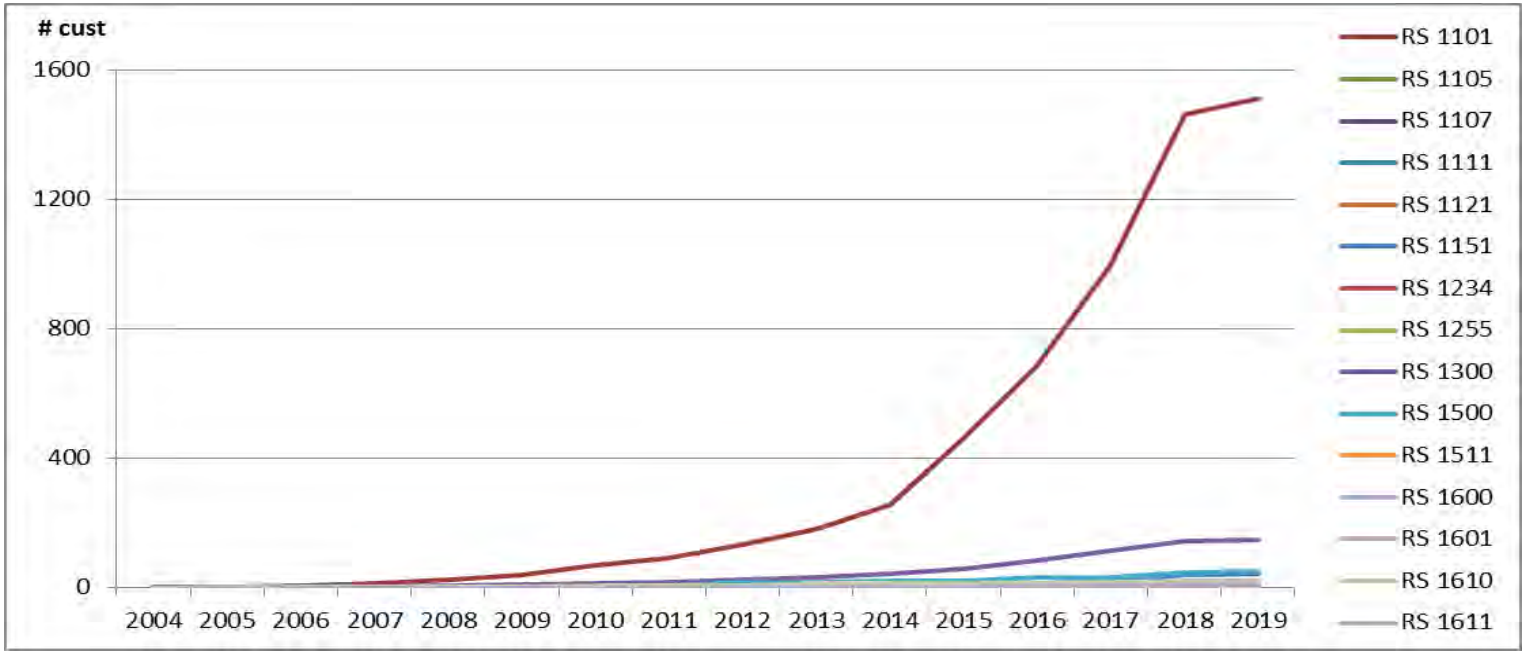
1.2.1 Please provide the program growth shown in Figure 2 for each eligible rate class by chart and numerically.

RESPONSE:

The table below provides the number of customers in the Program by rate class from 2004 to March 1, 2019.

	Years															
RS	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1101	3	4	5	13	23	39	68	91	133	181	258	463	685	997	1,463	1,510
1105							1	1	2	3	4	4	8	13	18	19
1107						1	1	1	1	1	2	2	2	3	4	4
1111									11	14	14	15	15	15	15	15
1121					1	1	1	1	1	1	1	1	2	2	2	2
1151	1	1	1	1	1	1	1	2	3	4	6	13	14	22	41	42
1234										1	1	1	4	7	7	7
1255										1	1	2	2	3	5	5
1300	1	2	2	3	5	9	12	17	25	31	42	60	86	115	145	149
1500		1	1	1	1	1	2	8	16	19	21	22	31	34	49	50
1511										1	1	1	1	1	1	1
1600						2	3	3	7	8	9	10	13	17	20	20
1601		1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
1610			2	2	3	4	5	6	8	12	13	14	14	16	16	16
1611									1	2	3	4	5	6	9	9
Total	5	9	12	21	35	60	96	132	210	281	378	614	884	1,253	1,797	1,851

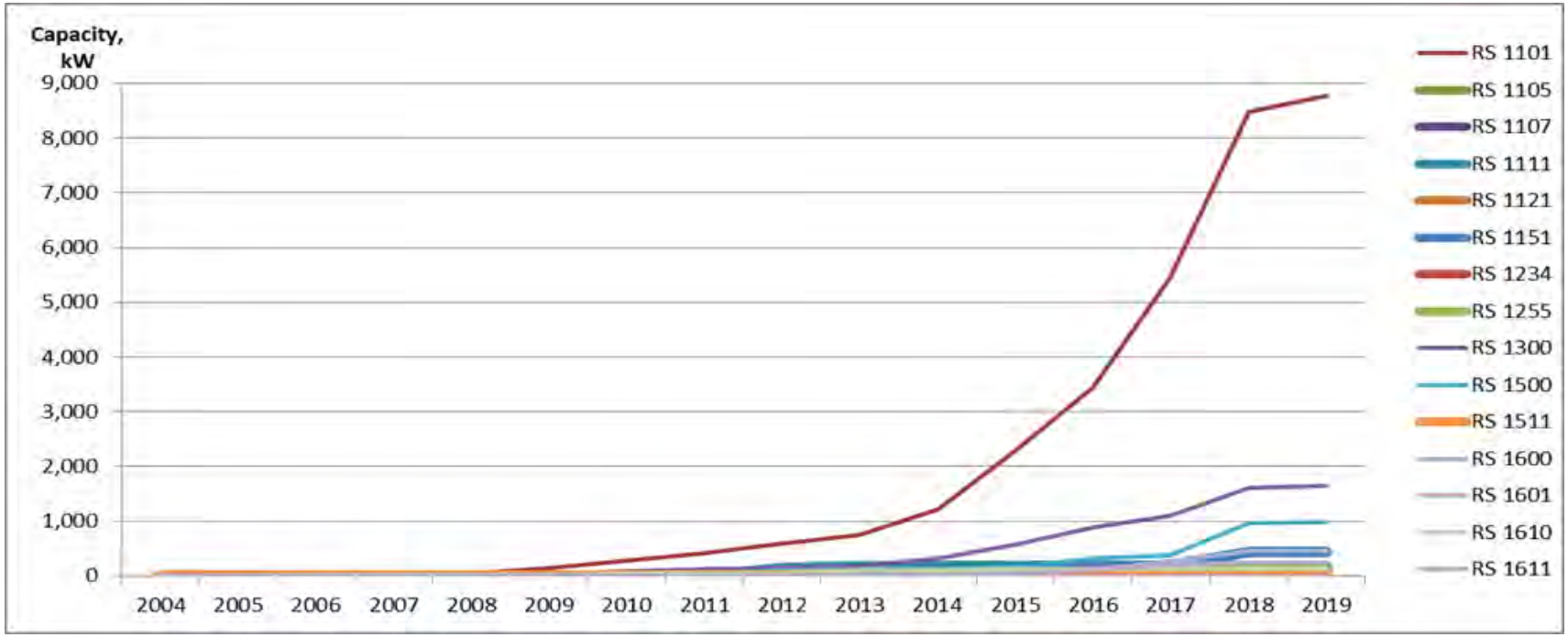
The chart below provides the number of customers in the Program by rate class from 2004 to March 1, 2019:



The table below provides the total installed capacity in the Program by rate class from 2004 to March 1, 2019:

	Years															
RS	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1101	7	10	11	35	56	148	290	424	603	760	1,214	2,285	3,447	5,455	8,489	8,781
1105							3	3	6	9	22	22	41	61	91	96
1107						2	2	2	2	2	7	7	7	10	22	22
1111									138	178	178	189	189	189	189	189
1121					2	2	2	2	2	2	2	2	8	8	8	8
1151	1	1	1	1	1	1	1	21	24	29	48	112	122	195	436	439
1234										22	22	22	81	138	138	138
1255										6	6	29	29	129	185	185
1300	5	6	6	7	12	51	89	126	151	177	318	568	884	1,104	1,611	1,652
1500		7	7	7	7	7	10	42	110	124	130	160	322	384	973	988
1511										45	45	45	45	45	45	45
1600						4	7	7	28	48	69	81	121	269	457	457
1601		6	6	6	6	10	10	10	10	10	10	10	10	10	10	10
1610			20	20	24	33	39	44	49	107	110	117	117	135	135	135
1611									7	16	26	30	130	210	245	245
Total	13	30	51	76	108	259	453	681	1,131	1,535	2,207	3,679	5,552	8,342	13,035	13,390

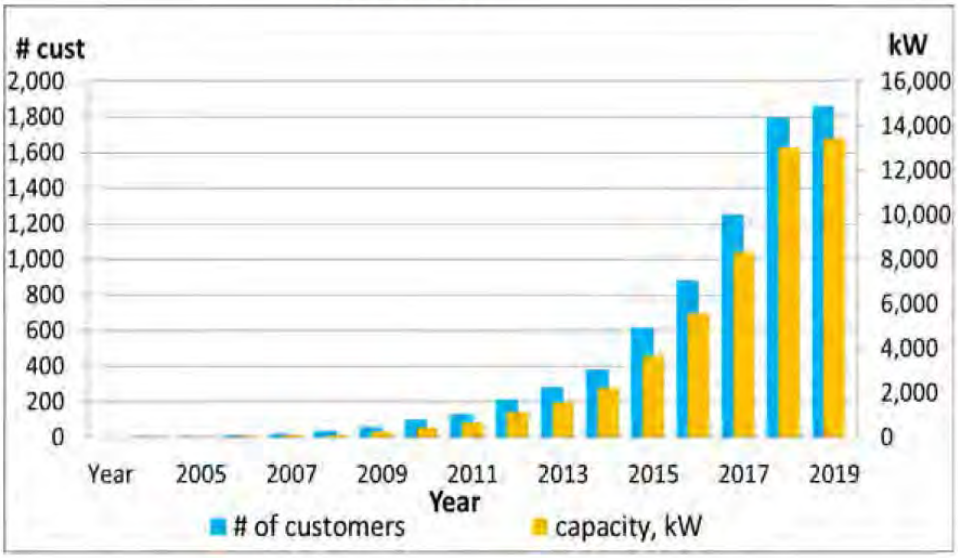
The chart below provides the total installed capacity in the Program by rate class from 2004 to March 1, 2019:



2.0 Reference: Exhibit B-1, page 8 and page 14

As explained in section 1, in the Application, BC Hydro is requesting approval from the BCUC to amend RS 1289 which provides Net Metering Service to BC Hydro's residential and commercial customers.

Figure 2 Net Metering Program Growth (2004 to 2019)



1.2.2 Please confirm that the years are calendar years.

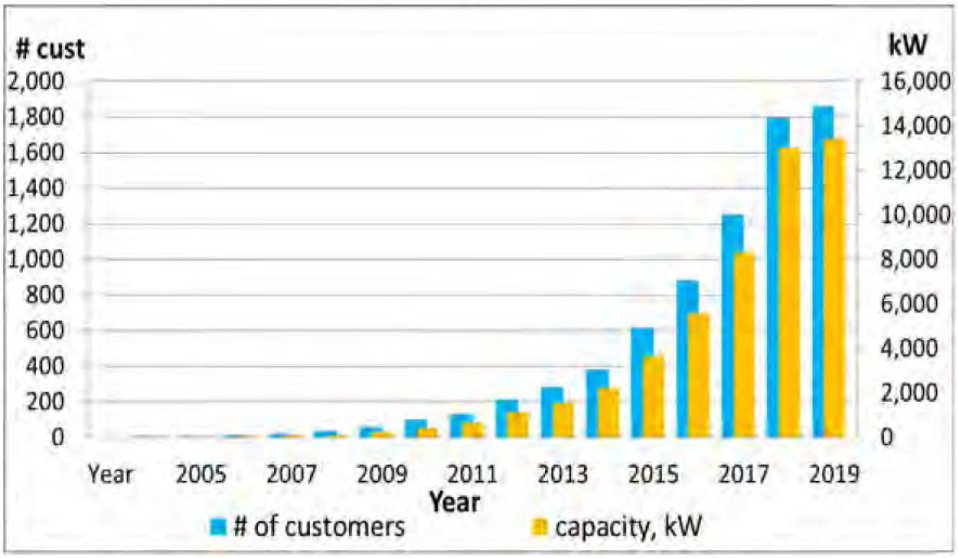
RESPONSE:

Confirmed.

2.0 Reference: Exhibit B-1, page 8 and page 14

As explained in section 1, in the Application, BC Hydro is requesting approval from the BCUC to amend RS 1289 which provides Net Metering Service to BC Hydro's residential and commercial customers.

Figure 2 Net Metering Program Growth (2004 to 2019)



1.2.3 Please confirm that the 2019 figure represents only a portion of the year.

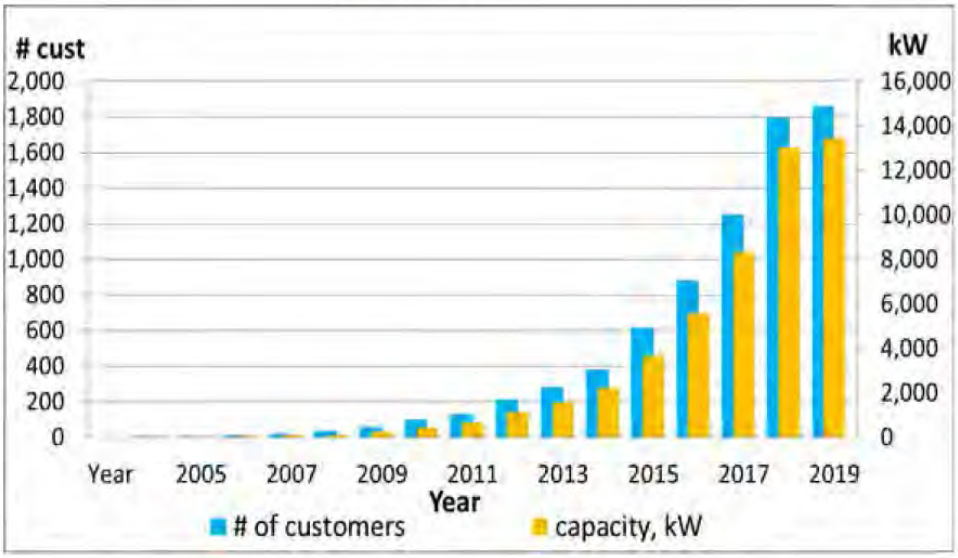
RESPONSE:

Confirmed.

2.0 Reference: Exhibit B-1, page 8 and page 14

As explained in section 1, in the Application, BC Hydro is requesting approval from the BCUC to amend RS 1289 which provides Net Metering Service to BC Hydro's residential and commercial customers.

Figure 2 Net Metering Program Growth (2004 to 2019)



1.2.4 Does BC Hydro have a forecast for the year end of 2019?

RESPONSE:

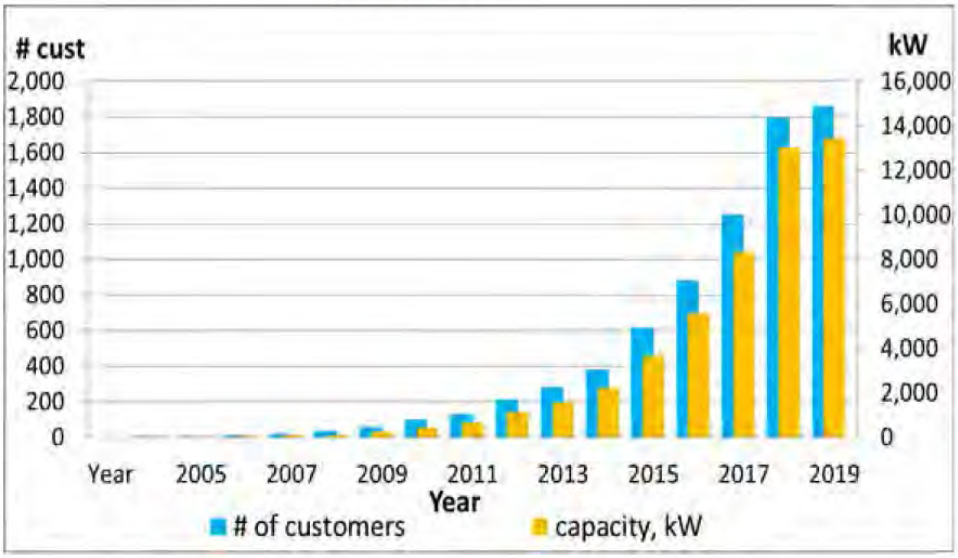
As stated in section 1.5 of the Application, approximately 1850 customers, representing a total installed capacity of approximately 13 MW, were participating in the Program as of March 1, 2019.

Assuming a 40 per cent growth rate, based on the growth of the Program over the past five years, BC Hydro would expect approximately 2500 customers, representing a total installed capacity of approximately 18 MW, to be participating in the Program by December 31, 2019.

2.0 Reference: Exhibit B-1, page 8 and page 14

As explained in section 1, in the Application, BC Hydro is requesting approval from the BCUC to amend RS 1289 which provides Net Metering Service to BC Hydro's residential and commercial customers.

Figure 2 Net Metering Program Growth (2004 to 2019)



1.2.4 Does BC Hydro have a forecast for the year end of 2019?

1.2.4.1 If yes, please provide.

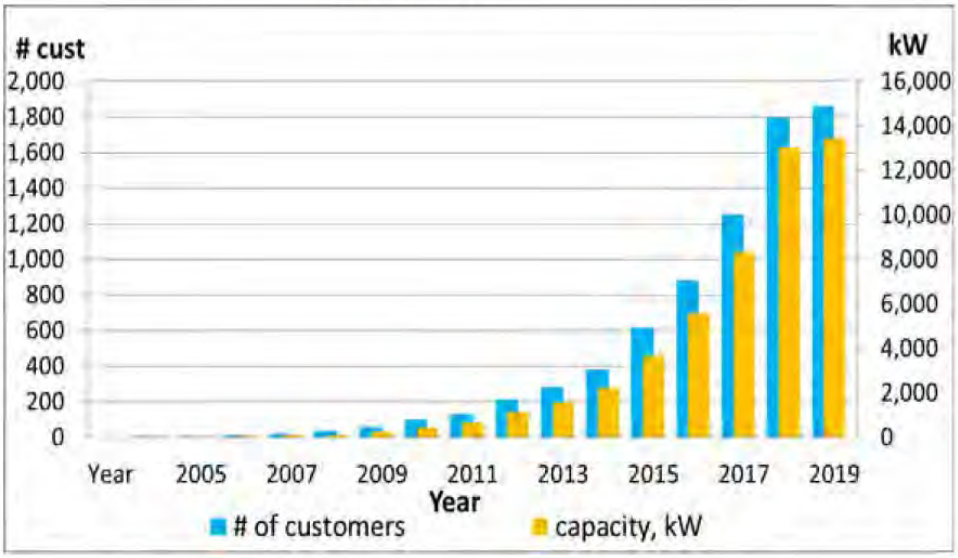
RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.2.4.

2.0 Reference: Exhibit B-1, page 8 and page 14

As explained in section 1, in the Application, BC Hydro is requesting approval from the BCUC to amend RS 1289 which provides Net Metering Service to BC Hydro's residential and commercial customers.

Figure 2 Net Metering Program Growth (2004 to 2019)



1.2.4 Does BC Hydro have a forecast for the year end of 2019?

1.2.4.2 If no, please explain why not.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.2.4.

3.0 Reference: Exhibit B-1, page 14

Table 2 Net Metering Program Customers by Generation Type (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	1,817	98.16
Hydro	16	0.86
Wind	9	0.49
Wind and photovoltaic	6	0.32
Hydro and photovoltaic	2	0.11
Biogas	1	0.05
Total	**1,851**	**100**

1.3.1 Please provide Table 2 for each eligible rate class.

RESPONSE:

The tables below provide Table 2 of the Application for each eligible rate class.

Net Metering Program Customers by Generation Type, RS 1101 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**1,492**	**98.81**
Hydro	**7**	**0.46**
Wind	**5**	**0.33**
Wind and photovoltaic	**4**	**0.26**
Hydro and photovoltaic	**2**	**0.13**
Biogas		
Total	**1,510**	**100**

Net Metering Program Customers by Generation Type, RS 1105 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**18**	**94.74**
Hydro		
Wind	**1**	**5.26**
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**19**	**100**

Net Metering Program Customers by Generation Type, RS 1107 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**4**	**100**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**4**	**100**

Net Metering Program Customers by Generation Type, RS 1111 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**15**	**100**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**15**	**100**

Net Metering Program Customers by Generation Type, RS 1121 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**1**	**50**
Hydro		
Wind	**1**	**50**
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**2**	**100**

Net Metering Program Customers by Generation Type, RS 1151 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**41**	**97.62**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas	**1**	**2.38**
Total	**42**	**100**

Net Metering Program Customers by Generation Type, RS 1234 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**7**	**100**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**7**	**100**

Net Metering Program Customers by Generation Type, RS 1255 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**5**	**100**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**5**	**100**

Net Metering Program Customers by Generation Type, RS 1300 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**141**	**94.63**
Hydro	**6**	**4.03**
Wind	**1**	**0.67**
Wind and photovoltaic	**1**	**0.67**
Hydro and photovoltaic		
Biogas		
Total	**149**	**100**

Net Metering Program Customers by Generation Type, RS 1500 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**47**	**94**
Hydro	**2**	**4**
Wind	**1**	**2**
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**50**	**100**

Net Metering Program Customers by Generation Type, RS 1511 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic		
Hydro	**1**	**100**
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**1**	**100**

Net Metering Program Customers by Generation Type, RS 1600 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**19**	**95**
Hydro		
Wind		
Wind and photovoltaic	**1**	**5**
Hydro and photovoltaic		
Biogas		
Total	**20**	**100**

Net Metering Program Customers by Generation Type, RS 1601 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**2**	**100**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**2**	**100**

Net Metering Program Customers by Generation Type, RS 1610 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**16**	**100**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**16**	**100**

Net Metering Program Customers by Generation Type, RS 1611 (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**9**	**100**
Hydro		
Wind		
Wind and photovoltaic		
Hydro and photovoltaic		
Biogas		
Total	**9**	**100**

3.0 Reference: Exhibit B-1, page 14

Table 2 Net Metering Program Customers by Generation Type (March 1, 2019)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	1,817	98.16
Hydro	16	0.86
Wind	9	0.49
Wind and photovoltaic	6	0.32
Hydro and photovoltaic	2	0.11
Biogas	1	0.05
Total	**1,851**	**100**

1.3.2 Please provide Table 2 over the last five years.

RESPONSE:

The tables below provide Table 2 of the Application for each of the last five years.

Net Metering Program Customers by Generation Type (December 31, 2014)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**353**	**93.88**
Hydro	**10**	**2.66**
Wind	**7**	**1.86**
Wind and photovoltaic	**4**	**1.06**
Hydro and photovoltaic	**1**	**0.27**
Biogas	**1**	**0.27**
Total	**376**	**100**

Net Metering Program Customers by Generation Type (December 31, 2015)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**587**	**95.92**
Hydro	**11**	**1.8**
Wind	**8**	**1.31**
Wind and photovoltaic	**4**	**0.65**
Hydro and photovoltaic	**1**	**0.16**
Biogas	**1**	**0.16**
Total	**612**	**100**

Net Metering Program Customers by Generation Type (December 31, 2016)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**855**	**96.94**
Hydro	**11**	**1.25**
Wind	**9**	**1.02**
Wind and photovoltaic	**5**	**0.57**
Hydro and photovoltaic	**1**	**0.11**
Biogas	**1**	**0.11**
Total	**882**	**100**

Net Metering Program Customers by Generation Type (December 31, 2017)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**1,224**	**97.69**
Hydro	**13**	**1.04**
Wind	**9**	**0.72**
Wind and photovoltaic	**5**	**0.4**
Hydro and photovoltaic	**1**	**0.08**
Biogas	**1**	**0.08**
Total	**1,253**	**100**

Net Metering Program Customers by Generation Type (December 31, 2018)

Generation Type	Number of Customers	% of Customers
Solar photovoltaic	**1,763**	**98.11**
Hydro	**16**	**0.89**
Wind	**9**	**0.5**
Wind and photovoltaic	**6**	**0.33**
Hydro and photovoltaic	**2**	**0.11**
Biogas	**1**	**0.06**
Total	**1,797**	**100**

4.0 Reference: Exhibit B-1, page 15

Table 3 Net Metering Program Customers by Generating Facility Size (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	955	51.59
> 5 kW, ≤ 10 kW	657	35.49
> 10 kW, ≤ 25 kW	189	10.21
> 25 kW, ≤ 50 kW	34	1.84
> 50 kW	16	0.86
Total Participants	**1,851**	**100**
Total Capacity (MW)	**13.39 MW**	

1.4.1 Please provide Table 3 for each eligible rate class.

RESPONSE:

The tables below provide Table 3 of the Application for each eligible rate class.

Net Metering Program Customers by Generating Facility Size, RS 1101 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	**829**	**55**
> 5 kW, ≤ 10 kW	**562**	**37**
> 10 kW, ≤ 25 kW	**109**	**7**
> 25 kW, ≤ 50 kW	**8**	**1**
> 50 kW	**2**	**0**
Total	**1,510**	**100**

Net Metering Program Customers by Generating Facility Size, RS 1105 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	11	58
> 5 kW, ≤ 10 kW	7	37
> 10 kW, ≤ 25 kW	1	5
> 25 kW, ≤ 50 kW		
> 50 kW		
Total	19	100

Net Metering Program Customers by Generating Facility Size, RS 1107 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	3	75
> 5 kW, ≤ 10 kW		0
> 10 kW, ≤ 25 kW	1	25
> 25 kW, ≤ 50 kW		
> 50 kW		
Total	4	100

Net Metering Program Customers by Generating Facility Size, RS 1111 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	1	7
> 5 kW, ≤ 10 kW	2	13
> 10 kW, ≤ 25 kW	12	80
> 25 kW, ≤ 50 kW		
> 50 kW		
Total	15	100

Net Metering Program Customers by Generating Facility Size, RS 1121 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	1	50
> 5 kW, ≤ 10 kW	1	50
> 10 kW, ≤ 25 kW		
> 25 kW, ≤ 50 kW		
> 50 kW		
Total	2	100

Net Metering Program Customers by Generating Facility Size, RS 1151 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	13	31
> 5 kW, ≤ 10 kW	12	29
> 10 kW, ≤ 25 kW	16	38
> 25 kW, ≤ 50 kW	1	2
> 50 kW		
Total	42	100

Net Metering Program Customers by Generating Facility Size, RS 1234 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	2	29
> 5 kW, ≤ 10 kW		
> 10 kW, ≤ 25 kW	4	57
> 25 kW, ≤ 50 kW	1	14
> 50 kW		
Total	7	100

Net Metering Program Customers by Generating Facility Size, RS 1255 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW		
> 5 kW, ≤ 10 kW	1	20
> 10 kW, ≤ 25 kW	2	40
> 25 kW, ≤ 50 kW	1	20
> 50 kW	1	20
Total	5	100

Net Metering Program Customers by Generating Facility Size, RS 1300 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	64	43
> 5 kW, ≤ 10 kW	46	31
> 10 kW, ≤ 25 kW	24	16
> 25 kW, ≤ 50 kW	12	8
> 50 kW	3	2
Total	149	100

Net Metering Program Customers by Generating Facility Size, RS 1500 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	18	36
> 5 kW, ≤ 10 kW	8	16
> 10 kW, ≤ 25 kW	14	28
> 25 kW, ≤ 50 kW	4	8
> 50 kW	6	12
Total	50	100

Net Metering Program Customers by Generating Facility Size, RS 1511 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW		
> 5 kW, ≤ 10 kW		
> 10 kW, ≤ 25 kW		
> 25 kW, ≤ 50 kW	1	100
> 50 kW		
Total	1	100

Net Metering Program Customers by Generating Facility Size, RS 1600 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	5	25
> 5 kW, ≤ 10 kW	4	20
> 10 kW, ≤ 25 kW	4	20
> 25 kW, ≤ 50 kW	5	25
> 50 kW	2	10
Total	20	100

Net Metering Program Customers by Generating Facility Size, RS 1601 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	1	50
> 5 kW, ≤ 10 kW	1	50
> 10 kW, ≤ 25 kW		
> 25 kW, ≤ 50 kW		
> 50 kW		
Total	2	100

Net Metering Program Customers by Generating Facility Size, RS 1610 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	6	38
> 5 kW, ≤ 10 kW	9	56
> 10 kW, ≤ 25 kW		
> 25 kW, ≤ 50 kW	1	6
> 50 kW		
Total	16	100

Net Metering Program Customers by Generating Facility Size, RS 1611 (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	1	11
> 5 kW, ≤ 10 kW	4	44
> 10 kW, ≤ 25 kW	2	22
> 25 kW, ≤ 50 kW		
> 50 kW	2	22
Total	9	100

4.0 Reference: Exhibit B-1, page 15

Table 3 Net Metering Program Customers by Generating Facility Size (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	955	51.59
> 5 kW, ≤ 10 kW	657	35.49
> 10 kW, ≤ 25 kW	189	10.21
> 25 kW, ≤ 50 kW	34	1.84
> 50 kW	16	0.86
Total Participants	**1,851**	**100**
Total Capacity (MW)	**13.39 MW**	

1.4.2 Please provide Table 3 over the last five years.

RESPONSE:

The tables below provide Table 3 of the Application for each of the last five years.

Net Metering Program Customers by Generating Facility Size (December 31, 2014)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	**247**	**65.7**
> 5 kW, ≤ 10 kW	**85**	**22.6**
> 10 kW, ≤ 25 kW	**36**	**9.57**
> 25 kW, ≤ 50 kW	**8**	**2.13**
> 50 kW		
Total	**376**	**100**

Net Metering Program Customers by Generating Facility Size (December 31, 2015)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	**385**	**62.9**
> 5 kW, ≤ 10 kW	**163**	**26.6**
> 10 kW, ≤ 25 kW	**48**	**7.84**
> 25 kW, ≤ 50 kW	**15**	**2.45**
> 50 kW	**1**	**0.16**
Total	**612**	**100**

Net Metering Program Customers by Generating Facility Size (December 31, 2016)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	546	61.9
> 5 kW, ≤ 10 kW	235	26.6
> 10 kW, ≤ 25 kW	79	8.96
> 25 kW, ≤ 50 kW	19	2.15
> 50 kW	3	0.34
Total	882	100

Net Metering Program Customers by Generating Facility Size (December 31, 2017)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	722	57.6
> 5 kW, ≤ 10 kW	392	31.3
> 10 kW, ≤ 25 kW	106	8.46
> 25 kW, ≤ 50 kW	24	1.92
> 50 kW	9	0.72
Total	1,253	100

Net Metering Program Customers by Generating Facility Size (December 31, 2018)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	930	51.8
> 5 kW, ≤ 10 kW	637	35.5
> 10 kW, ≤ 25 kW	180	10
> 25 kW, ≤ 50 kW	34	1.89
> 50 kW	16	0.89
Total	1,797	100

4.0 Reference: Exhibit B-1, page 15

Table 3 Net Metering Program Customers by Generating Facility Size (March 1, 2019)

Nameplate Capacity	Number of Customers	% of Customers
≤ 5 kW	955	51.59
> 5 kW, ≤ 10 kW	657	35.49
> 10 kW, ≤ 25 kW	189	10.21
> 25 kW, ≤ 50 kW	34	1.84
> 50 kW	16	0.86
Total Participants	**1,851**	**100**
Total Capacity (MW)	**13.39 MW**	

1.4.3 Please provide the median and mean capacity for each rate class.

RESPONSE:

The table below provides the median and the average (mean) capacity in kW for each rate class as of March 1, 2019:

RS	Median (kW)	Average (Mean) (kW)
1101	**5.00**	**5.82**
1105	**4.50**	**5.06**
1107	**3.98**	**5.44**
1111	**13.65**	**12.62**
1121	**3.90**	**3.90**
1151	**8.83**	**10.45**
1234	**19.00**	**19.73**
1255	**23.40**	**37.07**
1300	**6.02**	**11.09**
1500	**9.30**	**19.75**
1511	**45.00**	**45.00**
1600	**17.50**	**22.87**
1601	**5.22**	**5.22**
1610	**5.82**	**8.41**
1611	**10.00**	**27.19**

5.0 Reference: Exhibit B-1, page 16-17

2.1 Regulatory History Demonstrates that the Program Was Intended to Help Customers Offset Their Own Supply With Balanced Approach to Program Costs

Section 1.4 above reviews the regulatory history of the Program, including the following statements by the BCUC (emphasis added):

- The Commission's support for a net metering tariff is conditional on development and implementation that does not incur any substantial cost on the utility.
- Customer generation should be limited to own use only at the registered location of the net metering installation.
- The Commission considered that it would be fair if net metering customers were compensated for the value BC Hydro receives from net excess generation.
- A 50 kW system size is consistent with the intent of net metering to allow individual customers to meet all or part of their electricity demand.
- The Commission Panel believes that limited cost-shifting to non-participating customers is warranted to support the implementation of net metering for distributed renewable generation.

1.5.1 Please confirm or otherwise explain that the Commission is not bound by its prior determinations.

RESPONSE:

Confirmed. Section 75 of the *Utilities Commission Act* states "the commission must make its decision on the merits and justice of the case, and is not bound to follow its own decisions".

5.0 Reference: Exhibit B-1, page 16-17

2.1 Regulatory History Demonstrates that the Program Was Intended to Help Customers Offset Their Own Supply With Balanced Approach to Program Costs

Section 1.4 above reviews the regulatory history of the Program, including the following statements by the BCUC (emphasis added):

- The Commission's support for a net metering tariff is conditional on development and implementation that does not incur any substantial cost on the utility.
- Customer generation should be limited to own use only at the registered location of the net metering installation.
- The Commission considered that it would be fair if net metering customers were compensated for the value BC Hydro receives from net excess generation.
- A 50 kW system size is consistent with the intent of net metering to allow individual customers to meet all or part of their electricity demand.
- The Commission Panel believes that limited cost-shifting to non-participating customers is warranted to support the implementation of net metering for distributed renewable generation.

1.5.2 Please confirm that the 'cost on the utility' would be borne by all ratepayers, and not by the shareholder.

RESPONSE:

Confirmed.

5.0 Reference: Exhibit B-1, page 16-17

2.1 Regulatory History Demonstrates that the Program Was Intended to Help Customers Offset Their Own Supply With Balanced Approach to Program Costs

Section 1.4 above reviews the regulatory history of the Program, including the following statements by the BCUC (emphasis added):

- The Commission's support for a net metering tariff is conditional on development and implementation that does not incur any substantial cost on the utility.
- Customer generation should be limited to own use only at the registered location of the net metering installation.
- The Commission considered that it would be fair if net metering customers were compensated for the value BC Hydro receives from net excess generation.
- A 50 kW system size is consistent with the intent of net metering to allow individual customers to meet all or part of their electricity demand.
- The Commission Panel believes that limited cost-shifting to non-participating customers is warranted to support the implementation of net metering for distributed renewable generation.

1.5.2 Please confirm that the 'cost on the utility' would be borne by all ratepayers, and not by the shareholder.

1.5.2.1 If not confirmed, please explain why not.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.5.2.

6.0 Reference: Exhibit B-1, page 17

In summary, the BCUC has previously stated that the intent of the Program is to allow individual customers to meet all or part of their electricity demand, that customer generation should be limited to own use only, that customers should be compensated for the value BC Hydro receives from net excess generation and that while limited cost-shifting to non-participating customers is warranted, the Program should not incur any substantial cost on the utility.

1.6.1 Were all customers made aware of the intent of the Program 'to meet all or part of their electricity demand' at the time they originally signed up? Please explain and provide evidence if such evidence is available.

RESPONSE:

Rate Schedule 1289, in its opening paragraph, states that Net Metering service is available to customers who install a Generating Facility to generate electricity to serve all or part of their electricity requirements. This language has been included in all revisions of Rate Schedule 1289 since the Program's inception in 2004.

Also, BC Hydro's net metering web site (www.bchydro.com/netmetering), specifies that "[o]ur net metering program is designed for those who generate electricity for their own use."

7.0 Reference: Exhibit B-1, page 17

Table 5 Surplus Energy Payments (Fiscal 2018)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	1,044	80.31	0	0
≤ 100	103	7.92	3,949	1
>100, < 500	112	8.62	27,789	9
≥ 500, ≤ 1,000	21	1.62	13,396	4
> 1,000, ≤ 6,000	15	1.15	35,652	11
28,000 – 74,000	5	0.38	243,573	75
Total	**1,300**	**100**	**324,358**	**100**

As shown in Table 5 above, in fiscal 2018, five customers received approximately 75 per cent of the total Surplus Energy Payments, with payment amounts ranging from $28,000 to $74,000. The vast majority of customers (1,044 or 80 per cent) received no Surplus Energy Payment. Of the 256 customers who received a Surplus Energy Payment, 215 or 84 per cent received a payment of less than $500.

1.7.1 Please provide Table 5 by eligible rate class.

RESPONSE:

The table below provides Table 5 of the Application with a breakdown of Surplus Energy Payments by rate class. The table has been updated to correct the minor errors noted in BC Hydro's response to BCUC IR 1.3.1.

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments	1101		1101A		1105		1107	1111		1121	1151		1234		1255	1300		1500		1511		1600	1601	1610	1611
					# cust.	$$	# cust.	$$	# cust.	$$	# cust.	# cust.	$$	# cust.	# cust.	$$	# cust.	$$	# cust.	# cust.	$$	# cust.	$$	# cust.	$$	# cust.	# cust.	# cust.	# cust.
0	1,079	81.25	0	0	855	-	1	-	11	-	3	7	-	2	19	-	5	-	3	92	-	39	-	-	-	17	2	16	7
≤ 100	96	7.23	4,141	1	80	3,264	-	-	-	-	-	1	17	-	3	184	-	-	-	12	676	-	-	-	-	-	-	-	-
>100, < 500	113	8.51	28,251	9	95	23,857	-	-	1	133	-	3	792	-	1	104	1	459	-	12	2,906	-	-	-	-	-	-	-	-
≥ 500, ≤ 1,000	20	1.51	12,742	4	9	5,585	1	661	1	515	-	4	2,574	-	0	-	-	-	-	3	1,957	1	551	1	899	-	-	-	-
> 1,000, ≤ 6,000	15	1.13	35,652	11	6	13,463	-	-	-	-	-	-	-	-	0	-	1	1,279	-	8	20,910	-	-	-	-	-	-	-	-
28,000 – 74,000	5	0.38	243,573	75	3	155,714	-	-	-	-	-	-	-	-	0	-	-	-	-	2	87,859	-	-	-	-	-	-	-	-
Total	**1,328**	**100**	**324,358**	**100**	**1048**	**201,883**	**2**	**661**	**13**	**648**	**3**	**15**	**3,383**	**2**	**23**	**287**	**7**	**1,738**	**3**	**129**	**114,308**	**40**	**551**	**1**	**899**	**17**	**2**	**16**	**7**

7.0 Reference: Exhibit B-1, page 17

Table 5 Surplus Energy Payments (Fiscal 2018)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	1,044	80.31	0	0
≤ 100	103	7.92	3,949	1
>100, < 500	112	8.62	27,789	9
≥ 500, ≤ 1,000	21	1.62	13,396	4
> 1,000, ≤ 6,000	15	1.15	35,652	11
28,000 – 74,000	5	0.38	243,573	75
Total	**1,300**	**100**	**324,358**	**100**

As shown in Table 5 above, in fiscal 2018, five customers received approximately 75 per cent of the total Surplus Energy Payments, with payment amounts ranging from $28,000 to $74,000. The vast majority of customers (1,044 or 80 per cent) received no Surplus Energy Payment. Of the 256 customers who received a Surplus Energy Payment, 215 or 84 per cent received a payment of less than $500.

1.7.2 Please provide Table 5 historically over the last five years.

RESPONSE:

The tables below provide Table 5 of the Application for the past five years.

Table 5 Surplus Energy Payments (Fiscal 2019)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	**1,500**	**78.95**	**0**	**0**
≤ 100	**177**	**9.32**	**7,143**	**2**
>100, < 500	**163**	**8.58**	**37,855**	**10**
≥ 500, ≤ 1,000	**31**	**1.63**	**21,441**	**6**
> 1,000, ≤ 6,000	**23**	**1.21**	**43,418**	**12**
>6,000, < 28,000	**2**	**0.11**	**35,666**	**10**
28,000 – 74,000	**4**	**0.21**	**222,255**	**60**
Total	**1,900**	**100**	**367,778**	**100**

Table 5 Surplus Energy Payments (Fiscal 2018)

Please note that Table 5 of the Application (for fiscal 2018) was corrected, as described in BC Hydro's response to BCUC IR 1.3.1.

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	1,079	81.25	0	0
≤ 100	96	7.23	4,141	1
>100, < 500	113	8.51	28,251	9
≥ 500, ≤ 1,000	20	1.51	12,742	4
> 1,000, ≤ 6,000	15	1.13	35,652	11
28,000 – 74,000	5	0.38	243,573	75
Total	1,328	100	324,358	100

Table 5 Surplus Energy Payments (Fiscal 2017)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	756	81.91	0	0
≤ 100	70	7.58	2,390	1
>100, < 500	65	7.04	14,991	6
≥ 500, ≤ 1,000	19	2.06	12,820	5
> 1,000, ≤ 6,000	6	0.65	9,451	3
>6,000, < 28,000	3	0.33	30,548	12
28,000 – 74,000	4	0.43	192,345	73
Total	923	100	262,545	100

Table 5 Surplus Energy Payments (Fiscal 2016)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	533	83.67	0	0
≤ 100	51	8.01	1,810	1
>100, < 500	34	5.34	7,477	4
≥ 500, ≤ 1,000	10	1.57	7,609	4
> 1,000, ≤ 6,000	4	0.63	9,341	6
>6,000, < 28,000	2	0.31	24,928	15
28,000 – 74,000	3	0.47	120,834	70
Total	637	100	171,999	100

Table 5 Surplus Energy Payments (Fiscal 2015)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	356	84.97	0	0
≤ 100	27	6.44	1,206	1
>100, < 500	20	4.77	4,191	2
≥ 500, ≤ 1,000	5	1.19	3,887	2
> 1,000, ≤ 6,000	6	1.43	16,134	10
>6,000, < 28,000	2	0.48	26,185	16
28,000 – 74,000	3	0.72	116,344	69
Total	419	100	167,947	100

7.0 Reference: Exhibit B-1, page 17

Table 5 Surplus Energy Payments (Fiscal 2018)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	1,044	80.31	0	0
≤ 100	103	7.92	3,949	1
>100, < 500	112	8.62	27,789	9
≥ 500, ≤ 1,000	21	1.62	13,396	4
> 1,000, ≤ 6,000	15	1.15	35,652	11
28,000 – 74,000	5	0.38	243,573	75
Total	**1,300**	**100**	**324,358**	**100**

As shown in Table 5 above, in fiscal 2018, five customers received approximately 75 per cent of the total Surplus Energy Payments, with payment amounts ranging from $28,000 to $74,000. The vast majority of customers (1,044 or 80 per cent) received no Surplus Energy Payment. Of the 256 customers who received a Surplus Energy Payment, 215 or 84 per cent received a payment of less than $500.

1.7.3 Please provide the total rate impact on non-participating ratepayers of the surplus energy payments over the last five years.

RESPONSE:

The cost-shifting from customers in the Program to non-participants caused by Surplus Energy Payments can be quantified by the difference between the total Surplus Energy Payments provided and the value of the excess generation received by BC Hydro for those payments. This is shown in the table below, along with the corresponding rate impact, for fiscal 2015 to fiscal 2019.

Fiscal Year	Surplus Energy Payments ($)	Total Electricity Purchased Through Surplus Energy Payments (kWh)	Value of Energy Received[1] ($)	Difference Between Payments and Value Received ($)	Rate Impact
2015	**167,947**	**1,651,148**	**66,046**	**101,901**	**0.003**
2016	**171,999**	**1,721,713**	**55,095**	**116,904**	**0.003**
2017	**261,830**	**2,620,920**	**73,386**	**188,444**	**0.004**
2018	**324,358**	**3,246,827**	**94,158**	**230,200**	**0.005**
2019	**367,779**	**3,681,154**	**146,878**	**220,901**	**0.005**

In responding to this question, BC Hydro noticed an error with regards to BC Hydro's response to BCUC IR 1.9.3. This response quantified the cost-shifting from customers in the Program to non-participants caused by Surplus Energy Payments using the Total Electricity Purchased Through Surplus Energy Payments figure, adjusted to account for the estimated impact of BC Hydro's proposed amendments with regards to the Anniversary Date. The calculation should have used the unadjusted figure.

As shown in the table above, total Surplus Energy Payments in fiscal 2018 were $324,358 and the value of that energy to BC Hydro was approximately $94,158. This equates to difference of $230,200.

[1] **Based on the proposed Energy Price methodology, applied to the preceding calendar year. The historical Energy Price, by calendar year, using BC Hydro's proposed approach, is provided in BC Hydro's response to BCSEA IR 1.11.2.**

7.0 Reference: Exhibit B-1, page 17

Table 5 Surplus Energy Payments (Fiscal 2018)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	1,044	80.31	0	0
≤ 100	103	7.92	3,949	1
>100, < 500	112	8.62	27,789	9
≥ 500, ≤ 1,000	21	1.62	13,396	4
> 1,000, ≤ 6,000	15	1.15	35,652	11
28,000 – 74,000	5	0.38	243,573	75
Total	**1,300**	**100**	**324,358**	**100**

As shown in Table 5 above, in fiscal 2018, five customers received approximately 75 per cent of the total Surplus Energy Payments, with payment amounts ranging from $28,000 to $74,000. The vast majority of customers (1,044 or 80 per cent) received no Surplus Energy Payment. Of the 256 customers who received a Surplus Energy Payment, 215 or 84 per cent received a payment of less than $500.

1.7.4 What is the average % by which the surplus energy payments exceed the average annual bill? Please break down by the amount range as provided in Table 5.

RESPONSE:

The table below provides an average Surplus Energy Payment as a percentage of the total annual charges (excluding any Surplus Energy Payment which would have been applied to the customer's bill on the Anniversary Date) by the Surplus Energy Payment ranges in provided in Table 5 of the Application.

Please also refer to BC Hydro's response to BCOAPO IR 1.10.1 where we provide a breakdown of customers in the Program in fiscal 2018 by the percentage that their Surplus Energy Payment represents of their total annual charges.

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments	Average Surplus Energy Payment to Total Bill Charges without Surplus (%)
0	**1,079**	**81.25**	**0**	**0**	**0**
≤ 100	**96**	**7.23**	**4,141**	**1**	**2**
>100, < 500	**113**	**8.51**	**28,251**	**9**	**130**
≥ 500, ≤ 1,000	**20**	**1.51**	**12,742**	**4**	**515**
> 1,000, ≤ 6,000	**15**	**1.13**	**35,652**	**11**	**1927**
28,000 – 74,000	**5**	**0.38**	**243,573**	**75**	**60029**
Total	**1,328**	**100**	**324,358**	**100**	

7.0 Reference: Exhibit B-1, page 17

Table 5 Surplus Energy Payments (Fiscal 2018)

Amount Range ($)	Number of Customers	% of Overall Participants	Total Amount in Range ($)	% of Total Surplus Energy Payments
0	1,044	80.31	0	0
≤ 100	103	7.92	3,949	1
>100, < 500	112	8.62	27,789	9
≥ 500, ≤ 1,000	21	1.62	13,396	4
> 1,000, ≤ 6,000	15	1.15	35,652	11
28,000 – 74,000	5	0.38	243,573	75
Total	**1,300**	**100**	**324,358**	**100**

As shown in Table 5 above, in fiscal 2018, five customers received approximately 75 per cent of the total Surplus Energy Payments, with payment amounts ranging from $28,000 to $74,000. The vast majority of customers (1,044 or 80 per cent) received no Surplus Energy Payment. Of the 256 customers who received a Surplus Energy Payment, 215 or 84 per cent received a payment of less than $500.

1.7.5 For each of the 5 customers who received surplus energy payments ranging from $28,000 to $74,000 in 2018, please:

a) provide their historical annual billing and surplus energy payments for the last five years;
b) identify the generation type; and
c) identify their rate class.

Customers may be identified by number or letter to maintain confidentiality.

RESPONSE:

All five customers who received Surplus Energy Payment between $28,000 and $74,000 in fiscal 2018 have a hydroelectric Generating Facility. The table below provides the rate schedule and billing information for fiscal 2015 to fiscal 2019.

Cust. ID	Rate	Size	F2015		F2016		F2017		F2018		F2019	
		(kW)	Bill ($)	Surplus Energy Payment ($)	Bill ($)	Surplus Energy Payment ($)	Bill ($)	Surplus Energy Payment ($)	Bill ($)	Surplus Energy Payment ($)	Bill ($)	Surplus Energy Payment ($)
1	1101	100	60	44,691	64	46,117	67	58,541	69	73,008	71	72,066
2	1300	100					85	60,156	116	59,095	124	58,130
3	1101	50	60	41,263	64	41,880	68	41,221	69	41,994	71	41,910
4	1101	100	57	3,483	64	4,088	68	10,214	69	40,711	71	50,150
5	1300	50	75	30,390	82	32,837	86	32,428	119	28,764	124	26,937

8.0 Reference: Exhibit B-1, page 19

- Customers with premises built to the Passive House building standard may face barriers to participating in the Program due to their relatively low Annual Load;
- Customers expecting to purchase an electric vehicle would not have that incremental load reflected in the historical load used to estimate their Annual Load; and
- Over time, energy use and behaviours may change, leading to an increase or decrease in Annual Load.

1.8.1 Please provide the estimated average increase in load that would accrue from the purchase of a single electric vehicle.

RESPONSE:

The estimated average increase in load from one electric vehicle is approximately 3,200 kWh per year, assuming 16,000 kilometres driven per year and an efficiency of 0.2 KWh per kilometre. Actual consumption would vary depending on the annual distance driven and the characteristics of the vehicle.

9.0 Reference: Exhibit B-1, page 19 and page 20 and page 45 and Appendix G pages 1 and 2

- Other Suggestions (participants were able to provide written comments with this option).

In the Engagement Survey, BC Hydro presented the following options to address Oversized Generating Facilities while providing flexibility to address customer needs.

- Make the amendments proposed in the 2018 Amendment Application ongoing, with adjustments to provide greater flexibility to customers. In the Engagement Survey, the example provided for this option was to allow customers to size their Generating Facility to have an estimated Annual Energy Output up to 110 per cent of their estimated Annual Load;
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price; and

While BC Hydro does not have fiscal 2018 data for customers who entered the Program in fiscal 2019, these customers are likely to have minimal Surplus Energy Payments going forward. This is because the amendments approved in the 2018 Amendment Application were designed so that customers could not bypass an existing load on their premises or size their Generating Facility to have an estimated Annual Energy Output that was greater than their estimated Annual Load.

Table G-1 Jurisdictional Review Findings

Utility	Generating Facility Requirements	Anniversary Date	Period Between Surplus Energy Payments	Energy Price for Surplus Energy Payments
EPCOR	Annual Energy Output must match Annual Load	N/A	Monthly	Retail rate (updated monthly)
FortisBC Inc.	Customers must only intend to partially or fully offset their own load on an annual basis	March 31	12 months	RS 3808 Tranche 1 rate
Hydro One	No requirement	Based on the month that the Generation Account Balance accumulates	12 months	$0 (No Surplus Energy Payment)
Hydro Quebec	Annual Energy Output must match Annual Load	Customer choice and optimized default date	24 months	$0 (No Surplus Energy Payment)
Newfoundland Power	Annual Energy Output up to 110% of Annual Load	Based on when the customer joins the Net Metering program	12 months	Retail rate which is based on current gas market prices
Nova Scotia Power	Annual Energy Output up to 110% of Annual Load	Customer choice	12 months	Retail rate
SaskPower	No requirement	Customer choice and optimized default date	36 months	$0 (No Surplus Energy Payment)
Xcel Energy	Annual Energy Output up to 120% of Annual Load	Based on when the customer joins the Net Metering program	Indefinite or every 12 months (customer's choice)	Utility's average hourly incremental cost

1.9.1 Does 110% represent an increase from the original of 100%? If so, why did BC Hydro believe it is necessary to increase the

estimated annual energy output as a proportion of estimated annual load?

RESPONSE:

Currently, a customer's estimated Annual Load must be equal to or greater than the estimated Annual Energy Output of their Generating Facility (i.e., estimated Annual Energy Output cannot be greater than 100 per cent of estimated Annual Load).

As discussed in section 2.3 of the Application, through comments received from customers and stakeholders since the 2018 Amendment Application, BC Hydro became aware of the need to provide increased flexibility with regards to the size of a Customer's Generating Facility.

Accordingly, as discussed in section 2.7 of the Application, BC Hydro has proposed adjustments to provide additional flexibility to customers. This includes the proposal that customers (with a Generating Facility greater than 5 kW) be allowed to size their Generating Facility to have an estimated Annual Energy Output up to 110 per cent of their estimated Annual Load. As discussed in section 2.6 of the Application, this is similar to the approach taken by Newfoundland Power, Nova Scotia Power and Xcel Energy.

BC Hydro believes that this proposal, in combination with the other amendments discussed in section 2.7 of the Application, provides flexibility to customers while also maintaining the intent of the Program as a load offset program.

9.0 Reference: Exhibit B-1, page 19 and page 20 and page 45 and Appendix G pages 1 and 2

- Other Suggestions (participants were able to provide written comments with this option).

In the Engagement Survey, BC Hydro presented the following options to address Oversized Generating Facilities while providing flexibility to address customer needs.

- Make the amendments proposed in the 2018 Amendment Application ongoing, with adjustments to provide greater flexibility to customers. In the Engagement Survey, the example provided for this option was to allow customers to size their Generating Facility to have an estimated Annual Energy Output up to 110 per cent of their estimated Annual Load;
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price; and

While BC Hydro does not have fiscal 2018 data for customers who entered the Program in fiscal 2019, these customers are likely to have minimal Surplus Energy Payments going forward. This is because the amendments approved in the 2018 Amendment Application were designed so that customers could not bypass an existing load on their premises or size their Generating Facility to have an estimated Annual Energy Output that was greater than their estimated Annual Load.

Table G-1 Jurisdictional Review Findings

Utility	Generating Facility Requirements	Anniversary Date	Period Between Surplus Energy Payments	Energy Price for Surplus Energy Payments
EPCOR	Annual Energy Output must match Annual Load	N/A	Monthly	Retail rate (updated monthly)
FortisBC Inc.	Customers must only intend to partially or fully offset their own load on an annual basis	March 31	12 months	RS 3808 Tranche 1 rate
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Xcel Energy	Annual Energy Output up to 120% of Annual Load	Based on when the customer joins the Net Metering program	Indefinite or every 12 months (customer's choice)	Utility's average hourly incremental cost

1.9.2 Several utilities do not permit the generating facilities to exceed the annual load. On what basis did BC Hydro select 110% of estimated Annual Energy Output as an appropriate scale for the Generating Facility as opposed to 90%, 100%, or 120%, for example?

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.9.1.

9.0 Reference: Exhibit B-1, page 19 and page 20 and page 45 and Appendix G pages 1 and 2

- Other Suggestions (participants were able to provide written comments with this option).

In the Engagement Survey, BC Hydro presented the following options to address Oversized Generating Facilities while providing flexibility to address customer needs.

- Make the amendments proposed in the 2018 Amendment Application ongoing, with adjustments to provide greater flexibility to customers. In the Engagement Survey, the example provided for this option was to allow customers to size their Generating Facility to have an estimated Annual Energy Output up to 110 per cent of their estimated Annual Load;
- No requirement regarding the size of a customer's Generating Facility and a reduction to the Energy Price; and

While BC Hydro does not have fiscal 2018 data for customers who entered the Program in fiscal 2019, these customers are likely to have minimal Surplus Energy Payments going forward. This is because the amendments approved in the 2018 Amendment Application were designed so that customers could not bypass an existing load on their premises or size their Generating Facility to have an estimated Annual Energy Output that was greater than their estimated Annual Load.

Table G-1 Jurisdictional Review Findings

Utility	Generating Facility Requirements	Anniversary Date	Period Between Surplus Energy Payments	Energy Price for Surplus Energy Payments
EPCOR	Annual Energy Output must match Annual Load	N/A	Monthly	Retail rate (updated monthly)
FortisBC Inc.	Customers must only intend to partially or fully offset their own load on an annual basis	March 31	12 months	RS 3808 Tranche 1 rate

Utility	Generating Facility Requirements	Anniversary Date	Period Between Surplus Energy Payments	Energy Price for Surplus Energy Payments
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1.9.2 Several utilities do not permit the generating facilities to exceed the annual load. On what basis did BC Hydro select 110% of estimated Annual Energy Output as an appropriate scale for the Generating Facility as opposed to 90%, 100%, or 120%, for example?

1.9.2.1 If BC Hydro had quantitative measures to support the 110% (such as average range of annual energy output increases over time or some other measure) please provide.

RESPONSE:

BC Hydro did not use quantitative measures to inform this proposal. For further information, please refer to BC Hydro's response to CEC IR 1.9.1.

10.0 Reference: Exhibit B-1, pages 25 and 26

Table 6 below provides illustrative examples that demonstrate the benefits of an Anniversary Date that is optimized for customers in the Program. In the first example, with an Anniversary Date of September 1, the customer accumulates a Generation Account Balance of 600 kWh during the July/August billing period which is then paid out during the September/October billing period, before the customer can apply it to reduce the amount of energy they purchase from BC Hydro in a particular billing period (**Net Energy Purchased**). In the second example, with an optimized Anniversary Date of March 1, the customer accumulates the same Generation Account Balance of 600 kWh during the July/August billing period but is able to apply it to reduce their Net Energy Purchased during the November/December billing period.

Table 6 Illustrative Example of Benefits From Optimized Anniversary Date

Billing Period (All units in kWh)	Inflow	Outflow	Generation Account Balance	Net Energy Purchased by Customer	Surplus Energy Payment
Anniversary Date of September 1					
January/February	2,400	1,200	0	1,200	0
March/April	2,200	1,600	0	600	0
May/June	2,000	2,000	0	0	0
July/August	1,800	2,400	600	0	0
September/October	2,000	2,000	0	0	600
November/December	2,200	1,600	0	600	0
Total	12,600	10,800	-	2,400	600
Anniversary Date of March 1					
January/February	2,400	1,200	0	1,200	0
March/April	2,200	1,600	0	600	0
May/June	2,000	2,000	0	0	0
July/August	1,800	2,400	600	0	0
September/October	2,000	2,000	600	0	0
November/December	2,200	1,600	0	0	0
Total	12,600	10,800	-	1,800	0

As shown above, with an Anniversary Date of September 1, the Net Energy Purchased over the year is 2,400 kWh and the customer receives a Surplus Energy Payment for 600 kWh. With an optimized Anniversary Date of March 1, the Net Energy Purchased over the year is 1,800 kWh. The customer receives no Surplus Energy Payment but is able to apply their Generation Account Balance to reduce their Net Energy Purchased from BC Hydro by 600 kWh.

1.10.1 Does the optimized anniversary date make a difference in the total annual bill the customer is paying to BC Hydro (i.e. netting out the difference in receiving the payment vs offsetting their bill)? Please explain.

RESPONSE:

Yes. Using the example provided in Table 6 of the Application and assuming the RS 1101 Step 1 rate of $0.0945/kWh and an Energy Price of $0.0399/kWh, the customer's total annual payment for electricity consumption would be $32.76 less with an Anniversary Date of March 1 compared to an Anniversary Date of September 1. This calculation is shown below.

Anniversary Date of September 1:

Total = Net Energy Purchased * RS 1101 less Surplus Energy * Energy Price

= 2,400 kWh * $0.0945/kWh – 600 kWh * $0.0399/kWh

= $202.86

Anniversary Date of March 1:

Total = Net Energy Purchased * RS 1101 less Surplus Energy * Energy Price

= 1,800 kWh * $0.0945/kWh – 0 kWh * $0.0399/kWh

= $170.10

Difference: $202.86 – $170.10 = $32.76

10.0 Reference: Exhibit B-1, pages 25 and 26

Table 6 below provides illustrative examples that demonstrate the benefits of an Anniversary Date that is optimized for customers in the Program. In the first example, with an Anniversary Date of September 1, the customer accumulates a Generation Account Balance of 600 kWh during the July/August billing period which is then paid out during the September/October billing period, before the customer can apply it to reduce the amount of energy they purchase from BC Hydro in a particular billing period (**Net Energy Purchased**). In the second example, with an optimized Anniversary Date of March 1, the customer accumulates the same Generation Account Balance of 600 kWh during the July/August billing period but is able to apply it to reduce their Net Energy Purchased during the November/December billing period.

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March/April	2,200	1,600	0	600	0
May/June	2,000	2,000	0	0	0
July/August	1,800	2,400	600	0	0
September/October	2,000	2,000	0	0	600
November/December	2,200	1,600	0	600	0
Total	12,600	10,800	-	2,400	600
Anniversary Date of March 1					
January/February	2,400	1,200	0	1,200	0
March/April	2,200	1,600	0	600	0
May/June	2,000	2,000	0	0	0
July/August	1,800	2,400	600	0	0
September/October	2,000	2,000	600	0	0
November/December	2,200	1,600	0	0	0
Total	12,600	10,800	-	1,800	0

As shown above, with an Anniversary Date of September 1, the Net Energy Purchased over the year is 2,400 kWh and the customer receives a Surplus Energy Payment for 600 kWh. With an optimized Anniversary Date of March 1, the Net Energy Purchased over the year is 1,800 kWh. The customer receives no Surplus Energy Payment but is able to apply their Generation Account Balance to reduce their Net Energy Purchased from BC Hydro by 600 kWh.

1.10.2 If the difference in anniversary date creates an overall difference in the total net amount paid by the customer, please provide examples and include the total bill impacts that would arise from the two different options above, assuming the customer is on the residential tariff.

RESPONSE:

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

10.0 Reference: Exhibit B-1, pages 25 and 26

Table 6 below provides illustrative examples that demonstrate the benefits of an Anniversary Date that is optimized for customers in the Program. In the first example, with an Anniversary Date of September 1, the customer accumulates a Generation Account Balance of 600 kWh during the July/August billing period which is then paid out during the September/October billing period, before the customer can apply it to reduce the amount of energy they purchase from BC Hydro in a particular billing period (**Net Energy Purchased**). In the second example, with an optimized Anniversary Date of March 1, the customer accumulates the same Generation Account Balance of 600 kWh during the July/August billing period but is able to apply it to reduce their Net Energy Purchased during the November/December billing period.

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November/December	2,200	1,600	0	600	0
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July/August	1,800	2,400	600	0	0
September/October	2,000	2,000	600	0	0
November/December	2,200	1,600	0	0	0
Total	12,600	10,800	-	1,800	0

As shown above, with an Anniversary Date of September 1, the Net Energy Purchased over the year is 2,400 kWh and the customer receives a Surplus Energy Payment for 600 kWh. With an optimized Anniversary Date of March 1, the Net Energy Purchased over the year is 1,800 kWh. The customer receives no Surplus Energy Payment but is able to apply their Generation Account Balance to reduce their Net Energy Purchased from BC Hydro by 600 kWh.

1.10.3 Is BC Hydro able to carry the July/August excess in its hydro storage through to the fall, or are there economic limits imposed by excess freshet energy or by limitation of Powerex opportunities? Please explain and quantify.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.14.3 where we explain that BC Hydro does not provide storage on its system.

11.0 Reference: Exhibit B-1, page 31 and 32

The Evaluation Report notes that customers value the ability to use their Generation Account Balance to reduce their supply from BC Hydro and that BC Hydro has received suggestions to either set an optimal Anniversary Date or allow customers to choose their own Anniversary Date.

3.6 Proposed Amendments Would Provide Customers With Increased Opportunities and Flexibility to Reduce Their Supply From BC Hydro

BC Hydro has considered the Engagement Survey Results, the Jurisdictional Review and the Evaluation Report and is requesting BCUC approval to:

- Assign all customers an Anniversary Date of March 1, an optimized Anniversary Date for customers with solar photovoltaic Generating Facilities, which is the type of Generating Facility installed by 98 per cent of current customers in the Program; and
- Allow customers to choose their Anniversary Date once.

These amendments would allow customers to choose the Anniversary Date that is best for them while also setting a default Anniversary Date that is optimized for the vast majority of customers in the Program. This dual approach would provide

customers with flexibility while also setting a default option that provides benefits to those customers who are unaware of their option to choose their Anniversary Date or feel they do not have enough information to make an informed choice. As the Canadian Solar Industries Association explained in their written submission to BC Hydro:

> "The customer should be given the option to specify an anniversary date on their application or be given the default of March 1st. A default date ensures existing customers who have not made chosen a date utilize their net metering system at maximum profitability."

1.11.1 Please explain BC Hydro's view of the 'value' that customers place on being able to reduce their BC Hydro bill as opposed to receiving a payment.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.4 where we explain that assuming the rate charged to customers, under their applicable Rate Schedule, is greater than the Energy Price, it would be economical for customers to maximize their opportunity to offset their consumption and minimize their Surplus Energy Payment.

Please also refer to BC Hydro's response to BCUC IR 1.8.3 where we discuss the financial impact of the proposed amendments with regards to the Anniversary Date and to BC Hydro's response to CEC IR 1.10.1 where we calculate the financial impact based on the example provided in Table 6 of the Application.

11.0 Reference: Exhibit B-1, page 31 and 32

The Evaluation Report notes that customers value the ability to use their Generation Account Balance to reduce their supply from BC Hydro and that BC Hydro has received suggestions to either set an optimal Anniversary Date or allow customers to choose their own Anniversary Date.

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customers with flexibility while also setting a default option that provides benefits to those customers who are unaware of their option to choose their Anniversary Date or feel they do not have enough information to make an informed choice. As the Canadian Solar Industries Association explained in their written submission to BC Hydro:

> "The customer should be given the option to specify an anniversary date on their application or be given the default of March 1st. A default date ensures existing customers who have not made chosen a date utilize their net metering system at maximum profitability."

1.11.2 Please confirm or otherwise explain that a customer who originally uses the default anniversary date for a period of time still retains the one-time option to select an anniversary date of their choosing.

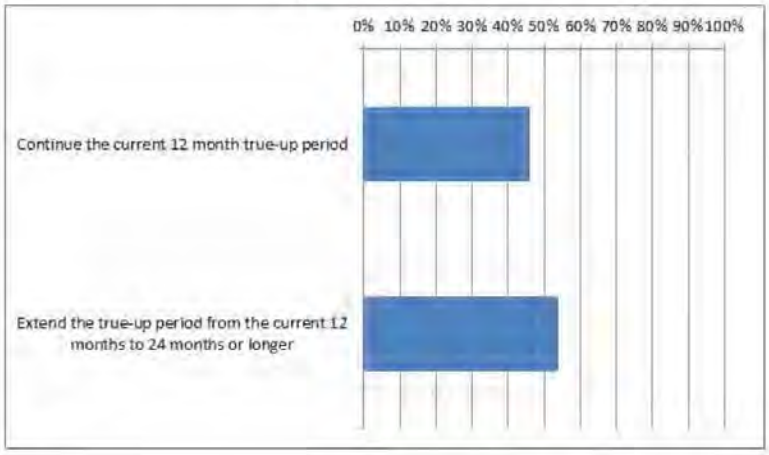
RESPONSE:

Confirmed.

12.0 Exhibit B-1, pages 28 and 29 and page 32

As shown in Figure 5 below, the Engagement Survey Results indicate that participants did not have a strong preference with regards to whether the period of time to accumulate and apply a Generation Account Balance between Surplus Energy Payments should be extended with 46 per cent supporting no change and 54 per cent supporting an extension.

Figure 5 Engagement Survey Results – Extending the Period Between Surplus Energy Payments



Given the Engagement Survey Results which indicated that participants did not have a strong preference with regards to whether the period of time to accumulate and apply a Generation Account Balance between Surplus Energy Payments should be extended, BC Hydro is not requesting BCUC approval for any amendments with regards to this provision, in the Application.

1.12.1 Please comment on the benefits that customers could receive, or perceive to receive, by a longer true-up period.

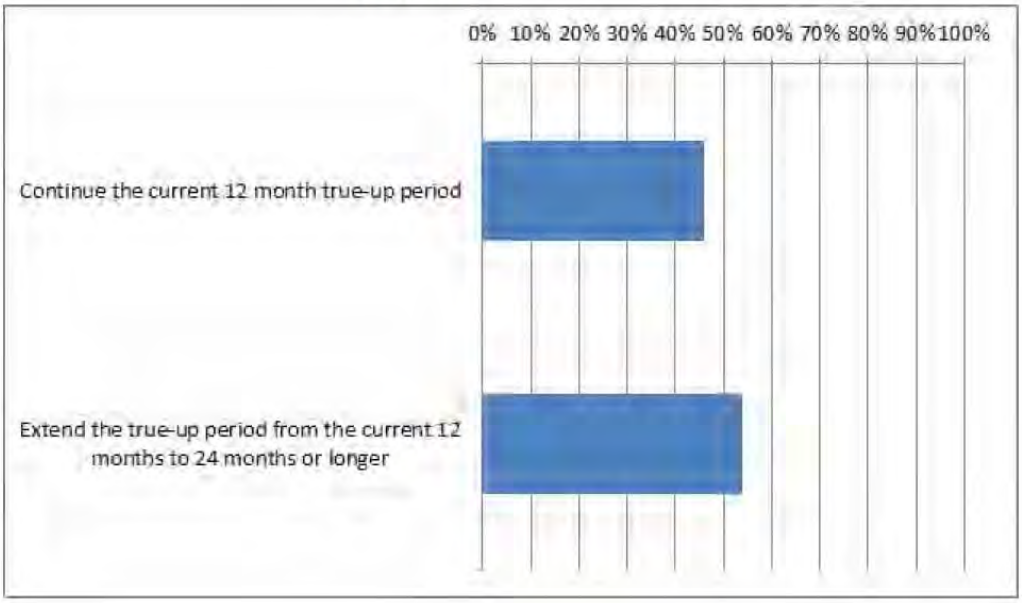
RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.5 where we discuss the implications of extending the true-up period from the perspective of customers in the Program.

12.0 Exhibit B-1, pages 28 and 29 and page 32

As shown in Figure 5 below, the Engagement Survey Results indicate that participants did not have a strong preference with regards to whether the period of time to accumulate and apply a Generation Account Balance between Surplus Energy Payments should be extended with 46 per cent supporting no change and 54 per cent supporting an extension.

Figure 5 Engagement Survey Results – Extending the Period Between Surplus Energy Payments



Given the Engagement Survey Results which indicated that participants did not have a strong preference with regards to whether the period of time to accumulate and apply a Generation Account Balance between Surplus Energy Payments should be extended, BC Hydro is not requesting BCUC approval for any amendments with regards to this provision, in the Application.

1.12.2 Are there any risks attached either to the customer or to BC Hydro of a longer true up period? Please explain.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.5 where we discuss the implications of extending the true-up period from the perspective of customers in the Program.

From BC Hydro's perspective, an extended true-up period would increase cost shifting from participating customers to non-participating customers (assuming that the rate paid by the customer, under their applicable Rate Schedule, is greater than the Energy Price).

13.0 Reference: Exhibit B-1, page 35

BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term.

If energy from the Program cannot be valued at a long-run price, then it must be valued at a short-run price that reflects its value at the point in time that it is received. The short-run value of energy received by BC Hydro is determined by the regional wholesale energy market as this is primarily where BC Hydro sells or acquires energy on a short-run basis.

It is important to recognize that the current design of the Program, which allows customers to apply a Generation Account Balance towards future consumption, means that energy received from the Program is valued at both the retail rate and the Energy Price.

While valuing energy received from the Program at the retail rate is not economic and does not reflect its actual value as a short-run resource, BC Hydro believes that this approach is necessary to support the intent of the Program and is consistent BCUC's determination that limited cost-shifting is warranted to support the implementation of net metering, given the relatively small size of the Program at this time. However, setting the Energy Price on a long-run basis, when the energy received only has a short-run value, goes beyond limited cost-shifting and does not represent a fair value to non-participating customers.

1.13.1 Please provide the meaning of 'retail rate' in this context.

RESPONSE:

Retail rate, as referenced in the preamble to the question, means the tariff rate paid by the customer under their applicable Rate Schedule.

13.0 Reference: Exhibit B-1, page 35

> BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term.
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1.13.2 Please confirm that during periods of surplus, the value of the energy received from customers to BC Hydro could appropriately be valued at the price that it can be sold for at Mid C, less the cost of transmission.

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 1.10.5, BC Hydro has recently adopted the market price as a conservative interim assumption for evaluating energy during surplus and deficit periods.

Please also refer to BC Hydro's response to BCSEA IR 1.11.1 where we explain that the rationale for using an unadjusted Mid-C price as the Energy Price and to BC Hydro's response to NMRG IR 1.4.1 where we explain that Mid-C is well established as an appropriate proxy for market value in the Electric Tariff and that excess energy from customers in the Program has negligible direct value in wholesale markets.

13.0 Reference: Exhibit B-1, page 35

> BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term.
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1.13.2 Please confirm that during periods of surplus, the value of the energy received from customers to BC Hydro could appropriately be valued at the price that it can be sold for at Mid C, less the cost of transmission.

1.13.2.1 If not confirmed, please explain why not.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.13.2

13.0 Reference: Exhibit B-1, page 35

> BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term.
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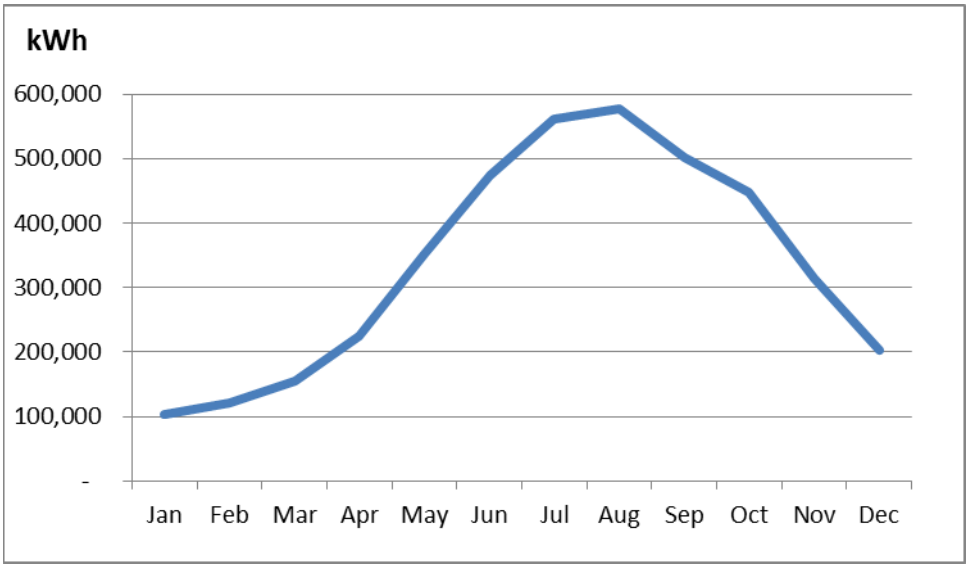
1.13.3 Please provide the curve for the average amount of energy (over 5 years) received from the net metering tariff by month over the course of a year.

RESPONSE:

The chart below provides the curve for the average amount of energy (over five years) received from customers in the Program, by month, over the course of a year.



Please also refer to BC Hydro's response to BCUC IR 1.14.2 which provides net consumption (inflow) and net generation (outflow) patterns, by season, for residential and Small General Service customers in the Program, based on fiscal 2016 data.

13.0 Reference: Exhibit B-1, page 35

BC Hydro and consequently, BC Hydro is unable to consider generation from the Program as part of its supply side resources. This means that energy from the Program does not have a long-run value because it cannot be used to displace or reduce BC Hydro's need to acquire new generation resources, over the long-term.

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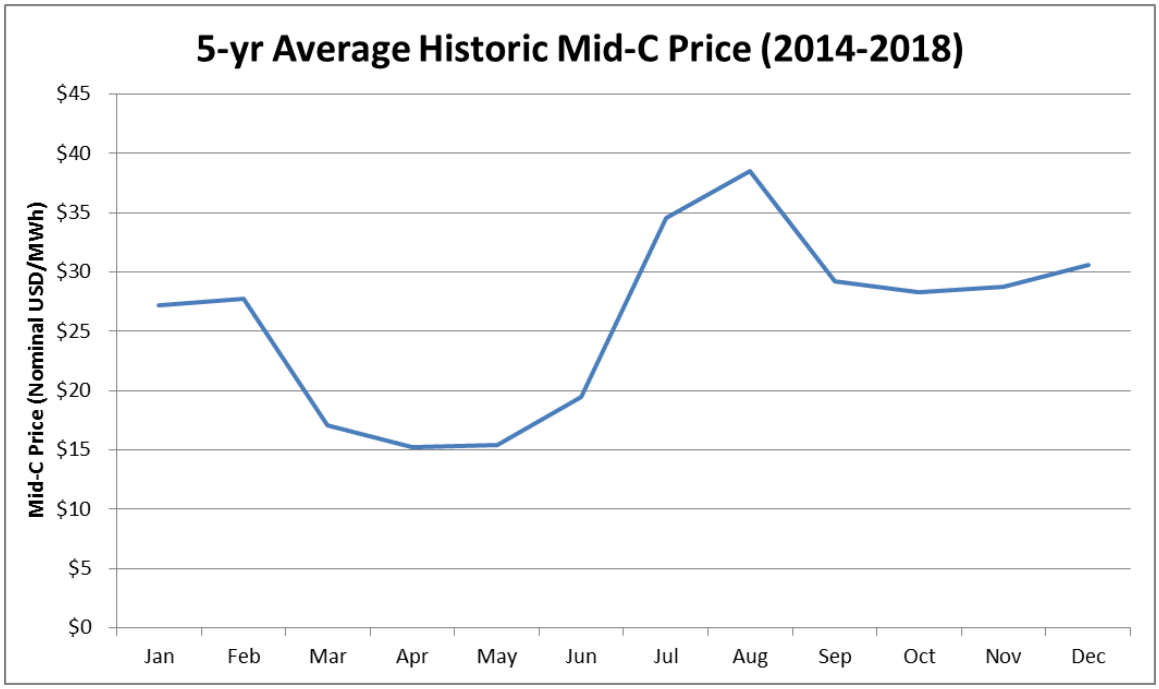
1.13.4 Please provide the curve for the average price of energy (over 5 years) at Mid C by month over the course of a year.

RESPONSE:

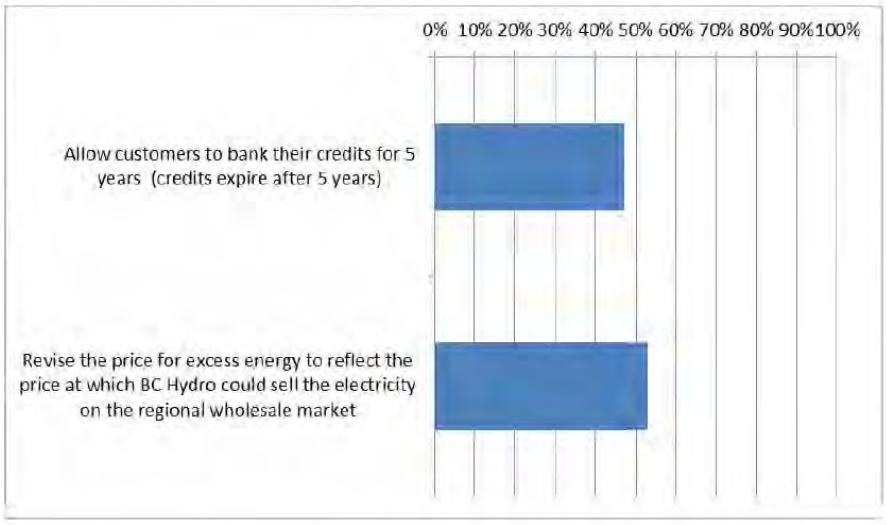
The average of the nominal monthly Mid-C market electricity prices over the period 2014 to 2018 is shown in the graph below.


5-yr Average Historic Mid-C Price (2014-2018)
Mid-C Price (Nominal USD/MWh)
$45
$40
$35
$30
$25
$20
$15
$10
$5
$0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

14.0 Reference: Exhibit B-1, page 36

> **4.4 Engagement Survey Results Indicate Slight Majority Support Revised Energy Price Compared to Option of Having Generation Account Balance Expire After An Extended Period**
>
> As shown in Figure 6 below, the Engagement Survey Results indicate that a slight majority (53 per cent) of participants support revising the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market compared to an alternative of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire.

Figure 6 Engagement Survey Results – Energy Price



1.14.1 What information was provided to customers with regard to the price that BC Hydro would expect to achieve if it were to reflect the regional wholesale market.

RESPONSE:

During the webinars, BC Hydro communicated that, based on historical data, the Energy Price would likely be in the range of 3 to 4 cents per kWh.

14.0 Reference: Exhibit B-1, page 36

4.4 Engagement Survey Results Indicate Slight Majority Support Revised Energy Price Compared to Option of Having Generation Account Balance Expire After An Extended Period

As shown in Figure 6 below, the Engagement Survey Results indicate that a slight majority (53 per cent) of participants support revising the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market compared to an alternative of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire.

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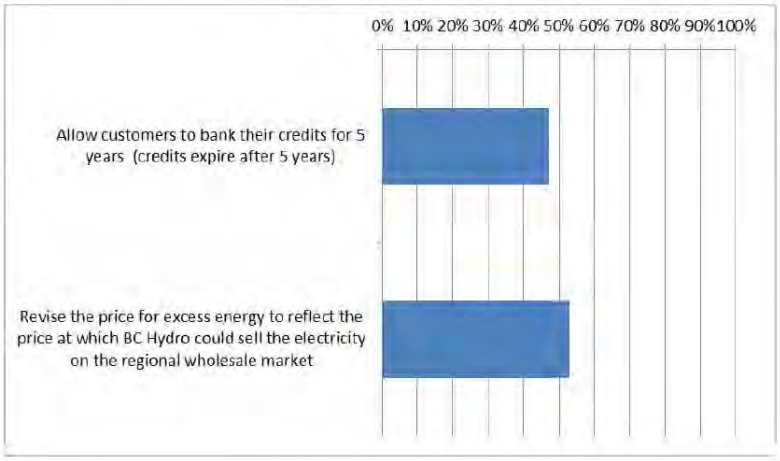

1.14.2 Please confirm that the value of the energy in offsetting customers' own consumption (rather than in a payout at the Energy Price) is appropriately calculated at the marginal cost of the energy under the customer's applicable tariff rate.

RESPONSE:

Not confirmed. Please refer to BC Hydro's response to BCUC IR 1.5.2.2 where we illustrate the cost-shifting that occurs from the ability of customers in the Program to accumulate a Generation Account Balance to offset their consumption in a subsequent billing period.

The value to a customer from accumulating a Generation Account Balance to offset their consumption in a subsequent billing period, rather than receiving a Surplus Energy Payment at the Energy Price, is calculated using the customer's applicable tariff rate. The applicable tariff rate also represents the value of lost revenue to BC Hydro.

As discussed in BC Hydro's response to BCUC IR 1.5.1, the update to the Energy Price proposed in the Application is only intended to address the cost-shifting that occurs with regards to Surplus Energy Payments.

14.0 Reference: Exhibit B-1, page 36

4.4 Engagement Survey Results Indicate Slight Majority Support Revised Energy Price Compared to Option of Having Generation Account Balance Expire After An Extended Period

As shown in Figure 6 below, the Engagement Survey Results indicate that a slight majority (53 per cent) of participants support revising the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market compared to an alternative of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire.

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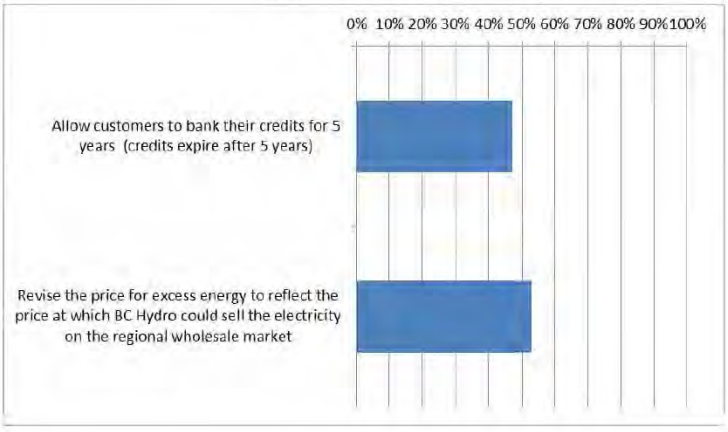

1.14.2 Please confirm that the value of the energy in offsetting customers' own consumption (rather than in a payout at the Energy Price) is appropriately calculated at the marginal cost of the energy under the customer's applicable tariff rate.

1.14.2.1 If not confirmed, please explain why not.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.14.2.

14.0 Reference: Exhibit B-1, page 36

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As shown in Figure 6 below, the Engagement Survey Results indicate that a slight majority (53 per cent) of participants support revising the Energy Price to reflect the price at which BC Hydro could sell the electricity on the regional wholesale market compared to an alternative of extending the period of time that customers are able to accumulate and apply their Generation Account Balance against their consumption to five years, after which any remaining Generation Account Balance would expire.

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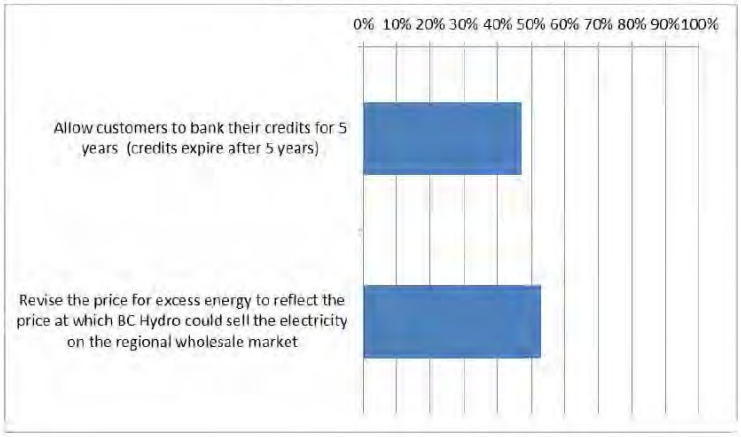


1.14.2 Please confirm that the value of the energy in offsetting customers' own consumption (rather than in a payout at the Energy Price) is appropriately calculated at the marginal cost of the energy under the customer's applicable tariff rate.

1.14.2.2 If confirmed, please confirm that this is the value to both the customer in terms of unspent dollars and to BC Hydro in terms of foregone revenue.

RESPONSE:

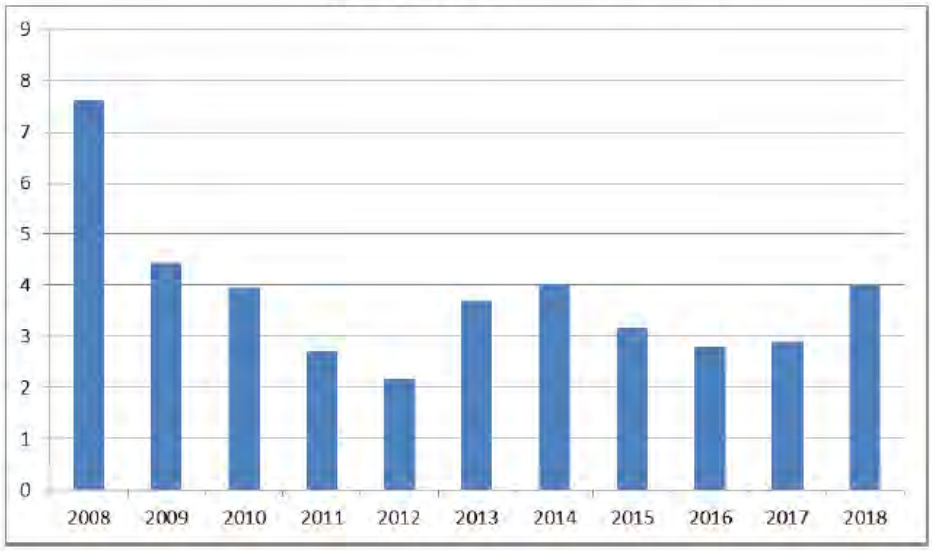
Please refer to BC Hydro's response to CEC IR 1.14.2.

15.0 Reference: Exhibit B-1, page 39 and page 40

The Mid-Columbia market price fluctuates constantly based on a number of factors such as the availability of supply resources, the demand for electricity, weather conditions, gas market prices and exchange rates. The most accurate way to determine and update the Energy Price would be to adopt a dynamic price that reflects these real-time price signals. While this may be possible over time, BC Hydro recognizes that changing the basis of the Energy Price from a long-run to a short-run value, is, in itself, a significant change and that adopting a dynamic pricing approach would require additional education and engagement. Therefore, BC Hydro proposes a simple approach where the Energy Price would be updated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year.

To sell electricity into the Mid-Columbia market, BC Hydro incurs costs to deliver the electricity, such as line losses and wheeling charges. However, to maintain a simple approach and to recognize the BCUC's previous determination that limited cost-shifting is warranted to support the implementation of net metering, BC Hydro does not believe that Energy Price should be adjusted to account for these costs.

Figure 7 Historical Energy Price by Calendar Year Using BC Hydro's Proposed Approach (cents per kWh)



1.15.1 Please explain why BC Hydro selected January 1st instead of some other time of year for updating the energy price.

RESPONSE:

BC Hydro believes that, to support customer understanding and design simplicity, an annual update should be aligned with either the calendar year (January 1 update) or BC Hydro's fiscal year (April 1 update).

As explained in section 3.1 of the Application, 98 per cent of customers in the Program have a solar photovoltaic Generating Facility and an optimized Anniversary Date for those customers would likely be some time in the spring.

This means that many customers may choose an Anniversary Date just prior to April 1 and many customers may choose an Anniversary Date just after April 1.

Accordingly, BC Hydro decided to propose a January 1 update for ease of administration and so that the Energy Price is updated in advance of the Anniversary Date for most customers.

15.0 Reference: Exhibit B-1, page 39 and page 40

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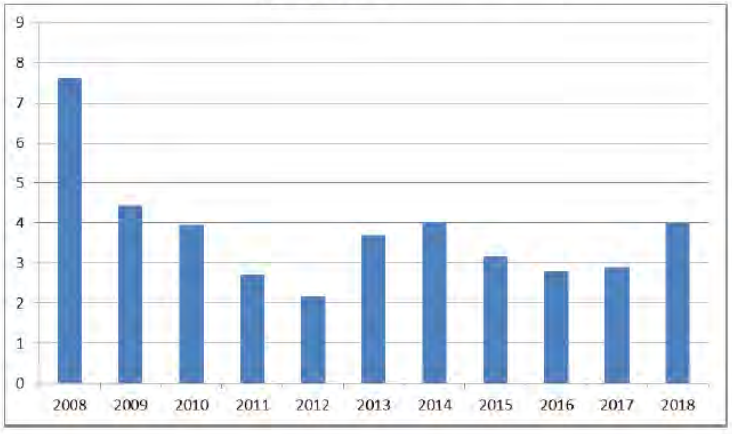

1.15.2 Could BC Hydro potentially use a forecast instead? Please explain why or why not.

RESPONSE:

Yes; however, as discussed in BC Hydro's response to BCSEA IR 1.9.9.1, for simplicity and because the Energy Price applies to energy already received by BC Hydro, we are proposing to use a historical average market price, based on the previous calendar year.

15.0 Reference: Exhibit B-1, page 39 and page 40

The Mid-Columbia market price fluctuates constantly based on a number of factors such as the availability of supply resources, the demand for electricity, weather conditions, gas market prices and exchange rates. The most accurate way to determine and update the Energy Price would be to adopt a dynamic price that reflects these real-time price signals. While this may be possible over time, BC Hydro recognizes that changing the basis of the Energy Price from a long-run to a short-run value, is, in itself, a significant change and that adopting a dynamic pricing approach would require additional education and engagement. Therefore, BC Hydro proposes a simple approach where the Energy Price would be updated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year.

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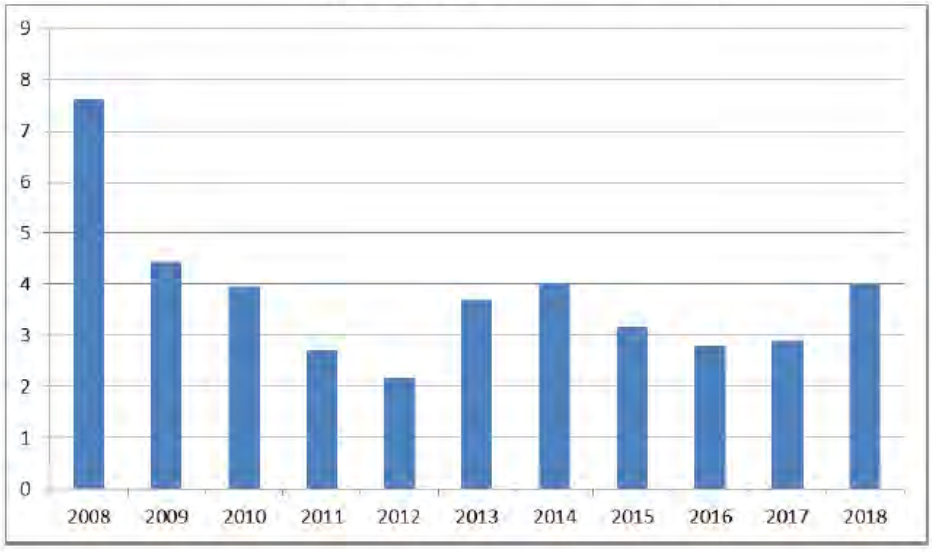

1.15.3 Please provide an estimate of the average amount that line losses, wheeling charges and other costs add to the delivery of electricity on a per kWh basis as well as a percentage of the

market price. Please specify if the charges are fully variable or if there are fixed components to the costs and identify which apply to the various cost items.

RESPONSE:

Delivering energy from B.C. at the Mid-C market hub has transmission costs associated with line losses and wheeling through the Bonneville Power Administration (BPA) system.

The wheeling charges are fixed at USD $5.16/MWh while the line losses are calculated as 1.9 per cent of the amount of energy transacted. Accordingly, the cost of line losses varies with the Mid-C price.

Please also refer to BC Hydro's response to BCOAPO IR 1.8.2 where we provide a calculation of these transmission costs as a percentage of the market price for a range of theoretical market prices.

15.0 Reference: Exhibit B-1, page 39 and page 40

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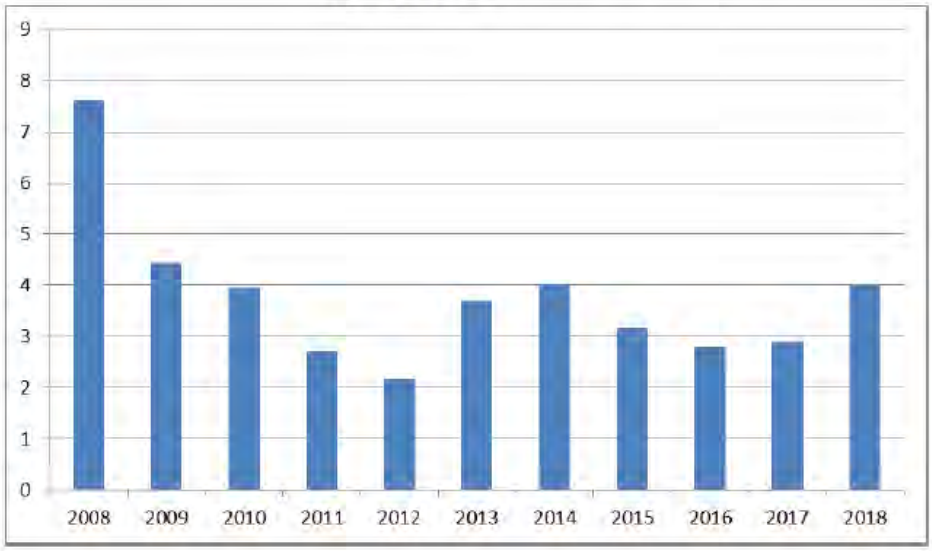

1.15.4 If the BCUC were to order that the costs to deliver electricity were to be included in the energy price, please provide the calculations necessary to determine what those costs should be, and the amounts that would be applicable in 2018.

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IR 1.8.2 where we provide the Energy Price with and without an adjustment for line losses and wheeling charges, based on a range of theoretical annual average Mid-C market prices.

The following calculation would determine the line losses and wheeling charges for the Energy Price based on calendar year 2018 data.

Annual Average Mid-C Price (2018): USD $30.76/MWh.

Line Losses: (1.9% x USD $30.76/MWh) = USD $0.58/MWh.

Wheeling Charges: USD $5.16/MWh.

Total Cost for 2018 (USD): $0.58 + $5.16 = USD $5.74/MWh.

2018 Exchange Rate = 1.2957 CAD/USD
(source: https://www.bankofcanada.ca/rates/exchange/annual-average-exchange-rates/).

Total Cost for 2018 (CAD): $5.74 x 1.2957 = CAD $7.44/MWh ($0.00744/KWh).

16.0 Reference: Exhibit B-1, page 41 and Appendix F page 31 of 53 and page 38 of 53

5.1 Clarification Would Help Prevent Unsafe Connections

As explained in section 9.1.6 of the Evaluation Report, some BC Hydro customers have installed generation at their residences or businesses without BC Hydro's knowledge or approval. This unauthorized generation may pose a safety hazard to BC Hydro employees and other customers, and can negatively impact power quality and reliability.

To help address this issue, BC Hydro is proposing an amendment to clarify that generation connections are not permitted except through an interconnection agreement or through the Program.

9.1.6 Unauthorized Generator Connections

Some BC Hydro customers have installed generation at their residences or businesses without BC Hydro's knowledge or approval. This unauthorized generation may pose a safety hazard to BC Hydro employees and other customers, and can negatively impact power quality and reliability. In one case a solar PV system was installed with inverters that were not approved for use in Canada, which could have resulted in a serious safety issue. To address this issue, BC Hydro may consider revising the language in the Electric Tariff to clarify that customers must seek and receive approval to connect generation under RS 1289 or have a signed interconnection agreement. Our Distributed Generation Interconnection Practices graphic in Appendix B, under the Other Program Type category, outlines the process to be followed by customer generation projects that do not fit into the suite of DG offers.

- Unauthorized generation is a serious issue for BC Hydro as it may pose a safety hazard to BC Hydro employees and other customers and may impact power quality and reliability. BC Hydro may revise the language in the Electric Tariff text to clarify that customers need to have approval to connect generation under RS 1289 or have a signed interconnection agreement with BC Hydro.

  BC Hydro is working to develop a process to identify and remove unauthorized generation.

- With the deployment of smart meters, in the last two years, BC Hydro has a small number of customers with a Legacy Meter wanting to participate in Net Metering. While RS 1289 requires a bi-directional meter, we have had customers challenge this requirement claiming that Legacy Meters are also bi-directional. The wording in the RS 1289 metering section could be improved to clarify that only bi-directional Smart Meters are required. This would eliminate any confusion that may arise regarding Legacy Meters.

1.16.1 What penalties, if any, does BC Hydro levy for unauthorized generation and interconnection?

RESPONSE:

In most cases of unauthorized generation, BC Hydro has been able to resolve the issue with the customer because the customer either permanently disconnects their generation or applies to interconnect their generation and obtains BC Hydro's authorization to connect. There are no penalties in these cases.

If a customer refuses to disconnect unauthorized generation, BC Hydro may disconnect service to the customer. If service is disconnected and the customer re-applies for service, the customer would be required to pay the greater of the Minimum Reconnection Charge, as set out in section 11.3 of the Electric Tariff (Minimum Reconnection Charges) or BC Hydro's estimated cost to restore Service, as described in section 2.10 of the Electric Tariff.

16.0 Reference: Exhibit B-1, page 41 and Appendix F page 31 of 53 and page 38 of 53

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1.16.2 Does unauthorized generation typically accompany unauthorized acquisition of energy as well, or is this a separate issue altogether? Please explain.

RESPONSE:

BC Hydro understands that "unauthorized acquisition of energy" is energy taken by a customer outside of the terms of the tariff and without agreement from BC Hydro. This is a separate issue from unauthorized generation whereby a customer connects to BC Hydro's system and does not follow the BC Hydro interconnection process and requirements.

16.0 Reference: Exhibit B-1, page 41 and Appendix F page 31 of 53 and page 38 of 53

5.1 Clarification Would Help Prevent Unsafe Connections

As explained in section 9.1.6 of the Evaluation Report, some BC Hydro customers have installed generation at their residences or businesses without BC Hydro's knowledge or approval. This unauthorized generation may pose a safety hazard to BC Hydro employees and other customers, and can negatively impact power quality and reliability.

To help address this issue, BC Hydro is proposing an amendment to clarify that generation connections are not permitted except through an interconnection agreement or through the Program.

9.1.6 Unauthorized Generator Connections

Some BC Hydro customers have installed generation at their residences or businesses without BC Hydro's knowledge or approval. This unauthorized generation may pose a safety hazard to BC Hydro employees and other customers, and can negatively impact power quality and reliability. In one case a solar PV system was installed with inverters that were not approved for use in Canada, which could have resulted in a serious safety issue. To address this issue, BC Hydro may consider revising the language in the Electric Tariff to clarify that customers must seek and receive approval to connect generation under RS 1289 or have a signed interconnection agreement. Our Distributed Generation Interconnection Practices graphic in Appendix B, under the Other Program Type category, outlines the process to be followed by customer generation projects that do not fit into the suite of DG offers.

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- With the deployment of smart meters, in the last two years, BC Hydro has a small number of customers with a Legacy Meter wanting to participate in Net Metering. While RS 1289 requires a bi-directional meter, we have had customers challenge this requirement claiming that Legacy Meters are also bi-directional. The wording in the RS 1289 metering section could be improved to clarify that only bi-directional Smart Meters are required. This would eliminate any confusion that may arise regarding Legacy Meters.

1.16.3 Please confirm or otherwise explain that customers with unauthorized generation are not able to offset their energy bills and do not receive compensation from BC Hydro in any form.

RESPONSE:

BC Hydro does not compensate customers with unauthorized generators for energy received by BC Hydro; however, the energy produced and consumed by the customer offsets the customer's load and reduces the amount of energy purchased from BC Hydro by the customer.

16.0 Reference: Exhibit B-1, page 41 and Appendix F page 31 of 53 and page 38 of 53

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1.16.4 What is a customers' purpose in having unauthorized generation? Please explain.

RESPONSE:

Customers typically install generation to offset all or part of their load. BC Hydro is aware of the following reasons why a customer may decide to install generation without following BC Hydro's generator interconnection process:

- **The customer has willfully installed electrical equipment that is not certified for use in BC and that BC Hydro has previously rejected;**
- **The customer is not aware of the electrical code and BC Hydro's generator interconnection requirements; or**
- **The customer wishes to avoid real or perceived interconnection process barriers.**

16.0 Reference: Exhibit B-1, page 41 and Appendix F page 31 of 53 and page 38 of 53

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1.16.5 Please elaborate on the activities that BC Hydro is undertaking to identify unauthorized generation connections.

RESPONSE:

BC Hydro identifies unauthorized generation connections by using Smart Meter data to detect power received from customers who are not authorized to generate and from field crews, who identify the presence of unauthorized generation through visual sightings and the detection of unexpected electrical back-feed.

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1.16.6 Does BC Hydro inspect all the initial connections under the tariff, or have an authorized representative do so? Please explain.

RESPONSE:

Before providing Interconnection Approval, BC Hydro requires the Customer to submit a copy of the final electrical inspection report or approval issued by the governmental authority that has jurisdiction. This process is in place so that Generating Facilities use equipment certified for use in British Columbia that is installed in accordance with the BC Electrical Safety Regulation.

For all Simple Projects (i.e., an inverter-based system less than 27 kW certified to CSA C22.2 No. 107.1-01 for utility interconnection that is installed in accordance with CSA C22.1), BC Hydro does not travel to a Customer's site to perform a field verification.

For Complex projects using a rotating machine (e.g., induction or synchronous generators), BC Hydro typically visits the Customer's generating facility to perform a field verification.

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1.16.7 Is BC Hydro of the view that customers have access to, and have read the tariff but are still not aware of the requirement for an interconnection agreement, or are there other forces at play that are resulting in customers interconnecting without authorization? Please explain.

RESPONSE:

The intent of the proposed amendment in the Application is to clarify for customers that they are required to have authorization from BC Hydro to connect their generation.

Please refer to BC Hydro's response to CEC IR 1.16.4, where we provide reasons why some customers may interconnect generation without authorization from BC Hydro.

16.0 Reference: Exhibit B-1, page 41 and Appendix F page 31 of 53 and page 38 of 53

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1.16.7.1 If there are other forces at work that are resulting in unauthorized connections, what additional actions is BC Hydro taking to ensure customers are aware of the need for authorization? Please explain.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.16.4 where we provide reasons for unauthorized generation connections.

BC Hydro actions to increase awareness include:

- **Meetings with electrical inspection authorities, such as Technical Safety BC and city electrical inspection departments;**
- **Presentations at renewable energy industry seminars and conferences; and**
- **Posting information on our web site (for example, see: https://www.bchydro.com/work-with-us/selling-clean-energy/net-metering/how_to_apply.html).**

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1.16.8 When does BC Hydro expect to have a process to identify and remove unauthorized generation? Please explain.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.16.5.

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1.16.9 Did the installation of Smart Meters provide BC Hydro with all the necessary information to identify unauthorized generation? Please explain.

RESPONSE:

Smart Meters are used to identify customers with energy flows to BC Hydro that are not authorized to generate. BC Hydro can use this information to open an investigation to determine if the energy flows are due to unauthorized generation.

Smart meters are not able to detect unauthorized generation where there is no energy flow to BC Hydro from the customer (i.e., the customer load is always greater than the generation).

16.0 Reference: Exhibit B-1, page 41 and Appendix F page 31 of 53 and page 38 of 53

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1.16.10 Please confirm, or otherwise explain, that Legacy meters are not bi-directional and are not capable of collecting and/or providing the necessary information to BC Hydro.

RESPONSE:

Confirmed. Legacy meters are not bi-directional meters and are not suitable for metering under Rate Schedule 1289.

Measurement Canada defines a bi-directional meter as a meter that has the capacity to meter delivered energy or received energy and to record the energy in separate registers.

17.0 Reference: Exhibit B-1, Appendix F, page 39 of 53

12.2 Future Considerations

BC Hydro offers the following future next steps and considerations to improve the existing Net Metering program in either the next Rate Design Application review expected in F2018 and/or in a separate Net Metering filing in the future as required:

1. Leasing – while this is still a new opportunity in BC, it is too early to determine if it will contribute to a significant growth in Net Metering customers. BC Hydro will continue to monitor the Net Metering participation rates.
2. Recovery of Fixed Infrastructure costs – we will continue to monitor the growth rate of Net Metering participation and the costs being paid by Net Metering customers to determine whether changes to the RS 1289 are needed for the recovery of fixed infrastructure costs from BC Hydro's Net Metering customers.
3. System constraints – BC Hydro will consider modifying tariff RS 1289 in the future to clarify our ability to reject projects that trigger significant costs to BC Hydro or could be a safety or risk to BC Hydro's operating systems.
4. Non-Integrated Areas – we have already adopted a practice identifying those areas that are constrained and recommending that customers not purchase any generation equipment before their Net Metering application is accepted by BC Hydro. We will consider modifying RS 1289 in the future to clarify BC Hydro's ability to reject applications in the NIA.
5. Virtual Net Metering – given that this is a relatively new trend, and we've only received a few inquiries, BC Hydro will continue to monitor the level of interest and policy development in other jurisdictions.
6. Unauthorized connections – consider modifying the Electric Tariff to clarify the treatment of unauthorized generator connections by stating that customers need to have approval to connect generation under RS 1289 or have a signed interconnection agreement with BC Hydro.
7. Net Metering Energy Price – based on the results of the SOP pricing review, the Net Metering Energy Price will be reviewed to ensure alignment with changing technological advancements and our changing system needs.
8. Anniversary date – given the low interest at this time, we will monitor this issue and explore possible options to address.
9. Smart Meter – consider modifying RS 1289, eligibility and metering section in the future to clarify that the Net Metering program is available only to customers with acceptable installed smart metering equipment.

1.17.1 Does BC Hydro have a threshold at which it believes that the recovery of fixed infrastructure costs would be appropriate? Please explain.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.1 where we explain that BC Hydro did not intend to suggest that there was a specific level of cost-shifting that would prompt BC Hydro to propose amendments to further improve cost recovery from Program participants.

17.0 Reference: Exhibit B-1, Appendix F, page 39 of 53

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1.17.1 Does BC Hydro have a threshold at which it believes that the recovery of fixed infrastructure costs would be appropriate? Please explain.

1.17.1.1 If yes, please provide.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.1 where we explain that BC Hydro did not intend to suggest that there was a specific level of cost-shifting that would prompt BC Hydro to propose amendments to further improve cost recovery from Program participants.

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1.17.1 Does BC Hydro have a threshold at which it believes that the recovery of fixed infrastructure costs would be appropriate? Please explain.

1.17.1.2 If no, how and when can the Commission determine at what point it would be appropriate for the tariff to recover fixed costs? Please explain.

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 1.18.1, BC Hydro will monitor the level of cost-shifting between customers in the Program and non-participating customers. Additional amendments to further improve cost recovery from Program participants may be included in future applications.

18.0 Reference: Exhibit B-1, Appendix F page 29 of 53

> Based on our benchmarking analysis, BC Hydro is the only utility that pays almost the entire cost to connect generators to our system (we pay all costs associated with connection to our system except for customers who utilize a synchronous generator, take service at a primary potential, or have projects over 50 kW). All other Canadian utilities require the customer to pay the full costs to connect, with the exception of Alberta, which in some circumstances gives the utility the ability to be reimbursed if

1.18.1 Please provide an estimate of the average cost that BC Hydro pays to connect the typical net metered generation to the system.

RESPONSE:

The cost to connect generators such as those referenced in the preamble to the question generally relates to upgrading undersized BC Hydro distribution transformers and secondary conductors. Typical net metering projects do not require upgrades and accordingly, there are no BC Hydro connection costs for a typical project.

When a new customer in the Program installs a generating facility that is smaller than the capacity of their Service Connection but larger than can be accommodated because the aggregate customer generation connected to the transformer exceeds the transformer capacity or because power quality requirements cannot be met with the existing transformer and secondary conductor, then BC Hydro pays for the transformer and secondary conductor upgrade costs. The average cost for a project requiring these upgrades is approximately $3,800.

Customers installing a Generating Facility that is larger than the capacity of their Service Connection are required to pay for the required upgrades, per section 3.11.2 of the Electric Tariff.

18.0 Reference: Exhibit B-1, Appendix F page 29 of 53

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1.18.2 Please provide the total cost that BC Hydro has paid for the net metering connections to the system over each of the last five years.

RESPONSE:

The table below provides the costs for BC Hydro system upgrades related to net metering connections for the past five fiscal years.

	F2015	F2016	F2017	F2018	F2019	Total
Cost ($)	**0**	**11,000**	**11,000**	**0**	**6,000**	**28,000**

18.0 Reference: Exhibit B-1, Appendix F page 29 of 53

> Based on our benchmarking analysis, BC Hydro is the only utility that pays almost the entire cost to connect generators to our system (we pay all costs associated with connection to our system except for customers who utilize a synchronous generator, take service at a primary potential, or have projects over 50 kW). All other Canadian utilities require the customer to pay the full costs to connect, with the exception of Alberta, which in some circumstances gives the utility the ability to be reimbursed if

1.18.3 Please confirm that the net metering connection costs are in addition to the payments that BC Hydro makes for customers who have excess generation.

RESPONSE:

Net Metering connection costs are for BC Hydro's infrastructure upgrades required to connect a new customer in the Program and are separate from Surplus Energy Payments.

19.0 Reference: Exhibit B-1, page 43 and Appendix B page 6

While all applications to the Program require acceptance from BC Hydro to proceed, BC Hydro is proposing an amendment to clarify that BC Hydro has the ability to reject applications if the applicant is within a service area with existing or expected system constraints. This amendment responds to the Evaluation Report and would support the Objectives by preventing connections that cannot be accommodated by BC Hydro's system, that would trigger substantial costs not recoverable under RS 1289, or that may create safety or other risks.

7. In BC Hydro's sole discretion, BC Hydro may reject any Net Metering Application where:

   (a) BC Hydro considers that the information provided in the Net Metering Application is insufficient or inconsistent with the terms of this Rate Schedule, the DGTIR-100 or other applicable interconnection requirements;

   (b) the Customer has submitted false or misleading information to BC Hydro in the Net Metering Application or other information requested by BC Hydro;

   (c) the Customer has a prior history of non-compliance with this Rate Schedule; or

   (d) BC Hydro's system cannot accommodate the connection of the Customer's Generating Facility due to existing or expected system, safety, financial or technical constraints.

1.19.1 Is BC Hydro under any obligation to explain in detail a rejection based on systems or other constraints? Please explain.

RESPONSE:

When rejecting an Net Metering Application, BC Hydro provides a reason for the rejection; however, BC Hydro is not obligated to explain the rejection in detail.

19.0 Reference: Exhibit B-1, page 43 and Appendix B page 6

While all applications to the Program require acceptance from BC Hydro to proceed, BC Hydro is proposing an amendment to clarify that BC Hydro has the ability to reject applications if the applicant is within a service area with existing or expected system constraints. This amendment responds to the Evaluation Report and would support the Objectives by preventing connections that cannot be accommodated by BC Hydro's system, that would trigger substantial costs not recoverable under RS 1289, or that may create safety or other risks.

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   (c) the Customer has a prior history of non-compliance with this Rate Schedule; or

   (d) BC Hydro's system cannot accommodate the connection of the Customer's Generating Facility due to existing or expected system, safety, financial or technical constraints.

1.19.2 What might constitute 'system' constraints? Please explain and provide an example.

RESPONSE:

This answer also responds to CEC IRs 1.19.3 and 1.19.4

System constraints refer to any constraints on interconnecting new generation imposed by the design or operation of the existing BC Hydro system as a whole. Technical constraints generally refer to specific technical limitations of individual pieces of standard equipment.

System constraints can be eliminated by adding or upgrading infrastructure or by changing the configuration or operation of the BC Hydro system.

If the cost associated with eliminating the system or technical constraints is high, this creates a financial constraint. Financial constraints can also be created when the operation of new generation facilities negatively impacts BC Hydro's existing contractual agreements.

An example of a system constraint is a substation transformer overload caused by interconnecting a new generator. Potential options to address such an overload include upgrading the transformer, performing switching (if possible) or reducing the output of dispatchable generation.

An example of a technical constraint is the limit imposed on connecting generation to a distribution feeder due to the thermal ratings of the largest standard distribution conductor. This constraint could be eliminated by building another distribution feeder.

19.0 Reference: Exhibit B-1, page 43 and Appendix B page 6

While all applications to the Program require acceptance from BC Hydro to proceed, BC Hydro is proposing an amendment to clarify that BC Hydro has the ability to reject applications if the applicant is within a service area with existing or expected system constraints. This amendment responds to the Evaluation Report and would support the Objectives by preventing connections that cannot be accommodated by BC Hydro's system, that would trigger substantial costs not recoverable under RS 1289, or that may create safety or other risks.

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   (c) the Customer has a prior history of non-compliance with this Rate Schedule; or

   (d) BC Hydro's system cannot accommodate the connection of the Customer's Generating Facility due to existing or expected system, safety, financial or technical constraints.

1.19.3 What might constitute 'financial' constraints? Please explain and provide an example.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.19.2.

19.0 Reference: Exhibit B-1, page 43 and Appendix B page 6

> While all applications to the Program require acceptance from BC Hydro to proceed, BC Hydro is proposing an amendment to clarify that BC Hydro has the ability to reject applications if the applicant is within a service area with existing or expected system constraints. This amendment responds to the Evaluation Report and would support the Objectives by preventing connections that cannot be accommodated by BC Hydro's system, that would trigger substantial costs not recoverable under RS 1289, or that may create safety or other risks.

> 7. In BC Hydro's sole discretion, BC Hydro may reject any Net Metering Application where:
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> (a) BC Hydro considers that the information provided in the Net Metering Application is insufficient or inconsistent with the terms of this Rate Schedule, the DGTIR-100 or other applicable interconnection requirements;
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> (b) the Customer has submitted false or misleading information to BC Hydro in the Net Metering Application or other information requested by BC Hydro;
>
> (c) the Customer has a prior history of non-compliance with this Rate Schedule; or
>
> (d) BC Hydro's system cannot accommodate the connection of the Customer's Generating Facility due to existing or expected system, safety, financial or technical constraints.

1.19.4 What might constitute 'technical' constraints? Please explain and provide an example.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.19.2.

20.0 Reference: Exhibit B-1, page 43

> In addition, BC Hydro has noticed that some accepted applications to the Program have remained inactive for one year or longer and the customers responsible for those applications have not proceeded to connect a Generating Facility to BC Hydro's system. When an application is inactive for a prolonged period of time, the data provided and assessed by BC Hydro will likely become outdated. Therefore, BC Hydro is proposing an amendment so that applications expire 18 months after BC Hydro's acceptance, if the customer has not received BC Hydro approval to connect their Generating Facility to BC Hydro's system. Customers with expired applications would be able to re-apply to the Program. This amendment would ensure that BC Hydro has current information on a customer's estimated Annual Load, proposed Generating Facility and system requirements. This amendment also supports the Objectives by streamlining administration of the Program.

1.20.1 How long does the application process normally take?

RESPONSE:

BC Hydro's application process can be found at: https://www.bchydro.com/work-with-us/selling-clean-energy/net-metering/how_to_apply.html.

Typically it will take BC Hydro two to six weeks to review an application. The approval process for an application varies from customer to customer depending on whether it is a simple or complex application, the time required for a customer to install a Generating Facility and whether there are any deficiencies in the information provided to BC Hydro or in the installation of the facilities.

As there is typically a larger volume of applications during the summer months, the review and approval process may take longer in those months.

20.0 Reference: Exhibit B-1, page 43

> In addition, BC Hydro has noticed that some accepted applications to the Program have remained inactive for one year or longer and the customers responsible for those applications have not proceeded to connect a Generating Facility to BC Hydro's system. When an application is inactive for a prolonged period of time, the data provided and assessed by BC Hydro will likely become outdated. Therefore, BC Hydro is proposing an amendment so that applications expire 18 months after BC Hydro's acceptance, if the customer has not received BC Hydro approval to connect their Generating Facility to BC Hydro's system. Customers with expired applications would be able to re-apply to the Program. This amendment would ensure that BC Hydro has current information on a customer's estimated Annual Load, proposed Generating Facility and system requirements. This amendment also supports the Objectives by streamlining administration of the Program.

1.20.2 What types of activities would the customer normally be required to undertake between the time they are accepted and when they would require the connection?

RESPONSE:

Once BC Hydro has accepted a customer's Net Metering application, the next steps would be for the customer to complete the installation of their Generating Facility and to provide BC Hydro with a copy of the electrical inspection document. For complex projects, additional steps may be requested such as providing photos and/or field verification test results to BC Hydro.

20.0 Reference: Exhibit B-1, page 43

> In addition, BC Hydro has noticed that some accepted applications to the Program have remained inactive for one year or longer and the customers responsible for those applications have not proceeded to connect a Generating Facility to BC Hydro's system. When an application is inactive for a prolonged period of time, the data provided and assessed by BC Hydro will likely become outdated. Therefore, BC Hydro is proposing an amendment so that applications expire 18 months after BC Hydro's acceptance, if the customer has not received BC Hydro approval to connect their Generating Facility to BC Hydro's system. Customers with expired applications would be able to re-apply to the Program. This amendment would ensure that BC Hydro has current information on a customer's estimated Annual Load, proposed Generating Facility and system requirements. This amendment also supports the Objectives by streamlining administration of the Program.

1.20.3 What is the range in time periods that BC Hydro typically experiences between the application acceptance and the interconnection due to normal activities?

RESPONSE:

The table below provides a breakdown of time periods between application acceptance and the effective date of the customer receiving service under RS 1289. This information is based on all applications which have been accepted since the inception of the Program.

Duration (Days)	Percent of Applications (%)
<90	**73**
>=90 and <180	**14**
>180 and <=365	**9**
>365 and <=540	**2**
>540	**2**

20.0 Reference: Exhibit B-1, page 43

> In addition, BC Hydro has noticed that some accepted applications to the Program have remained inactive for one year or longer and the customers responsible for those applications have not proceeded to connect a Generating Facility to BC Hydro's system. When an application is inactive for a prolonged period of time, the data provided and assessed by BC Hydro will likely become outdated. Therefore, BC Hydro is proposing an amendment so that applications expire 18 months after BC Hydro's acceptance, if the customer has not received BC Hydro approval to connect their Generating Facility to BC Hydro's system. Customers with expired applications would be able to re-apply to the Program. This amendment would ensure that BC Hydro has current information on a customer's estimated Annual Load, proposed Generating Facility and system requirements. This amendment also supports the Objectives by streamlining administration of the Program.

1.20.4 If BC Hydro were to become aware of a customer experiencing difficulty meeting the 18 month deadline, would it be possible for them to receive an extension if they so requested?

RESPONSE:

No. If a customer experiences difficulties in installing or interconnecting their Generating Facility, the customer may submit a new Net Metering Application. There is no fee related to submitting a Net Metering Application.

21.0 Reference: Exhibit B-1, page 44 and 45

> **6 Proposed Transitional Energy Price Mitigates Impact to Existing Customers**
>
> The following section provides the background and rationale for a transitional Energy Price that would maintain the current Energy Price of 9.99 cents per kWh for all customers with accepted applications as of April 20, 2018, for a period of five years.[4] During this five-year period, BC Hydro will monitor the impact of the proposed changes to determine if further measures are required.
>
> BC Hydro recognizes that the proposed amendment to update the Energy Price from 9.99 cents per kWh to an amount that reflects the price BC Hydro can sell the electricity for on the regional wholesale market, may have a material impact on the Surplus Energy Payments some existing customers receive.
>
> The proposed amendment to the Energy Price was supported by a slight majority (53 per cent) of customers compared to the alternative option. It also supports the Objectives because the Energy Price would reflect the value of the electricity to non-participating customers. However, supporting the Objectives also means that
>
> the process for implementing this proposed amendment should be fair to existing customers in the Program.
>
> Overall, this means that the vast majority of customers are not materially impacted by an update to the Energy Price as they are likely to either not receive Surplus Energy Payments or receive minimal Surplus Energy Payments.
>
> While many survey responses advocated to maintain the current Energy Price for existing customers for an indefinite or longer period, BC Hydro notes that it has no obligation to maintain the current Energy Price and that when the BCUC approved changes to FortisBC Inc.'s Energy Price by Order No. G-63-18, transitional provisions were not provided to existing customers.

1.21.1 Were customers made specifically aware that their rate might change at some point, or is there just an absence of a guaranteed rate? Please explain and provide the section of the tariff that indicated that the rate might change or other evidence, if available.

RESPONSE:

As discussed in section 1.4 of the Application, the Energy Price has changed multiple times since the Program was established.

When a Customer takes Service from BC Hydro, the rights and responsibilities of BC Hydro and the Customer are set out in the applicable provisions of the Terms and Conditions of the BC Hydro Electric Tariff and any applicable Rate Schedule(s) and Electric Tariff Supplement(s).

Section 6.1.1 of the BC Hydro Electric Tariff states:

> **6.1.1 Application of Rate Schedules**
>
> **The rates to be charged by and paid to BC Hydro for Service will be the rates set out in the Rate Schedules from time to time in effect or elsewhere in the Electric Tariff, available at www.bchydro.com or upon request.**

The specific terms of the Program are contained in Rate Schedule 1289 (including BC Hydro's DGTIR-100 and section 9.7 of the BC Hydro Electric Tariff). Rate Schedule 1289 prescribes the rate that BC Hydro charges customers in the Program for their Net Consumption (Energy Charge) and the price BC Hydro pays customers in the Program for the balance remaining in the Customer's Generation Account at the Anniversary Date (Energy Price).

Both the Energy Charge and the Energy Price are variable rates. The Energy Charge is based on Residential and General Service Rate Schedules which change regularly. The Energy Price has changed twice since the start of the Program in 2004. BC Hydro has not made any representations that the Energy Price is guaranteed or would otherwise remain unchanged.

For further information on the material provided to potential net metering customers, please refer to BC Hydro's response to BCUC IR 1.2.1 and to BC Hydro's net metering web site at: https://www.bchydro.com/work-with-us/selling-clean-energy/net-metering.html.

21.0 Reference: Exhibit B-1, page 44 and 45

> **6 Proposed Transitional Energy Price Mitigates Impact to Existing Customers**
>
> The following section provides the background and rationale for a transitional Energy Price that would maintain the current Energy Price of 9.99 cents per kWh for all customers with accepted applications as of April 20, 2018, for a period of five years.[4] During this five-year period, BC Hydro will monitor the impact of the proposed changes to determine if further measures are required.
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> BC Hydro recognizes that the proposed amendment to update the Energy Price from 9.99 cents per kWh to an amount that reflects the price BC Hydro can sell the electricity for on the regional wholesale market, may have a material impact on the Surplus Energy Payments some existing customers receive.
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> While many survey responses advocated to maintain the current Energy Price for existing customers for an indefinite or longer period, BC Hydro notes that it has no obligation to maintain the current Energy Price and that when the BCUC approved changes to FortisBC Inc.'s Energy Price by Order No. G-63-18, transitional provisions were not provided to existing customers.

1.21.2 Please confirm that because the BCUC determines rates and prices for energy that a fundamental assumption is that rates can and are likely changing over time.

RESPONSE:

Confirmed. As discussed in section 1.4 of the Application, the Energy Price has changed multiple times since the Program was established.

22.0 Reference: Exhibit B-1, page 49

> **7.2 Virtual Net Metering**
>
> As discussed in section 9.1.5 of the Evaluation Report, Virtual Net Metering refers to a system that allows bill crediting across multiple customers for a shared net metering project by allocating credits to each subscriber's electric bill for excess energy produced by their share of the net metering project.
>
> BC Hydro's current billing process requires a bill to be associated with a single customer premise. While BC Hydro has received several requests to support Virtual Net Metering, including through the Engagement Survey Results, enabling customers to share credits would require significant modifications to our billing process.
>
> In the meantime, BC Hydro has suggested that one customer "own" the net metering installation and perform the administrative task of allocating credits between the participating customers.
>
> BC Hydro will consider potential additional measures to support virtual net metering for a future application.

1.22.1 Please provide a brief outline of the types of system changes that might be required to facilitate Virtual Net metering, and an order of magnitude estimate of the costs.

RESPONSE:

BC Hydro has not determined how or whether Virtual Net Metering, Aggregate Net Metering or Community Net Metering will be offered by BC Hydro in the future. Accordingly, we are not able to provide any details on definitions, eligibility requirements, implementation, charges or costs of such initiatives.

As discussed in BC Hydro's response to BCSEA IR 1.7.12, BC Hydro's next Integrated Resource Plan will be informed by an updated resource options inventory which will reflect data on trends in distributed energy resources as well as the recommendations from Phase Two of the Government of B.C.'s Comprehensive Review of BC Hydro.

22.0 Reference: Exhibit B-1, page 49

> **7.2 Virtual Net Metering**
>
> As discussed in section 9.1.5 of the Evaluation Report, Virtual Net Metering refers to a system that allows bill crediting across multiple customers for a shared net metering project by allocating credits to each subscriber's electric bill for excess energy produced by their share of the net metering project.
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> In the meantime, BC Hydro has suggested that one customer "own" the net metering installation and perform the administrative task of allocating credits between the participating customers.
>
> BC Hydro will consider potential additional measures to support virtual net metering for a future application.

1.22.2 Please confirm that allocating credits between participating customers can be accurately undertaken by the participants given the information they have available.

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.20.1.

22.0 Reference: Exhibit B-1, page 49

> **7.2 Virtual Net Metering**
>
> As discussed in section 9.1.5 of the Evaluation Report, Virtual Net Metering refers to a system that allows bill crediting across multiple customers for a shared net metering project by allocating credits to each subscriber's electric bill for excess energy produced by their share of the net metering project.
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> In the meantime, BC Hydro has suggested that one customer "own" the net metering installation and perform the administrative task of allocating credits between the participating customers.
>
> BC Hydro will consider potential additional measures to support virtual net metering for a future application.

1.22.2 Please confirm that allocating credits between participating customers can be accurately undertaken by the participants given the information they have available.

1.22.2.1 Is such a task highly onerous, or can it be undertaken fairly easily by the participants?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.20.1.

22.0 Reference: Exhibit B-1, page 49

> **7.2 Virtual Net Metering**
>
> As discussed in section 9.1.5 of the Evaluation Report, Virtual Net Metering refers to a system that allows bill crediting across multiple customers for a shared net metering project by allocating credits to each subscriber's electric bill for excess energy produced by their share of the net metering project.
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>
> In the meantime, BC Hydro has suggested that one customer "own" the net metering installation and perform the administrative task of allocating credits between the participating customers.
>
> BC Hydro will consider potential additional measures to support virtual net metering for a future application.

1.22.3 What additional measures is BC Hydro considering? Please explain.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

23.0 Reference: Exhibit B-1, page 49 and 51

7.3 Broader Costs and Benefits of the Program

As discussed in section 9.1.2 of the Evaluation Report, the majority of BC Hydro's costs are recovered through a variable energy rate. This type of rate design will become more problematic as the Program grows because customers in the Program still require energy from BC Hydro on demand but consume less energy compared to non-participants. This means that while both participating and non-participating customers depend on BC Hydro's ability to supply them with the electricity they require at any point in time, non-participating customers pay relatively more for this service, compared to Program participants.[5]

Allowing customers to apply their Generation Account Balance as a credit towards future consumption also has the potential to cause material cost-shifting between participating and non-participating customers. At a point in time, customers in the Program may send energy to BC Hydro or may receive energy from BC Hydro. However, the value of this energy is different depending on the time of year or time of day. For example, a customer in the Program with a solar photo voltaic Generating Facility may send excess energy to BC Hydro during the day, when market prices are low and then receive energy from BC Hydro in the evening, when market prices are higher. However, the Customer would be able to bank the excess energy sent to BC Hydro and apply it towards the energy they received from BC Hydro as though the energy was of equal value. This means that a Customer in the Program is able to net their energy use over the course of a day or billing period to zero while still imposing costs on BC Hydro and non-participating customers. Given the installed capacity and volume of the energy generated by customer Generating Facilities in the Program at this time, the cost-shifting between participating and non-participating customers is not material. However, over time, as the Program grows, the cost-shifting could become material.

Through Phase Two of the Comprehensive Review, BC Hydro and the Government of B.C. intend to explore the potential application of Marginal Cost Pricing, including its potential application to the Program. Specifically, Phase Two of the Comprehensive Review may consider whether customers in the Program should be able to buy electricity at its marginal cost while paying a fixed system access charge and whether the marginal cost for buying and selling electricity should be more reflective of real-time price signals.

1.23.1 Could rate design changes such as the implementation of time of use pricing and/or demand charges or others be utilized to provide more neutrality and reduce cost-shifting? Please explain.

RESPONSE:

There are a number of potential rate design elements that could be utilized to reduce the cost-shifting inherent in the current Rate Schedule 1289. For example, demand charges, time of use energy charges and fixed charges.

Please refer to BC Hydro's response to BCUC IR 1.5.1 where we discuss how cost-shifting between customers in the Program and non-participating customers occurs and where we explain that the amendments proposed in the Application are only intended to address cost-shifting that occurs with regards to Surplus Energy Payments.

1.0 Topic 1: Duty of service versus electricity supply.

1.1.0 Can you please confirm what BC Hydro means by a customer's "supply" as noted in Exhibit B-1 section 1.2.2? Does this intend to mean electricity supply as a duty of service or the more technical delivery of electrical energy and power that can then be charged to that customer?

RESPONSE:

In section 1.2.2 of the Application, "supply" is intended to mean "net energy purchased from BC Hydro".

2.0 Topic 2: Establishing Load Estimates for Oversizing Limits

Section 2.7 presents three main concepts for customers regarding Intent, Fairness and Flexibility. Based on lines 1-5 of the same page, the customer is the specific consumer who will directly benefit from the installation not the general rate payer.

1.2.a Can you please provide what is acceptable information to BC Hydro as per line 16 that a new build construction can provide to justify a certain energy forecast? We have seen these estimates vary as much as 40-50% even on LEED buildings. Annual Load + 10% is highly restrictive and does not represent the active use versus estimated use reality of the corporations we have worked with.

RESPONSE:

BC Hydro will review and consider any information relevant to the estimated Annual Load including but not limited to:

- **An energy modelling document;**
- **Electric Service design documents;**
- **Calculations of estimated future load; and**
- **For an electric vehicle and/or electric vehicle charger, information such as, the type of charger, the number of electric vehicles to be charged on site and the expected annual mileage.**

2.0 Topic 2: Establishing Load Estimates for Oversizing Limits

Section 2.7 presents three main concepts for customers regarding Intent, Fairness and Flexibility. Based on lines 1-5 of the same page, the customer is the specific consumer who will directly benefit from the installation not the general rate payer.

1.2.b If a new building has a reduced load from that forecast in Q2a, and a PV was sized to 100% offset that buildings annual load, what happens to extra energy generated if that load forecast was wrong by more than 10%? This discrepancy unfortunately does not demonstrate an intent to sell or be a net-generator.

RESPONSE:

The requirement for Generating Facilities with a generating capacity greater than 5 kW to have an Annual Energy Output that does not exceed 110 per cent of Annual Load is assessed upon enrolment and upon an application by the customer to expand the generating capacity of their Generating Facility or to modify their Generating Facility. If a customer has a Generation Account Balance remaining at their Anniversary Date, they would receive a Surplus Energy Payment for the remaining balance, at the Energy Price.

2.0 Topic 2: Establishing Load Estimates for Oversizing Limits

Section 2.7 presents three main concepts for customers regarding Intent, Fairness and Flexibility. Based on lines 1-5 of the same page, the customer is the specific consumer who will directly benefit from the installation not the general rate payer.

1.2.c If the owner of the building has multiple meters on site, or around the BC Hydro distribution area, how can load be added or aggregated if the point of new load is inconvenient? This is particularly relevant to the BC Hydro conversation in section 7.3.

- Eg 1: industrial customer in Richmond has 6 meters due to historical activity, solar and batteries located at meter 2 and are now overpowering due to moving workforce but they can install 5 EV chargers near to meter 5. How would this work?
- Eg 2: building 1 of an LGS customer has solar installed in 2020 but they have demand charge issues on their billing as well as they try to lower overall energy consumption, but as a result have high demand cycling. What do you recommend as a way to encourage renewable energy, lower consumption, fairness to the customer who is looking to do what is right, all while encouraging flexibility and fairness?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.19.1 where we explain that a customer cannot aggregate multiple accounts under the Program and to BC Hydro's response to BCSEA IR 1.19.1.2 where we explain how Net Energy is calculated when there are multiple meters associated with a Customer's account.

3.0 Topic 3: Establishing a Fair Overage Price

As established throughout the document, BC Hydro has made an attempt to keep the ability to put solar on a roof as being as simple as possible. As presented in section 4.2, we agree with many of the components of short run and long run value, but the problem is, the Net Metering program is simplified to the point where short run conversations are moot points.

1.3.a Can you please provide the evidence that points in section 4.2 lines 19-21, are true? How do you determine fair value to non-participating customers?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

3.0 Topic 3: Establishing a Fair Overage Price

As established throughout the document, BC Hydro has made an attempt to keep the ability to put solar on a roof as being as simple as possible. As presented in section 4.2, we agree with many of the components of short run and long run value, but the problem is, the Net Metering program is simplified to the point where short run conversations are moot points.

1.3.b Section 4.3 and 4.4, if after 5 years of over generating a customer has excess credits, they expire, getting zero for them, how is this acknowledging BC Hydro's support of short run pricing?

RESPONSE:

Please refer to BC Hydro's response to GUY IR 1.2.2.

3.0 Topic 3: Establishing a Fair Overage Price

As established throughout the document, BC Hydro has made an attempt to keep the ability to put solar on a roof as being as simple as possible. As presented in section 4.2, we agree with many of the components of short run and long run value, but the problem is, the Net Metering program is simplified to the point where short run conversations are moot points.

1.3.c If BC Hydro is interested in Short Run pricing, why do we not have time of day or seasonal energy pricing? Establishing Net Metering Overage by taking the average of the average of the previous y e a r s Mid-C price as proposed is anything but short run.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.12.6.1 where we explain why BC Hydro believes that an annual update to the Energy Price appropriately balances concerns with regards to rate stability and customer understanding and acceptance and against the objective of reflecting the value of the energy to non-participating customers.

3.0 Topic 3: Establishing a Fair Overage Price

As established throughout the document, BC Hydro has made an attempt to keep the ability to put solar on a roof as being as simple as possible. As presented in section 4.2, we agree with many of the components of short run and long run value, but the problem is, the Net Metering program is simplified to the point where short run conversations are moot points.

1.3.d The scenarios proposed in section 7.3 has a lot of suppositions. Can BC Hydro please provide data to support demonstrating high PV generation capacity with low energy rate in our regional market? Lines 1-12 on p50, in particular, are problematic.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.14.2.1 where we discuss the difference between the value of energy delivered to BC Hydro from customers in the Program and BC Hydro's cost to serve those customers.

3.0 Topic 3: Establishing a Fair Overage Price

As established throughout the document, BC Hydro has made an attempt to keep the ability to put solar on a roof as being as simple as possible. As presented in section 4.2, we agree with many of the components of short run and long run value, but the problem is, the Net Metering program is simplified to the point where short run conversations are moot points.

1.3.e Section 7.4 this is problematic in practice for net metering, as marginal cost on next day is not the price of today.

RESPONSE:

BC Hydro did not identify a question in this information request. Section 7.4 provides a discussion on matters that may be considered in future applications.

3.0 Topic 3: Establishing a Fair Overage Price

As established throughout the document, BC Hydro has made an attempt to keep the ability to put solar on a roof as being as simple as possible. As presented in section 4.2, we agree with many of the components of short run and long run value, but the problem is, the Net Metering program is simplified to the point where short run conversations are moot points.

1.3.f In the current program how does BC Hydro aggregate and sell the carbon reduction rights of the Net Metered projects? What are the revenues from this over the past 5 years?

RESPONSE:

BC Hydro has not and does not sell any carbon reduction credits from net metering customers or their generating facilities.

1.0 Size of Generation Facility

Reference: Section 2 - Amendments will prevent Oversized Generating Facility and Support Program Intent, Fairness and Flexibility

1.1.1 If the intent of the Net Metering Program was to simply offset an individual customer's demand, why did BC Hydro allow oversized projects for the entire existence of the Program up until the amendment application in 2018?

RESPONSE:

Until the interim amendments, approved by BCUC Order No. G-100-18, Rate Schedule 1289 did not provide BC Hydro with the discretion to deny applications from customers with Oversized Generating Facilities.

1.0 Size of Generation Facility

Reference: Section 1.4.4 (Page 12, Paragraph 19-26, Page 13 Paragraph 1-2)

1.1.2 The increase in Capacity Limit for the Net Metering Program allowed for the City's project to be approved. Further, BC Hydro was very supportive of the City's project under the Net Metering Program compared to it being advanced through the now abandoned Standing Offer Program. Why did BC Hydro recommend that the City advance the Project under the Net Metering Program with the understanding that it would generate a surplus of energy relative to the account?

RESPONSE:

At the time that the City of Fort St. John was exploring the development of its generation project, both the Standing Offer Program and the Net Metering Program were available options for the project.

BC Hydro's practice is to inform customers about the options available to them. The decision on which option to pursue is made by the customer.

2.0 Transitional Energy Price

Reference: Section 6 Proposed Transitional Energy Price mitigates Impact to Existing Customers
Paragraph 15-16: "During this five-year period, BC Hydro will monitor the impact of the proposed changes to determine if further measures are required"

1.2.1 How does BC Hydro intend to "monitor the impact" of the proposed changes to the Energy Price given the material impact to the "Surplus Energy Payments" made to the City, given the substantial investment made by the City into this Project?

RESPONSE:

At this time, BC Hydro has not determined any specifics with regards to how the impact of the proposed changes would be monitored or the factors that would determine if further measures are required.

The amendments proposed in the Application would not impact the Surplus Energy Payments to customers accepted into the Program prior to April 20, 2018, for five years. The proposed transitional Energy Price would maintain the current Energy Price of 9.99 cents per kWh for those customers over that period.

During this time, there may be other changes with regards to distributed energy resources, as a result of BC Hydro's next Integrated Resource Plan, as discussed further in BC Hydro's response to BCSEA IR 1.7.12. Any future applications by BC Hydro with regards to Rate Schedule 1289 would be informed by, and consistent with, BC Hydro's approved Integrated Resource Plan.

2.0 Transitional Energy Price

Reference: Section 6 Proposed Transitional Energy Price mitigates Impact to Existing Customers
Paragraph 15-16: "During this five-year period, BC Hydro will monitor the impact of the proposed changes to determine if further measures are required"

1.2.2 What will be the determining factor which identifies if further measures are required?

RESPONSE:

Please refer to BC Hydro's response to FORT ST. JOHN IR 1.2.1.

2.0 Transitional Energy Price

Reference: Section 6 Proposed Transitional Energy Price mitigates Impact to Existing Customers
Paragraph 15-16: "During this five-year period, BC Hydro will monitor the impact of the proposed changes to determine if further measures are required"

1.2.3 Would BC Hydro consider a 15 year transitional energy price for oversized projects given the substantial capital investment made by customers, like the City of Fort St. John, into micro-generation projects?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain the rationale for proposing a five-year transition period and to BC Hydro's response to BCSEA IR 1.13.6 where we explain why a longer transition period would not be appropriate.

3.0 City of Fort St. John Micro-Hydro Project

1.3.1 Just three years ago (April 22, 2016) BC Hydro celebrated this Project as a success story, as demonstrated by the former CEO of BC Hydro being present at the Project's "ribbon cutting" event. Could BC Hydro advise as to why it did not disclose the proposed rule changes at the time of the Net Metering Program application? How is the proposed Energy Price amendment fair to the City of Fort St. John and its citizens given the substantial investment made by the City into this Project with the understanding of a higher Energy Price (and level of return on investment).

RESPONSE:

BC Hydro was not contemplating the amendments proposed in the Application in April 2016.

As discussed in BC Hydro's response to BCUC IR 1.15.5, enrolment in the Program does not entail any contractual agreement that provides assurance with regards to cost recovery of capital investments by the customer or stability of the terms and conditions, including the Energy Price.

In addition, enrolment in the Program does not provide customers with any assurance or guarantee with regards to realizing a return on their investments. Similarly, an Electricity Purchase Agreement with an Independent Power Producer does not provide any assurance or guarantee to the proponent with regards to realizing a return on their investment.

Please also refer to BC Hydro's response to BCSEA IR 1.13.6, which explains that unlike an Electricity Purchase Agreement, which is a commercial instrument, Rate Schedule 1289 is a rate as approved under the *Utilities Commission Act* and is subject to change as approved by the BCUC.

3.0 City of Fort St. John Micro-Hydro Project

Reference: Section 1.1 Net Metering Program Allows Customers to Offset Their Supply from BC Hydro (Page 3, paragraphs 2-11}

"Our objectives are to:

1. Maintain the Program as a load offset program so that customers can generate their own electricity to reduce their supply from BC Hydro

1.3.2 The City (as a Customer) has many different meter locations and a total demand much greater than the output of its Micro-Hydro project which is under Schedule 1289. The current demand is invoiced (across all meters) to a single customer account. If the intent of the Net Metering Program is to allow a customer offset their total demand, would BC Hydro be open to advancing a Net Metering agreement with the City that allows its oversized project to offset the demand of other accounts held by the City of Fort St. John (the Customer)? Would this not align with the key Program Objectives outlined on Page 3 of the BCUC application?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.19.1 where we explain that a customer cannot aggregate multiple accounts under the Program and to BC Hydro's response to CEC IR 1.22.1 where we explain that BC Hydro has not determined how or whether Virtual Net Metering, Aggregate Net Metering or Community Net Metering will be offered by BC Hydro in the future.

3.0 City of Fort St. John Micro-Hydro Project

Reference: Section 7.2 Virtual Net Metering (Page 48 Paragraph 21-25, page 49 Paragraph 1-10}

"In the meantime, BC Hydro [in response to virtual net metering requests] has suggested that one customer "own" the net metering installation and perform the administrative task of allocating credits between the participating customers" [clarification added]

1.3.3 Assessing the City's energy use across all meters would effectively allow them to perform the administrative task that BC Hydro has identified for Virtual Net Metering. This appears to be supported (through comments for the Virtual Net Metering) for a group that is off-setting more than one load. Could this same premise be used to the City?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.20.1 with regards to financial arrangements for shared net metering projects and to BC Hydro's response to CEC IR 1.22.1 where we explain that BC Hydro has not determined how or whether Virtual Net Metering, Aggregate Net Metering or Community Net Metering will be offered by BC Hydro in the future.

4.0 Engagement Survey

Reference: Appendix E

1.4.1 How were surveys and webinars advertised and distributed to current net metering customers as well as the general public?

RESPONSE:

Please refer to BC Hydro's response to BCOAPO IRs 1.1.1 and 1.1.3.

4.0 Engagement Survey

Reference: Figure E-4: Engagement Survey Results

1.4.2 Less than 20% of respondent represent those that will receive surplus energy payments. Was any data collected to determine the magnitude of surplus energy payments these respondents represent?

RESPONSE:

The Engagement Survey was designed to protect the privacy of the participants and participants were not required to identify themselves. As a result, BC Hydro did not collect any data to determine the magnitude of Surplus Energy Payments represented by those who participated in the Engagement Survey.

1.0 Reference: Exhibit B-1, Section 1, re: effective date of the amended tariff:

By Hydro has proposed that the Net Metering amendment, if approved, would take effect in April 2018, which is BEFORE the application was submitted.

I was not aware of BC Hydro's intention to apply to BCUC to modify its Net Metering Program until after I had completed an economic analysis and signed a contract with a solar PV installer in winter 2019. Any lowering of the price paid by BC Hydro for excess energy will negatively impact my economic outcomes. I believe it would be fair that I and others in my position be included in the "grandfather" group associated with this application. A fair effective date would be sometime AFTER the application is approved (if indeed it is approved), not a date BEFORE the application was submitted.

1.1.1 Please explain the rationale for choosing an effective date in April 2018, before the application was submitted.

RESPONSE:

BC Hydro clarifies that the April 2018 dates refer to eligibility for the applicable Energy Price.

Please refer to BC Hydro's response to BCUC IR 1.1.1 where we explain why BC Hydro does not believe it is necessary to provide a transitional Energy Price to customers who entered the Program after April 20, 2018.

1.0 Reference: Exhibit B-1, Section 1, re: effective date of the amended tariff:

By Hydro has proposed that the Net Metering amendment, if approved, would take effect in April 2018, which is BEFORE the application was submitted.

I was not aware of BC Hydro's intention to apply to BCUC to modify its Net Metering Program until after I had completed an economic analysis and signed a contract with a solar PV installer in winter 2019. Any lowering of the price paid by BC Hydro for excess energy will negatively impact my economic outcomes. I believe it would be fair that I and others in my position be included in the "grandfather" group associated with this application. A fair effective date would be sometime AFTER the application is approved (if indeed it is approved), not a date BEFORE the application was submitted.

1.1.2 Please provide an alternative date that follows submission of the application, with supporting rationale.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.1.1 where we explain why BC Hydro does not believe it is necessary to provide a transitional Energy Price to customers who entered the Program after April 20, 2018.

2.0 Reference: Exhibit B-1, Section 4.4 re BC Hydro's survey of net metering customers:

Figure 6 in Section 4.4 shows responses to a question in BC Hydro's surbey of net metering customers, asking customers to choose between one of two options: (1) accept a reduced price or (2) lose any credit balances after 5 years. This is akin to choosing between "a rock and a hard place", and interpretation of the responses will be biased by the nature of the question.

1.2.1 Please explain why no additional alternatives were provided in the survey question.

RESPONSE:

The options provided represent common approaches in other jurisdictions. For further information, please refer to Appendix G of the Application.

BC Hydro recognizes that some existing customers in the Program feel that the Program works well and should not be changed. However, BC Hydro does not believe that the Program should continue without any changes. In particular, changes are required to maintain the Program as a load offset program and to limit cost shifting between participating and non-participating customers.

2.0 Reference: Exhibit B-1, Section 4.4 re BC Hydro's survey of net metering customers:

Figure 6 in Section 4.4 shows responses to a question in BC Hydro's surbey of net metering customers, asking customers to choose between one of two options: (1) accept a reduced price or (2) lose any credit balances after 5 years. This is akin to choosing between "a rock and a hard place", and interpretation of the responses will be biased by the nature of the question.

1.2.2 BC Hydro has stated that it is seeking to improve fairness. Please explain how an expiry of a credit would be a fair option.

RESPONSE:

In the Application, BC Hydro is not proposing that credits would expire. Rather, BC Hydro is proposing that the Energy Price be updated so that it reflects the value BC Hydro receives from excess generation.

BC Hydro included an alternative of extending the true-up period to five years, after which any remaining Generation Account Balance would expire, in the Engagement Survey. A slight majority (53 per cent) of participants indicated that they would prefer revising the Energy Price compared to this alternative.

Please refer to BC Hydro's response to BCUC IR 1.8.5 for further discussion with regards to the implications of extending the true-up period.

3.0 Reference Exhibit B-1, Section 3.3, re: extended true-up period:

BC Hydro is considering an extension to 24 months from the current 12 month true-up period. I welcome this additional flexibility. BC Hydro also references consideration of the potential for even longer true-up periods. Additional flexibility could be created if the carry-over period was extended beyond 24 months as is done in some jurisdictions. For example, individuals who have an early spring true-up date but leave B.C. in some winters could make use of an extended carry-over opportunity.

1.3.1 Please explain whether BC Hydro will consider extending the true-up period beyond 24 months to up to 36 months or longer.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.8.5 where we explain why BC Hydro chose to maintain the 12-month true-up period.

4.0 Reference: Exhibit B-1, Section 7.2, re Virtual Net Metering (VNM):

BC Hydro proposes to defer consideration of Virtual Net Metering until a future date. However, I believe it should be considered as part of the present application process. The sharing of credits between meters would allow additional flexibility and reduce the annual payments from BC Hydro for excess energy. An interim step towards broader implementation of a VNM program could allow individual or corporate customers with more than one meter to transfer credits between their accounts. This could likely be accomplished by a fairly simple programming adjustment to the billing software.

I have a second BC Hydro account at another address and I would be happy to share any excess kWh generated by the solar array at my primary residence with my other account, rather than receive an annual payment from BC Hydro for any excess energy I might generate.

1.4.1 Please outline the process, time, and costs required to implement the interim Virtual Net Metering concept described above.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.22.1.

5.0 Reference: Exhibit B-1, Section 4.2, re Price for Surplus Energy

BC Hydro proposes to reduce the price paid to net metering customers for any excess energy that is generated. The rationale is based on an argument that I cannot follow involving the short-run and the long-run value of electricity.

1.5.1 Please explain clearly and concisely BC Hydro's belief that akWh of energy acquired from a metering generator should be treated differently than a kWh of energy acquired from other classes of electricity generators.

RESPONSE:

The price paid by BC Hydro to an energy producer will vary depending on the program or agreement under which this energy is acquired by BC Hydro.

Please refer to BC Hydro's response to BCSEA IR 1.9.9.1 where we explain that, for the renewal of Electricity Purchase Agreements, we use a forecast market price with adjustments for evaluating energy.

Please also refer to BC Hydro's response to BCUC IR 1.10.5 where we explain that BC Hydro has recently adopted the market price as a conservative interim assumption for evaluating energy during surplus and deficit periods.

1.0 Would Hydro please provide the calculations and results of the determination of what the update value mentioned for the average mid-Columbia pricing would net/kwh to self-generators who provide more to hydro than they consume, based on the most recent data available?

RESPONSE:

BC Hydro is unable to provide the requested calculation because BC Hydro does not have data on the customers' costs to generate energy. In addition, under BC Hydro's proposed approach, the Energy Price would change each year.

2.0 Does Hydro intend to be fair to all customers with the pricing of power they acquire and does Hydro not in future intend to average out the cost of new power with that of the heritage assets, but only acquire power that can be sold as a net benefit to the Province?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

3.0 What factors is Hydro taking into account when it determines that unfairness might infringe on the non-participating customers?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.5.1 where we explain how cost-shifting between customers in the Program and non-participating customers occurs and to BC Hydro's response to CEC IR 1.7.3 where we quantify the cost-shifting caused by the current Energy Price.

4.0 Would Hydro explain in what way does this respond to changing technological advancements? ---question from page 41, "BC Hydro believes that the proposed amendment should be approved. The amendment.... Responds to the Evaluation Report which indicated that the Energy Price would be reviewed to ensure alignment with changing technological advancements and changing system needs."

RESPONSE:

The reference to changing technological advancements is meant to convey BC Hydro's intention to review the Energy Price, considering, among other things, the value of energy, based on technological advancements.

Please refer to BC Hydro's response to BCUC IR 1.10.5 where we state that BC Hydro recently adopted the market price as a conservative interim assumption for evaluating energy during surplus and deficit periods, in part, due to technology cost uncertainty over the long term.

5.0 If this approach ie striking a fair balance between producers and consumers, were taken with respect to the existing large ipps contracts, what would Hydro expect in terms of push back from the ipps?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.13.6 where we explain that unlike an Electricity Purchase Agreement, which is a commercial instrument, Rate Schedule 1289 is a rate as approved under the *Utilities Commission Act* that is subject to change as approved by the BCUC.

6.0 Is it possible through this amendment, that Hydro could purchase low cost energy from consumers and sell back high priced power?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.12.4 where we explain why BC Hydro's proposed approach to update the Energy Price provides a reasonable approximation of the value of the energy received by BC Hydro. Please also refer to BC Hydro's response to BCUC IR 1.5.1 where we explain how cost-shifting occurs between customers in the Program and non-participating customers with regards to Surplus Energy Payments.

7.0 With respect to the objectives mentioned on page 3, Who and how and when were these objectives established? #7a IE, are these objectives identified in the Clean Energy act that ordered Hydro to establish programs that encourage people to self-generate electricity?

RESPONSE:

The objectives set out in section 1.1 of the Application reflect the regulatory history of the Program, including the minimum parameters set out by the BCUC in 2003 by Letter No. L-37-03.

As explained in section 1.3 of the Application, the BCUC has previously determined that the energy objectives in the *Clean Energy Act* support a focus on economic efficiency. BC Hydro believes that the proposed amendments reflect economic efficiency because they improve the allocation of costs between customers in the Program and non-participating customers with regards to Surplus Energy Payments.

8.0 Has Hydro analyzed whether the amendment might increase fairness in the relatively narrow circumstances outlined in the application to determine if it produces an increase in total unfairness, in total cost of the system, in terms of social and environmental costs if the amendment goes through and discourages customers from adapting alternative energies C9-2 that are less costly than a dam at site c?

RESPONSE:

BC Hydro believes that the proposed amendments in the Application are a step towards improving cost recovery from customers in the Program and by extension, would be beneficial to ratepayers overall.

9.0 Would Hydro expand on how the Crown corporation believes future alternative energy self-generation projects with surplus power cannot be used to displace or reduce Hydros need to acquire new generation resources, over the long-term?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.18.4.

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.1 Please confirm that BC Hydro's proposal to grandfather the current net metering generation rate for five years at 9.99 cents/kWh (or expressed as $99.90/MWH) and then drop that price to 3.0 cents/kWh (or expressed as $30.00/MWh) would result in a price reduction of approximately 70% (rounded up from 69.97%).

RESPONSE:

Not confirmed. BC Hydro is not proposing an Energy Price of 3.0 cents per kWh. Rather, BC Hydro is proposing that the Energy Price be an amount determined every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars, using the average annual exchange rate from the Bank of Canada for that year.

For the historical Energy Price by calendar year using BC Hydro's proposed approach, please refer to BC Hydro's response to BCSEA IR 1.11.2.

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.2 To provide another perspective please confirm that BC Hydro's current net metering generation rate of 9.99 cents/kWh is 330% higher than the proposed dropped rate of 3.0 cents/kWh.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.1.1.

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.3 Please confirm that both the proposed rate drop of approximately 70% and the relative rate difference of 330% (i.e. current 9.99 cents/kWh vs. proposed 3.0 cents/kWh) would be even greater if adjusted for the effects of inflation during the proposed five-year grandfathering period.

RESPONSE:

Not confirmed. Please refer to BC Hydro's response to:

- **NMRG IR 1.1.1 where we explain that BC Hydro is not proposing an Energy Price of 3.0 cents per kWh;**
- **BCSEA IR 1.11.2 where we provide the historical Energy Price by calendar year using BC Hydro's proposed approach; and**
- **NMRG IR 1.1.5 where we explain why BC Hydro does not believe that inflation is a relevant consideration with regards to the Energy Price.**

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.4 Please provide BC Hydro's assumptions for Canadian inflation for each year 2020 through 2029.

RESPONSE:

BC Hydro's inflation forecast is provided by the Treasury Board of the Government of B.C. The forecast extends to calendar 2023 and is provided below.

Year	2019	2020	2021	2022	2023
Canada CPI (%)	2.2	2.1	2.0	2.0	2.0

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.5 Using Bank of Canada inflation numbers please confirm that 9.99 cents in 2012 is equivalent to 11.20 cents in 2019, or if not please explain. Does that mean that net metering customers have already sustained what amounts to a rate reduction of 12.09% due to the effects of inflation over the period 2012 to 2019? If not, please explain and provide the effective reduction in the rate paid by BC Hydro to net metering customers over that period.

RESPONSE:

BC Hydro does not believe that inflation is a relevant consideration with regards to the Energy Price. The Energy Price is not based on the costs incurred by the customer. Rather, in Order No. G-26-04, the BCUC determined that "it would be fair if net metering customers were compensated for the value BC Hydro receives from net excess generation."

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value.

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.6 Please confirm that over the same period Residential rates in RS 1101 have risen from 6.80 cents/kWh low tier and 10.19 cents/kWh high tier (675 kWh threshold) in 2012 to 9.45 cents/kWh low tier and 14.17 cents/kWh high tier (same threshold) in 2019. Please confirm that equates to rate increases of approximately 28% and 33% respectively or approximately 30% on average.

RESPONSE:

BC Hydro confirms that the RS 1101 rate at April 1, 2012 was 6.80 cents/kWh for Tier 1 consumption and 10.19 cents/kWh for Tier 2 consumption. The RS 1101 rate as of April 1, 2019, approved by the BCUC on an interim basis, is 9.45 cents/kWh for Tier 1 consumption and 14.17 cents/kWh for Tier 2 consumption.

In both cases, consumption at or below the bi-monthly billing period threshold of 1,350 kWh is billed at the Tier 1 rate, while consumption for the bi-monthly billing period above 1,350 kWh is billed at the Tier 2 rate.

BC Hydro calculates this increase to the RS 1101 Tier 1 and Tier 2 rate to be 39 per cent over the period April 1, 2012 to April 1, 2019.

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.7 Please explain the rationale for the rate paid by BC Hydro to net metering customers effectively going down even though the rate paid by Residential customers has gone sharply up over the same period.

RESPONSE:

When BC Hydro's rates increase, customers in the Program receive increased financial benefit from the ability to offset their load and accumulate a Generation Account Balance to reduce subsequent bill(s).

In the Application, BC Hydro is requesting approval to update the Energy Price to an amount determined every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars, using the average annual exchange rate from the Bank of Canada for that year.

This request reflects the BCUC's determination in Order No. G-26-04 that customers in the Program should be compensated for the value BC Hydro receives from excess generation. Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why the value BC Hydro receives from excess generation should be based on the market value.

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.8 To enable a more informed comparison between the current rate of 9.99 cents/kWh and the proposed dropped rate of 3.0 cents/kWh please provide the Net Present Value (NPV) of 3.0 cents in 2025 and each of the subsequent five years.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.1.1.

1.0 Topic: Magnitude of the Proposed Rate Reduction for Net Metering Generation

Reference: Exhibit B-1, PDF 5.

The Application states that the most recent price increase for Net Metering generation was from 8.16 cents/kWh to 9.99 cents/kWh in 2012.

1.1.9 Has BC Hydro at any time in its history reduced a Rate Schedule for any service by 70% or more? If not, please identify and provide details of the five largest reductions ever made in BC Hydro Rate Schedules. Please include the Rate Schedule number, the rates before and after a reduction, the percentage of the reduction, the effective date and whether the rate reduction was phased in or included grandfathering for then existing customers of that Rate Schedule.

RESPONSE:

The Energy Price is part of Rate Schedule 1289 and is the price paid by BC Hydro for any remaining balance in the Customer's Generation Account at their Anniversary Date. Any Surplus Energy Payment a customer may receive is incremental to the benefit the customer receives from the ability to offset their consumption and accumulate a Generation Account Balance to reduce subsequent bill(s).

The Surplus Energy Payment is not equivalent to the vast majority of BC Hydro's rate schedules where it is the customer that pays BC Hydro for electricity services received from BC Hydro. Accordingly, in BC Hydro's view, the proposed update to the Energy Price is not comparable to changes made to other rate schedules.

BC Hydro has proposed a five-year transitional Energy Price, recognizing that the proposed update to the Energy Price may impact existing customers in the Program. Please refer to BC Hydro's response BCUC IR 1.15.1 where we explain the rationale for a five-year transition period.

2.0 Topic: Amendments to Energy Price

Reference: Exhibit B-1, PDF 5.

1.2.1 In developing the proposed rate for net metering generation how did BC Hydro reflect and fully account for the fact that BC Hydro incurred no costs for the design and building of participants' net metering projects nor any costs for ongoing maintenance and supervision of those projects?

RESPONSE:

As discussed in section 1.1 of the Application, the purpose of the Program is to be a load offset program so that customers can generate their own electricity to reduce their supply from BC Hydro.

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why the value of excess generation from customers in the Program should be based on the market value.

Please also refer to BC Hydro's response to BCUC IR 1.5.1 where we explain the cost-shifting that occurs between customers in the Program and non-participating customers with regards to Surplus Energy Payments.

2.0 Topic: Amendments to Energy Price

Reference: Exhibit B-1, PDF 5.

1.2.2 Please reconcile the portions of BC Hydro's evidence that discuss a number of apparently conflicting methods to determine the appropriate net metering generation rate, including discussion of market prices, retail electricity rates, spot market, etc.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why the value of excess generation from customers in the Program should be based on the market value.

Please also refer to BC Hydro's response to BCUC IR 1.12.4 where we explain how the proposed approach provides a reasonable approximation of the value of excess generation to BC Hydro and to BC Hydro's response to BCUC IR 1.12.6.1 where we explain that an annual update to the Energy Price appropriately balances rate stability and customer acceptance and understanding against the objective of reflecting the value of excess generation to BC Hydro.

2.0 Topic: Amendments to Energy Price

Reference: Exhibit B-1, PDF 5.

1.2.3 Please discuss the relative merits of two approaches taken by BC Hydro:

1. In 2014, basing the net metering generation energy price on relatively simple assumptions and calculations that could be easily verified by participating or non-participating customers and the BCUC; and
2. Going forward, basing the net metering energy price on calculations using the "average of the daily average Mid-Columbia market prices over the previous calendar year" which appears complex and not easily verifiable.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.13.1 where we provide a table outlining the advantages and disadvantages of using various prices for the Energy Price, including the status quo (adopted in 2014) and BC Hydro's proposed approach as provided in the Application.

Please also refer to BC Hydro's response to NMRG IR 1.2.4 where we explain that calculations would be required for both the current Energy Price and BC Hydro's proposed update to the Energy Price.

2.0 Topic: Amendments to Energy Price

Reference: Exhibit B-1, PDF 5.

1.2.4 Does BC Hydro believe that the proposed change in how it calculates the net metering energy price will tend to make it easier or more difficult to understand the rate and consider whether it is appropriate?

RESPONSE:

Calculations are required for both the current Energy Price and BC Hydro's proposed update to the Energy Price.

BC Hydro is proposing an approach where Energy Price would be updated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year.

Please refer to BC Hydro's response to NMRG IR 1.2.5 where we explain how the Energy Price would be calculated under this proposed approach.

As discussed in footnote 7 on page 25 of Appendix F of the Application, the current Energy Price is calculated using the starting Standing Offer Program price of $117.6 per MWh (2009$) and the non-firm energy price of $48.84 per MWh (2009$) and applying the Standing Offer Program assumption that energy is 70 per cent firm and 30 per cent non-firm. Using these values, the current Energy Price was calculated as follows: (0.7)*($117.76) + (0.3)*($48.84), adjusted to 2011$.

2.0 Topic: Amendments to Energy Price

Reference: Exhibit B-1, PDF 5.

1.2.5 Please confirm that the Application does not contain a clear example of how the proposed energy price of 3.00 cents/kWh would be calculated.

RESPONSE:

BC Hydro confirms that an example is not provided in the Application. However, Figure 7 of the Application provides the historical average weighted energy price by calendar year for the past 10 years.

BC Hydro is proposing an approach where the Energy Price would be updated every January 1st based on the daily average Mid-Columbia prices for the previous calendar year, converted to Canadian dollars using the average annual exchange rate from the Bank of Canada for that year.

To calculate the weighted average price, the following formula would be used for each year:

> **Energy Price = Average of (((daily on-peak price * # of on-peak hours per day) + (daily off-peak price * # of off-peak hours per day))/24 hours per day)**

In BC Hydro's response to BCUC IR 1.12.2, we provided the daily average Mid-C market price during both light load hours ("off-peak hours") and heavy load hours ("on-peak hours"), as well as the daily average, for each day, in the previous calendar year. This data is part of BC Hydro's subscription service with Intercontinental Exchange (ICE) and is proprietary. However, a portion of this information (i.e., the ICE daily average for "on-peak" hours) is publicly available on the U.S. Energy Information Administration's web site. For further information, please refer to: https://www.eia.gov/electricity/wholesale/.

2.0 Topic: Amendments to Energy Price

Reference: Exhibit B-1, PDF 5.

1.2.6 Did BC Hydro intend the link to a website where a request for reports needs to be made via subscribing to a private data service company to be an appropriate substitute for providing a clear example of the rate calculation?

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.2.5.

3.0 Topic: Innovative Technologies

Reference: Clean Energy Act

Section 2 of the Clean Energy Act sets out British Columbia's energy objectives, which include:

"to use and foster the development in B.C. of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources."

1.3.1 Does BC Hydro believe that the Net Metering Program and micro hydroelectric generating facilities represent important steps toward meeting this objective? Please explain.

RESPONSE:

The Program is one mechanism that can help encourage the use of clean or renewable resources. Please refer to BC Hydro's response to BCCSC IR 1.5.1 where we discuss how the energy objectives in the *Clean Energy Act* relate to the Application.

3.0 Topic: Innovative Technologies

Reference: Clean Energy Act

Section 2 of the Clean Energy Act sets out British Columbia's energy objectives, which include:

"to use and foster the development in B.C. of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources."

1.3.2 If BC Hydro believes that the Net Metering Program and micro hydroelectric generating facilities don't represent important steps toward meeting this objective, please identify the innovative technologies and clean or renewable resources that would represent better steps toward this objective.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.3.1.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.1 Please confirm that electricity exported from British Columbia goes to California where it is sold into the California ISO market, not the Mid C market.

RESPONSE:

Not confirmed. Electricity exported from British Columbia can be sold to various entities and in various markets in the Western Interconnection including, but not limited to, the Pacific Northwest, California, and Alberta.

Mid-C is a well established trading hub for energy in the Pacific Northwest. The Mid-C price index has been approved by the BCUC on numerous occasions as an appropriate proxy for market value, and is used in the Electric Tariff. For example, Mid-C is used in Rate Schedule 1892 (Transmission Service – Freshet Energy) and Rate Schedule 1253 (Distribution Service – IPP Station Service).

Excess generation from customers in the Program is intermittent, infrequent, non-firm energy that cannot be accurately forecasted, planned or operationalized. Consequently, the energy has negligible direct value in the wholesale markets.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.2 Please confirm that in 2010 approximately 43% of all electricity exported from British Columbia went to California where it was sold into the California ISO market.

RESPONSE:

BC Hydro does not maintain records on the percentages of all electricity exported from British Columbia to California.

BC Hydro believes that the source of this statistic is a March 15, 2017 National Energy Board Market Snapshot. BC Hydro is not able to independently confirm this statistic because it is an aggregated value calculated by the National Energy Board that includes exports from other entities besides BC Hydro.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.3 Please confirm that in 2016 approximately 79% of all electricity exported from British Columbia went to California where it was sold into the California ISO market.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.4.2.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.4 Please provide the percentages of all electricity exported from British Columbia that went to California for 2017, 2018 and 2019 (estimate).

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.4.2.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.5 Does electricity exported from British Columbia and sold into the California ISO market typically trade at a premium to electricity sold into the Mid C market? Please provide further detail of the price premium, if any, and explain why there is typically a price difference between those two electricity markets.

RESPONSE:

Electricity exported from British Columbia and sold into the California ISO market may trade at a premium to electricity sold into the Mid-C market.

Please refer to BC Hydro's response to NMRG IR 1.4.1, where we explain that Mid-C is well established as the appropriate proxy for market value and that excess energy from customers in the Program has negligible direct value in the wholesale markets.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.6 Please describe if, how and to what extent California zero emissions requirements and Renewables Portfolio Standard may make electricity from British Columbia more desirable or necessary for export to California. Please also comment on whether current or anticipated emissions standards and renewables portfolio standards in other neighbouring or nearby jurisdictions (e.g. Alberta, Washington, Oregon) are likely to contribute to demand for electricity from net metering generation in British Columbia.

RESPONSE:

California is the largest market in Western North America for renewable energy through its mandated Renewable Portfolio Standard (RPS). Selling renewable energy into California's RPS market requires registration and approval on a facility-by-facility basis by the California Energy Commission. Excess energy from customers in the Program is not registered with the California Energy Commission and run-of-river hydro energy from British Columbia is not eligible for the California RPS program.

To be eligible for high value deliveries under the California RPS, the renewable energy must be simultaneously scheduled and delivered to the California state grid at the time the energy is generated. As excess energy from customers in the Program is an unplanned delivery of energy to BC Hydro's distribution grid, it cannot be simultaneously scheduled and delivered to California's grid, and is ineligible for high value RPS deliveries in California's market.

BC Hydro understands that the same requirements would apply in neighbouring jurisdictions. With regards to Alberta, Washington and Oregon, BC Hydro understands that:

- **Alberta does not have a RPS program;**
- **Net metering generation is not eligible for the Washington State RPS program; and**
- **Generation from British Columbia is not eligible for high value deliveries under the Oregon RPS program.**

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.7 Does BC Hydro have some reason to believe that California demand for electricity exported from British Columbia will decrease over the next 10 years? Please explain, including discussion of how California's Renewables Portfolio Standard is likely to impact such imports and related pricing.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.4.1, where we explain that Mid-C is well established as the appropriate proxy for market value and to BC Hydro's response to NMRG IR 1.4.6 where we explain that excess energy from customers in the Program would be ineligible for high value deliveries under the California Renewable Portfolio Standard.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.8 Does net metering generation from hydro projects tend to help BC Hydro to achieve positive net electricity exports – energy and revenue – due to the additional ability to export electricity from British Columbia during higher priced periods, particularly at night, from August onwards until the US gets cooler temperatures and in winter when demand is high in Canada? Please explain.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.12.4 where we show generation delivered from hydro customers in the Program, aggregated by month, for 2018, and show that the proposed method to update the Energy Price provides a reasonable approximation of the value of this energy.

Please also refer to BC Hydro's response to NMRG IR 1.4.1 where we explain that excess energy from customers in the Program has negligible direct value in the wholesale markets.

4.0 Topic: Whether Mid C Pricing is Appropriate for Net Metering Generation

Reference: Exhibit B-1

1.4.9 Please describe how net metering hydro generation may provide BC Hydro with a greater ability to implement British Columbia's electricity trade strategy of taking advantage of opportunities to "buy low and sell high".

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.4.8.

5.0 Topic: Price Typically Received by BC Hydro for Net Metering Generation

Reference: Exhibit B-1

1.5.1 Please confirm that all net metering generation is typically used by the producing customer or sold locally at full retail rates to BC Hydro customers.

RESPONSE:

Not confirmed. Please refer to BC Hydro's response to BCSEA IR 1.21.3.

5.0 Topic: Price Typically Received by BC Hydro for Net Metering Generation

Reference: Exhibit B-1

1.5.2 Please confirm that BC Hydro's operates its grid in a manner that has all electricity generated used in priority sequence dictated by the shortest distance from generation. For example, would the most local load for a net metering customer's generation be their own load, then the next nearest BC Hydro customer such as a neighbor, and so on by distance?

RESPONSE:

Not confirmed.

BC Hydro operates its grid to match generation and load, maintain scheduled interchange with other Balancing Authorities, and maintain the frequency in real-time of the electric power system.

The flow of electric power on a distribution feeder is governed by system impedances, the amount and location of load on the feeder, and the amount and location of generation on the feeder. The shortest physical distance is not always the shortest electrical distance. As the load and generation is constantly changing, it is not practical to determine the exact path the electric power generated by a customer in the Program takes on the BC Hydro distribution system.

Please also refer to BC Hydro's response to BCSEA IR 1.21.3 where we explain that BC Hydro's system is managed as a whole and that energy received by a customer is not attributed to a particular use by BC Hydro.

5.0 Topic: Price Typically Received by BC Hydro for Net Metering Generation

Reference: Exhibit B-1

1.5.3 If BC Hydro's grid was not operated in the manner described in IR 5.2 above, would the bi-directional kWh meters supplied to net metering customers by BC Hydro operate properly or would they show an infinite amount of kWh in both feed in and feed out directions? Please explain.

RESPONSE:

The bi-directional meters would operate properly. For further discussion, please refer to BC Hydro's response to NMRG IR 1.5.2.

5.0 Topic: Price Typically Received by BC Hydro for Net Metering Generation

Reference: Exhibit B-1

1.5.4 Please confirm that BC Hydro is required to meet local load in British Columbia before exporting electricity.

RESPONSE:

As a public utility, BC Hydro has an obligation to serve its customers in accordance with the terms and conditions of its Tariff. BC Hydro plans its system to serve its domestic load requirements, which also includes a long-standing obligation to deliver 230 MW of energy to Seattle City Light under the Skagit Valley Treaty. Exports can be undertaken when BC Hydro has capability to accommodate these transactions while meeting load requirements. These transactions are performed exclusively by Powerex.

5.0 Topic: Price Typically Received by BC Hydro for Net Metering Generation

Reference: Exhibit B-1

1.5.5 To the extent that net metering generation meets local load, doesn't that enable BC Hydro to store more water to enable more generation during high price periods thus giving it the opportunity to achieve the most lucrative electricity exports?

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.4.8.

5.0 Topic: Price Typically Received by BC Hydro for Net Metering Generation

Reference: Exhibit B-1

1.5.6 Please confirm that local use of electricity from net metering generation ensures that electricity will always be sold at full retail rates, and never at wholesale or discounted rates. Please explain.

RESPONSE:

Not confirmed. Please refer to BC Hydro's response to BCSEA IR 1.21.3.

6.0 Topic: Other Benefits of Local Generation

Reference: Exhibit B-1

1.6.1 Does BC Hydro tend to experience more low voltage and imbalance problems in rural or otherwise identifiable areas? Please describe how net metering generation situated in those areas may contribute to addressing those problems.

RESPONSE:

Currently, rural areas account for approximately 31 per cent of low voltage complaints and 50 per cent of voltage unbalance (imbalance) complaints.

In general, energy received from customers in the Program in rural areas is not a viable solution for power quality issues. For example, low voltage and unbalance problems generally occur when there is a peak load and as explained in BC Hydro's response to BCUC IR 1.14.2.1, generation from residential customers in the Program does not coincide with BC Hydro's peak demand period or the residential class non-coincident peak period.

6.0 Topic: Other Benefits of Local Generation

Reference: Exhibit B-1

1.6.2 Please discuss whether BC Hydro studied and considered the savings to BC Hydro and its non-participating customers made possible by avoiding the costs of upgrading or building and maintaining new infrastructure in areas that have experienced low voltage and imbalance problems? Please provide sources of supporting data.

RESPONSE:

BC Hydro has not deferred any infrastructure upgrades as a result of the Program. Accordingly, there have been no savings related to the deferral of capital projects.

Please refer to BC Hydro's response to NMRG IR 1.6.1 where we explain that the majority of net metering generation does not address low voltage or voltage unbalance problems.

BC Hydro is monitoring developments in smart inverters which have capabilities to help address power quality problems, especially those caused by distributed generation. BC Hydro expects to upgrade the DGTIR-100 to include smart meters after the next revision of the CSA C22.3 No. 9 interconnection standard is published.

7.0 Topic: Magnitude of Private Investments Made in Reliance on Net Metering Pricing Approved by the BCUC

Reference: Exhibit B-1

1.7.1 Please provide the total amount of private investment made by current net metering ratepayers in planning, designing, building, purchasing and operating generation facilities or equipment in British Columbia for each year since Net Metering was approved by the BCUC in 2003 through 2018. Please include the source(s) of that data.

RESPONSE:

BC Hydro does not have data or estimates on the amount of private investment made by current or prospective net metering customers.

7.0 Topic: Magnitude of Private Investments Made in Reliance on Net Metering Pricing Approved by the BCUC

Reference: Exhibit B-1

1.7.2 Please provide a graph showing the distribution of net metering ratepayer's investments in their own generation facilities or equipment and identify the average investment amount. Please include the source(s) of the underlying data.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.7.1.

7.0 Topic: Magnitude of Private Investments Made in Reliance on Net Metering Pricing Approved by the BCUC

Reference: Exhibit B-1

1.7.3 Please provide the total amount of private investment that BC Hydro estimates is likely to be made by current or prospective net metering ratepayers in planning, designing, building, purchasing and operating generation facilities or equipment in British Columbia for each year 2019 through 2029 assuming that BC Hydro's Application ***is approved***, specifically ***including*** the proposed grandfathering period pricing and the subsequent energy price drop for net metering. Please explain the basis for those estimates and the source(s) of underlying data, if any.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.7.1.

7.0 Topic: Magnitude of Private Investments Made in Reliance on Net Metering Pricing Approved by the BCUC

Reference: Exhibit B-1

1.7.4 Please provide the total amount of private investment that BC Hydro estimates is likely to be made by ratepayers in planning, designing, building, purchasing and operating generation facilities or equipment in British Columbia for each year 2019 through 2029 assuming that BC Hydro's Application is ***not*** approved, specifically ***rejecting*** the proposed grandfathering period pricing and the subsequent energy price drop. Please explain the basis for those estimates and the source(s) of underlying data, if any. Please also indicate any assumptions made by BC Hydro regarding the length of the grandfathering period, the net metering generation energy price during the grandfathering period, and energy price beyond the grandfathering period.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.7.1.

8.0 Topic: Grandfathering Term and Pricing Required to Provide Reasonable Prospect of Net Metering Ratepayers Recovering Their Investment

Reference: Exhibit B-1

1.8.1 Please describe the steps taken by BC Hydro, including the method of analysis, any assumptions and calculations, to determine what length of the grandfathering term (e.g. how many years) and the energy price applied during and after the grandfathering term, will ensure a reasonable opportunity for net metering ratepayers to recover their own investments?

RESPONSE:

As discussed in BC Hydro response to NMRG IR 1.7.1, BC Hydro does not have data on the investments made by customers in the Program.

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain the rationale for proposing a five-year transition period and where we explain why it is not possible to know whether, and to what extent, the changes proposed in the Application may prevent the recovery of a customer's initial capital investment over time.

Please also refer to BC Hydro's response to BCUC IR 1.15.5 where we confirm that enrolment in the Program does not entail any contractual agreement or guarantee between BC Hydro and the customer that provides assurance on the cost recovery of capital investments by the customer or stability of the terms and conditions, including the Energy Price.

8.0 Topic: Grandfathering Term and Pricing Required to Provide Reasonable Prospect of Net Metering Ratepayers Recovering Their Investment

Reference: Exhibit B-1

1.8.2 If BC Hydro did not conduct analysis or calculations of the type referenced in IR 8.1 above, please explain why.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.8.1.

8.0 Topic: Grandfathering Term and Pricing Required to Provide Reasonable Prospect of Net Metering Ratepayers Recovering Their Investment

Reference: Exhibit B-1

1.8.3 Prior to the filing of the Application, what steps did BC Hydro take to contact existing and prospective net metering customers to ensure BC Hydro had at least a reasonable understanding of magnitude of net metering ratepayers' investments, and the energy price scheme necessary to provide a reasonable prospect of those ratepayers recovering their investments?

RESPONSE:

Through the Engagement Survey, customers provided feedback on BC Hydro's proposed five-year transition period. A summary of these comments is provided in section 1.3.5 of Appendix E of the Application.

Please refer to BC Hydro's response to BCUC IR 1.15.1 where we explain the rationale for proposing a five-year transition period and where we explain why it is not possible to know whether, and to what extent, the changes proposed in the Application may prevent the recovery of a customer's initial capital investment over time.

Please also refer to BC Hydro's response to BCUC IR 1.15.5 where we confirm that enrolment in the Program does not entail any contractual agreement between BC Hydro and the customer that provides assurance on the cost recovery of capital investments by the customer or stability of the terms and conditions, including the Energy Price.

8.0 Topic: Grandfathering Term and Pricing Required to Provide Reasonable Prospect of Net Metering Ratepayers Recovering Their Investment

Reference: Exhibit B-1

1.8.4 Please describe all circumstances under which BC Hydro's position would be that net metering ratepayers should not be provided with a reasonable prospect of recovering their investments.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 1.15.5 where we confirm that enrolment in the Program does not entail any contractual agreement between BC Hydro and the customer that provides assurance on the cost recovery of capital investments by the customer.

8.0 Topic: Grandfathering Term and Pricing Required to Provide Reasonable Prospect of Net Metering Ratepayers Recovering Their Investment

Reference: Exhibit B-1

1.8.5 Please provide BC Hydro's expectations for the useful life of a net metering hydro plant, describe the underlying assumptions and provide the sources of data supporting those expectations.

RESPONSE:

As stated in BC Hydro's response to BCUC IR 1.10.3, BC Hydro estimates the useful life of a typical micro-hydro Plant to be 30 years; however, the life of the initial capital investment in a distributed generation facility is dependent on factors that are controlled by the customer including the equipment quality, installation practices, equipment service conditions, and maintenance practices.

The induction generation is a large cost component of a micro-hydro plant. BC Hydro assumes that the average life of an induction motor/generator in the range of 25 to 100 kW is approximately 30 years. This assumption is supported by:

- **The U.S. Department Energy Report DOE/CS-0147, which states that an induction motor in the range of 51 to 125 hp [38 to 93 kW] has an average life is 28.5 years and a life range of 25 to 38 years; and**
- **The Natural Resources Canada publication *An Introduction to Micro-Hydro Power Systems* which states that a micro-hydro system (up to 100 kW) has a life of 20 to 30 years.**

Please also refer to BC Hydro's response to BCUC IR 1.15.5 where we confirm that enrolment in the Program does not entail any contractual agreement between BC Hydro and the customer that provides assurance on the cost recovery of capital investments by the customer.

8.0 Topic: Grandfathering Term and Pricing Required to Provide Reasonable Prospect of Net Metering Ratepayers Recovering Their Investment

Reference: Exhibit B-1

1.8.6 Does BC Hydro expect that net metering hydro plants will have a relatively longer useful life than net metering solar generation equipment? Does BC Hydro expect that the time period required for recovery of the initial investment will be relatively longer for net metering hydro plants than for net metering solar equipment. Please explain and quantify any such difference.

RESPONSE:

In BC Hydro's response to BCUC IR 1.10.3, BC Hydro estimates a useful life of typical solar facility to be 25 years and the useful life of a typical micro-hydro plant to be 30 years.

For a typical 4 kW residential solar system, BC Hydro estimates a simple payback of approximately 23 years, excluding maintenance costs. The payback is driven by avoiding the Step 2 energy charge of 14.17 cents/kWh.

BC Hydro does not have data on the cost of net metering hydro plants and is unable to provide a typical cost or payback because the costs may vary significantly based on site conditions.

9.0 Topic: Prospect of Achieving a Reasonable Return on Ratepayer Net Metering Investments

Reference: Exhibit B-1

1.9.1 Please describe the steps taken by BC Hydro, including the method of analysis, any assumptions and calculations, to determine what length of the grandfathering term (e.g. how many years) and the pricing level applied during and after the grandfathering term, will ensure a reasonable opportunity for net metering ratepayers to recover their own investments ***and to realize a return on those investments***?

RESPONSE:

As discussed in BC Hydro response to NMRG IR 1.7.1, BC Hydro does not have data on the investments made by customers in the Program.

Please also refer to BC Hydro's response to:

- **BCUC IR 1.15.1 where we explain the rationale for proposing a five-year transition period and where we explain why it is not possible to know whether, and to what extent, the changes proposed in the Application may prevent the recovery of a customer's initial capital investment over time;**
- **BCUC IR 1.15.5 where we confirm that enrolment in the Program does not entail any contractual agreement or guarantee between BC Hydro and the customer that provides assurance on the cost recovery of capital investments by the customer or stability of the terms and conditions, including the Energy Price; and**
- **BCSEA IR 1.13.6 where we explain that unlike an Electricity Purchase Agreement which is a commercial instrument, Rate Schedule 1289 is a rate as approved under the *Utilities Commission Act* that is subject to change as approved by the BCUC.**

9.0 Topic: Prospect of Achieving a Reasonable Return on Ratepayer Net Metering Investments

Reference: Exhibit B-1

1.9.2 If BC Hydro did not conduct analysis or calculations of the type referenced in IR 9.1 above, please explain why.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.9.1.

9.0 Topic: Prospect of Achieving a Reasonable Return on Ratepayer Net Metering Investments

Reference: Exhibit B-1

1.9.3 Prior to the filing of the Application, what steps did BC Hydro take to contact existing and prospective net metering customers to ensure BC Hydro had at least a reasonable understanding of magnitude of net metering ratepayers' expectations of a reasonable opportunity to realize a return on those investments?

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.8.3.

9.0 Topic: Prospect of Achieving a Reasonable Return on Ratepayer Net Metering Investments

Reference: Exhibit B-1

1.9.4 Please describe all circumstances under which BC Hydro's position would be that net metering ratepayers should not be provided with a reasonable prospect to realize a return on their investments.

RESPONSE:

Enrolment in the Program does not provide customers in the Program with any contractual agreement or guarantee with regards to realizing a return on their investments. As explained in BC Hydro's response to BCSEA IR 1.13.6, unlike an Electricity Purchase Agreement, which is a commercial instrument, Rate Schedule 1289 is a rate as approved under the *Utilities Commission Act* that is subject to change as approved by the BCUC.

9.0 Topic: Prospect of Achieving a Reasonable Return on Ratepayer Net Metering Investments

Reference: Exhibit B-1

1.9.5 As a regulated utility does BC Hydro expect and regularly apply to the BCUC for approval of a Revenue Requirements Application that includes a significant component reflecting a return on investments made by BC Hydro? Please explain.

RESPONSE:

BC Hydro's return on equity for fiscal 2020 and fiscal 2021 is prescribed by section 3 of Direction No. 8 to the BCUC (BC Reg. 24/2019) issued under the *Utilities Commission Act*. Under section 3 of Direction No. 8, the BCUC must allow BC Hydro to achieve an annual rate of return on deemed equity that would yield a distributable surplus of $712 million in fiscal 2020 and fiscal 2021.

10.0 Topic: Net Metering Practices at Other Utilities and in Other Jurisdictions

Reference: Exhibit B-1

1.10.1 Please describe the steps taken by BC Hydro to compare and evaluate its own net metering repricing proposal with approved or applied-for net metering pricing at other electric utilities in British Columbia as well as in other jurisdictions.

RESPONSE:

BC Hydro conducted a Jurisdictional Review of eight other utilities to understand their approach to the price paid for excess generation under their respective net metering programs.

As discussed in section 4.5 of the Application, the Jurisdictional Review indicated that most utilities surveyed either do not provide Surplus Energy Payments or have an Energy Price based on the market price or their incremental cost.

11.0 Topic: Size and Impact of the Net Metering Program

Reference: Exhibit B-1, PDF 6.

"In 2003, when the Program was established, it was expected to be a very small program with just a handful of interested participants. More recently, the Program has been more successful than originally expected. At the end of March 2018, the Program had over 1,330 customers with 9,000 kW of total capacity. In the past 12 months alone, BC Hydro has received over 500 new Net Metering applications."

1.11.1 Did BC Hydro expect "just a handful of interested participants" would be 5, 10 or some other number? What was the basis for that expectation? Please provide specific references to all BC Hydro materials related to the introduction and implementation of the Net Metering Program that expressly indicated such limited participation.

RESPONSE:

BC Hydro's expectation in 2003, with regards to participation in the Program, was based on factors at that particular time such as the capital cost to install a Generating Facility and the value of offsetting consumption from BC Hydro, based on the applicable electricity rates.

As stated in a White Paper prepared by Compass Resource Management Ltd. and submitted to the BCUC on June 27, 2003:

> **"Under the most favourable assumptions of installation costs, resource quality and rate treatment, customer costs in the absence of additional subsidies would exceed current retail rates in virtually all circumstances. Customers have expressed a willingness to pay a premium for other indirect and societal such as environmental improvements. However, uptake would depend upon customer ability and willingness to pay a substantial premium (in many cases exceeding 50 per cent) for these other benefits. These economics may change with future changes in technology costs and retail rates."**

11.0 Topic: Size and Impact of the Net Metering Program

Reference: Exhibit B-1, PDF 6.

"In 2003, when the Program was established, it was expected to be a very small program with just a handful of interested participants. More recently, the Program has been more successful than originally expected. At the end of March 2018, the Program had over 1,330 customers with 9,000 kW of total capacity. In the past 12 months alone, BC Hydro has received over 500 new Net Metering applications."

1.11.2 By what metric did BC Hydro consider Net Metering to be "a very small program"? Please provide specific examples of five other current programs that BC Hydro considers "very small" and provide the number of participating customers, total kW of capacity, and number of applications within the last 12 months.

RESPONSE:

Please refer to BC Hydro's response to NMRG IR 1.11.1 where we explain the basis for BC Hydro's expectation, in 2003, with regards to participation in the Program. In fiscal 2005, there were five participants in the Program. Participation in the Program remained under 100 customers until fiscal 2011.

11.0 Topic: Size and Impact of the Net Metering Program

Reference: Exhibit B-1, PDF 6.

"In 2003, when the Program was established, it was expected to be a very small program with just a handful of interested participants. More recently, the Program has been more successful than originally expected. At the end of March 2018, the Program had over 1,330 customers with 9,000 kW of total capacity. In the past 12 months alone, BC Hydro has received over 500 new Net Metering applications."

1.11.3 Please provide references to all public statements by BC Hydro that established any upper limits for the number of participating customers, the total kW of capacity or the number of applicants annually.

RESPONSE:

BC Hydro is not proposing to limit the number of participating customers, the total kW of capacity or the number of applicants accepted into the Program annually. As outlined in section 1.5 of the Application, participation in the Program continues to grow.

11.0 Topic: Size and Impact of the Net Metering Program

Reference: Exhibit B-1, PDF 6.

"In 2003, when the Program was established, it was expected to be a very small program with just a handful of interested participants. More recently, the Program has been more successful than originally expected. At the end of March 2018, the Program had over 1,330 customers with 9,000 kW of total capacity. In the past 12 months alone, BC Hydro has received over 500 new Net Metering applications."

1.11.4 Given BC Hydro's recent assessment that the Net Metering Program has been "more successful than originally expected" what is the rationale for a proposed price freeze and subsequent drop that appears likely to undermine confidence in a successful program?

RESPONSE:

Please refer to BC Hydro's response to BCSEA IR 1.3.1 where we explain why BC Hydro does not anticipate that reducing the Energy Price would adversely impact the number of applications submitted to the Program.

Please also refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why the value of excess generation from customers in the Program should be based on the market value and to BC Hydro's response to BCUC IR 1.5.1 where we explain how the proposed update to the Energy Price will mitigate cost-shifting between customers in the Program and non-participating customers with regards to Surplus Energy Payments.

11.0 Topic: Size and Impact of the Net Metering Program

Reference: Exhibit B-1, PDF 6.

"In 2003, when the Program was established, it was expected to be a very small program with just a handful of interested participants. More recently, the Program has been more successful than originally expected. At the end of March 2018, the Program had over 1,330 customers with 9,000 kW of total capacity. In the past 12 months alone, BC Hydro has received over 500 new Net Metering applications."

1.11.5 Does BC Hydro agree that with its over 4 million customers (as of 2017) the uptake of the Net Metering Program by 1,330 customers over more than a decade and a half since introduction in 2003 continues to be very small? Please explain.

RESPONSE:

As of June 1, 2019, the total number of customers in the Program was 2014, which demonstrates that the rate of uptake continues to increase.

While approximately 2000 customers represents a relatively small portion of BC Hydro's total number of customers, the amendments proposed in the Application are not intended to curtail the growth of the Program. Rather, they are intended to maintain the Program as a load offset program and to limit cost-shifting between participating and non-participating customers with regards to Surplus Energy Payments.

11.0 Topic: Size and Impact of the Net Metering Program

Reference: Exhibit B-1, PDF 6.

"In 2003, when the Program was established, it was expected to be a very small program with just a handful of interested participants. More recently, the Program has been more successful than originally expected. At the end of March 2018, the Program had over 1,330 customers with 9,000 kW of total capacity. In the past 12 months alone, BC Hydro has received over 500 new Net Metering applications."

1.11.6 Please confirm that assuming an annual growth rate of 500 new net metering applicants is sustained, and assuming zero attrition, after another five years less than 0.01% of BC Hydro customers would be participating in the Net Metering Program.

RESPONSE:

Not confirmed. Based on the assumptions outlined in the question, BC Hydro calculates that, after five years, the percentage of customers participating in the Program would be approximately 0.2 per cent of BC Hydro's total customers in all customer classes.

The percentage is calculated as follows:

- **Number of customers in the Program at March 31, 2019: 1,900;**
- **Estimated number of customers in the Program at March 31, 2024 (after five years), assuming growth of 500 new customers per year: 4,400;**
- **Number of BC Hydro total customers at March 31, 2019: 2,045,738;**
- **Estimated number of BC Hydro total customers at March 31, 2024 (after five years), assuming 1.5 per cent growth rate per year for BC Hydro's total customers in all customer classes: 2,203,841; and**
- **Percentage calculation = 4,400/2,203,841 = 0.2 per cent.**

12.0 Topic: Suggested "Cost Shifting"

Reference: Exhibit B-1, PDF 9.

"In this context, BC Hydro believes that annual surplus energy payouts ranging from $10,000 to $60,000 per customer, as discussed above, go far beyond the limited cost shifting that the Commission has previously stated is warranted to support the implementation of Net Metering and in fact represent substantial costs for both BC Hydro and its ratepayers."

1.12.1 Does BC Hydro agree that any determination of "cost shifting" in this context requires not only looking at the quantum of payments ***to*** net metering customers but also at the value of the energy received ***from*** those same net metering customers? Please explain.

RESPONSE:

Yes, BC Hydro agrees that any determination of cost-shifting with regards to Surplus Energy Payments must consider both the cost of the payments to BC Hydro as well as the value of energy received by BC Hydro.

As discussed in BC Hydro's response to BCUC IR 1.5.1, the proposed update to the Energy Price is intended to mitigate cost-shifting with regards to Surplus Energy Payments by more accurately reflecting the value of the energy to BC Hydro.

Please refer to BC Hydro's response to CEC IR 1.7.3 where we quantify the cost-shifting from customers in the Program to non-participants caused by the current Energy Price, considering both the payments provided and the value of the energy received.

12.0 Topic: Suggested "Cost Shifting"

Reference: Exhibit B-1, PDF 9.

"In this context, BC Hydro believes that annual surplus energy payouts ranging from $10,000 to $60,000 per customer, as discussed above, go far beyond the limited cost shifting that the Commission has previously stated is warranted to support the implementation of Net Metering and in fact represent substantial costs for both BC Hydro and its ratepayers."

1.12.2 In assessing the value of the energy received ***from*** net metering customers please describe how BC Hydro:

1. has considered the increased value of the "steady" power produced by high capacity factor net metering participants;
2. has reflected that the net metering program does not include an inflationary rate adjustment;
3. determines the value of Net Metering power entering the grid and used locally with little transmission line loss; and
4. reflects that the Net Metering power entering the grid is most likely to be sold by BC Hydro to its retail customers at rates significantly higher than the rates paid to net metering participants.

RESPONSE:

With regards to point 1:

- **Please refer to BC Hydro's response to BCUC IR 1.14.2.1, where we explain that generation from residential customers in the Program provides energy value only and does not result in any avoided demand-related costs; and**
- **Please also refer to BC Hydro's response to BCUC IR 1.11.2 where we explain why BC Hydro does not consider generation from customers in the Program, on an aggregate basis, to provide capacity benefits.**

With regards to point 2, please refer to BC Hydro's response to NMRG IR 1.1.5 where we explain why BC Hydro does not believe that inflation is a relevant consideration with regards to the Energy Price.

With regards to point 3, please refer to BC Hydro's response to BCSEA IR 1.21.3 where we explain that excess energy received from customers in the Program is not attributed to a particular use by BC Hydro.

With regards to point 4:

- **Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why it is appropriate to value excess generation from customers in the Program based on the market value; and**
- **Please also refer to BC Hydro's response to BCSEA IR 1.21.4 where we explain why the value of excess generation from customers in the Program is not the same as the customer's tariff rate.**

13.0 Topic: "Oversized Generating Facilities"

Reference: Exhibit B-1, PDF 7.

"The impact of these applications with oversized generating facilities is reflected in the annual energy surplus payout amounts. In 2017, 230 Net Metering customers received an annual energy surplus payout. The total annual payout amounts were approximately $280,000 which would imply an average payout of approximately $1,200 for each customer. However, of these 230 customers, six customers received approximately $220,000 with individual annual payouts ranging from $10,000 to $60,000 per customer. This means that almost 80 per cent of the total annual payout was received by just 3 per cent of all Net Metering customers who received an annual energy surplus payout. BC Hydro estimates that there are approximately 12 customers with oversized generating facilities in the application review process at the time of this filing."

1.13.1 Please confirm that BC Hydro has no objection to the concept of net metering participants receiving an annual energy surplus payout.

RESPONSE:

The amendments proposed in the Application maintain a Surplus Energy Payment for any excess generation remaining at a customer's Anniversary Date.

Rate Schedule 1289 is a rate as approved under the *Utilities Commission Act* that is subject to change as approved by the BCUC.

13.0 Topic: "Oversized Generating Facilities"

Reference: Exhibit B-1, PDF 7.

"The impact of these applications with oversized generating facilities is reflected in the annual energy surplus payout amounts. In 2017, 230 Net Metering customers received an annual energy surplus payout. The total annual payout amounts were approximately $280,000 which would imply an average payout of approximately $1,200 for each customer. However, of these 230 customers, six customers received approximately $220,000 with individual annual payouts ranging from $10,000 to $60,000 per customer. This means that almost 80 per cent of the total annual payout was received by just 3 per cent of all Net Metering customers who received an annual energy surplus payout. BC Hydro estimates that there are approximately 12 customers with oversized generating facilities in the application review process at the time of this filing."

1.13.2 Does BC Hydro agree that absent the potential to receive an annual energy surplus payout Net Metering becomes simply metering, with no need for any "net" calculation or any Net Metering Program? Please explain.

RESPONSE:

BC Hydro does not agree. As discussed in section 1.1 of the Application, when a customer in the Program generates more electricity than they need at a point in time, that surplus electricity is banked in the Customer's Generation Account. The Generation Account Balance is then applied as a credit to offset electricity consumption later, when the customer does not generate enough electricity to meet their needs and requires electricity from BC Hydro.

The benefit from accumulating a Generation Account Balance would not be available to customers without the Net Metering Program. Please refer to BC Hydro's response to BCUC IR 1.5.2.2 where we illustrate the cost-shifting that occurs from the ability of customers in the Program to accumulate a Generation Account Balance to offset their consumption in a subsequent billing period.

Under the amendments proposed in the Application, customers would continue to be able to accumulate a Generation Account Balance to apply against subsequent bill(s) and would continue to receive Surplus Energy Payments for any balance remaining on their Anniversary Date.

13.0 Topic: "Oversized Generating Facilities"

Reference: Exhibit B-1, PDF 7.

"The impact of these applications with oversized generating facilities is reflected in the annual energy surplus payout amounts. In 2017, 230 Net Metering customers received an annual energy surplus payout. The total annual payout amounts were approximately $280,000 which would imply an average payout of approximately $1,200 for each customer. However, of these 230 customers, six customers received approximately $220,000 with individual annual payouts ranging from $10,000 to $60,000 per customer. This means that almost 80 per cent of the total annual payout was received by just 3 per cent of all Net Metering customers who received an annual energy surplus payout. BC Hydro estimates that there are approximately 12 customers with oversized generating facilities in the application review process at the time of this filing."

1.13.3 Please confirm that BC Hydro's objection is limited to the amount of the individual annual payouts of just six existing and 12 prospective customers with "oversized generating facilities".

RESPONSE:

Not confirmed.

BC Hydro believes that amendments are required to prevent Oversized Generating Facilities and to update the Energy Price so that it reflects the value that BC Hydro receives from excess generation.

13.0 Topic: "Oversized Generating Facilities"

Reference: Exhibit B-1, PDF 7.

"The impact of these applications with oversized generating facilities is reflected in the annual energy surplus payout amounts. In 2017, 230 Net Metering customers received an annual energy surplus payout. The total annual payout amounts were approximately $280,000 which would imply an average payout of approximately $1,200 for each customer. However, of these 230 customers, six customers received approximately $220,000 with individual annual payouts ranging from $10,000 to $60,000 per customer. This means that almost 80 per cent of the total annual payout was received by just 3 per cent of all Net Metering customers who received an annual energy surplus payout. BC Hydro estimates that there are approximately 12 customers with oversized generating facilities in the application review process at the time of this filing."

1.13.4 1Is BC Hydro proposing to determine "oversized generating facilities" based on capacity, individual annual payout or some combination of both?

RESPONSE:

As set out in item 3 of the Net Metering Application and Interconnection Approval section of the proposed tariff (page 5 of Appendix B of the Application), BC Hydro would assess a proposed Generating Facility as follows:

(a) For Generating Facilities with a nameplate rating of less than or equal to five kilowatts, BC Hydro will not assess the Customer's Annual Load or require a Customer to submit load data or load estimates in their Net Metering Application, and

(b) For Generating Facilities with a nameplate rating of greater than five kilowatts, the Generating Facility's Annual Energy Output must not exceed 110 per cent of the Annual Load.

The proposed definitions of Annual Energy Output and Annual Load are provided on pages 2 and 3 of Appendix B of the Application.

13.0 Topic: "Oversized Generating Facilities"

Reference: Exhibit B-1, PDF 7.

"The impact of these applications with oversized generating facilities is reflected in the annual energy surplus payout amounts. In 2017, 230 Net Metering customers received an annual energy surplus payout. The total annual payout amounts were approximately $280,000 which would imply an average payout of approximately $1,200 for each customer. However, of these 230 customers, six customers received approximately $220,000 with individual annual payouts ranging from $10,000 to $60,000 per customer. This means that almost 80 per cent of the total annual payout was received by just 3 per cent of all Net Metering customers who received an annual energy surplus payout. BC Hydro estimates that there are approximately 12 customers with oversized generating facilities in the application review process at the time of this filing."

1.13.5 When did BC Hydro first introduce the term "oversized generating facilities" in the context of net metering? Where may ratepayers find the definition of "oversized generating facilities"?

RESPONSE:

BC Hydro introduced the term "Oversized Generating Facilities" in the 2018 Amendment Application. The term is defined in Appendix H of the Application.

13.0 Topic: "Oversized Generating Facilities"

Reference: Exhibit B-1, PDF 7.

"The impact of these applications with oversized generating facilities is reflected in the annual energy surplus payout amounts. In 2017, 230 Net Metering customers received an annual energy surplus payout. The total annual payout amounts were approximately $280,000 which would imply an average payout of approximately $1,200 for each customer. However, of these 230 customers, six customers received approximately $220,000 with individual annual payouts ranging from $10,000 to $60,000 per customer. This means that almost 80 per cent of the total annual payout was received by just 3 per cent of all Net Metering customers who received an annual energy surplus payout. BC Hydro estimates that there are approximately 12 customers with oversized generating facilities in the application review process at the time of this filing."

1.13.6 What is BC Hydro's rationale for changing the energy price paid to ***all*** net metering participants to deal with a concern currently limited to just six customers?

RESPONSE:

The update to the Energy Price is intended to reflect the value that BC Hydro receives from excess generation, and is not limited to a concern with specific customers.

Please refer to BC Hydro's response to BCUC IR 1.10.2 where we explain why the value of excess generation from customers in the Program should be based on the market value.

Please also refer to BC Hydro's response to BCUC IR 1.5.3 where we explain why, if the Energy Price reflected the value BC Hydro receives from excess generation, BC Hydro believes there would still be a need to limit the size of a customer's Generating Facility.

1.0 Reference: 1 Introduction and 1.2 Proposed Amendments

1.1.1 RS 1289 is available to residential and commercial customers, please provide the following for the year ending 31 March 2018 (F2017) and for the year ending 31 March 2019 (F2018):

- Residential customers (accounts):
  - In F2017
    - Number of residential customers
    - Total revenue from BASIC CHARGE
    - Total revenue from STEP 1 ENERGY CHARGE
    - Total revenue from STEP 2 ENERGY CHARGE
  - In F2018
    - Number of residential customers
    - Total revenue from BASIC CHARGE
    - Total revenue from STEP 1 ENERGY CHARGE
    - Total revenue from STEP 2 ENERGY CHARGE
- Commercial customers (accounts):
  - In F2017
    - Number of commercial customers
    - Total revenue from BASIC CHARGE
    - Total revenue from ENERGY CHARGE
  - In F2018
    - Number of commercial customers
    - Total revenue from BASIC CHARGE
    - Total revenue from ENERGY CHARGE

RESPONSE:

The requested information, based on billed sales, is provided in the tables below.

Residential Customers in Program

Fiscal Year	Number of Residential Customers in Program	Total Revenue from Basic Charge ($)	Total Revenue from Step 1 Energy Charge ($)	Total Revenue from Step 2 Energy Charge ($)
Fiscal 2018	**1,114**	**64,857.67**	**545,318.30**	**820,382.59**
Fiscal 2019	**1,640**	**97,953.89**	**774,013.83**	**1,124,103.11**

Commercial Customers in Program

Fiscal Year	Number of Commercial Customers in Program	Total Revenue from Basic Charge ($)	Total Revenue from Energy Charge ($)
Fiscal 2018	**201**	**17,997.19**	**5,346,237.90**
Fiscal 2019	**230**	**22,759.72**	**6,274,564.48**

1.0 Reference: 1 Introduction and 1.2 Proposed Amendments

1.1.2 Even though RS 1289 says it is available to residential and commercial customers, if also available for small and large industrial customers, please provide the following for the year ending 31 March 2018 (F2017) and for the year ending 31 March 2019 (F2018):

- Small Industrial customers (accounts):
    - In F2017
        - Number of small industrial customers
        - Total revenue from BASIC CHARGE
        - Total revenue from ENERGY CHARGE
        - Total revenue from DEMAND CHARGE
        - Total revenue from POWER FACTOR SURCHARGE
        - Total revenue from any RATE RIDERS
    - In F2018
        - Number of small industrial customers
        - Total revenue from BASIC CHARGE
        - Total revenue from ENERGY CHARGE
        - Total revenue from DEMAND CHARGE
        - Total revenue from POWER FACTOR SURCHARGE
        - Total revenue from any RATE RIDERS
- Large Industrial customers (accounts):
    - In F2017
        - Number of large industrial customers
        - Total revenue from BASIC CHARGE
        - Total revenue from ENERGY CHARGE
        - Total revenue from DEMAND CHARGE
        - Total revenue from POWER FACTOR SURCHARGE
        - Total revenue from any RATE RIDERS
    - In F2018
        - Number of large industrial customers
        - Total revenue from BASIC CHARGE
        - Total revenue from ENERGY CHARGE
        - Total revenue from DEMAND CHARGE
        - Total revenue from POWER FACTOR SURCHARGE
        - Total revenue from any RATE RIDERS

RESPONSE:

BC Hydro's small industrial accounts are included in the commercial customer information provided in BC Hydro's response to SJOMAN IR 1.1.1. The Program is not available to large industrial customers.

2.0 Reference: 1.5 Net Metering Program Growth, In Fiscal 2018 Surplus Energy Payments, Table 5

1.2.1 Please provide the following details for each of the 256 Net Metering customers that got surplus payment (Table 5):

- Town (or nearest town),
- Type of Net Metering generator (ie PV, Wind, Hydro, Wind-PV, Hydro-PV, Biogas),
- Installed (nameplate) capacity in kW.
- Date Net Metering generator commissioned and connect to BC Hydro (In-service date)
- Surplus kWh's and payment ($) for year ending 31 March 2018 (F2017) and for year ending 31 March 2019 (F2018).

RESPONSE:

Please refer to Attachment 1 of BC Hydro's response to BCUC IR 1.3.4 which provides all of the details requested with the exception of town (or nearest town), which BC Hydro respectfully declines to provide in order to maintain the confidentiality of individual customer information.

3.0 Reference: 2.1 Regulatory History

1.3.1 From the beginning of the Net Metering Program please provide the following information:

- For every BC Hydro hydro plant with a storage reservoir,
  - When the storage hydro plants released water from the spillways. I.E. when the reservoir was full and any surplus inflow needed to be spilled.
  - Date for start of each spill event at each hydro plant.
  - Duration of each spill event (hours) at each hydro plant.

RESPONSE:

Spills are not differentiated based on the criteria specified in this information request. BC Hydro releases water through water conveyance structures (i.e, spillways and low level outlets) for a variety of purposes, such as:

- **Flood routing;**
- **System requirements;**
- **Economics;**
- **Environmental flow requirements;**
- **Domestic water withdrawals; and**
- **To meet maintenance and capital project requirements.**

Water may also be pre-spilled when forecast to exceed storage capacity in order to manage the risk of high flows downstream.

4.0 Reference: 1.2.3 Amendments will Improve Fairness Non-Participating Customers

1.4.1 Please provide the energy mix a Mid-Columbia with the following:

- For the year ending 31 March 2018 (F2107) and for the year ending 31 March 2019 (F2018):
- How many annual kWh's where available at Mid-Columbia that came from each of the following generator types:
    - Nuclear
    - Coal
    - Natural Gas
    - Large-Scale wind (greater then 100 kW)
    - Micro-wind (less then 100 kW)
    - Large-scale PV (greater then 100 kW)
    - Micro-PV (less then 100 kW)
    - Large-Scale hydro (greater then 15 MW)
    - Run-of-river hydro (greater then 100 kW to 15,000 kW (15 MW))
    - Micro-hydro (less then 100 kW)

RESPONSE:

BC Hydro does not have information on the sources of electricity transacted at Mid-C. To BC Hydro's knowledge, this information is not publicly available.

However, the US Energy Information Administration (EIA) provides public information on total generation mix by each U.S. state. The EIA information on Washington State's generation mix can be accessed at: https://www.eia.gov/electricity/state/.

4.0 Reference: 1.2.3 Amendments will Improve Fairness Non-Participating Customers

1.4.2 Please provide the following:

- For the year ending 31 March 2018 (F2017) and for the year ending 31 March 2019, (F2018)
    - How many kWh's of electricity did BC Hydro (or Powerex) buy from Mid-Columbia that then came back across the border in to BC.
    - How many kWh's of BC Hydro generated electricity (not from BC IPP's) did BC Hydro (or Powerex) sell to Mid-Columbia (also not including Columbia River Treaty electricity or any long-term electricity contacts that were in place before the Net Metering program started).
    - How many kWh's of Green-e® Energy-certified Renewable Energy Credits (RECs) and renewable electricity products did BC Hydro (or Powerex) sell outside of BC, from electricity that was generated inside BC (do not include electricity from IPP's)
    - Overall how many kWh's of electricity did BC Hydro (or Powerex) import in to BC.
    - Overall how many kWh's of electricity did BC Hydro (or Powerex) export from BC.

RESPONSE:

The table below provides BC Hydro's imports and exports of electricity for fiscal 2018 (ending March 31, 2018) and fiscal 2019 (ending March 31, 2019).

	F2018 RRA (kWh)	F2018 Actual (kWh)	F2019 RRA (kWh)	F2019 Forecast (kWh)
Market Electricity Purchases (BC Hydro imports)	**747,017,977**	**150,235,614**	**934,193,256**	**2,076,856,890**
Surplus Sales (BC Hydro exports)	**(5,555,674,465)**	**(5,071,655,000)**	**(4,516,973,698)**	**(2,229,901,416)**

BC Hydro does not transact outside of British Columbia or sell renewable energy credits. Any transactions outside of British Columbia or with regards to environmental attributes in the export market are conducted by BC Hydro's marketing subsidiary, Powerex Corp. As discussed in BC Hydro's response to

NMRG IR 1.5.4, exports can be undertaken when BC Hydro has capability to accommodate these transactions while meeting load requirements. Information on Powerex's commercial transactions is commercially sensitive and, therefore confidential.

BC Hydro does not have information on all transactions specifically located at Mid-C because Mid-C is a trading hub which functions as a proxy for wholesale electricity market transactions in the Pacific Northwest region. Please refer to BC Hydro's response to NMRG IR 1.4.1 where we state that the Mid-C price index has been approved by the BCUC on numerous occasions as an appropriate proxy for market value.

4.0 Reference: 1.2.3 Amendments will Improve Fairness Non-Participating Customers

1.4.3 Please provide the following:

- For the year ending 31 March 2018 (F2017) and for the year ending 31 March 2019, (F2018)
    - From all the Net Metering customers how may Green-e® Energy-certified Renewable Energy Credits (RECs) did BC Hydro receive.
    - How much was BC Hydro (or Powerex) able to sell those Green-e® Energy-certified REC's for.

RESPONSE:

Generation from customers in the Program is not certified with Green-e. Accordingly, none of the energy from customer Generating Facilities has received any Green-e Renewable Energy Credits.

5.0 Reference: Appendix F, 6.1 Summary of Inquires

1.5.1 For F2014, F2015, F2016, F2017 and F2018 please provide the following:

- The overall number phone calls and emails received from all the residential customers for any reason be it general inquires, questions about billing, complaints etc.

RESPONSE:

The table below provides the number phone calls and emails from residential customers, by fiscal year. This includes phone calls and emails related to the Program.

Fiscal Year	Phone calls	Emails
2014	**1,493,568**	**112,981**
2015	**1,437,633**	**48,632**
2016	**1,449,600**	**51,511**
2017	**1,309,835**	**56,175**
2018	**1,235,003**	**53,106**