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November 19, 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)

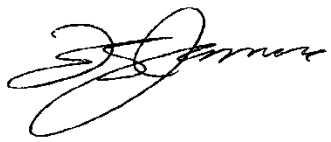
BC Hydro writes in compliance with Commission Order No. G-279-19 to provide as Exhibit B-23-2 its remaining responses to Round 4 information requests.

Overall, BC Hydro received 327 Round 4 information requests. Responses to 33 of those information requests are included in this filing and responses to 260 of those information requests were previously filed on November 14, 2019.

The remaining 34 information requests are the subject of BC Hydro's letter of November 8, 2019, Exhibit B-21 (the information requests at issue are listed in Attachment A to that letter). They are being addressed through the comment process established by Commission Order No. G-279-19.

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

177.0 20-YEAR LOAD FORECAST

Reference **Exhibit B-15, page 2, Figure 1 and page 11**

4.177.1 Please provide the numerical values for the plot lines (excluding the uncertainty range) shown in Figure 1 for the years F2017 to F2024.

RESPONSE:

The numerical values for the plot lines in Figure 1 of Exhibit B-15 are provided in the table below.

(GWh)	Actuals	June 2019 Mid Forecast	October 2018 Mid Forecast
F2017	**50,323**		
F2018	**52,098**		
F2019		**52,602**	**52,691**
F2020		**53,283**	**53,742**
F2021		**53,840**	**53,442**
F2022		**53,317**	**53,279**
F2023		**53,945**	**53,548**
F2024		**55,115**	**54,627**

The difference between these values and the values provided in Table 2 on page 11 of Exhibit B-15 is that these values include estimates of electricity used by BC Hydro assets (BC Hydro own use) and the values in Table 2 do not.

87.0 Topic: Load Forecast

Reference: Exhibit B-15, June 2019 Load Forecast F2020-F2039, "4. June 2019 Load Forecast Expects Annual Load Growth of Approximately 1 per cent Over Next 20 Years"

"As shown in Table 2 below, on a billed sales basis, the June 2019 Load Forecast expects load growth of approximately one per cent per year from fiscal 2020 to fiscal 2039."

"As shown in Figure 1 above, BC Hydro's load forecast includes projections for the mid, high and low forecast."

4.87.3 With reference to Table 2, please provide a graph and table for the June 2019 Forecast showing annual increases in Total Domestic Sales after DSM and Rate Impacts in GWh and as a percent change from the previous year. Please briefly explain any notable trends.

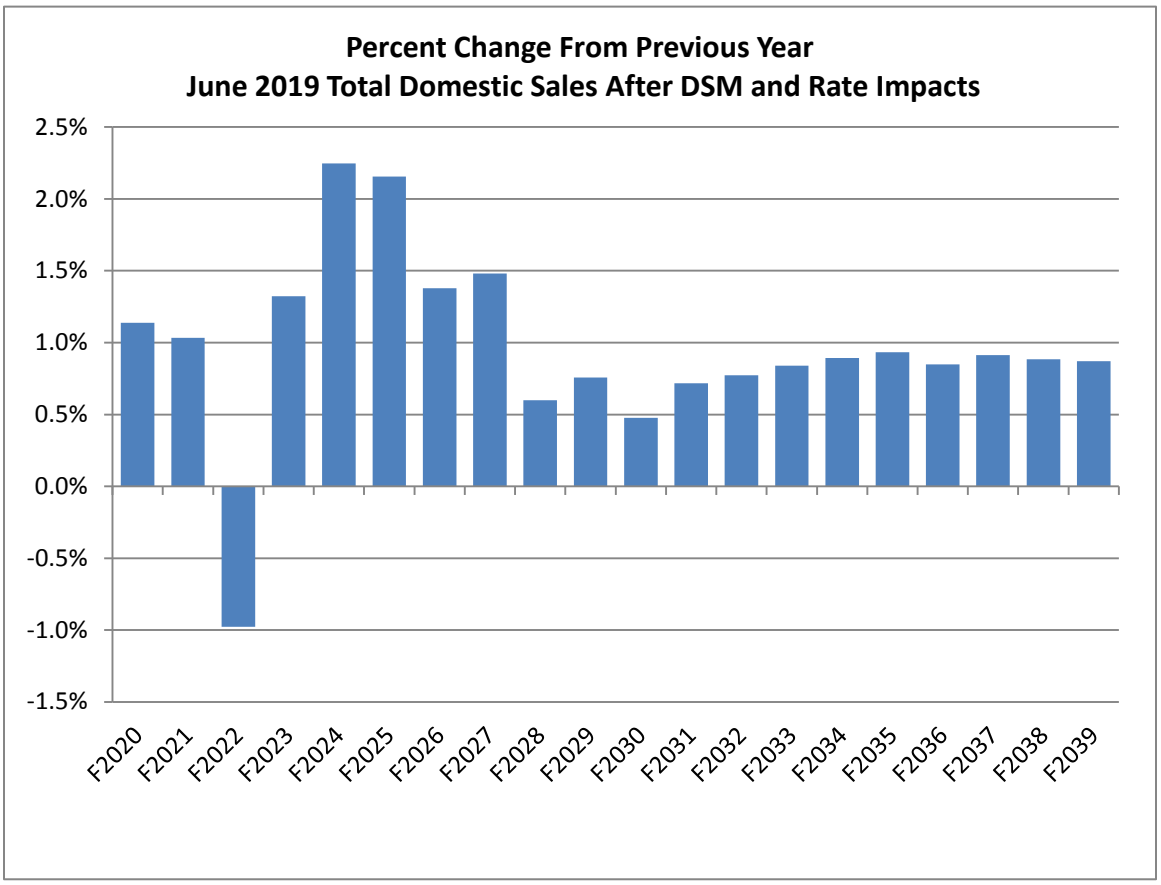
RESPONSE:

The requested table and graph are provided below.

In general, moderate growth occurs each year due to increasing accounts in the residential sector. The year-to-year volatility (i.e., decline in the near term, followed by higher than average growth from fiscal 2023 to fiscal 2027) is primarily due to customer-specific changes in the large industrial sector.

Fiscal Year	June 2019 Load Forecast of Domestic Sales (GWh)	Time Period	Change From Previous Year (GWh)	Change From Previous Year (%)
F2019	52,505			
F2020	53,103	F2020 - F2019	598	1.1
F2021	53,652	F2021 - F2020	549	1.0
F2022	53,128	F2022 - F2021	-524	-1.0
F2023	53,831	F2023 - F2022	703	1.3
F2024	55,040	F2024 - F2023	1,209	2.2
F2025	56,226	F2025 - F2024	1,186	2.2
F2026	57,001	F2026 - F2025	775	1.4
F2027	57,845	F2027 - F2026	844	1.5
F2028	58,192	F2028 - F2027	347	0.6

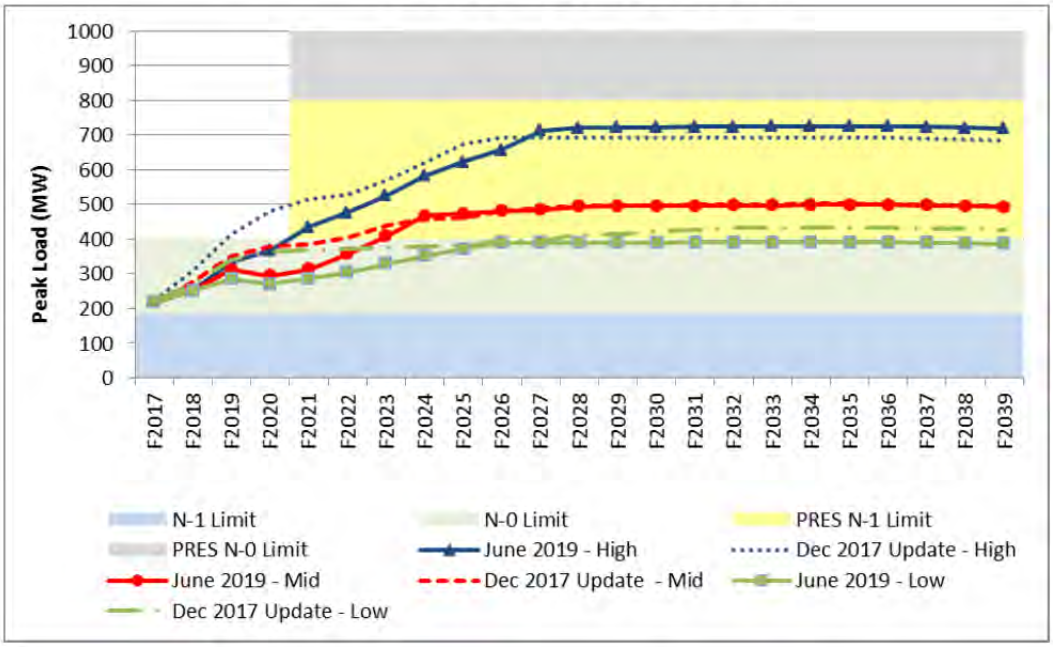
Fiscal Year	June 2019 Load Forecast of Domestic Sales (GWh)	Time Period	Change From Previous Year (GWh)	Change From Previous Year (%)
F2029	58,633	F2029 - F2028	441	0.8
F2030	58,913	F2030 - F2029	280	0.5
F2031	59,336	F2031 - F2030	423	0.7
F2032	59,795	F2032 - F2031	459	0.8
F2033	60,297	F2033 - F2032	502	0.8
F2034	60,835	F2034 - F2033	538	0.9
F2035	61,403	F2035 - F2034	568	0.9
F2036	61,924	F2036 - F2035	521	0.8
F2037	62,490	F2037 - F2036	566	0.9
F2038	63,043	F2038 - F2037	553	0.9
F2039	63,592	F2039 - F2038	549	0.9



59.0 Reference: Exhibit B-15, 20-Year Load Forecast, Appendix C, June 2019 update to South Peace River forecast.

In Appendix C, BC Hydro provides the following chart to illustrate the differences between the previous (May 2016) and the latest (June 2019) Load Forecast for the area to be serviced by the PRES project:

Figure C-1 South Peace Region Load Forecasts June 2019 and December 2017 Update



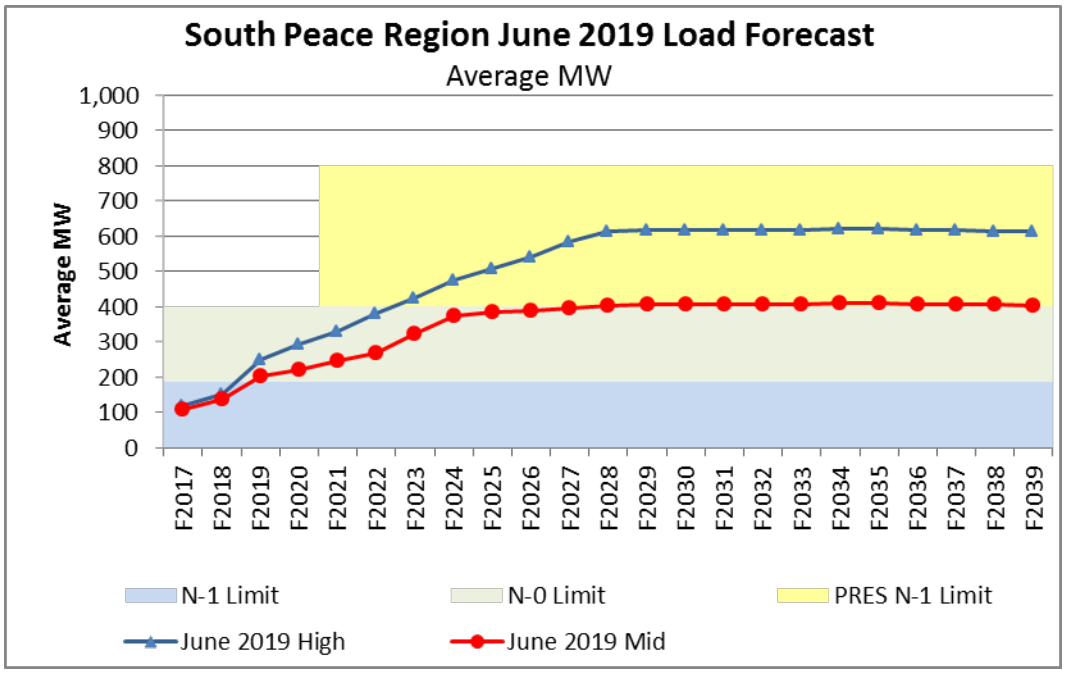
The chart appears to show the Mid Forecast of Peak Loads reaching around 500 MW by F2024, and the High Forecast of Peak Loads reaching around 700 MW by F2027. These are approximately the same levels as were forecast in May 2016, except that the newer High Forecast reaches a level about 20 MW higher, which BC Hydro describes as *"due to increased electrification assumptions in the Groundbirch area as a result of LNG development."*

4.59.2 What are the average MW loads that BC Hydro would expect to correspond to the Mid and High Peak Loads shown in the forecast chart?

RESPONSE:

The figure below provides the requested information from the June 2019 Load Forecast in average annual MW.

Average annual MW was calculated by dividing annual energy (MWh) by the total number of hours in a year (8760). The difference between average MW and peak demand is due to plant load factor.



Generally, the mid and high forecast average MW track the mid and high forecast peak MW. However, from fiscal 2019 to fiscal 2020, the mid average MW rises while the peak MW declines. This occurs because:

- **New plants are coming into service in fiscal 2019 and ramping up production in fiscal 2020 (i.e., average MW demand is increasing and peak MW demand is relatively unchanged); and**
- **Some existing plants are decreasing production (i.e., both average MW and peak MW demand are decreasing).**

62.0 Reference: Exhibit B-15, 20-Year Load Forecast, and Mandate letter from the Minister of Energy, Mines and Petroleum Resources.

On February 21, 2019, the Minister sent a Mandate Letter to the Chairman of BC Hydro. In that letter, the Minister stated the following Government intentions regarding its climate strategy:

> "While Government has already taken steps towards achieving our legislated carbon reduction targets, much remains to be done. Our new climate strategy will outline **significant GHG reduction measures in 2019/20** while supporting our program and service objectives through economic growth powered by clean, renewable energy. 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 supported by technological innovation. **Please ensure your organization's operations align with Government's new climate plan**;" [emphasis added]

4.62.2 What BC Hydro electrification loads are included in this new Load Forecast that will support the Government's new climate plan in accomplishing its 2030 GHG reduction goals?

RESPONSE:

Please refer to BC Hydro's responses to BCUC IRs 4.325.1 and 4.325.2 where we provide details on how the June 2019 Load Forecast reflects the CleanBC plan for the Test Period. As described in BC Hydro's response to BCUC IR 4.318.4, BC Hydro is currently preparing a comprehensive system level energy and peak load forecast for the 2021 Integrated Resource Plan (IRP). We believe that questions and issues related to BC Hydro's long term load forecast, and its alignment with the long-term goals of the CleanBC plan are best addressed as part of the review of the 2021 IRP.

63.0 Reference: Exhibit B-15, 20-Year Load Forecast, and BC Hydro's 2019/20 – 2021/22 Service Plan dated February, 2019.

BC Hydro has declared the following goal in its latest Service Plan, dated February, 2019:

> **Goal 4: Help Make Renewable, Clean Power British Columbia's Leading Energy Source**
>
> **Objective 4.1:** BC Hydro will strengthen its legacy of renewable, clean power and conservation investments through its energy-efficiency and conservation programs, capacity reduction initiatives and support of low-carbon electrification.
>
> **Key Strategies:**
>
> - Support the implementation of the CleanBC plan to increase British Columbians' use of cleaner energy in key sectors of the economy and shift away from reliance on fossil fuels for transportation, industry, and housing.
> - Support customers with initiatives that help them make smart energy management choices with conservation, efficiency, capacity reduction and low carbon electrification.
> - Implement our energy conservation and energy management plan, which will exceed the *Clean Energy Act* requirement to meet at least two-thirds of future demand growth by 2020.
> - Provide customers with the opportunity to access clean, renewable power to displace the use of higher carbon energy sources.
> - As part of the CleanBC plan, partner with the Province and the federal government to implement a new Remote Community Clean Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

4.63.1 How is the June, 2019 Load Forecast consistent with BC Hydro supporting British Columbians to "shift away from reliance on fossil fuels for transportation, industry, and housing"? How much new load is included in the June, 2019 Load Forecast as a result of implementing this Key Strategy?

RESPONSE:

As described in BC Hydro's response to BCUC IR 4.325.2, the June 2019 Load Forecast incorporates a portion of the CleanBC plan. The plan's strategy is to reduce greenhouse gas emissions by increasing the use of cleaner energy, especially electricity, by shifting away from the economy's current reliance on fossil fuels for transportation, industry and housing.

For the same reasons described in BC Hydro's response to BCUC IR 4.325.2, it is not practical to isolate load growth specifically attributed to meeting the strategies referenced in the question relative to other variables that drive future demand for electricity.

63.0 Reference: Exhibit B-15, 20-Year Load Forecast, and BC Hydro's 2019/20 – 2021/22 Service Plan dated February, 2019.

BC Hydro has declared the following goal in its latest Service Plan, dated February, 2019:

Goal 4: Help Make Renewable, Clean Power British Columbia's Leading Energy Source

Objective 4.1: BC Hydro will strengthen its legacy of renewable, clean power and conservation investments through its energy-efficiency and conservation programs, capacity reduction initiatives and support of low-carbon electrification.

Key Strategies:

- Support the implementation of the CleanBC plan to increase British Columbians' use of cleaner energy in key sectors of the economy and shift away from reliance on fossil fuels for transportation, industry, and housing.
- Support customers with initiatives that help them make smart energy management choices with conservation, efficiency, capacity reduction and low carbon electrification.
- Implement our energy conservation and energy management plan, which will exceed the *Clean Energy Act* requirement to meet at least two-thirds of future demand growth by 2020.
- Provide customers with the opportunity to access clean, renewable power to displace the use of higher carbon energy sources.
- As part of the CleanBC plan, partner with the Province and the federal government to implement a new Remote Community Clean Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

4.63.2 How much new load growth is included in the June, 2019 Load Forecast that supports customer initiatives for low carbon electrification? How many incremental GWh does this new load growth contribute by F2024? By F2030? By F2040?

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.325.1 which describes the Low Carbon Electrification Program and its estimated load over the Test Period.

As described in BC Hydro's response to BCUC IR 4.318.4, BC Hydro is currently preparing a comprehensive system level energy and peak load forecast for the 2021 Integrated Resource Plan (IRP). We believe questions and issues related to BC Hydro's long-term load forecast and its alignment with the long term goals of the CleanBC plan are best addressed as part of the review of the 2021 IRP.

63.0 Reference: Exhibit B-15, 20-Year Load Forecast, and BC Hydro's 2019/20 – 2021/22 Service Plan dated February, 2019.

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> - Provide customers with the opportunity to access clean, renewable power to displace the use of higher carbon energy sources.
> - As part of the CleanBC plan, partner with the Province and the federal government to implement a new Remote Community Clean Energy Strategy to help remote communities, with a focus on Indigenous communities, reduce or eliminate diesel generation and replace it with energy from cleaner sources.

4.63.3 What is the amount of new load growth included in the June, 2019 Load Forecast represented by BC Hydro's customer opportunities to "to access clean, renewable power to displace the use of higher carbon energy sources"?

RESPONSE:

It is not practical to isolate load growth specifically attributed to meeting the strategies referenced in the question, relative to other variables that drive future demand for electricity. For further discussion, please refer to BC Hydro's response to BCUC IR 4.325.2.

2.0 Reference: Exhibit B-15 page 7 and 8

> **3.1.2 Electric Vehicles**
>
> The June 2019 Load Forecast uses a new methodology for EVs, to align with the CleanBC Plan for light duty electric vehicles. Specifically, the *Zero-Emission Vehicles Act* (**ZEV Act**) was enacted on May 30, 2019. The ZEV Act stipulates the percentage of new light duty car and truck sales in B.C. that must be zero emission vehicles, as follows: 10 per cent of sales by 2025; 30 per cent of sales by 2030; and 100 per cent of sales by 2040.
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> Accordingly, the low EV forecast in the June 2019 Load Forecast is based on these requirements and the associated incentives because, at a minimum, EV sales would be expected to reach the levels required by legislation. The high-EV scenario
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> assumes EV models are more available, the purchase cost declines, consumers' preferences change, and more infrastructure becomes available. In other words, the high EV forecast assumes that the natural uptake of EVs is greater than the requirements set out in the ZEV 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. [1]

4.2.1 Please confirm that the ZEV Act represents targets that are not yet achieved.

RESPONSE:

Confirmed, based on fiscal 2018 actual sales data which is the most recent actual data used by BC Hydro to develop its June 2019 Load Forecast. However, based on the recently published report by Electric Mobility Canada (EMC), we believe that B.C. EV sales in the second quarter of 2019 achieved the *Zero-Emission Vehicles Act* 2025 target of 10 per cent of new vehicle sales. This report can be found at: https://emc-mec.ca/wp-content/uploads/Sales-Report-2019-Q2_revised.pdf.

[1] Exhibit B-15, page 8

2.0 Reference: Exhibit B-15 page 7 and 8

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4.2.5 Please provide the parameters that define the high EV scenario – i.e. Purchase cost reductions, preference changes, infrastructure, etc.

RESPONSE:

Please refer to BC Hydro's response to BCUC IR 4.323.1 which describes the key inputs that were used to develop the June 2019 high Electric Vehicle (EV) load forecast.

2.0 Reference: Exhibit B-15 page 7 and 8

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4.2.6 Please confirm that the availability of EV from producers and suppliers represents a potential constraint on uptake.

RESPONSE:

Confirmed. One of BC Hydro's Electric Vehicle (EV) model constraints is the availability of EVs from producers and suppliers in British Columbia. For further information, please refer to BC Hydro's response to BCSEA IR 1.8.3, where we explain the impact of market constraints on our EV model.

2.0 Reference: Exhibit B-15 page 7 and 8

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4.2.8 What evidence, if any, does BC Hydro have to suggest that the EV uptake could be higher than provided for in the ZEV Act?

RESPONSE:

British Columbia is in the early stages of Electric Vehicle (EV) adoption. As discussed in section 3.3.6 of Chapter 3 of the Application, it is challenging to predict the trajectory of EV growth. While the introduction of the *Zero-Emission Vehicles Act* (*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.

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[1] Exhibit B-15, page 8

To develop this EV forecast, we considered government mandates, incentives, and potential changes in purchase prices.

For the low EV scenario, we assume EV sales would reach the levels required by the *ZEV Act*.

For the high EV scenario, we assume that declines in purchase prices, changes in consumer preferences, and the availability of charging infrastructure will result in a higher uptake of EVs than what is required by the *ZEV Act*. We developed the high scenario in consideration of the following information that is explicitly and implicitly incorporated into our EV model assumptions:

- **EV uptake in British Columbia has been strong in the past few years (please see BC Hydro's response to CEC IR 4.2.3 for information on historical EV growth rates);**
- **Consumer acceptance is increasing as the costs of EVs decline relative to internal combustion engine vehicles and the maintenance and energy costs of operating EVs are lower than internal combustion engine vehicles;**
- **EV vehicle choice and inventory is increasing;**
- **EV vehicle range is increasing for new model years; and**
- **EV infrastructure is expanding. For example, public charging stations are becoming more available, and building codes require new buildings to be EV charging ready.**

For more information on explicit and implicit factors considered in our EV model, please refer to BC Hydro's response to BCSEA IR 1.8.3.

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. As stated in BC Hydro's response to CEC IR 4.2.1, according to a recently published report by Electro Mobility Canada, B.C. EV sales in the second quarter of 2019 achieved the *ZEV Act* 2025 target of 10 per cent of new vehicle sales.

2.0 Reference: Exhibit B-15 page 7 and 8

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4.2.9 Did BC Hydro consider alternatives to an 'average' of the low and high EV forecast? Please explain.

RESPONSE:

Yes. BC Hydro considered taking the same approach as the October 2018 EV load forecast by developing a mid-scenario using our EV model, and developing a high and low scenario using our EV Monte Carlo model. This approach would have included assigning a distribution of outcomes for gasoline prices as well as capital costs for both gasoline vehicles and EVs.

Both methods produce similar results in the Test Period. BC Hydro decided to adopt the approach described in section 3.1.2 of Exhibit B-15 because we believe it provides a better assessment of the range of uncertainty over the long-term.

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[1] Exhibit B-15, page 8

2.0 Reference: Exhibit B-15 page 7 and 8

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4.2.10 Does BC Hydro consider the 'average' to be the most likely scenario? Please explain and answer what considerations BC Hydro used to assess a 'most likely' scenario?

RESPONSE:

No. BC Hydro considers the average of the high and low scenarios to be a mid forecast for the purpose of quantifying the Electric Vehicle load contribution to BC Hydro's overall mid load forecast. A mid load forecast represents a reasonable expectation of future electricity demand for rate setting and system planning purposes, recognizing that there is inherent uncertainty regarding future demand.

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[1] Exhibit B-15, page 8

5.0 Reference: Exhibit B-15, Appendix B page 4

> The distribution peak process starts with the historical substation data collection and analysis. Temperature adjusted peak demands are estimated for each substation. In addition, a mid forecast of peak demand from Electric Vehicles (**EVs**) is developed using the number of EVs, consistent with the mid energy forecast.

4.5.1 How has BC Hydro accounted for changing weather patterns in its forecasting? Please explain.

RESPONSE:

Please refer to BC Hydro's response to CEC IR 1.14.1.

5.0 Reference: Exhibit B-15, Appendix B page 4

> The distribution peak process starts with the historical substation data collection and analysis. Temperature adjusted peak demands are estimated for each substation. In addition, a mid forecast of peak demand from Electric Vehicles (**EVs**) is developed using the number of EVs, consistent with the mid energy forecast.

4.5.2 Please provide the methodology for temperature adjusting data.

RESPONSE:

BC Hydro uses different methodologies for temperature adjusting data for the energy and peak forecasts.

For the energy forecast, as stated in section 19 of Appendix O of the Application, the model forecasts are based on a normal temperature, which is defined as a 10-year rolling average of monthly heating and cooling degree days that are region specific to BC Hydro's service area.

For the peak demand forecast, the distribution forecast is based on a normal temperature, which is defined as a rolling thirty year average of the coldest annual daily average temperature. There is no temperature adjustment applied to the transmission sector data.

BC Hydro's distribution peak temperature normalization process can be broken down into three stages:

1. **Producing a weather normalized history for distribution substations: A temperature adjustment of historical data is developed at the substation level to create a temperature normalized load profile. A normalized substation load profile is created using temperature data from Environment Canada weather stations and regression analysis. The load profiles and temperature data are used to estimate the previous year's temperature normalized substation peak demand for each substation based on a regression model specific to that substation;**
2. **Calibrating peak coefficients for the guideline forecast: This is a multistep process that starts with determining the response of residential accounts and general sales (combined commercial and light industrial) to the temperatures of the most recent cold year. This is done at a regional level and for various types of residential accounts and general sales. These**

coefficients are then set to normal temperature (rolling thirty year average of the coldest annual daily average temperature). The results are then further regressed against the weather normalized history described in step 1 to produce a set of coefficients that are calibrated to normal temperature and normalized history; and

3. **Producing the mid guideline distribution forecast: The calibrated coefficients are then applied to the residential accounts forecast and general sales forecast to calculate a base distribution peak forecast. Other adjustments are then made to the base forecast (such as Electric Vehicles, additional spot loads, Demand Side Management savings, etc.) to produce a guideline forecast. The guideline forecast is used in the development of the individual substation forecasts.**

In addition to the temperature adjustments described above for the energy and peak forecast models, the Monte Carlo model used to develop load forecast uncertainty bands incorporates uncertainty associated with the impact of temperature on load through a random simulation of the heating degrees over the past 10 years. For further information, please refer to section 11.2.6 of Appendix O of the Application.

5.0 Reference: Exhibit B-15, Appendix B page 4

> The distribution peak process starts with the historical substation data collection and analysis. Temperature adjusted peak demands are estimated for each substation. In addition, a mid forecast of peak demand from Electric Vehicles (**EVs**) is developed using the number of EVs, consistent with the mid energy forecast.

4.5.3 What methodologies has BC Hydro employed to ensure its temperature adjustment methodologies remain appropriate?

RESPONSE:

BC Hydro reviews its temperature adjustment methodologies and monitors industry practices so that its approach remains appropriate.

As described in BC Hydro's response to INCE IR 1.8.15, BC Hydro worked with Itron, our Statistically Adjusted End-use (SAE) software vendor, to update various model parameters, which included updating the revised temperature cut-points that establish the heating and cooling degree day variables used to develop the load forecast. For more information on the updated cut-points that BC Hydro incorporated in its SAE models, please refer to section 17.3 of Appendix O of the Application. For more information on BC Hydro's temperature normalization methodology, please refer to section 19 of Appendix O of the Application.

For the distribution peak forecast, as described in BC Hydro's response to CEC IR 2.112.1, we are currently making improvements to normalizing peak demand to annual weather to address the recent historical gap between forecasted peaks and actual peaks, with the goal of achieving a closer correlation.

For climate change trends, as described in BC Hydro's response to CEC IR 1.14.1, BC Hydro is working in partnership with the Pacific Climate Impacts Consortium to assess the potential impacts of new climate scenarios on future load and identify any changes that may be required to our temperature adjustment methods.

8.0 Reference: Exhibit B-15, page 10, Section 4

> **4 June 2019 Load Forecast Expects Annual Load Growth of Approximately 1 per cent Over Next 20 Years**
>
> As shown in Table 2 below, on a billed sales basis, the June 2019 Load Forecast expects load growth of approximately one per cent per year from fiscal 2020 to fiscal 2039. The 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 IRP. [1]

4.8.2 Please provide the range of uncertainty and confidence levels for BC Hydro's load growth forecast during the test period, and for each of the five years remaining in the forecast.

RESPONSE:

The uncertainty range for the June 2019 Load Forecast is shown in Figure 1 of Exhibit B-15. The numeric values for total firm sales for the high and low cases are provided in the table below. The range of uncertainty provided represents an 80 per cent confidence interval.

(GWh)	June 2019 Low Case	June 2019 High Case	Range Between High and Low	
F2020	51,577	54,126	2,549	Test Period
F2021	51,624	55,294	3,670	
F2022	50,793	55,198	4,405	
F2023	51,009	56,342	5,333	
F2024	51,755	58,003	6,247	
F2025	52,761	59,412	6,651	
F2026	53,364	60,407	7,043	
F2027	53,813	61,664	7,851	

[1] Exhibit B-15, page 10

(GWh)	June 2019 Low Case	June 2019 High Case	Range Between High and Low
F2028	**53,955**	**62,264**	**8,309**
F2029	**53,785**	**63,380**	**9,596**
F2030	**53,675**	**64,099**	**10,424**
F2031	**53,880**	**64,741**	**10,861**
F2032	**54,177**	**65,416**	**11,239**
F2033	**54,577**	**66,007**	**11,430**
F2034	**55,002**	**66,683**	**11,681**
F2035	**55,433**	**67,369**	**11,936**
F2036	**55,912**	**67,940**	**12,029**
F2037	**56,453**	**68,550**	**12,097**
F2038	**56,961**	**69,114**	**12,153**
F2039	**57,522**	**69,689**	**12,166**

15.0 Reference: Exhibit B-19, Appendix G page 2

> Actual residential sales were 250 GWh (or 1.4 per cent) lower than the fiscal 2019 RRA Plan. The residential sales forecast is based on three main variables:
>
> - Number of accounts;
> - Electricity sales per account (use per account); and
> - Temperature.
>
> The residential sales variance was related to a lower than expected usage per residential account. The lower usage per account is likely due to a number of factors including higher Demand-Side Management savings, denser housing development (more multiple unit dwellings), fewer people per account, and changes in appliance mix resulting in more efficient appliances (appliance stock turnover). The total number of residential accounts was 2,000 (or 0.1 per cent) higher than forecast in fiscal 2019 and temperatures were slightly colder than normal during the year. As such, temperature and the number of accounts do not account for the negative sales variance.

4.15.2 Please provide the average use per account, temperature normalized, for the last 15 years.

RESPONSE:

The average temperature normalized use per residential account for the 10 year calibration period used in the October 2018 and June 2019 load forecasts is provided in the table below.

Data calculated in a consistent manner is not available for the fiscal 2004 to fiscal 2008 period. However, those years were not used in the calibration of the current load forecast models.

Fiscal Year	Use per Account (kWh / account)
F2009	**10,775**
F2010	**11,011**
F2011	**10,824**

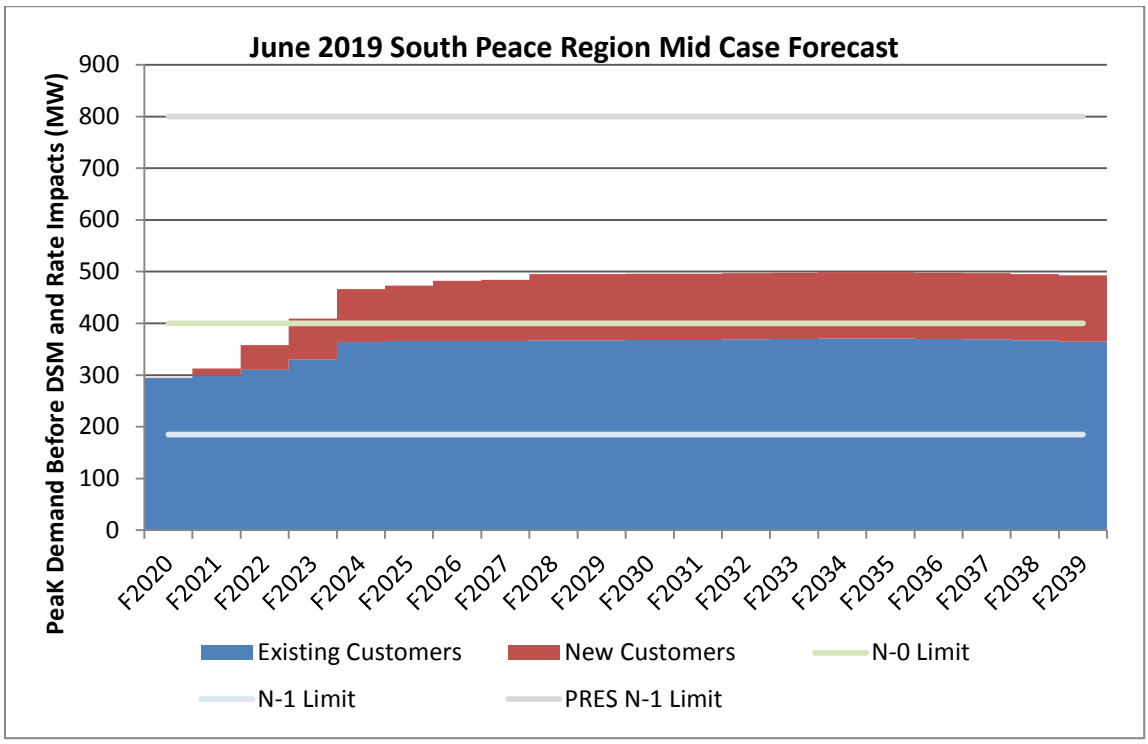
Fiscal Year	Use per Account (kWh / account)
F2012	**10,648**
F2013	**10,625**
F2014	**10,552**
F2015	**10,459**
F2016	**10,358**
F2017	**10,177**
F2018	**10,053**

1.0 In Appendix C - South Peace Region Forecast, on page 1 of 2, BC Hydro states: "In response to a commitment made in BC Hydro's response to BCUC IR 1.119.4, this appendix provides an update to the South Peace Region forecast for the area serviced by the Peace Region Electricity Supply Project (PRES).

4.1.4 Please provide a breakdown of the South Peace Region Forecast for the area serviced by the PRES, by a) existing load, including load growth associated with existing customer footprint vs. b) new load (i.e. new customers and/or customer activities) including new load growth.

RESPONSE:

The figure below shows the existing load (including load growth associated with existing customers) and new customer load growth. The data provided is before adjusting for Demand-Side Management (DSM) savings and rate impacts.



9 Topic: Electric Vehicles

Reference: Section 3.1.2: Twenty-Year Load Forecast October 3, 2019

"The June 2019 Load Forecast uses a new methodology for EVs, to align with the CleanBC Plan for light duty electric vehicles. Specifically, the Zero-Emission Vehicles Act (ZEV Act) was enacted on May 30, 2019. The ZEV Act stipulates the percentage of new light duty car and truck sales in B.C. that must be zero emission vehicles, as follows: 10 per cent of sales by 2025; 30 per cent of sales by 2030; and 100 per cent of sales by 2040.

Accordingly, the low EV forecast in the June 2019 Load Forecast is based on these requirements and the associated incentives because, at a minimum, EV sales would be expected to reach the levels required by legislation. The high-EV scenario assumes EV models are more available, the purchase cost declines, consumers' preferences change, and more infrastructure becomes available. In other words, the high EV forecast assumes that the natural uptake of EVs is greater than the requirements set out in the ZEV 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."

4.9 Please provide the Electric Vehicle assumptions in Zero Emission Vehicles Act (ZEV) which forms the basis of BC Hydro's updated Electric Vehicle forecast. Specifically please provide the following:

a. The forecast of assumed work intensity for electric vehicles as expressed as kWh/km driven for each of the vehicle types in the EV model. Directionally, please indicate how this is expected to change in the future;
b. A distribution of BC driving distances assumed in the forecast model;
c. Provide the assumed minimum economic threshold distance driven per year, below which customers are assumed not to purchase an EV;
d. Provide assumed vehicle availability constraints, due to manufacturing or distribution constraints, expressed as the maximum number of EVs that can be delivered to the BC market, regardless of customer demand or economic viability. Provide background support as to the reason for this assumed constraint;
e. Provide the electricity price forecast used in the electric vehicle model;

f. Provide assumptions with respect to potential discounting of electricity rates for electric vehicle charging. This could include Time of Use or Off-Peak price discounts;
g. Provide the gasoline price forecast used in the electric vehicle model.
h. Provide the initial purchase price assumptions for electricity and gasoline vehicles.
i. Please provide a description of the class of proxy vehicle(s) assumed in the model;
j. Provide the assumed threshold in the model, in terms of maximum vehicle range expressed as daily and yearly travel distance;
k. Provide the conversion efficiency assumed for electric vehicles and associated charging hardware, as the ratio of electrical energy delivered to the vehicle wheels divided by metered electricity;
l. Provide assumptions with respect to purchase price rebates or incentives from the provincial or federal government. These rebates could take the form of lowering the purchase price of EVs, or lowering the installation cost of charging infrastructure or both;
m. Provide assumptions into the EV peak load forecast as to the breakdown between EV customers who have 110V vs. 220v vs. faster charging options;
n. Provide assumptions with respect to the installed cost of EV charging hardware for an average installation, by charging level;
o. Provide assumptions with respect to the charging profile (by time of day) for each charging level above. That is, kW by hour for an average customer;
p. Provide a generic charging profile used in the peak load forecast, that shows current (kW) from time zero (initial connection of EV charger) until full charge is achieved, by each charging level;
q. Please provide coincidence assumptions in the EV peak forecast. That is, what percent of vehicles are assumed to be charging per hour of the day, and what is the aggregate charging profile (MW of EV demand with hourly resolution) during the system peak day; and
r. Please provide specifics on the incentives or programs (rate, capital cost or technology) that BC Hydro is undertaking in order to minimize potential negative local and system effects of on-peak period EV charging.

RESPONSE:

Please refer to BC Hydro's response to INCE IR 1.8.44 which provides the requested information with regards to the October 2018 EV Load Forecast.

The answers below reflect differences between the June 2019 and October 2018 EV Load Forecasts.

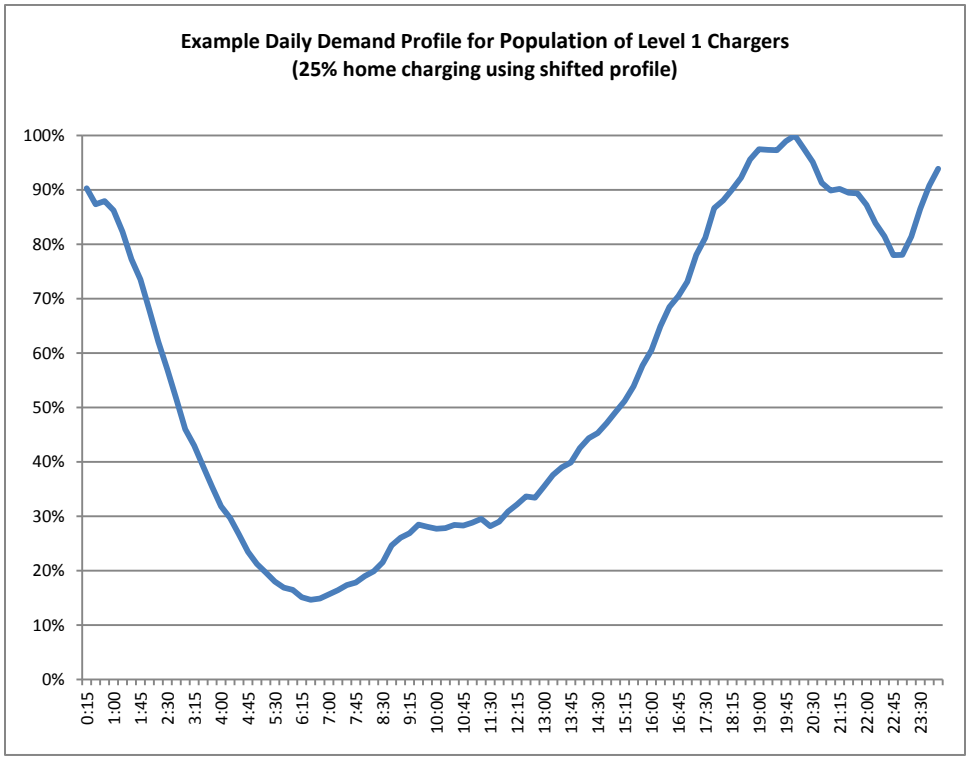
(c) The minimum economic threshold for annual distance driven in fiscal 2021 for is 10,700 km.

(l) The June 2019 Load Forecast assumed a combined provincial and federal purchase incentive of $10,000 for fiscal 2020 and the first nine months of fiscal 2021.

(n) BC Hydro's EV model assumes an average EV charging hardware cost of $2,000. The June 2019 Load Forecast assumed a $500 home charging incentive for fiscal 2020 and the first nine months of fiscal 2021.

(o) As described in BC Hydro's response to INCE IR 1.8.44, the assumptions used to determine the daily demand profile for EVs are the same for all charging types. The three major assumptions that are considered are charging start time, battery depletion, and charging level. For the June 2019 EV peak forecast, an additional home charging profile was added to reflect potential incentives to shift charging behavior to the off peak period. The probability of charging under this profile was adjusted to reflect different forecast scenarios.

The charts below provide charging profiles for a population of vehicles for each charge type.


Example Daily Demand Profile for Population of Level 1 Chargers
(25% home charging using shifted profile)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0:15
1:00
1:45
2:30
3:15
4:00
4:45
5:30
6:15
7:00
7:45
8:30
9:15
10:00
10:45
11:30
12:15
13:00
13:45
14:30
15:15
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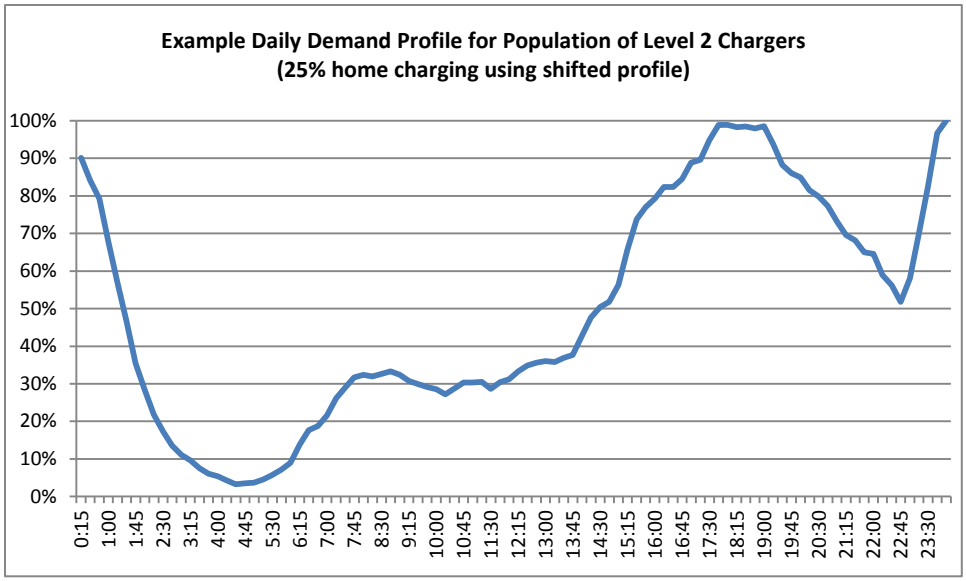
19:00
19:45
20:30
21:15
22:00
22:45
23:30


Example Daily Demand Profile for Population of Level 2 Chargers
(25% home charging using shifted profile)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0:15
1:00
1:45
2:30
3:15
4:00
4:45
5:30
6:15
7:00
7:45
8:30
9:15
10:00
10:45
11:30
12:15
13:00
13:45
14:30
15:15
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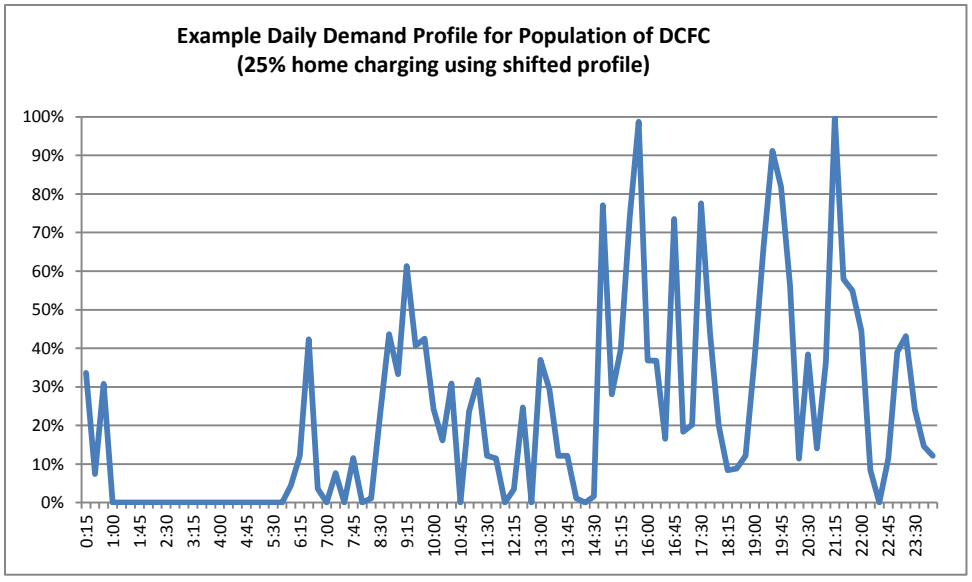
19:00
19:45
20:30
21:15
22:00
22:45
23:30


Example Daily Demand Profile for Population of DCFC
(25% home charging using shifted profile)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0:15
1:00
1:45
2:30
3:15
4:00
4:45
5:30
6:15
7:00
7:45
8:30
9:15
10:00
10:45
11:30
12:15
13:00
13:45
14:30
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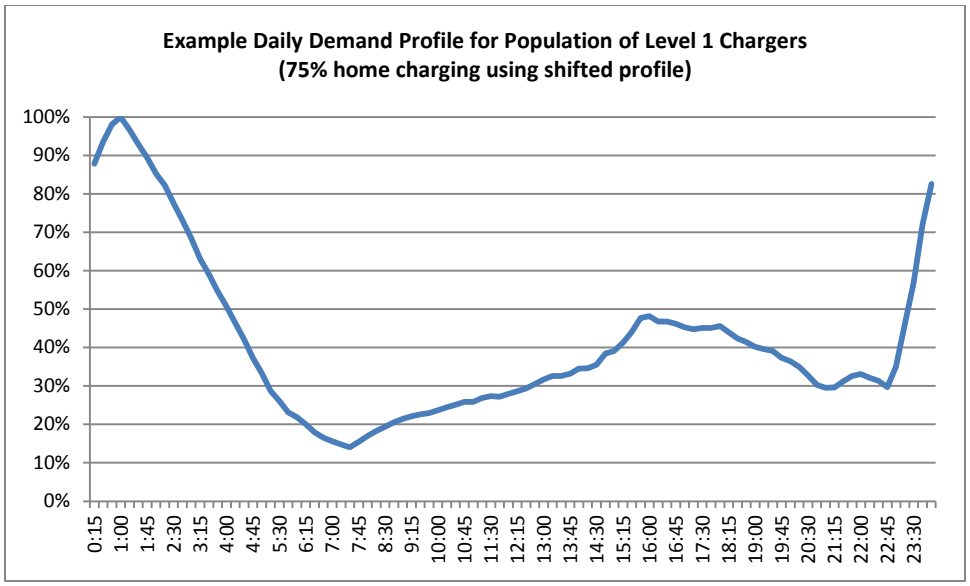
19:45
20:30
21:15
22:00
22:45
23:30


Example Daily Demand Profile for Population of Level 1 Chargers
(75% home charging using shifted profile)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0:15
1:00
1:45
2:30
3:15
4:00
4:45
5:30
6:15
7:00
7:45
8:30
9:15
10:00
10:45
11:30
12:15
13:00
13:45
14:30
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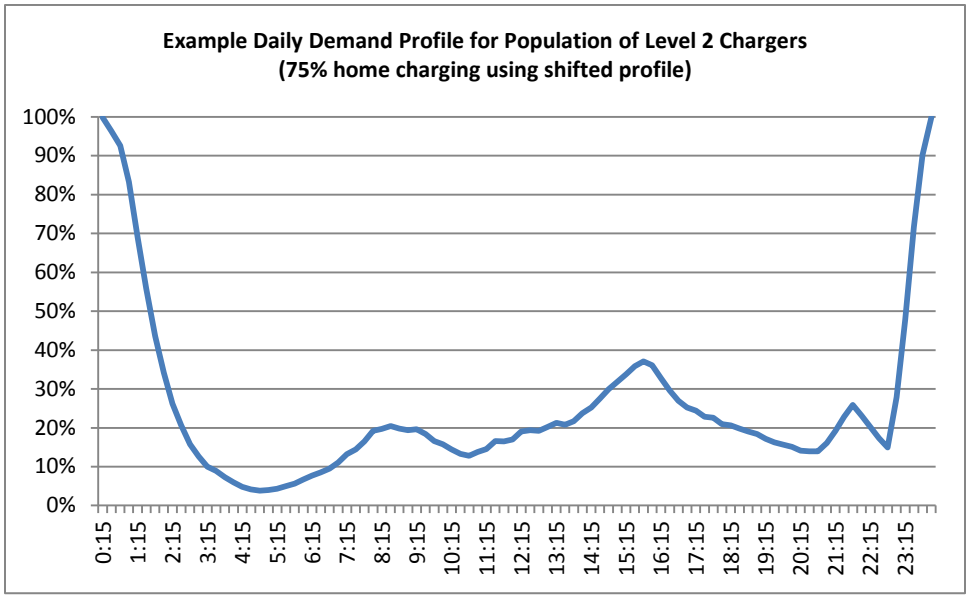
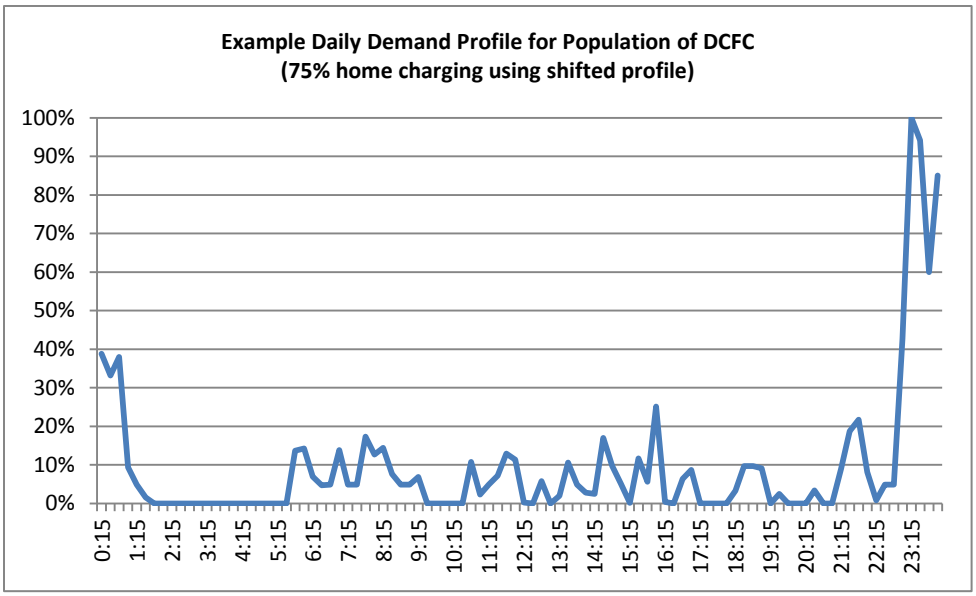
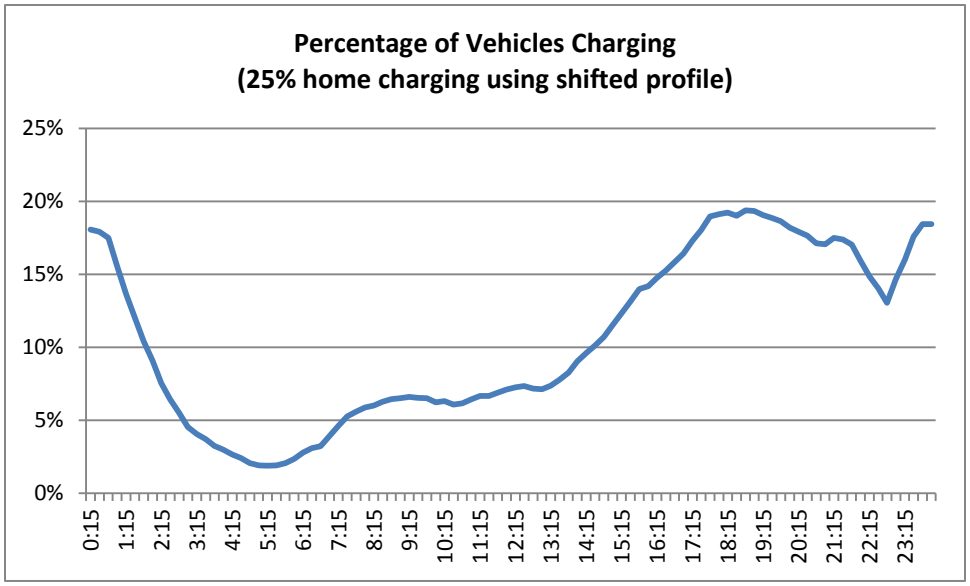
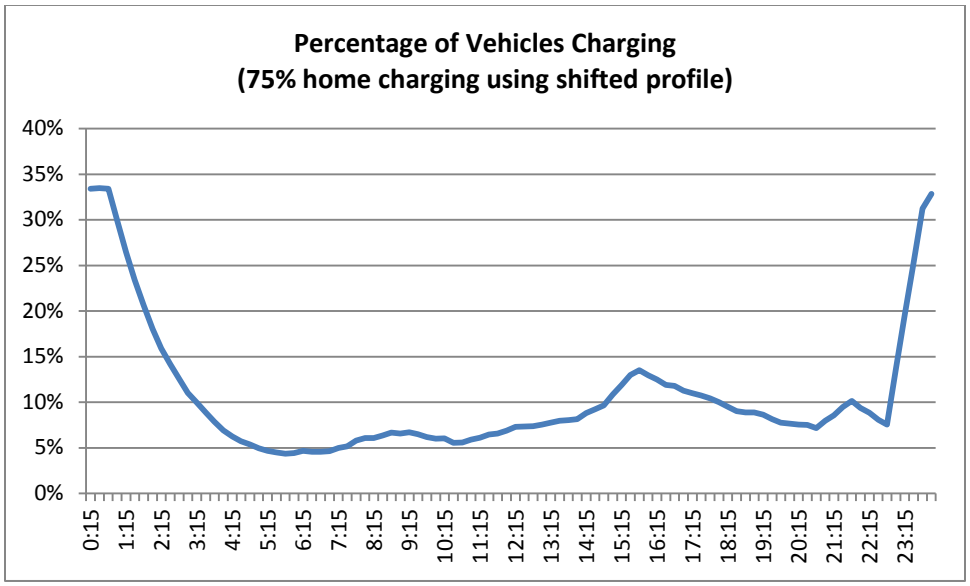
19:45
20:30
21:15
22:00
22:45
23:30



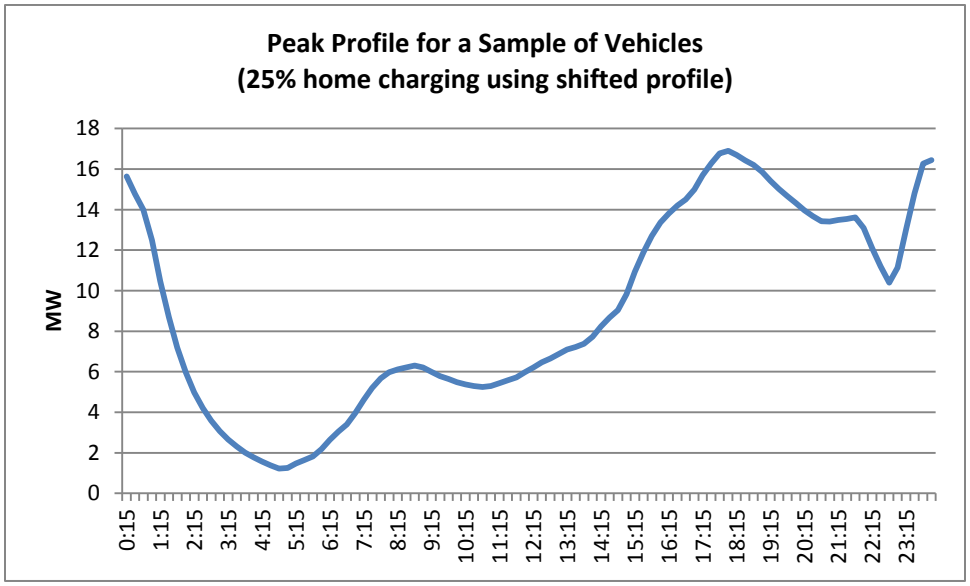


(q) The following graphs show the percentage of vehicles charging, on a 15 minute interval.





The graph below shows the aggregate charging profile in terms of MW of EV demand with a 15-minute interval resolution.


Peak Profile for a Sample of Vehicles
(25% home charging using shifted profile)
MW
18
16
14
12
10
8
6
4
2
0
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
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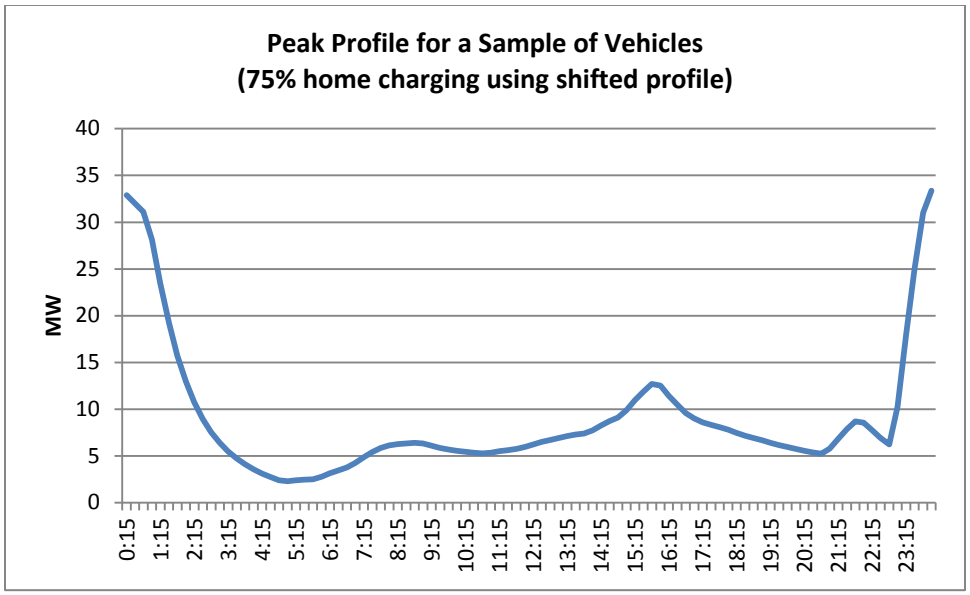
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15


Peak Profile for a Sample of Vehicles
(75% home charging using shifted profile)
MW
40
35
30
25
20
15
10
5
0
0:15
1:15
2:15
3:15
4:15
5:15
6:15
7:15
8:15
9:15
10:15
11:15
12:15
13:15
14:15
15:15
16:15
17:15
18:15
19:15
20:15
21:15
22:15
23:15

18 Reference: British Columbia Hydro & Power Authority Fiscal 2017 – Fiscal 2019 Revenue Requirements Application Commercial Energy Consumers Association of British Columbia Information Request No. 2.130 Dated: December 16, 2016 British Columbia Hydro & Power Authority Response issued January 23, 2017

4.18 In the response to this request, BC Hydro indicated that it has not adjusted its then current (2016) load forecast to reflect the City of Vancouver's Renewable City Strategy, or the Province's Climate Leadership Plan. Please comment if adjustments have been made to the current load forecast to incorporate these strategies.

RESPONSE:

This answer also responds to INCE IR 4.19.0.

With regards to the Government of B.C.'s 2016 Climate Leadership Plan, the Government of B.C. updated the 2016 Climate Leadership Plan with the release of its 2018 CleanBC Plan. Please refer to BC Hydro's response to BCUC IR 4.325.2 where we describe how the CleanBC Plan is reflected in the June 2019 Load Forecast.

With regards to climate strategies developed by the City of Vancouver or other municipalities:

- **BC Hydro does not maintain a list of the municipal and regional governments in British Columbia that have adopted policies related to reducing natural gas or other policies that could influence future electricity demand;**
- **BC Hydro's June 2019 Load Forecast does not directly account for municipal initiatives on climate change. Similar to the discussion provided in BC Hydro's response to MOVEUP IR 4.6.5, while there may be an impact over the longer term, at this point, without the accompanying plans, regulations and requirements in effect, it is too early for BC Hydro to quantify how municipal climate strategies may impact future electricity demand. Future load forecasts will incorporate municipal initiatives as they develop and become more certain and as the associated loads become material; and**
- **BC Hydro has been working with the City of Vancouver to support the City's Renewable City Strategy. This includes collaborating with the City of Vancouver to understand the impact of potential regulations and other actions on electricity demand from both the building and transportation sectors.**

19 Reference: British Columbia Hydro & Power Authority Fiscal 2017 – Fiscal 2019 Revenue Requirements Application Commercial Energy Consumers Association of British Columbia Information Request No. 2.130 Dated: December 16, 2016 British Columbia Hydro & Power Authority Response issued January 23, 2017

4.19 As indicated in BC Hydro's response to CEC IR 2.130.2, BC Hydro was not aware of any other local governments that have adopted policies beyond the City of Vancouver and the City of Victoria with respect to reduction of natural gas or other policies that could influence the electricity load requirements. Please comment if this statement is still true, and whether BC Hydro has incorporated the effects of policy statements of BC municipalities in its current load forecast.

RESPONSE:

Please refer to BC Hydro's response to INCE IR 4.18.0

33 Reference: British Columbia Utilities Commission Information Request No. 3.296.3 Dated: September 19, 2019 British Columbia Hydro & Power Authority Response issued October 10, 2019

4.33 Please provide the rate-induced elasticity effect of these two rate trajectories, in terms of energy and peak.

RESPONSE:

BC Hydro is unable to complete this specific analysis within the time allocated for responses to this round of information requests. However, as stated in section 3.5 of Exhibit B-15:

- **The June 2019 Load Forecast rate impact adjustment is based on the five-year net bill increase forecast provided in the Government of B.C.'s Phase One Final Report on the Comprehensive Review of BC Hydro (cumulative net bill increase of 8.1 per cent); and**
- **If the five-year net bill increase forecast provided in the Evidentiary Update was used (cumulative net bill increase of 6.2 per cent), forecast load in the Test Period would increase by approximately 80 GWh, all else equal.**

In other words, a difference in the cumulative net bill increase of approximately 2 per cent equates to an increase of forecast load in the Test Period of approximately 80 GWh. This provides an order of magnitude estimate of the effect of a -0.1 elasticity that can be applied to the various trajectories set out in BC Hydro's response to BCUC IR 3.296.3.

37 Reference: Response to BCUC IR 3.288.1

4.37 With respect to the declining use per residential account, what are the following assumptions made in the load forecast:

a. People per residential account,
b. Breakdown (absolute numbers) of the residential housing fleet served by BC Hydro by housing type: including single family, duplex, townhome, condominiums and apartments.
c. The average yearly electricity usage (kWh) for each housing type.
d. The penetration of (primary) electric space heating for each housing type (percent).
e. The assumed average yearly electricity use (kWh/yr) for those residences with primary electric space heating by housing type.
f. The penetration of (primary) electric water heating for each housing type (percent).
g. The assumed average yearly electricity use (kWh/yr) for those residences with primary electric water heating – by housing type.
h. The forecast peak coincident demand for each housing type. That is, what is the kW per residence during the forecast BC Hydro system peak hour. By housing type please.

RESPONSE:

As stated in Exhibit B-15, with the exception of Electric Vehicles, the inputs to the June 2019 Load Forecast for the residential sector were the same as those for the October 2018 Load Forecast. Therefore, the information provided in previous responses is still applicable.

(a) Please refer to BC Hydro's response to BCUC IR 1.5.1.1 where the people per account assumptions are provided.

(b) Please refer to Attachment 1 of BC Hydro's response to CEABC IR 1.2.1 where the residential housing assumptions are provided.

(c) Please refer to Attachment 1 of BC Hydro's response to CEABC IR 1.2.1 where the average electricity usage for each housing type can be calculated by multiplying the average use per account by the number of accounts.

(d) Please refer to BC Hydro's response to INCE IR 1.8.27 where the electric space heating assumptions are provided.

(e) **As described in BC Hydro's response to INCE IR 1.8.27, BC Hydro does not forecast average usage by housing type nor does it segregate usage by residences with primarily electric space heating because this information is not used to develop our electricity sales forecast.**

(f) **Please refer to BC Hydro's response to INCE IR 1.8.27 where penetration of electric water heating was provided.**

(g) **As described in BC Hydro's response to INCE IR 1.8.27, Table F-3 on page 163 of Appendix O of the Application provides the forecast average efficiency of the various residential end uses, which includes electric water heating. The forecast efficiency is not broken down by housing type as BC Hydro does not forecast average use per account by housing type.**

(h) **Coincident factors used to determine residential peak demand are not relevant to the energy forecast used in determining the rates requested in the Application.**

40 Reference: 20 Year Load Forecast section 3.1.1

4.40 Please quantify the absolute magnitude of the DSM-related adjustments made to BC Hydro's load forecast in the 2016 and current 20-year load forecasts. In MWh and MW.

RESPONSE:

BC Hydro assumes that the question is referring to the effect of the codes and standards overlap adjustment described in section 3.1.1 of Exhibit B-15.

The table below quantifies the adjustments made to the current and past forecasts, for the Test Period.

		Residential			Commercial		
		May 2016 Load Forecast	**October 2018 Load Forecast**	**June 2019 Load Forecast**	**May 2016 Load Forecast**	**October 2018 Load Forecast**	**June 2019 Load Forecast**
(GWh)	**F2020**	**188**	**81**	**85**	**32**	**10**	**38**
	F2021	**216**	**114**	**121**	**37**	**25**	**69**
(MW)	**F2020**	**29**	**9**	**9**	**3**	**1**	**1**
	F2021	**33**	**13**	**13**	**4**	**3**	**3**

The adjustments in the table above are cumulative and have different starting years, which contributes to the large differences between the May 2016 Load Forecast and more recent load forecasts.

7.0 TOPIC: EXHIBIT B-15, OCTOBER 3 2019 20-YEAR LOAD FORECAST

HARMONIZATION WITH OTHER UTILITIES

4.7.1 To what extent has BC Hydro taken account of FortisBC Energy Inc. and other energy utilities' assumptions and forecasts related to loads and energy resource selection trends in developing its own load forecast?

RESPONSE:

BC Hydro collaborates with FortisBC and other utilities on a broad range of issues.

With regards to load forecasting specifically:

- **BC Hydro forecasts sales to FortisBC based on information provided by FortisBC Electric as well as projections from our internal model that considers the forecast of electricity market prices relative to the cost of purchases from BC Hydro under Rate Schedule 3808; and**
- **As discussed in section 3.2.11 of Chapter 3 of the Application, BC Hydro prepared an alternative residential and commercial forecast using the FortisBC Electric methodology for short-term forecasts. Considering the recent performance of our own methodology, the results of our comparison using the alternative short-term forecast methodology, and the recent improvements to our methodology, we concluded that it was appropriate to use our forecast methodology for the Load Forecast in the Application.**

64.0 Topic: Changes in Methodology and Input Assumptions

Reference: Exhibit B-15 (Twenty-Year Load Forecast), Table 1, page 4.

Regarding the changes in methodology between October 2018 and June 2019 Load Forecast, BC Hydro states, in note 4 on page 4 of the Twenty-Year Evidentiary Update for the Large Industrial Sector:

Primarily from customer information and market research. No formal update to third-party expert information.

4.64.1 Provide details as to the type of market research BC Hydro conducted for the Large Industrial sector in updating its June 2019 forecasts.

RESPONSE:

The updates to the large industrial sector in the June 2019 Load Forecast were primarily due to:

- **Information provided to BC Hydro by large industrial customers; and**
- **Monthly reviews of actual customer loads.**

These changes were validated by market research from company websites and news articles, as well as commodity price information.

The types of market research used to update large industrial sector forecast in the June 2019 Load Forecast relative to the October 2018 Load Forecast include the following:

- **Oil and Gas Sub-Sector:**
  - **Sproule.com (https://sproule.com/forecasts/archives/april-30-2019)**
    - **Specifically: data natural gas, condensate and crude from the Escalated Forecast data spreadsheet.**
  - **Tradingeconomics.com (https://tradingeconomics.com/commodity/natural-gas)**
    - **Specifically: the current charts for crude, naphtha, natural gas, propane and lumber.**

- **Forestry Sub-Sector:**
  - **Pulpmarket.ca (https://www.pulpmarket.ca/subscriber-login-downloads/pulp-price-forecasts/)**
    - **Specifically: paid for monthly subscription services for Pulp Price Forecasts as well as Market Pulp, China BCTMP and Kraft price forecasts.**
  - **ERA-research.com (http://era-research.com/subscription/)**
    - **Specifically: paid for monthly and/or weekly subscription services for Industry Overview, Commodity Analysis and Commodity Price Forecast.**
  - **Madisonsreport.com (https://madisonsreport.com/)**
    - **Specifically: paid for weekly subscription services for Madison's Lumber Reporter.**
  - **Tradingeconomics.com (https://tradingeconomics.com/commodity/lumber)**
    - **Specifically: the charts for Lumber prices.**

64.0 Topic: Changes in Methodology and Input Assumptions

Reference: Exhibit B-15 (Twenty-Year Load Forecast), Table 1, page 4.

Regarding the changes in methodology between October 2018 and June 2019 Load Forecast, BC Hydro states, in note 4 on page 4 of the Twenty-Year Evidentiary Update for the Large Industrial Sector:

Primarily from customer information and market research. No formal update to third-party expert information.

4.64.1.1 Please provide a copy of any market research reports relied on to inform this update.

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 4.64.1.

64.0 Topic: Changes in Methodology and Input Assumptions

Reference: Exhibit B-15 (Twenty-Year Load Forecast), Table 1, page 4.

Regarding the changes in methodology between October 2018 and June 2019 Load Forecast, BC Hydro states, in note 4 on page 4 of the Twenty-Year Evidentiary Update for the Large Industrial Sector:

Primarily from customer information and market research. No formal update to third-party expert information.

4.64.1.2 Did the market research align with the specific customer updates?

RESPONSE:

Yes, the market research aligned with the customer information and the specific customer updates that were made.

64.0 Topic: Changes in Methodology and Input Assumptions

Reference: Exhibit B-15 (Twenty-Year Load Forecast), Table 1, page 4.

Regarding the changes in methodology between October 2018 and June 2019 Load Forecast, BC Hydro states, in note 4 on page 4 of the Twenty-Year Evidentiary Update for the Large Industrial Sector:

Primarily from customer information and market research. No formal update to third-party expert information.

4.64.1.2 Did the market research align with the specific customer updates?

4.64.1.2.1 If they did not, please identify how they differed and how BC Hydro treated the differing information in developing the June 2019 Load Forecast?

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 4.64.1.2.

64.0 Topic: Changes in Methodology and Input Assumptions

Reference: Exhibit B-15 (Twenty-Year Load Forecast), Table 1, page 4.

Regarding the changes in methodology between October 2018 and June 2019 Load Forecast, BC Hydro states, in note 4 on page 4 of the Twenty-Year Evidentiary Update for the Large Industrial Sector:

Primarily from customer information and market research. No formal update to third-party expert information.

4.64.1.3 Why did BC Hydro not undertake market assessments from third-party industry experts in developing the June 2019 forecasts as was done in the October 2018 forecast?

RESPONSE:

As discussed in BC Hydro's response to BCSEA IR 4.86.1, the June 2019 Load Forecast was primarily an extension of the October 2018 Load Forecast.

The third-party consultants retained by BC Hydro to assist in developing the October 2018 Load Forecast developed 20-year economic and market assessments pursuant to their contracted scope of work. That same information was used to develop the June 2019 Load Forecast because:

- **The assessments had been developed fairly recently and were considered to still be valid;**
- **There was insufficient time in the June 2019 Load Forecast schedule to produce a comprehensive update relative to the October 2018 Load Forecast, with the exception of the changes described in section 2 of Exhibit B-15; and**
- **BC Hydro typically engages third-party industry experts once per year as part of our annual load forecasting cycle. To re-engage them for updated assessments specifically for the June Load Forecast would have required additional contracts and costs.**

As discussed in BC Hydro's response to BCUC IR 4.320.2, third-party consultants were contacted to assist in the assessment of near-term closure risk for specific pulp and paper mills. BC Hydro is currently preparing a comprehensive system level energy and peak load forecast for the 2021 Integrated Resource Plan (IRP). New third-party market assessments will be used in the preparation of that forecast.

66.0 Topic: Codes and Standards

Reference: Exhibit B-15 (Twenty-Year Forecast), page 7;
Exhibit B-1 (Application), Appendix O, page 129 of 170.

From Appendix O of the Application, BC Hydro states:

> For the non-lighting code items that were considered to be an overlap, BC Hydro applied 50 per cent of the forecast of DSM savings of these various codes and standards which overlapped with the EIA. These estimates were then used as the adjustments to the SAE model projections.

On page 7 of the Twenty-Year Forecast, BC Hydro states:

> 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 projects. 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. Accordingly, an updated adjustment was made for Codes and Standards in the June 2019 Load Forecast. The change in codes and standards estimates relative to the October 2018 Load Forecast is less than 50 GWh per year for fiscal 2020 and fiscal 2021.

4.66.1 Confirm, or explain otherwise, whether BC Hydro applied the 50% forecast of DSM savings to adjust the Statistically Adjusted End Use (SAE) model projections for the additional end uses technologies which overlapped between the EIA and DSM plan relative to previous assumptions reflected in the October 2018 Load Forecast.

4.66.1.1 In Navigant Inc.'s 2019 independent review was the 50% assumption factor reviewed?

RESPONSE:

This answer also responds to ZONE II RPG IR 4.66.1.1.1

Navigant's analysis found various degrees of overlap levels, and additional end use technologies which overlapped between the EIA and DSM plan relative to the previous assumptions reflected in the October 2018 Load Forecast. As described in section 12.3 of Appendix O of the Application, due to a number of uncertainties

such as potential differences in timing of codes and standards implementation between our service area relative to the geographical areas incorporated in the EIA model, and differences in end use technologies modelled, BC Hydro decided to continue with its existing assumption of applying a 50 per cent adjustment for end use technologies where overlap was identified. This approach results in a lower net upward adjustment to the forecast than if a 100 per cent adjustment was made.

The decision to continue with the 50 per cent adjustment was an outcome of our analysis of the Navigant study and was not part of the scope of the study itself. As part of ongoing continuous improvement efforts, BC Hydro will continue to assess the extent of the overlap for the diverse set of end use technologies.

66.0 Topic: Codes and Standards

Reference: Exhibit B-15 (Twenty-Year Forecast), page 7;
Exhibit B-1 (Application), Appendix O, page 129 of 170.

From Appendix O of the Application, BC Hydro states:

> For the non-lighting code items that were considered to be an overlap, BC Hydro applied 50 per cent of the forecast of DSM savings of these various codes and standards which overlapped with the EIA. These estimates were then used as the adjustments to the SAE model projections.

On page 7 of the Twenty-Year Forecast, BC Hydro states:

> 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 projects. 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. Accordingly, an updated adjustment was made for Codes and Standards in the June 2019 Load Forecast. The change in codes and standards estimates relative to the October 2018 Load Forecast is less than 50 GWh per year for fiscal 2020 and fiscal 2021.

4.66.1 Confirm, or explain otherwise, whether BC Hydro applied the 50% forecast of DSM savings to adjust the Statistically Adjusted End Use (SAE) model projections for the additional end uses technologies which overlapped between the EIA and DSM plan relative to previous assumptions reflected in the October 2018 Load Forecast.

4.66.1.1 In Navigant Inc.'s 2019 independent review was the 50% assumption factor reviewed?

4.66.1.1.1 If not, why not.

RESPONSE:

Please refer to BC Hydro's response to ZONE II RPG IR 4.66.1.1.