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November 14, 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. 1598990
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Fiscal 2020 to Fiscal 2021 Revenue Requirements Application (the Application)

BC Hydro writes in compliance with Commission Order No. G-279-19 to provide its responses to Round 4 information requests as follows:

Exhibit B-22	Responses to Commission IRs (Public Version)
Exhibit B-22-1	Responses to Commission IRs (Confidential Version)
Exhibit B-23	Responses to Intervener IRs (Public Version)
Exhibit B-23-1	Responses to Intervener IRs (Confidential Version)

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

Overall, BC Hydro received 327 Round 4 information requests. Responses to 260 of those information requests are included in this filing.

Thirty-four information requests are the subject of BC Hydro's letter of November 8, 2019 (the information requests at issue are listed in the attachment to that letter). They are being addressed through the comment process established by Order No. G-279-19.

After accounting for those information requests, only 33 responses are still outstanding. They will be filed by Tuesday, November 19, 2019, in accordance with BCUC Order No. G-279-19. For ease of reference, those outstanding responses are listed below:

BCOAPO 4.177.1	BCSEA 4.87.3	CEABC 4.59.2
CEABC 4.62.2	CEABC 4.63.1	CEABC 4.63.2
CEABC 4.63.3	CEC 4.2.1	CEC 4.2.5
CEC 4.2.6	CEC 4.2.8	CEC 4.2.9
CEC 4.2.10	CEC 4.5.1	CEC 4.5.2
CEC 4.5.3	CEC 4.8.2	CEC 4.15.2
GJOSHE 4.1.4	INCE 4.9.0	INCE 4.18.0
INCE 4.19.0	INCE 4.33.0	INCE 4.37.0
INCE 4.40.0	MOVEUP 4.7.1	ZONE II RPG 4.64.1
ZONE II RPG 4.64.1.1	ZONE II RPG 4.64.1.2	ZONE II RPG 4.64.1.2.1
ZONE II RPG 4.64.1.3	ZONE II RPG 4.66.1.1	ZONE II RPG 4.66.1.1.1

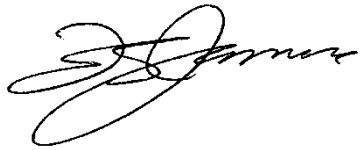
Lastly, to be consistent with the numbering approach used by other interveners in this round of information requests, BC Hydro has re-numbered information requests received from Commercial Energy Consumers (**CEC**) and Edlira Gjoshe (**GJOSHE**) as follows:

Intervener	Original IR Number	Revised IR Number
CEC (Exhibit C9-8)	1.1	9.1
CEC (Exhibit C9-8)	1.2	9.2
CEC (Exhibit C9-8)	1.2.1	9.2.1
CEC (Exhibit C9-8)	2.1	10.1
CEC (Exhibit C9-8)	2.2	10.2
CEC (Exhibit C9-8)	2.3.1	10.2.1
CEC (Exhibit C9-8)	2.3	10.3
CEC (Exhibit C9-8)	3.1	11.1
CEC (Exhibit C9-8)	3.2	11.2
CEC (Exhibit C9-8)	3.2.1	11.2.1
CEC (Exhibit C9-8)	3.3	11.3
CEC (Exhibit C9-8)	3.4	11.4
CEC (Exhibit C9-8)	3.5	11.5
CEC (Exhibit C9-8)	4.1	12.1
CEC (Exhibit C9-8)	4.2	12.2
CEC (Exhibit C9-8)	5.1	13.1
CEC (Exhibit C9-8)	5.1.1	13.1.1
CEC (Exhibit C9-8)	5.2	13.2
CEC (Exhibit C9-8)	5.3	13.3
CEC (Exhibit C9-8)	5.4	13.4

Intervener	Original IR Number	Revised IR Number
CEC (Exhibit C9-8)	5.5	13.5
CEC (Exhibit C9-8)	6.1	14.1
CEC (Exhibit C9-8)	6.2	14.2
CEC (Exhibit C9-8)	6.3	14.3
CEC (Exhibit C9-8)	7.1	15.1
CEC (Exhibit C9-8)	7.2	15.2
CEC (Exhibit C9-8)	7.3	15.3
CEC (Exhibit C9-8)	8.1	16.1
CEC (Exhibit C9-8)	9.1	17.1
CEC (Exhibit C9-8)	10.1	18.1
CEC (Exhibit C9-8)	11.1	19.1
CEC (Exhibit C9-8)	11.2	19.2
CEC (Exhibit C9-8)	12.1	20.1
CEC (Exhibit C9-8)	12.2	20.2
CEC (Exhibit C9-8)	12.3	20.3
CEC (Exhibit C9-8)	13.1	21.1
CEC (Exhibit C9-8)	14.1	22.1
CEC (Exhibit C9-8)	14.2	22.2
CEC (Exhibit C9-8)	14.3	22.3
CEC (Exhibit C9-8)	15.1	23.1
CEC (Exhibit C9-8)	15.2	23.2
CEC (Exhibit C9-8)	15.3	23.3
CEC (Exhibit C9-8)	16.1	24.1
CEC (Exhibit C9-8)	16.2	24.2
CEC (Exhibit C9-8)	17.1	25.1
CEC (Exhibit C9-8)	17.2	25.2
CEC (Exhibit C9-8)	18.1	26.1
CEC (Exhibit C9-8)	19.1	27.1
CEC (Exhibit C9-8)	19.2	27.2
GJOSHE (Exhibit C14-6)	5.1	4.2.1
GJOSHE (Exhibit C14-6)	5.2	4.2.2
GJOSHE (Exhibit C14-6)	5.3	4.2.3
GJOSHE (Exhibit C14-6)	5.4	4.2.4
GJOSHE (Exhibit C14-6)	5.5	4.2.5
GJOSHE (Exhibit C14-6)	5.6	4.2.6
GJOSHE (Exhibit C14-6)	5.7	4.2.7

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/rh

Enclosure

317.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, 20-Year Load Forecast, cover letter, p. 1; Figure 1, p. 2;
Appendix B, Figure B-1, Figure B-3, pp. 2, 6; Appendix D; Exhibit B-1, Appendix O
Relevance of 20-year forecast to the Test Period

British Columbia Hydro and Power Authority (BC Hydro) states that:

> In response to a commitment made at the March 15, 2019 Workshop and information requests received to-date and in accordance with BCUC Order G-218-19, BC Hydro writes to file its June 2019 Load Forecast, covering fiscal 2020 to fiscal 2039… BC Hydro suggests that Information Requests on the June 2019 Load Forecast be focused on the Test Period of the Application (fiscal 2020 and fiscal 2021). Questions regarding the years beyond the Test Period are more appropriately addressed in the 2021 IRP [Integrated Resource Plan] proceeding.

BC Hydro provides the June 2019 load forecast in Figure 1 of Exhibit B-15, as well as in Appendix D. BC Hydro provides the peak load forecast in Appendix B of Exhibit B-15 and shows the building blocks of the peak demand in Figure B-1 and the total integrated system peak forecast in Figure B-3.

BC Hydro also includes the Electric Load Forecast Report Fiscal 2019 to Fiscal 2024 (F2019-F2024) in Appendix O of the Application.

4.317.1 Please explain whether the energy load forecast beyond the Test Period and the 20-year June 2019 peak forecast, respectively, impact any component of the revenue requirement for the Test Period such as: capital planning; capital expenditures; cost of energy; and deferral account balances to be recovered within the Test Period.

RESPONSE:

This answer also responds to BCUC IR 4.317.1.1.

As explained in BC Hydro's response to BCUC IR 1.4.2.1, the energy load forecast beyond the test period is an input to the Cost of Energy Studies, which are prepared over a five-year time horizon. Accordingly, three years beyond the test period in the October 2018 Load Forecast influenced the cost of energy component of the revenue requirements for the Test Period.

The energy forecast and peak forecast provided in the June 2019 Load Forecast were not used to determine any components of the Test Period revenue requirements. This is because:

- **As stated on page 1 of Exhibit B-15, the calculation of the Test Period revenue requirements, as updated by the Evidentiary Update, uses actual financial results for April 2019 and May 2019 and the October 2018 Load Forecast for the remainder of fiscal 2020 and all of fiscal 2021; and**

- **No capital additions in fiscal 2020 and fiscal 2021 were adjusted as a result of the June 2019 Load Forecast. BC Hydro's most recent Capital Plan, covering fiscal 2021 to fiscal 2030, had a currency date of April 1, 2019 and accordingly, did not fully incorporate the June 2019 Load Forecast. Preliminary load forecast information did inform BC Hydro's decision to defer $0.8 million in capital expenditures (not capital additions) in the Test Period related to the Interior to Lower Mainland Remedial Action Schemes Installation project. However, capital expenditures do not impact rates and accordingly, the deferral of these expenditures has no effect on the Test Period revenue requirements.**

The June 2019 Load Forecast will inform BC Hydro's fiscal 2022 to fiscal 2031 capital planning cycle.

317.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, 20-Year Load Forecast, cover letter, p. 1; Figure 1, p. 2;
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BC Hydro provides the June 2019 load forecast in Figure 1 of Exhibit B-15, as well as in Appendix D. BC Hydro provides the peak load forecast in Appendix B of Exhibit B-15 and shows the building blocks of the peak demand in Figure B-1 and the total integrated system peak forecast in Figure B-3.

BC Hydro also includes the Electric Load Forecast Report Fiscal 2019 to Fiscal 2024 (F2019-F2024) in Appendix O of the Application.

4.317.1.1 Please specify and explain which years out of the forecast provided for F2021 to F2039 included in the 20-year energy and peak load forecasts, respectively, impact each component of the Test Period revenue requirement.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.317.1.

317.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, 20-Year Load Forecast, cover letter, p. 1; Figure 1, p. 2;
Appendix B, Figure B-1, Figure B-3, pp. 2, 6; Appendix D; Exhibit B-1, Appendix O
Relevance of 20-year forecast to the Test Period

British Columbia Hydro and Power Authority (BC Hydro) states that:

> In response to a commitment made at the March 15, 2019 Workshop and information requests received to-date and in accordance with BCUC Order G-218-19, BC Hydro writes to file its June 2019 Load Forecast, covering fiscal 2020 to fiscal 2039… BC Hydro suggests that Information Requests on the June 2019 Load Forecast be focused on the Test Period of the Application (fiscal 2020 and fiscal 2021). Questions regarding the years beyond the Test Period are more appropriately addressed in the 2021 IRP [Integrated Resource Plan] proceeding.

BC Hydro provides the June 2019 load forecast in Figure 1 of Exhibit B-15, as well as in Appendix D. BC Hydro provides the peak load forecast in Appendix B of Exhibit B-15 and shows the building blocks of the peak demand in Figure B-1 and the total integrated system peak forecast in Figure B-3.

BC Hydro also includes the Electric Load Forecast Report Fiscal 2019 to Fiscal 2024 (F2019-F2024) in Appendix O of the Application.

4.317.2 To the extent the 20-year load forecast has impact on any component of the Test Period revenue requirement, please explain the load forecast methodology and input assumptions for each customer class for the June 2019 mid forecast and the uncertainty range. Please highlight and explain any differences in the forecast methodology from those explained in Appendix O of the Application.

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 4.317.1, the June 2019 Load Forecast does not impact the Test Period revenue requirements.

The differences in methodology and input assumptions between the June 2019 Load Forecast and the October 2018 Load Forecast are summarized in section 2 of Exhibit B-15.

317.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, 20-Year Load Forecast, cover letter, p. 1; Figure 1, p. 2;
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Relevance of 20-year forecast to the Test Period

British Columbia Hydro and Power Authority (BC Hydro) states that:

> In response to a commitment made at the March 15, 2019 Workshop and information requests received to-date and in accordance with BCUC Order G-218-19, BC Hydro writes to file its June 2019 Load Forecast, covering fiscal 2020 to fiscal 2039… BC Hydro suggests that Information Requests on the June 2019 Load Forecast be focused on the Test Period of the Application (fiscal 2020 and fiscal 2021). Questions regarding the years beyond the Test Period are more appropriately addressed in the 2021 IRP [Integrated Resource Plan] proceeding.

BC Hydro provides the June 2019 load forecast in Figure 1 of Exhibit B-15, as well as in Appendix D. BC Hydro provides the peak load forecast in Appendix B of Exhibit B-15 and shows the building blocks of the peak demand in Figure B-1 and the total integrated system peak forecast in Figure B-3.

BC Hydro also includes the Electric Load Forecast Report Fiscal 2019 to Fiscal 2024 (F2019-F2024) in Appendix O of the Application.

4.317.3 To the extent the 20-year peak forecast has impact on any component of the Test Period revenue requirement, please explain the following:

- The input assumption and methodology to produce the uncertainty range of the peak load forecast;
- Whether the peak load forecast represents the coincidental peak across all customer classes; and
- The basis for the assumption around EV charging time profile.

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 4.317.1, the June 2019 Load Forecast does not impact the Test Period revenue requirement.

Please refer to BC Hydro's response to AMPC IR 2.23.2 where we explain that while previous peak demand (system and distribution substation) forecasts were inputs into BC Hydro's fiscal 2020 to fiscal 2024 Capital Plan, the Capital Plan was

developed with the understanding that the demand for electricity was growing more slowly than previously anticipated. Accordingly, as discussed in section 6.3.2.1 of Chapter 6 of the Application, adjustments were made to the timing of some planned investments to expand BC Hydro's system.

Please also refer to BC Hydro's response to BCUC IR 1.108.1.2 where we provide a list of projects that were deferred or cancelled as a result of the reductions to the fiscal 2020 to fiscal 2024 Capital Plan and identify which deferrals or cancelations were made as a result of the expected change in the load forecast.

318.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 10; Exhibit B-12, BCUC IR 208.1, 209.1
Purpose of the June 2019 load forecast

BC Hydro states on page 10 that "[t]he June 2019 Load Forecast was prepared as an interim step to inform BC Hydro's capital planning cycle and the February 2020 Service Plan. In early 2020, BC Hydro will complete an updated comprehensive 20-year load forecast to inform the 2021 [Integrated Resource Plan]."

BC Hydro stated in response to BCUC IR 208.1 that:

> BC Hydro normally completes a comprehensive load forecast once per year as part of BC Hydro's annual Service Plan schedule. The latest approved load forecast is the October 2018 Load Forecast, and it will be used in the Energy Studies until the next service plan load forecast is available in October 2019.

BC Hydro elaborated in response to BCUC IR 209.1:

> BC Hydro normally makes changes to our load forecast in three ways, and each with different frequency:
>
> - By building a comprehensive system level energy and peak load forecast, (referred to as a 'comprehensive load forecast');
> - By developing partial updates to a comprehensive load forecast, which we call a 'load forecast update'; and
> - By adjusting a version of a comprehensive load forecast or a load forecast update within a fiscal year for financial forecasting purposes.

4.318.1 Please elaborate on how the June 2019 load forecast informs BC Hydro's capital planning cycle and the February 2020 Service Plan.

RESPONSE:

BC Hydro uses the load forecast to prepare the financial forecast underlying the Service Plan. The 2019/20 to 2021/22 Service Plan was prepared using the October 2018 Load Forecast. The financial forecast underlying the 2020/21 to 2022/23 Service Plan will use the June 2019 Load Forecast. The 2020/21 to 2022/23 Service Plan will be released in February 2020.

The June 2019 Load Forecast will inform BC Hydro's fiscal 2022 to fiscal 2031 capital planning cycle.

318.0 Reference: TWENTY YEAR LOAD FORECAST
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> - By adjusting a version of a comprehensive load forecast or a load forecast update within a fiscal year for financial forecasting purposes.

4.318.2 Please explain whether there is any other application of the June 2019 load forecast beyond informing BC Hydro's capital planning cycle and the February 2020 Service Plan.

RESPONSE:

The June 2019 Load Forecast will also be used as an input to prepare financial forecasts and monthly Energy Studies, until a new load forecast is developed.

318.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 10; Exhibit B-12, BCUC IR 208.1, 209.1
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> - By adjusting a version of a comprehensive load forecast or a load forecast update within a fiscal year for financial forecasting purposes.

4.318.3 Considering that the 20-year load forecast was filed on October 3, 2019, please explain why the load forecast is dated June 2019 rather than a more recent date.

RESPONSE:

The June 2019 date reflects the time that the June 2019 Load Forecast was approved by BC Hydro's Executive Team, which occurred on June 25, 2019.

Once approved, the June 2019 forecast was scheduled for review at the next BC Hydro Board of Directors meeting, which was held on September 13, 2019.

The Board of Directors has the responsibility to oversee the conduct of BC Hydro's business, supervise management and endeavor to ensure that all

major issues affecting the business and affairs of BC Hydro are given proper consideration.

Following the Board of Directors' review, BC Hydro drafted the formal document for filing which was filed with the BCUC on October 3, 2019 in accordance with the Regulatory Timetable that was established by BCUC Order No. G-146-19.

318.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 10; Exhibit B-12, BCUC IR 208.1, 209.1
Purpose of the June 2019 load forecast

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> - By adjusting a version of a comprehensive load forecast or a load forecast update within a fiscal year for financial forecasting purposes.

4.318.4 Please explain whether BC Hydro will be producing a comprehensive system level energy and peak load forecast for the 2021 IRP.

RESPONSE:

Yes, BC Hydro is currently preparing a comprehensive system level energy and peak load forecast for the 2021 Integrated Resource Plan (IRP). We expect that the forecast will be ready for review and approval by BC Hydro's Executive Team by early 2020.

This schedule is not expected to impact subsequent annual load forecast updates.

318.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 10; Exhibit B-12, BCUC IR 208.1, 209.1
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> - By adjusting a version of a comprehensive load forecast or a load forecast update within a fiscal year for financial forecasting purposes.

4.318.4 Please explain whether BC Hydro will be producing a comprehensive system level energy and peak load forecast for the 2021 IRP.

4.318.4.1 If yes, please explain when the forecast will be completed and whether this timing has any impact on BC Hydro's existing schedule to produce a comprehensive load forecast and any subsequent updates going forward.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.318.4.

318.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 10; Exhibit B-12, BCUC IR 208.1, 209.1
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> - By adjusting a version of a comprehensive load forecast or a load forecast update within a fiscal year for financial forecasting purposes.

4.318.4 Please explain whether BC Hydro will be producing a comprehensive system level energy and peak load forecast for the 2021 IRP.

4.318.4.2 If no, please explain how BC Hydro intends to make changes to its load forecast for presentation in the IRP, including which load forecast will be the base forecast to which BC Hydro will be updating, if applicable.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.318.4.

318.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 10; Exhibit B-12, BCUC IR 208.1, 209.1
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> - By adjusting a version of a comprehensive load forecast or a load forecast update within a fiscal year for financial forecasting purposes.

4.318.4.2.1 Please explain how BC Hydro has determined that this level of review and update to the load forecast is appropriate for the purpose of the IRP.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.318.4 where we explain that we are currently preparing a comprehensive system level energy and peak load forecast for the 2021 Integrated Resource Plan (IRP). Given the significance of the IRP, we believe it warrants a comprehensive forecast.

319.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, pp. 8, 9; CBC News, Mill workers and forest industry staff call on B.C. for policy change amid closures, dated September 13, 20191
Forestry

BC Hydro states on pages 8 to 9 of Exhibit B-15 that:

> Forecast sales to the forestry sub-sector in fiscal 2020 have decreased as a result of temporary shift and mill curtailments at some transmission serviced forestry mills due to fibre shortages and market conditions… The October 2018 Load Forecast assumed that electricity sales to the forestry sub-sector would decline; however, the recent closures and curtailments have been greater than forecast and most of this incremental impact is reflected in the June 2019 Load Forecast.

BC Hydro also states on page 9 that "[f]orecast sales to the forestry sub-sector in fiscal 2021 increase due to deferred closure risk for a major pulp and paper mill. This deferred closure risk more than offsets the decline in fiscal 2020 because a single pulp and paper mill consumes significantly more electricity than multiple sawmills."

In a CBC article dated September 13, 2019, it states: "B.C. has been plagued by a series of mill curtailments and closures over the past few months, affecting nearly 6,000 workers at 25 different mills across the province."

4.319.1 In light of the recent announcements regarding mill closures to date, please discuss whether there are any mill closures that have not been accounted for in the June 2019 forecast.

RESPONSE:

This answer also responds to BCUC IRs 4.319.1.1 and 4.319.1.1.1

The public version of the response has been redacted to maintain confidentiality over customer information. The un-redacted version of the response is being made available to the BCUC only, in order to protect customers' commercial interests.

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[1] Retrieved October 30, 2019, from https://www.cbc.ca/news/canada/british-columbia/mill-workers-forest-industry-staff-reactions-closures-1.5283821.

The October 2018 Load Forecast assumed that electricity sales to the forestry sub sector would decline and the June 2019 Load Forecast reflected a further decline, based on information known in the spring of 2019.

Overall, based on announced permanent, temporary or indefinite closures as of October 24, 2019, BC Hydro estimates that approximately 70 per cent of the expected decline in forecast electricity sales to the forestry sub sector in fiscal 2020 is captured in the June 2019 Load Forecast.

This estimate is based on BC Hydro's identification of 51 forestry mills that have been impacted by permanent, temporary or indefinite closures, with a total estimated load reduction of 528 GWh in fiscal 2020 (402 GWh in the large industrial sector and 126 GWh in the light industrial sub-sector). The June 2019 Load Forecast reflects approximately 384 GWh of this estimated load reduction (336 GWh in the large industrial sector and 48 GWh in the light industrial sub-sector). This results in a net difference of 144 GWh. Of this difference:

- **66 GWh is related to specific forestry customers in the large industrial sector. Attachment 1 to this response, provided in confidence to the BCUC only, is an updated version of Appendix A of Exhibit B-15. It identifies and quantifies the specific impacts to the forecast for large industrial customers and also contains some minor typographical corrections.**
- **78 GWh is related to distribution-serviced mills, which are part of the light industrial sub-sector load forecast. Of this amount, [redacted] GWh is related to the permanent closure of Interfor Hammond, which was not anticipated in the June 2019 Load Forecast and the remaining amount relates to temporary load reductions at various mills.**

As 144 GWh represents less than 0.3 per cent of BC Hydro's load forecast for fiscal 2020 and given the ongoing uncertainty with regards to mill closures, some of which have already returned to normal operations, BC Hydro believes that its revenue forecast for the Test Period remains reasonable. Any difference between actual and forecast electricity sales would be deferred for future recovery from, or refund to, ratepayers.

While a number of mills that experienced temporary closures have returned to normal operations, the full extent and duration of temporary and indefinite closures at other mills for the remainder of fiscal 2020 and beyond, remains uncertain.

CONFIDENTIAL ATTACHMENT

FILED WITH BCUC ONLY

319.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, pp. 8, 9; CBC News, Mill workers and forest industry staff call on B.C. for policy change amid closures, dated September 13, 20191
Forestry

BC Hydro states on pages 8 to 9 of Exhibit B-15 that:

> Forecast sales to the forestry sub-sector in fiscal 2020 have decreased as a result of temporary shift and mill curtailments at some transmission serviced forestry mills due to fibre shortages and market conditions… The October 2018 Load Forecast assumed that electricity sales to the forestry sub-sector would decline; however, the recent closures and curtailments have been greater than forecast and most of this incremental impact is reflected in the June 2019 Load Forecast.

BC Hydro also states on page 9 that "[f]orecast sales to the forestry sub-sector in fiscal 2021 increase due to deferred closure risk for a major pulp and paper mill. This deferred closure risk more than offsets the decline in fiscal 2020 because a single pulp and paper mill consumes significantly more electricity than multiple sawmills."

In a CBC article dated September 13, 2019, it states: "B.C. has been plagued by a series of mill curtailments and closures over the past few months, affecting nearly 6,000 workers at 25 different mills across the province."

4.319.1 In light of the recent announcements regarding mill closures to date, please discuss whether there are any mill closures that have not been accounted for in the June 2019 forecast.

4.319.1.1 If yes, please identify the mill closures, and discuss and quantify the impact on the Test Period load forecast and the 20-year load forecast to the extent it impacts the Test Period revenue requirement.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.319.1.

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[1] Retrieved October 30, 2019, from https://www.cbc.ca/news/canada/british-columbia/mill-workers-forest-industry-staff-reactions-closures-1.5283821.

319.0 Reference: TWENTY YEAR LOAD FORECAST
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4.319.1 In light of the recent announcements regarding mill closures to date, please discuss whether there are any mill closures that have not been accounted for in the June 2019 forecast.

4.319.1.1 If yes, please identify the mill closures, and discuss and quantify the impact on the Test Period load forecast and the 20-year load forecast to the extent it impacts the Test Period revenue requirement.

4.319.1.1.1 If applicable, please provide an update to Appendix A.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.319.1.

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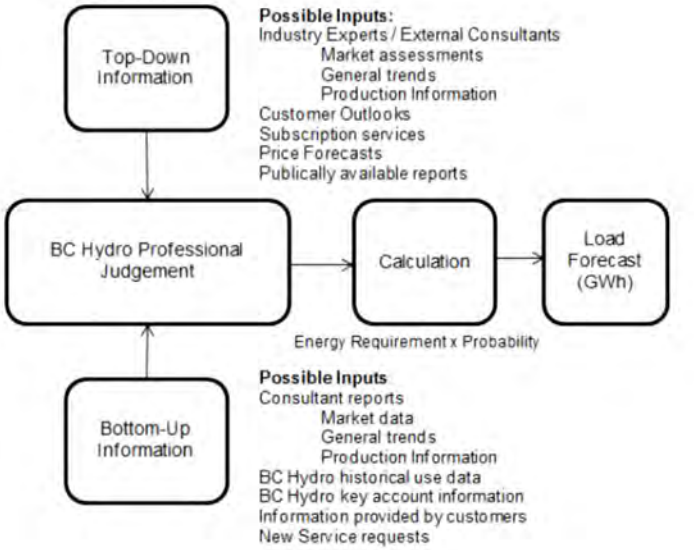
[1] Retrieved October 30, 2019, from https://www.cbc.ca/news/canada/british-columbia/mill-workers-forest-industry-staff-reactions-closures-1.5283821.

320.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix A; Exhibit B-5, BCUC IR 9.2; Midcontinent Independent System Operator (MISO), Peak Forecast Methodology Review,1 p. 7
Industrial customer load forecast

BC Hydro provides customer specific updates in Appendix A of Exhibit B-15.

In response to BCUC IR 9.2, BC Hydro provided the following figure explaining the general overview of top-down bottom-up forecasting methodology for the large industrial customer class:

Figure 1 General Overview of Top-Down, Bottom-Up Forecasting Methodology



BC Hydro further provided Figure 2 in response to BCUC IR 9.2 on whether top-down analysis was done on each sub-sector within the large industrial customer class.

In the Peak Forecast Methodology Review by MISO, it states on page 7 that:

> A forecast based on informed opinion is determined from expert judgement. This method is sometimes used to predict large industrial customer use, or new uses of electricity. The primary difficulties in using informed opinion are the lack of quantitative support, the inability to examine alternatives, and the qualifications of the 'expert' making the forecast. Informed opinion

[1] https://cdn.misoenergy.org/Peak%20Forecasting%20Methodology%20Review%20Whitepaper173766.pdf.

should be used, in our judgement, to design a forecasting system that quantifies the 'expert' knowledge in a way that allows for examination by outside parties.

4.320.1 Please comment on whether BC Hydro's load forecast methodology for the Test Period for light and large industrial customers, involving information provided by customers and/or a third-party expert, is susceptible to the weaknesses of "informed opinion" as a forecast methodology as stated in the report by MISO.

RESPONSE:

The response below addresses aspects that are specific to each of the large industrial and light industrial forecasts, summarizes relevant conclusions from the Load Forecast audit and provides context for the referenced MISO report.

In general, the methodologies used to develop the light and large industrial load forecasts for our major sub-sectors (i.e., forestry, oil and gas, mining) are not susceptible to the weakness of an "informed opinion" from an "expert" or from the customer. This is because those forecasts are primarily developed from multiple quantitative and qualitative analyses provided by both internal and external experts in addition to information provided by our customers. In other words, our major subsector forecasts are developed from multiple qualified expert inputs, including from outside parties. The forecasts are developed in a collaborative process thereby allowing for alternative perspectives to be shared.

The extent to which expert inputs are applied varies across each of the major subsectors and is a function of market complexity and uncertainty, number of customers and magnitude of the load.

For example, the forestry subsector is our largest and most complex market. Consequently, the forecast methodology is based on the collective input of three expert consulting firms, five key account managers, the manager of industrial marketing, and the senior load forecast advisor responsible for coordinating development of the forestry subsector forecast. The consultants are industry recognized experts who develop detailed quantitative assessments of key market drivers, including market supply and demand, price forecasts, fibre supply and costs; and qualitative corporate and mill assessments. The key account managers are responsible for understanding the industry through strategic relationships built with multiple contacts and levels within the customer. This includes keeping up to date on the production processes and economics of customers.

The oil and gas and mining subsector forecasts similarly employ multiple internal and external analyses, albeit to a lesser extent. However, as noted in section 3.2.8.2 of Chapter 3 of the Application, BC Hydro retained a third-party consultant to support the development of the oil and gas subsector forecast given the subsector's increasing contribution to future electricity demand.

The remaining large industrial subsector (Other) is made up of a diverse range of customers that operate in different areas of the provincial economy. Examples include the University of British Columbia, Vancouver International Airport and Port of Vancouver. Load forecasts for this subsector primarily rely on historical sales data, information provided by our customers regarding their long term plans and electricity needs, and key account management's professional judgment. BC Hydro believes the approach for this subsector is appropriate for the following reasons:

- **The subsector is not a significant component of BC Hydro's overall load (approximately 1,200 GWh per year);**
- **The subsector is primarily made up of long standing customers with relatively stable (i.e., non-volatile) historical sales; and**
- **The financial costs needed to develop external assessments for each of the diverse segments making up the subsector are not justified given the first two bullets above.**

The emerging cryptocurrency and cannabis segments are included in the Other large industrial subsector and the light industrial sector. The load forecasts for these sectors are based almost entirely on customer service requests. However, we are mitigating any weakness associated with relying only on customer-provided information, through the following approach:

- **The load forecast is based only on those customers requesting service that are at an advanced stage in BC Hydro's interconnection process;**
- **For the cannabis segment, forecast loads are held constant beyond fiscal 2024. While preliminary market assessments indicate likely growth over the long term, the 20-year forecast is held at projected fiscal 2024 levels. BC Hydro will be retaining a third-party to undertake a market assessment and may develop a more comprehensive load forecast methodology for future load forecasts based on the results of this work; and**
- **For the cryptocurrency segment, forecast loads are also held constant beyond fiscal 2024. This conservative assumption is based on the volatile nature of this segment, notwithstanding ongoing customer inquiries and requests for service. BC Hydro has retained a third-party to undertake a**

market assessment and may develop a more comprehensive load forecast methodology for future load forecasts based on the results of this work.

The light industrial load forecast is also not subject to potential weakness associated with relying only on customer-provided information. The portion of the light industrial forecast that is developed on an account-by-account basis applies the same methodologies described above for the large industrial subsectors.

The remaining portion of the light industrial forecast is developed based on a regression model and a provincial GDP forecast obtained from the provincial government and the Conference Board of Canada. As such, it is not subject to the potential weakness described in the question.

The Load Forecast Audit included a review of BC Hydro's large industrial load forecast methodology. Its conclusions include the following statements:

> **"Primary forecasting methodology for the industrial class is to develop individual customer forecasts within each sector derived as the product of three inputs: facility production, electricity intensity and the percent load supplied by BC Hydro (probability weighting). Inputs for these components are based on information from Key Account Managers, external consultants and industry subscription services.**
>
> - **This methodology is preferred to other methods as it provides greater flexibility to quantify relevant factors for the sector and individual customer energy sales. It also provides greater detail for tracking and explaining forecast variances.**
>
> - **The forecast approach is dependent upon detailed and reliable information from external sources and internal key account managers."**

With respect to the light industrial load forecast methodology the Load Forecast Audit concludes the following:

> **"The methods used to forecast energy sales for the Light Industrial class are appropriate."**

Lastly, BC Hydro wishes to provide context for the referenced MISO report. The document is intended to provide guidance to load serving entities (LSEs) that are required to submit three year peak load forecasts to the MISO as part of the MISO's annual capacity market auction. The guidance document was developed to assist in establishing a consistent quality of load forecast submissions from the

approximately 200 to 300 annual LSE submissions received by the MISO. In discussion with MISO representatives, LSEs do submit load forecasts that use some variant of "informed opinion" to project a portion of its large industrial load, typically customer-specific, but will have provided extensive, well-reasoned documentation in support of their forecast.

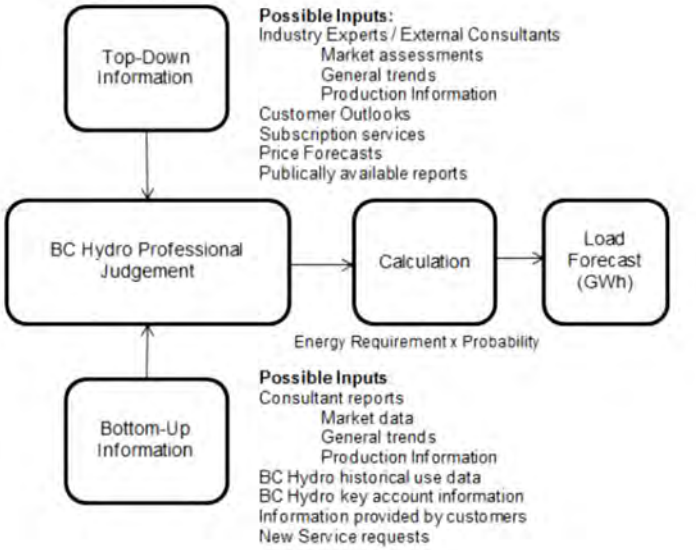
As described above, BC Hydro's considers its light and large industrial forecasts to be based on extensive information and well-reasoned analysis.

320.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix A; Exhibit B-5, BCUC IR 9.2; Midcontinent Independent System Operator (MISO), Peak Forecast Methodology Review,1 p. 7
Industrial customer load forecast

BC Hydro provides customer specific updates in Appendix A of Exhibit B-15.

In response to BCUC IR 9.2, BC Hydro provided the following figure explaining the general overview of top-down bottom-up forecasting methodology for the large industrial customer class:

Figure 1 General Overview of Top-Down, Bottom-Up Forecasting Methodology



BC Hydro further provided Figure 2 in response to BCUC IR 9.2 on whether top-down analysis was done on each sub-sector within the large industrial customer class.

In the Peak Forecast Methodology Review by MISO, it states on page 7 that:

> A forecast based on informed opinion is determined from expert judgement. This method is sometimes used to predict large industrial customer use, or new uses of electricity. The primary difficulties in using informed opinion are the lack of quantitative support, the inability to examine alternatives, and the qualifications of the 'expert' making the forecast. Informed opinion

[1] https://cdn.misoenergy.org/Peak%20Forecasting%20Methodology%20Review%20Whitepaper173766.pdf.

should be used, in our judgement, to design a forecasting system that quantifies the 'expert' knowledge in a way that allows for examination by outside parties.

4.320.2 Please explain how the 20-year energy load forecast is conducted for light and large industrial customers and highlight any difference from the methodology for the Test Period load forecast, as explained in Appendix O of the Application.

RESPONSE:

The methodologies used to develop the light and large industrial portions of the June 2019 Load Forecast, including for the Test Period, are the same as described in Appendix O of the Application. As described in section 2 of Exhibit B-15, the June 2019 Load Forecast is an extension to the October 2018 Load Forecast and the only methodological change made was in developing the electric vehicle (EV) load forecast.

While the methodologies remained the same, except for the EV forecast, updated information was used when applying the methodologies.

For the large industrial sector, this means the methodologies for the first five years of the June 2019 Load Forecast are the same as the October 2018 Load Forecast with some customer-specific updates related to temporary production curtailments, permanent closures, deferred or cancelled projects, and production increases.

These updates were primarily provided by our customers through BC Hydro's Key Account Managers. For the forestry sub-sector in particular, changes were made to the first five years of the June 2019 Load Forecast relative to the October 2018 Load Forecast based on:

- **Market research from company websites;**
- **News articles;**
- **Commodity prices; and**
- **Third-party consultants used to assist in the assessment of the near-term closure risks for specific pulp and paper mills.**

A summary of the customer-specific updates for the large industrial sector between the June 2019 Load Forecast and October 2018 Load Forecast for the

fiscal 2020 through fiscal 2024 period was provided confidentially to the BCUC in Appendix A of Exhibit B-15.

For the portion of the light industrial subsector forecast developed on an account-by-account basis, updates were undertaken following the same approach used to update the large industrial forecast, as described above.

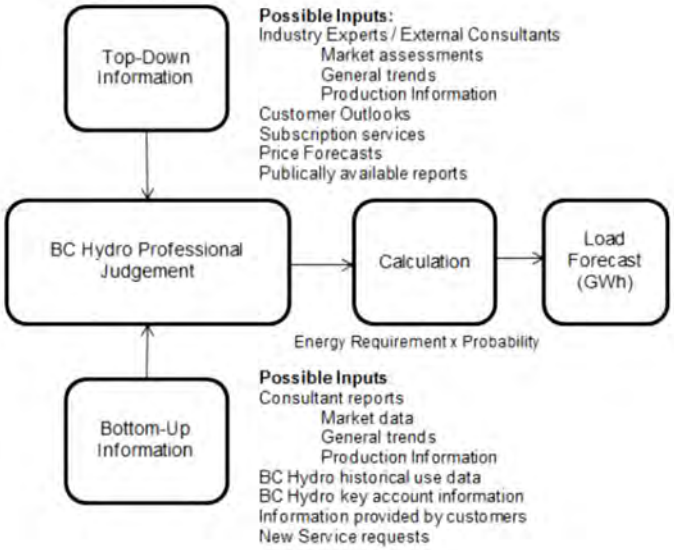
For the portion of the light industrial subsector forecast developed using GDP, the period from fiscal 2020 – fiscal 2024 was updated using the five-year B.C. GDP forecast from the Ministry of Finance February 2019 Budget.

320.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix A; Exhibit B-5, BCUC IR 9.2; Midcontinent Independent System Operator (MISO), Peak Forecast Methodology Review,1 p. 7
Industrial customer load forecast

BC Hydro provides customer specific updates in Appendix A of Exhibit B-15.

In response to BCUC IR 9.2, BC Hydro provided the following figure explaining the general overview of top-down bottom-up forecasting methodology for the large industrial customer class:

Figure 1 General Overview of Top-Down, Bottom-Up Forecasting Methodology



BC Hydro further provided Figure 2 in response to BCUC IR 9.2 on whether top-down analysis was done on each sub-sector within the large industrial customer class.

In the Peak Forecast Methodology Review by MISO, it states on page 7 that:

> A forecast based on informed opinion is determined from expert judgement. This method is sometimes used to predict large industrial customer use, or new uses of electricity. The primary difficulties in using informed opinion are the lack of quantitative support, the inability to examine alternatives, and the qualifications of the 'expert' making the forecast. Informed opinion

[1] https://cdn.misoenergy.org/Peak%20Forecasting%20Methodology%20Review%20Whitepaper173766.pdf.

should be used, in our judgement, to design a forecasting system that quantifies the 'expert' knowledge in a way that allows for examination by outside parties.

4.320.2.1 If an "informed opinion," either from an "expert" or from the customer is used to produce the load forecast for industrial customers, please discuss whether BC Hydro's load forecast methodology is susceptible to the weaknesses of "informed opinion" as a forecast methodology as stated in the report by MISO.

RESPONSE:

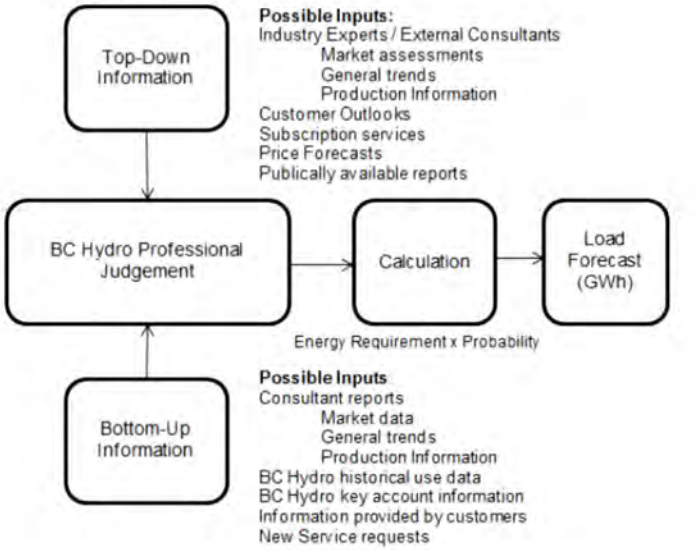
Please refer to BC Hydro's response to BCUC IR 4.320.1.

320.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix A; Exhibit B-5, BCUC IR 9.2; Midcontinent Independent System Operator (MISO), Peak Forecast Methodology Review,1 p. 7
Industrial customer load forecast

BC Hydro provides customer specific updates in Appendix A of Exhibit B-15.

In response to BCUC IR 9.2, BC Hydro provided the following figure explaining the general overview of top-down bottom-up forecasting methodology for the large industrial customer class:

Figure 1 General Overview of Top-Down, Bottom-Up Forecasting Methodology



BC Hydro further provided Figure 2 in response to BCUC IR 9.2 on whether top-down analysis was done on each sub-sector within the large industrial customer class.

In the Peak Forecast Methodology Review by MISO, it states on page 7 that:

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should be used, in our judgement, to design a forecasting system that quantifies the 'expert' knowledge in a way that allows for examination by outside parties.

4.320.2.2 Please provide BC Hydro's opinion, on whether the use of customer information (such as customer's energy nomination) is appropriate for a longer term forecast up to 20-years.

RESPONSE:

In BC Hydro's opinion, it is appropriate to use customer information (such as customer's energy nomination) for a longer term large industrial forecast up to 20 years, when used in conjunction with other inputs as part of broader analysis.

Figure 1 provided in BC Hydro's response to BCUC IR 1.9.2 lists, "information provided by customers," as one input among several that can be used in the bottom-up information portion of the methodology.

The large industrial forecast methods employed for our most significant large industrial sub-sectors (forestry, oil and gas, mining) rely on numerous internal and external analyses beyond customer-provided information. For further discussion please refer to BC Hydro's response to BCUC IRs 4.320.1 and 1.9.1.1.

321.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-11, Appendix A, Schedule 1.0; Exhibit B-15, p. 5
Impact on revenue requirement forecast

BC Hydro states on page 5 that:

> …the June 2019 Load Forecast is on average within 0.1 per cent of the October 2018 Load Forecast for the Test Period. Accordingly, and given that the Evidentiary Update incorporated two months of actual results for fiscal 2020, BC Hydro is not proposing any further adjustments to the revenue forecast provided in the Evidentiary Update. Any variances between forecast and actual revenue would be deferred in the normal course for future recovery from, or refund to, ratepayers.

In schedule 1.0 of Appendix A to the Evidentiary Update, BC Hydro provides it revenue requirements summary.

4.321.1 Please discuss the impact the 0.1 percent average change between the October 2018 and June 2019 load forecast has on each component of the Test Period revenue requirements forecast. If possible, please update schedule 1.0 of Appendix A to show the revenue requirements for each year of the Test Period based on the June 2019 load forecast compared to the October 2018 load forecast.

RESPONSE:

This answer also responds to AMPC IR 4.6.1.

As stated on page 1 of Exhibit B-15, the calculation of the Test Period revenue requirements, as updated by the Evidentiary Update, uses actual financial results for April 2019 and May 2019 and the October 2018 Load Forecast for the remainder of fiscal 2020 and all of fiscal 2021.

BC Hydro is not able to update Schedule 1.0 of Appendix A to show the revenue requirements for each year of the Test Period based on the June 2019 Load Forecast. In particular, the Energy Study is updated each month for current conditions and the most recent forecasts of inflows and market conditions, which are constantly evolving. In BC Hydro's view, updating financial schedules outside of this cycle, based on specific updates, would not provide a meaningful comparison.

In general, if the Test Period revenue requirements were based on the June 2019 Load Forecast:

- **Cost of Energy would decrease in fiscal 2020 and increase in fiscal 2021:**
  - **In general, when load is reduced and all other inputs are unchanged, the optimization process in the Energy Studies would, when the system is in an annual deficit situation as in fiscal 2020, likely result in decreases in gas fired thermal IPP generation and market energy purchases; and**
  - **In general, when load is increased and all other inputs are unchanged, the optimization process in the Energy Studies would, when the system is in an annual surplus situation as forecast for fiscal 2021, likely result in decreases in surplus sales; and**
- **Total Domestic Revenue would decrease in fiscal 2020 and increase in fiscal 2021.**

In addition, as a result of the above, there would be related impacts to Deferral Account Recoveries and Finance Charges for fiscal 2020 and fiscal 2021.

Variances between the fiscal 2020 and fiscal 2021 forecast Cost of Energy and Domestic Revenues in the Evidentiary Update and actual Cost of Energy and Domestic Revenues would be captured in the Cost of Energy Variance Accounts, which means that over time ratepayers will only pay the actual costs and will receive the benefit of actual revenues.

322.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 7
Impact on Demand-Side Management (DSM) savings

BC Hydro states on page 7 that:

> In 2019, Navigant Inc. completed an independent review of the overlap in codes and standards included in the EIA [U.S. Energy Information Administration] projections and BC Hydro's DSM Plan. The review reconciled codes and standards set out by legislation in British Columbia and Canada, which are reflected in BC Hydro's DSM Plan, with the U.S. federal codes and standards reflected in the EIA projections. The review found that there were additional end uses technologies which overlapped between the EIA and DSM plan relative to previous assumptions reflected in the October 2018 Load Forecast.

4.322.1 Please explain whether the overlap identified between the EIA and DSM plan has any impact on the DSM energy savings included in Chapter 10 of the Application. If yes, please discuss the extent of the impact and provide an update to the applicable sections of the revenue requirements application (RRA), where possible.

RESPONSE:

The additional overlap in Codes and Standards between the EIA and the DSM Plan, as identified in Navigant's 2019 review, does not alter the forecast of DSM Codes and Standards energy savings shown in Chapter 10 of the Application.

The forecast of Codes and Standards savings included in Chapter 10 of the Application is directly tied to regulations enacted at the local, provincial, and federal levels and represents BC Hydro's estimate of the impact of these regulations. As such, these savings are appropriately included in the DSM Plan set out in Chapter 10 of the Application.

The EIA efficiency forecast embedded in the load forecast reflects the impact of U.S. based Codes and Standards, some of which target similar end uses to those included in the DSM Plan. An adjustment is made within the load forecast to account for the potential overlap in Codes and Standards. The additional overlap identified in Navigant's 2019 review increased the magnitude of this adjustment to the load forecast.

323.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-1, p. 3-56; Exhibit B-15, p. 8;
BC Hydro Fleet Electrification Rate Application, Exhibit B-1, cover letter, pp. 8, 10
Electric vehicle (EV) load and revenue forecasts

BC Hydro states in Exhibit B-15 that "the high EV forecast assumes that the natural uptake of EVs is greater than the requirements set out in the ZEV Act [Zero-Emission Vehicles Act], resulting in a higher total EV forecast. Due to the significant level of uncertainty when developing a long-term EV forecast, BC Hydro developed its mid-EV forecast by taking the average between the high and low EV forecasts."

4.323.1 Please explain the input assumptions and methodology used to produce the high EV forecast under each customer class, respectively. Please include references, if available.

RESPONSE:

The Electric Vehicle (EV) model methodology is described in section 9.2 of Appendix O of the Application.

In the June 2019 Load Forecast, the total load for EVs was calculated and then 85 per cent was allocated to the residential sector and 15 per cent was allocated to the commercial sector. The allocation is based on ICBC data and is consistent with the assumptions made in the October 2018 Load Forecast.

The key input assumptions used to develop the June 2019 high EV load forecast include the following:

- **Purchase incentive of $10,000 for fiscal 2020 and most of fiscal 2021;**
- **Capital cost of EVs decrease linearly starting in fiscal 2025. It is assumed that EVs will cost the same as gasoline vehicles by the end of the 20-year forecast period; and**
- **During the 20-year forecast period, more EV models are available, consumer preferences change, and more infrastructure becomes available.**

As shown in BC Hydro's response to CEC IR 4.2.7, for fiscal 2021 the difference between the high and low EV forecasts is 15 GWh.

As discussed in section 3.3.6 of Chapter 6 of the Application, it is challenging to predict the trajectory of electric vehicles over the long term. While the

introduction of the *ZEV Act* provides legislative certainty, the actual EV load growth may be higher or lower than the EV uncertainty bands in the June 2019 Load Forecast.

BC Hydro continues to monitor EV market development and actual sales growth and will be incorporating that information as part of future load forecast updates.

323.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-1, p. 3-56; Exhibit B-15, p. 8;
BC Hydro Fleet Electrification Rate Application, Exhibit B-1, cover letter, pp. 8, 10
Electric vehicle (EV) load and revenue forecasts

BC Hydro states in Exhibit B-15 that "the high EV forecast assumes that the natural uptake of EVs is greater than the requirements set out in the ZEV Act [Zero-Emission Vehicles Act], resulting in a higher total EV forecast. Due to the significant level of uncertainty when developing a long-term EV forecast, BC Hydro developed its mid-EV forecast by taking the average between the high and low EV forecasts."

4.323.2 Please provide a breakdown of the EV load forecast as presented in the June 2019 forecast by customer class.

RESPONSE:

The table below provides a breakdown, by customer class, of BC Hydro's mid Electric Vehicle (EV) energy forecast as included in the June 2019 Load Forecast.

	June 2019 Mid EV Forecast		
	Residential EV Load GWh	Commercial EV Load GWh	Total EV Load GWh
F2019	48	8	56
F2020	66	12	77
F2021	192	34	226
F2022	243	43	286
F2023	297	52	349
F2024	348	61	409
F2025	403	71	474
F2026	506	89	595
F2027	639	113	752
F2028	803	142	945
F2029	999	176	1,175
F2030	1,222	216	1,437
F2031	1,462	258	1,720
F2032	1,725	304	2,029
F2033	2,009	354	2,363
F2034	2,311	408	2,719
F2035	2,631	464	3,095
F2036	2,964	523	3,487
F2037	3,309	584	3,893
F2038	3,662	646	4,308
F2039	4,020	709	4,729

323.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-1, p. 3-56; Exhibit B-15, p. 8;
BC Hydro Fleet Electrification Rate Application, Exhibit B-1, cover letter, pp. 8, 10
Electric vehicle (EV) load and revenue forecasts

On August 7, 2019, BC Hydro filed the Fleet Electrification Rate Application with the BCUC for approval of Rate Schedules 164x - Overnight Rate (150 kW and over) and 165x - Demand Transition Rate (150 kW and over) for use for charging of electric fleet vehicles and vessels. The Overnight Rate is proposed to be effective as of April 1, 2021, and the Demand Transition Rate is proposed to be effective as of April 1, 2020.

BC Hydro states in the Application that "[t]he Revenue Forecast for fiscal 2020 to fiscal 2021 is based on fiscal 2019 rates approved by the Decision from the Previous Application, and excludes the proposed rate increases sought in this application and the impact of any future rate structure changes."

4.323.3 Please explain what the assumed rate schedules under which revenue will be collected from EV customers in each respective customer class (e.g. residential, commercial, industrial) in BC Hydro's revenue forecast for the Test Period. If BC Hydro assumes revenue from EV customers within the Test Period will be collected under EV-specific rate schedules, please elaborate on the rate structure, eligibility and implementation date of the respective EV-specific rate schedules.

RESPONSE:

BC Hydro does not currently have any rate schedules for service specifically to electric vehicles only.

Any revenue from charging electric vehicles will be collected under the rate schedule applicable to the customer where the charging takes place.

For example, the Residential Inclining Block Rate may apply to electric vehicle charging at home, and a General Service Rate may apply to electric vehicle charging at a workplace.

No revenue assumed to result from the proposed Fleet Electrification Rates referenced in the preamble to the question has been included in the Test Period. The Fleet Electrification Rate Application is currently being reviewed by the BCUC.

Any variances between planned and actual revenue are deferred for future recovery from, or refund to, ratepayers.

323.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-1, p. 3-56; Exhibit B-15, p. 8;
BC Hydro Fleet Electrification Rate Application, Exhibit B-1, cover letter, pp. 8, 10
Electric vehicle (EV) load and revenue forecasts

On August 7, 2019, BC Hydro filed the Fleet Electrification Rate Application with the BCUC for approval of Rate Schedules 164x - Overnight Rate (150 kW and over) and 165x - Demand Transition Rate (150 kW and over) for use for charging of electric fleet vehicles and vessels. The Overnight Rate is proposed to be effective as of April 1, 2021, and the Demand Transition Rate is proposed to be effective as of April 1, 2020.

BC Hydro states in the Application that "[t]he Revenue Forecast for fiscal 2020 to fiscal 2021 is based on fiscal 2019 rates approved by the Decision from the Previous Application, and excludes the proposed rate increases sought in this application and the impact of any future rate structure changes."

4.323.4 Please explain whether the proposal to implement the Demand Transition Rate effective April 1, 2020 is expected to have any impact on the EV load from fleets within the Test Period. If yes, please explain whether this has been accounted for in the June 2019 load forecast. If not, why not?

RESPONSE:

This answer also responds to BCUC IR 4.323.5.

The estimated loads associated with the rates proposed in the Fleet Electrification Rate Application for the Test Period are provided in the table below. These estimates are not forecasts and therefore were not included in the June 2019 Load Forecast.

(GWh)	F2020	F2021
Depot Charging	**0**	**1**
In Route Charging	**1**	**4**
Total	**1**	**5**

Given the magnitude of the load estimates, BC Hydro does not expect the rates proposed in the Fleet Electrification Rate Application to have a material impact on the EV fleet loads within the Test Period.

323.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-1, p. 3-56; Exhibit B-15, p. 8;
BC Hydro Fleet Electrification Rate Application, Exhibit B-1, cover letter, pp. 8, 10
Electric vehicle (EV) load and revenue forecasts

On August 7, 2019, BC Hydro filed the Fleet Electrification Rate Application with the BCUC for approval of Rate Schedules 164x - Overnight Rate (150 kW and over) and 165x - Demand Transition Rate (150 kW and over) for use for charging of electric fleet vehicles and vessels. The Overnight Rate is proposed to be effective as of April 1, 2021, and the Demand Transition Rate is proposed to be effective as of April 1, 2020.

BC Hydro states in the Application that "[t]he Revenue Forecast for fiscal 2020 to fiscal 2021 is based on fiscal 2019 rates approved by the Decision from the Previous Application, and excludes the proposed rate increases sought in this application and the impact of any future rate structure changes."

4.323.5 Please discuss and quantify, where possible, any impact on the EV load from electric fleets in light of the proposed rates under BC Hydro's Fleet Electrification Rate Application.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.323.4.

324.0 Reference: TWENTY YEAR LOAD FORECAST
CTV News, The Canadian Press, B.C. gives $4 million in rebates for electric vehicle charge stations,1 dated September 26, 2019
EV charger rebates

In the news article by CTV News dated September 26, 2019, it states:

> A $2,000 rebate is available for installation of a Level 2 charging station designed for multiple users in apartments or workplaces… More than $4 million has been set aside for the new CleanBC rebate program.

4.324.1 Please explain whether the EV load forecast accounts for the potential impact as a result of the government rebate on charging stations. If yes, please explain how the impact has been accounted for in the load forecast, both in the Test Period and in the 20-year horizon. If not, please explain why not.

RESPONSE:

BC Hydro's June 2019 EV energy forecast was developed prior to September 26, 2019 and does not include the specific incentive amounts mentioned in the preamble to the question.

The June 2019 EV model assumes a conservative $500 EV charging incentive for calendar years 2019 and 2020. The model does not make assumptions about future charging incentives.

[1] Retrieved September 30, 2019, from https://www.ctvnews.ca/autos/b-c-gives-4-million-in-rebates-for-electric-vehicle-charge-stations-1.4612352.

324.0 Reference: TWENTY YEAR LOAD FORECAST
CTV News, The Canadian Press, B.C. gives $4 million in rebates for electric vehicle charge stations,[1] dated September 26, 2019
EV charger rebates

In the news article by CTV News dated September 26, 2019, it states:

> A $2,000 rebate is available for installation of a Level 2 charging station designed for multiple users in apartments or workplaces… More than $4 million has been set aside for the new CleanBC rebate program.

4.324.2 Please explain how the rebates on charging stations will be offered, including details on: the source of funding; the cost recovery mechanism of the funding; entities involved in the administration, implementation and oversight of these rebates; and eligibility criteria for the rebates.

RESPONSE:

BC Hydro worked in partnership with the Government of B.C. and FortisBC (Electric) to develop the CleanBC Go Electric EV Charger Rebate Program, which includes rebates for charging stations at apartments and workplaces. The rebates outside of FortisBC (Electric) service territory are administered by BC Hydro on behalf of the Government of B.C.

The Government of B.C. funds 100 per cent of the cost of the rebates as well as the costs related to administration and implementation.

With regards to the eligibility criteria for the rebates for charging stations for apartments and workplaces:

- **Apartments and condos – rebates depend on when the building was constructed with respect to municipal bylaws requiring EV-ready parking stalls. Customers must apply to be pre-approved before installing chargers:**
  - **a. Constructed prior to municipal bylaws: Up to 50 per cent of purchase and installation costs of eligible, new, Level 2 (208-volt or 240-volt) charging stations or energized outlets to a maximum of $14,000 (no more than $2,000 per station). Dual-port stations count as two; and**

[1] Retrieved September 30, 2019, from https://www.ctvnews.ca/autos/b-c-gives-4-million-in-rebates-for-electric-vehicle-charge-stations-1.4612352.

b. Constructed after municipal bylaws: Up to 50 per cent of purchase and installation costs of eligible, new, Level 2 (208-volt or 240-volt) charging stations to a maximum of $5,000 (no more than $350 per station). Dual-port stations count as two; and

- **Workplaces – up to 50 per cent of purchase and installation costs of eligible, new, Level 2 charging equipment, to a maximum of $14,000 (no more than $2,000 per station). Customers must apply to be pre-approved before installing chargers.**

In addition to the rebates for charging stations at apartments and workplaces, the CleanBC Go Electric EV Charger Rebate Program also includes a rebate of up to $700 for single family homes. The rebate will reimburse up to 50 per cent of the cost of purchasing and installing new, Level 2 charging equipment in existing single family homes (not new construction) with dedicated parking spaces. Customers who have participated in the ZAPBC charger program are ineligible for the rebate.

BC Hydro and the Government of B.C. both contribute to the cost of the single family charging station rebate offer. The Government of B.C. funds the initial rebate amount up to $350 as well as the related administration and implementation costs. BC Hydro funds up to $350 toward the rebate for the portion beyond the initial contribution from the Government of B.C. as well as related communication costs.

BC Hydro's expenditures for this initiative are within its Low-Carbon Electrification Program.

324.0 Reference: TWENTY YEAR LOAD FORECAST
CTV News, The Canadian Press, B.C. gives $4 million in rebates for electric vehicle charge stations,[1] dated September 26, 2019
EV charger rebates

In the news article by CTV News dated September 26, 2019, it states:

> A $2,000 rebate is available for installation of a Level 2 charging station designed for multiple users in apartments or workplaces… More than $4 million has been set aside for the new CleanBC rebate program.

4.324.2.1 If BC Hydro is contributing towards the funds for the rebates, please elaborate on how BC Hydro intends to recover those funds.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.324.2 where we explain that any BC Hydro expenditures related to the CleanBC Go Electric EV Charger Rebate program are contained within the Low Carbon Electrification (LCE) Program.

The Direction to the BCUC Respecting Undertaking Costs (B.C. Reg. 77/2017) requires the BCUC to allow BC Hydro to defer LCE expenditures to the DSM Regulatory Account.

[1] Retrieved September 30, 2019, from https://www.ctvnews.ca/autos/b-c-gives-4-million-in-rebates-for-electric-vehicle-charge-stations-1.4612352.

325.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 11; Government of BC, CleanBC plan,[1] updated March 2019, p. 10
Impact of CleanBC strategies

BC Hydro states in Exhibit B-15 that "The June 2019 Load Forecast reflects the CleanBC plan during the Test Period as it incorporates changes to the EV methodology to align with the CleanBC Plan for light duty electric vehicles."

The CleanBC plan states on page 10: "Specifically, by 2030, the policies in this strategy will require an additional 4,000 gigawatt-hours of electricity over and above currently projected demand growth to electrify key segments of our economy."

4.325.1 Please identify whether any other strategies are mentioned in the CleanBC plan, aside from the strategy regarding light duty electric vehicles, which may impact BC Hydro's Test Period load forecast. If yes, please discuss and quantify the expected impact on BC Hydro's load forecast for each customer class, where possible.

RESPONSE:

The CleanBC Plan outlines multiple strategies to reduce carbon emissions, across the areas of transportation, buildings, industry and waste. Strategies that are expected to impact BC Hydro's Load Forecast during the Test Period, aside from light duty electric vehicles, are:

- **Support for better buildings; and**
- **Industrial electrification.**

BC Hydro's Low Carbon Electrification (LCE) projects/programs, described in Appendix Y of the Application, support these CleanBC strategies. The impact of BC Hydro-funded LCE during the Test Period is approximately 360 GWh and is included in both the October 2018 Load Forecast and the June 2019 Load Forecast. The majority of this load (~330 GWh) is in the large industrial sector.

In addition, the impact of the fuel switching component of the government-funded CleanBC Better Buildings/Homes program, which BC Hydro is administering on behalf of the Government of B.C, is captured in the Load Forecast. The impact during the Test Period from this program is approximately 15 GWh (10 GWh in the residential sector and 5 GWh in the commercial sector).

[1] https://blog.gov.bc.ca/app/uploads/sites/436/2019/02/CleanBC_Full_Report_Updated_Mar2019.pdf.

325.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, p. 11; Government of BC, CleanBC plan,[1] updated March 2019, p. 10
Impact of CleanBC strategies

BC Hydro states in Exhibit B-15 that "The June 2019 Load Forecast reflects the CleanBC plan during the Test Period as it incorporates changes to the EV methodology to align with the CleanBC Plan for light duty electric vehicles."

The CleanBC plan states on page 10: "Specifically, by 2030, the policies in this strategy will require an additional 4,000 gigawatt-hours of electricity over and above currently projected demand growth to electrify key segments of our economy."

4.325.2 Please explain whether the 20-year energy and peak load forecasts include the estimated increase in electricity demand as discussed in the CleanBC plan.

RESPONSE:

The June 2019 Load Forecast reflects a portion of the estimated increase in electricity demand reported in the CleanBC plan. In developing the mid-load forecast, BC Hydro evaluates the impact of public policy commitments such as the CleanBC plan based on the legislation, regulations and funding in place to achieve the policy's stated objectives.

Accordingly, the June 2019 Load Forecast incorporated legislative and policy measures related to CleanBC that were already in place or were close to being enacted, giving them a higher degree of certainty. For example, the CleanBC plan made a firm commitment to a Zero Electric Vehicle (ZEV) mandate that was subsequently enacted in legislation on May 20, 2019. Accordingly, the ZEV mandate was included in the June 2019 Load Forecast.

BC Hydro has updated a number of other elements unrelated to the CleanBC plan since the May 2016 Load Forecast, such as economic drivers, the price of gasoline, and natural gas price forecasts. Accordingly, it is not practical to isolate the specific, quantitative impacts of the CleanBC policy measures from other changes between the forecasts.

In addition, assumptions and programs in previous load forecasts that are consistent with strategies included in the CleanBC plan, were carried over into the June 2019 Load Forecast. For example:

[1] https://blog.gov.bc.ca/app/uploads/sites/436/2019/02/CleanBC_Full_Report_Updated_Mar2019.pdf.

- **The Peace Region Electricity Supply (PRES) project. The May 2016 Load Forecast, October 2018 Load Forecast and June 2019 Load Forecast assume that the PRES project proceeds. This project is needed for the purpose of reducing greenhouse gas emissions, by meeting BC Hydro's forecast oil and gas sector growth in the South Peace region; and**
- **BC Hydro-funded and government-funded Low Carbon Electrification (LCE) activities. These activities are described in BC Hydro's response to BCUC IR 4.325.1. Projected load from these activities is expected to continue beyond the Test Period.**

Other elements of the CleanBC plan remain under development, which means there may be further electricity demand growth beyond the initiatives announced in December 2018. Specifically, the CleanBC plan states, on page 5:

> **"The full scope of actions envisioned in CleanBC – on the part of citizens, industry and business, and local and provincial government – will accomplish our 2030 GHG reduction goals. This plan describes specific reductions from the first set of actions totaling more than 75 per cent. Over the next 18 to 24 months we will identify additional reductions across more sectors of our economy with the strong potential to exceed the remaining 25 per cent of our 2030 goals."**

Future load forecasts will incorporate new elements of the CleanBC plan and future public policies as they are developed and implemented.

326.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix D, Table D-3; BC Hydro F2017 to F2019 Revenue Requirements Application, Exhibit B-1-1, Application, Table 3-8; Government of BC, Ministry of Energy, Mines and Petroleum Resources, Comprehensive Review of BC Hydro: Phase 1 Report, pp. 22, 23
IPP Renewals

BC Hydro provides the planning view of the energy load resource balance after planned resources in Table D-3 included in Appendix D of Exhibit B-15. It shows the future supply-side resources for F2036 includes 8,123 GWh of energy from Independent Power Producer (IPP) renewals and 226 GWh of energy from expected Standing Offer Program (SOP) Projects and other first nations commitments.

BC Hydro provides the energy load resource balance after planned resources in Table 3-8 of its F2017 to F2019 Revenue Requirements Application. It shows that the future supply-side resources for F2036 includes 5,515 GWh and 2,045 GWh of energy from IPP renewals and the SOP, respectively.

Page 22 of the Comprehensive Review of BC Hydro: Phase 1 Report states "[t]he cost of energy procured from Independent Power Producers is now one of BC Hydro's biggest cost drivers and these costs will be recovered from ratepayers. Though BC Hydro has not conducted competitive calls for power since 2011, it is projected to have an energy surplus into the 2030s." The report further states on page 23 that "[t]he primary opportunities for managing costs moving forward relate to expiring biomass agreements and the Standing Offer Program."

4.326.1 Please provide a breakdown of the "existing and committed IPP Resources" line item by resource type for each year in the load resource balance included in Table D-3 and in Table 3-8 from the F2017-F2019 RRA, respectively, and include a line comparing any difference in terms of volume (GWh) between the two load resource balances for each resource type. Please also provide this information in Excel format.

RESPONSE:

This answer also responds to BCUC IR 4.326.1.1.

BC Hydro notes that a revised version of Table 3-8 from the Fiscal 2017 to Fiscal 2019 Revenue Requirements Application (Previous Application) was provided in BC Hydro's response to BCUC IR 1.11.1 in that proceeding.

Table 3-8 in the Previous Application provides the energy load resource balance, after planned resources, from a long-term operational view, whereas Table D-3 in Appendix D of Exhibit B-15 shows the energy load resource balance, after planned resources, from a planning view. Accordingly, Table D-3 and Table 3-8 are not comparable. Please refer to BC Hydro's response to CEABC IR 2.28.1 where we provide a description of the assumptions used under BC Hydro's planning and operational views.

However, to be responsive, and to explain the changes in IPP resources between the Previous Application and the Application, BC Hydro provides the table below. This table provides a breakdown of the existing and committed IPP resources by resource type from Table D-3 as compared to the existing and committed IPP resources from the revised version of Table 3-8 from a planning view perspective (i.e., an "apples to apples" comparison).

Differences in Planning View of Energy (GWh / year) between Exhibit B-15 and the Previous Application

		F 2017	F 2018	F 2019	F 2020	F 2021	F 2022	F 2023	F 2024	F 2025	F 2026	F 2027	F 2028	F 2029	F 2030	F 2031	F 2032	F 2033	F 2034	F 2035	F 2036	F 2037	F 2038	F 2039
Storage Hydro	Exhibit B-15					2,514	2,611	2,565	2,565	2,565	2,565	2,565	2,553	2,392	2,194	2,118	2,113	2,093	2,085	1,775	942	942	942	942
	Previous Application (Planning View)	1,901	1,866	1,910	1,979	1,979	1,979	1,972	1,970	1,970	1,970	1,970	1,958	1,798	1,597	1,524	1,520	1,507	1,499	1,387	1,055			
	Difference					535	632	593	595	595	595	595	594	595	597	595	593	586	586	388	(113)			
Non-Storage Hydro	Exhibit B-15					6,045	6,143	6,143	5,934	5,688	5,548	5,447	5,353	5,224	5,224	5,224	5,164	5,150	5,150	5,150	5,077	5,068	5,068	5,041
	Previous Application (Planning View)	5,210	5,653	5,827	5,827	5,827	5,828	5,828	5,615	5,364	5,210	5,109	5,018	4,886	4,886	4,886	4,828	4,812	4,812	4,812	4,730			
	Difference					219	315	315	318	325	338	338	334	338	338	338	337	338	338	338	346			
Gas Fired Thermal	Exhibit B-15					3,075	3,075	1,084	905	905	905	905	905	905	448	65	65	65	65	65	47	-	-	-
	Previous Application (Planning View)	3,075	3,111	3,148	3,148	3,148	3,148	1,158	978	978	978	978	978	978	521	138	138	138	138	138	107			
	Difference					(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(73)	(59)			
Wind	Exhibit B-15					2,072	2,072	2,072	2,072	2,072	2,072	2,072	2,072	2,072	2,072	2,072	2,072	2,072	1,941	1,665	1,534	1,183	1,011	706
	Previous Application (Planning View)	1,620	2,130	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2,031	1,743	1,612			
	Difference					(81)	(81)	(81)	(81)	(81)	(81)	(81)	(81)	(81)	(81)	(81)	(81)	(81)	(90)	(78)	(78)			
Solar	Exhibit B-15					4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Previous Application (Planning View)	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
	Difference					2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
Biomass	Exhibit B-15					2,239	1,913	1,916	1,916	1,916	1,948	1,948	1,948	1,820	1,739	1,664	1,380	1,222	1,086	969	531	487	487	487
	Previous Application (Planning View)	3,178	3,687	3,049	2,890	2,503	2,040	1,901	1,777	1,640	1,557	1,557	1,341	1,148	1,063	1,063	1,060	1,060	1,060	1,060	679			
	Difference					(264)	(127)	14	139	276	391	391	607	672	676	600	320	162	26	(90)	(148)			
Biogas	Exhibit B-15					124	124	124	103	70	63	54	54	48	45	38	38	37	36	36	-	-	-	-
	Previous Application (Planning View)	124	124	124	124	124	124	124	103	70	63	55	55	48	45	38	38	37	36	36	-			
	Difference					(0)	(0)	(0)	0	(0)	0	(0)	(0)	(0)	(0)	(0)	(0)	0	(0)	(0)	-			
ERG	Exhibit B-15					120	120	120	120	120	120	120	120	78	45	45	45	30	1	0	-	-	-	-
	Previous Application (Planning View)	123	123	123	123	123	123	123	123	123	123	123	123	79	48	48	48	32	1	0	-			
	Difference					(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(1)	(3)	(3)	(3)	(2)	-	0	-			
MSW	Exhibit B-15					166	166	166	166	166	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Previous Application (Planning View)	166	166	166	166	166	166	166	166	166	-	-	-	-	-	-	-	-	-	-	-			
	Difference					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			

Attachment 1 to this response provides the above table in Excel format.

The following provides a brief summary of the differences, in the planning view, for the existing and committed IPP resources by resource type between the Previous Application and Exhibit B-15.

Storage Hydro – increases primarily due to:

- **Expected increase to the generation at Rio Tinto Alcan due to the completion of a second tunnel; and**
- **A non-storage hydro facility that had been erroneously labeled as a storage hydro facility has been removed from this category, which offsets a portion of the expected increase to the generation at Rio Tinto Alcan.**

Non-storage Hydro – increases primarily due to:

- **The addition of a non-storage hydro project that had previously been mislabeled as a storage hydro facility;**
- **Several new EPAs for non-storage hydro IPP projects; and**
- **Renewals of EPAs for several non-storage hydro projects (which were previously considered non-committed resources).**

Gas Fired Thermal – decreases due to the termination of an EPA for a project in development.

Wind – decreases due to the termination of an EPA for a project in development and updated generation expectations for several projects.

Solar – increases due to the addition of a solar project.

Biomass – differences are primarily due to updated generation expectations and extending the expiry dates for those EPAs where an IPP has an option to extend the term of their agreement.

Biogas – no differences.

Energy Recovery Generation (ERG) – small difference due to updated generation expectations.

Municipal Solid Waste (MSW) – no differences.

BC Hydro
Power smart

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(Accessible by opening the Attachments Tab in Adobe)

326.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix D, Table D-3; BC Hydro F2017 to F2019 Revenue Requirements Application, Exhibit B-1-1, Application, Table 3-8; Government of BC, Ministry of Energy, Mines and Petroleum Resources, Comprehensive Review of BC Hydro: Phase 1 Report, pp. 22, 23
IPP Renewals

BC Hydro provides the planning view of the energy load resource balance after planned resources in Table D-3 included in Appendix D of Exhibit B-15. It shows the future supply-side resources for F2036 includes 8,123 GWh of energy from Independent Power Producer (IPP) renewals and 226 GWh of energy from expected Standing Offer Program (SOP) Projects and other first nations commitments.

BC Hydro provides the energy load resource balance after planned resources in Table 3-8 of its F2017 to F2019 Revenue Requirements Application. It shows that the future supply-side resources for F2036 includes 5,515 GWh and 2,045 GWh of energy from IPP renewals and the SOP, respectively.

Page 22 of the Comprehensive Review of BC Hydro: Phase 1 Report states "[t]he cost of energy procured from Independent Power Producers is now one of BC Hydro's biggest cost drivers and these costs will be recovered from ratepayers. Though BC Hydro has not conducted competitive calls for power since 2011, it is projected to have an energy surplus into the 2030s." The report further states on page 23 that "[t]he primary opportunities for managing costs moving forward relate to expiring biomass agreements and the Standing Offer Program."

4.326.1.1 For the years that overlap between the load resource balance provided in Table 3-8 of the F2017-2019 RRA and in Table D-3, please explain any difference between the "existing and committed IPP Resources" volumes by resource type.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.326.1.

326.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix D, Table D-3; BC Hydro F2017 to F2019 Revenue Requirements Application, Exhibit B-1-1, Application, Table 3-8; Government of BC, Ministry of Energy, Mines and Petroleum Resources, Comprehensive Review of BC Hydro: Phase 1 Report, pp. 22, 23
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4.326.2 Please provide a table with the total volume of IPP resources (in GWh) for each year as included in Table D-3 and in Table 3-8 from the F2017-F2019 RRA, respectively, and break down by: existing IPP; future IPP renewals; expected SOP projects; and First Nations commitments. Please also include a "total" line and present each component's proportion (in percentage terms) of the total amount in each year. Please also provide this information in Excel format.

RESPONSE:

This answer also responds to BCUC IR 4.326.2.1.

Please refer to BC Hydro's response to BCUC IR 4.326.1 where we explain that Table D-3 in Appendix D of Exhibit B-15 and Table 3-8 from the Previous

Application are not comparable. In order to explain the changes in the breakdown and total amount of IPP energy between the Previous Application and the Application, BC Hydro provides, in that response, a breakdown of the existing and committed IPP resources by resource type from Table D-3 as compared to the existing and committed IPP resources from the revised version of Table 3-8 from a planning view perspective (i.e., an "apples to apples" comparison).

The table below provides the additional breakdowns and totals requested in the question. The expected SOP projects and other First Nations commitments have been combined into one category, since all of the SOP projects that BC Hydro announced in March 2018 were selected because they are part of Impact Benefit Agreements with BC Hydro and/or are mature projects that have significant First Nations involvement.

Differences in Planning View of Energy (GWh / year) between Exhibit B-15 and the Previous Application

	F2017	F2018	F2019	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031	F2032	F2033	F2034	F2035	F2036	F2037	F2038	F2039
Exhibit B-15																							
Total IPP Energy (GWh/yr)					17,444	17,688	17,689	17,637	17,576	17,573	17,548	17,525	17,428	17,151	17,078	16,932	16,848	16,780	16,722	16,485	16,460	16,460	16,453
Existing & Committed IPPs (GWh/yr)					16,359	16,227	14,193	13,783	13,505	13,224	13,115	13,008	12,542	11,770	11,228	10,880	10,671	10,366	9,664	8,136	7,684	7,511	7,180
(% of total)					*94%*	*92%*	*80%*	*78%*	*77%*	*75%*	*75%*	*74%*	*72%*	*69%*	*66%*	*64%*	*63%*	*62%*	*58%*	*49%*	*47%*	*46%*	*44%*
Future (Planned) IPP Renewals (GWh/yr)					1,058	1,280	3,270	3,628	3,845	4,124	4,208	4,291	4,660	5,154	5,624	5,826	5,951	6,188	6,832	8,123	8,550	8,723	9,048
(% of total)					*6%*	*7%*	*18%*	*21%*	*22%*	*23%*	*24%*	*24%*	*27%*	*30%*	*33%*	*34%*	*35%*	*37%*	*41%*	*49%*	*52%*	*53%*	*55%*
Expected SOP Projects and other First Nation Commitments (GWh/yr)					27	182	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226
(% of total)					*0%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Previous Application (Planning View)																							
Total IPP Energy (GWh/yr)	17,018	17,193	17,250	17,378	17,295	17,176	17,210	17,204	17,182	17,214	17,299	17,279	17,260	17,328	17,439	17,534	17,640	17,751	17,851	17,731			
Existing & Committed IPPs (GWh/yr)	16,863	16,863	16,501	16,412	16,024	15,562	13,426	12,887	12,465	12,056	11,946	11,628	11,091	10,315	9,851	9,786	9,739	9,578	9,178	8,185			
(% of total)	*99%*	*98%*	*96%*	*94%*	*93%*	*91%*	*78%*	*75%*	*73%*	*70%*	*69%*	*67%*	*64%*	*60%*	*56%*	*56%*	*55%*	*54%*	*51%*	*46%*			
Future (Planned) IPP Renewals (GWh/yr)	93	244	576	683	876	1,108	3,168	3,590	3,880	4,210	4,294	4,482	4,889	5,623	6,087	6,136	6,178	6,339	6,740	7,522			
(% of total)	*1%*	*1%*	*3%*	*4%*	*5%*	*6%*	*18%*	*21%*	*23%*	*24%*	*25%*	*26%*	*28%*	*32%*	*35%*	*35%*	*35%*	*36%*	*38%*	*42%*			
Expected SOP Projects and other First Nation Commitments (GWh/yr)	62	87	173	284	394	505	615	727	837	948	1,058	1,169	1,279	1,391	1,501	1,612	1,722	1,833	1,934	2,024			
(% of total)	*0%*	*1%*	*1%*	*2%*	*2%*	*3%*	*4%*	*4%*	*5%*	*6%*	*6%*	*7%*	*7%*	*8%*	*9%*	*9%*	*10%*	*10%*	*11%*	*11%*			

Attachment 1 to this response provides the above table in Excel format.

The following provides a brief summary of the differences between the Previous Application and Exhibit B-15:

- **The energy from Existing and Committed IPPs has increased primarily because of the expected increases to the generation at Rio Tinto Alcan due the completion of a second tunnel, the addition of EPAs for several new non-storage hydro projects, and several EPAs being renewed or extended since the Previous Application was prepared. A portion of this increase is offset by the termination of the EPA for a gas fired thermal project in development and updated generation expectations for existing projects with EPAs;**

- **The energy from Future IPP Renewals has increased due to the Biomass Energy Program (which changes the energy volume renewal assumption, in aggregate, from 50 per cent to 80 per cent for the eligible biomass projects with EPAs expiring prior to April 2022). This is partially offset by a lower number of non-storage hydro projects that are subject to renewal. In fiscal 2035, there is a further increase in Future IPP Renewals due to the assumed renewal of Rio Tinto Alcan; and**

- **The energy from "Expected SOPs and other First Nations Commitments" has decreased as the Standing Offer Program has been indefinitely suspended and only a small number of SOP projects and other First Nations commitments are proceeding.**

Overall, relative to the Previous Application, total IPP energy has increased in the Test Period and decreased over the long-term.

BC Hydro
Power smart

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(Accessible by opening the Attachments Tab in Adobe)

326.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix D, Table D-3; BC Hydro F2017 to F2019 Revenue Requirements Application, Exhibit B-1-1, Application, Table 3-8; Government of BC, Ministry of Energy, Mines and Petroleum Resources, Comprehensive Review of BC Hydro: Phase 1 Report, pp. 22, 23
IPP Renewals

BC Hydro provides the planning view of the energy load resource balance after planned resources in Table D-3 included in Appendix D of Exhibit B-15. It shows the future supply-side resources for F2036 includes 8,123 GWh of energy from Independent Power Producer (IPP) renewals and 226 GWh of energy from expected Standing Offer Program (SOP) Projects and other first nations commitments.

BC Hydro provides the energy load resource balance after planned resources in Table 3-8 of its F2017 to F2019 Revenue Requirements Application. It shows that the future supply-side resources for F2036 includes 5,515 GWh and 2,045 GWh of energy from IPP renewals and the SOP, respectively.

Page 22 of the Comprehensive Review of BC Hydro: Phase 1 Report states "[t]he cost of energy procured from Independent Power Producers is now one of BC Hydro's biggest cost drivers and these costs will be recovered from ratepayers. Though BC Hydro has not conducted competitive calls for power since 2011, it is projected to have an energy surplus into the 2030s." The report further states on page 23 that "[t]he primary opportunities for managing costs moving forward relate to expiring biomass agreements and the Standing Offer Program."

4.326.2.1 For the years that overlap between the load resource balance provided in Table 3-8 of the F2017-F2019 RRA and in Table D-3, please explain any difference between the breakdown and total volume of IPP energy expected to be part of BC Hydro's supply-side resources in the future.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.326.2.

326.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix D, Table D-3; BC Hydro F2017 to F2019 Revenue Requirements Application, Exhibit B-1-1, Application, Table 3-8; Government of BC, Ministry of Energy, Mines and Petroleum Resources, Comprehensive Review of BC Hydro: Phase 1 Report, pp. 22, 23
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BC Hydro provides the energy load resource balance after planned resources in Table 3-8 of its F2017 to F2019 Revenue Requirements Application. It shows that the future supply-side resources for F2036 includes 5,515 GWh and 2,045 GWh of energy from IPP renewals and the SOP, respectively.

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4.326.3 Please explain the increase in IPP renewals under "future resources" for each year up to F2036 included in Table D-3 compared to the load resource balance filed as Table 3-8 in the F2017-F2019 RRA.

RESPONSE:

As discussed in BC Hydro's response to BCUC IR 4.326.1, Table 3-8 in the Previous Application and Table D-3 in Exhibit B-15 are not comparable. This is because Table 3-8 provides a long-term operational view whereas Table D-3 provides a planning view. Specifically, the difference is primarily due to differences in assumptions for Island Generation between the operational view (in Table 3-8) and the planning view (in Table D-3).

As stated and further explained in BC Hydro's response to BCUC IR 4.326.2, overall, relative to the Previous Application, total IPP energy has increased in the Test Period and is expected to decrease over the long-term.

326.0 Reference: TWENTY YEAR LOAD FORECAST
Exhibit B-15, Appendix D, Table D-3; BC Hydro F2017 to F2019 Revenue Requirements Application, Exhibit B-1-1, Application, Table 3-8; Government of BC, Ministry of Energy, Mines and Petroleum Resources, Comprehensive Review of BC Hydro: Phase 1 Report, pp. 22, 23
IPP Renewals

BC Hydro provides the planning view of the energy load resource balance after planned resources in Table D-3 included in Appendix D of Exhibit B-15. It shows the future supply-side resources for F2036 includes 8,123 GWh of energy from Independent Power Producer (IPP) renewals and 226 GWh of energy from expected Standing Offer Program (SOP) Projects and other first nations commitments.

BC Hydro provides the energy load resource balance after planned resources in Table 3-8 of its F2017 to F2019 Revenue Requirements Application. It shows that the future supply-side resources for F2036 includes 5,515 GWh and 2,045 GWh of energy from IPP renewals and the SOP, respectively.

Page 22 of the Comprehensive Review of BC Hydro: Phase 1 Report states "[t]he cost of energy procured from Independent Power Producers is now one of BC Hydro's biggest cost drivers and these costs will be recovered from ratepayers. Though BC Hydro has not conducted competitive calls for power since 2011, it is projected to have an energy surplus into the 2030s." The report further states on page 23 that "[t]he primary opportunities for managing costs moving forward relate to expiring biomass agreements and the Standing Offer Program."

4.326.3.1 Please comment on whether the increase in IPP renewals is consistent with the Comprehensive Review of BC Hydro: Phase 1 Report.

RESPONSE:

Yes, the IPP forecast used in the Load Resource Balance provided in Appendix D of Exhibit B-15 is consistent with the outcomes of Phase One of the Comprehensive Review of BC Hydro.

As stated and further explained in BC Hydro's response to BCUC IR 4.326.2, overall, relative to the Previous Application, total IPP energy is expected to decrease over the long-term.

BC Hydro's IPP forecast assumes that IPP renewals can be undertaken on a cost effective basis. The IPP forecast will be re-evaluated and updated through the 2021 Integrated Resource Plan.