

REQUESTOR NAME: **Clean Energy Association of B.C. (CEABC)**
INFORMATION REQUEST ROUND NO: #1
TO: **BRITISH COLUMBIA HYDRO & POWER AUTHORITY (BC Hydro)**
DATE: January 26, 2021
PROJECT NO: 1599164
APPLICATION NAME: **F2022 Revenue Requirements Application**

1.0 Reference: Exhibit B-2, Section 3.1, and Exhibit B-8 filed in the Long Term Resource Plan Filing Date (LTPR or IRP) proceeding, Electrification Scenarios and Table 1, pages 4-6.

Section 3.1 states that “BC Hydro prepared a comprehensive 20-year load forecast (the March 2020 Load Forecast)... prior to the onset of impacts associated with the COVID-19 pandemic.” It then developed two scenarios intended to adjust for the impacts of the pandemic, of which “**Scenario A** is used in the calculation of the Test Period revenue requirements”

More detail about the March 2020 Load Forecast is provided in Exhibit B-8, filed in the BC Hydro LTRP Filing Date proceeding. Therein, BC Hydro describes the Electrification Scenarios that were used in the forecast, stating that:

“The Government of B.C.’s CleanBC Plan established GHG reduction goals for 2030 and includes actions to achieve the first 75 per cent of these reductions...”

*Table 1 below specifies the electrification measures included in the March 2020 Load Forecast as well as three illustrative electrification scenarios. These scenarios were derived from a report by NAVIUS entitled **British Columbia Electrification Impacts Study: Forecasting the Impact of Achieving British Columbia’s Greenhouse Gas Emissions Targets on Provincial Electricity Consumption**. This report estimates the total demand from electrification if provincial GHG reduction targets are achieved.” [emphasis added]*

In Exhibit B-8 (filed in the LTRP Filing Date proceeding, pages 4-6), BC Hydro explains that the Navius report concludes that all of the scenarios described in Table 1 are required in order to achieve the CleanBC Plan GHG reduction goals for 2030. However, in its March 2020 Load Forecast, BC Hydro only includes the first level of electrification activities, captioned “Load Forecast – Reference case”, on the grounds that these “... have a higher level of probability of materializing...”

Included in the Navius scenarios that go beyond the Reference Case scenario, there are incremental electricity loads that would result from “strong policies” (presumably by Government). All of these incremental loads are necessary to meet the GHG reduction goals in the CleanBC Plan. According to Table 1, “strong policies” will result in additional electrical loads amounting to:

- 7,000 GWh for light duty EV load, plus 700 GWh for medium and heavy-duty vehicle electrification, although the majority will be after 2030;
- 5,600 GWh for Oil & Gas subsector load, with most of that growth occurring before 2030;
- plus an additional 3,000 GWh from electrification of the Oil & Gas subsector;
- plus an additional 4,000 GWh for built environment, primarily on the South Coast, with more than half before 2030;
- plus an additional 10,000 GWh for LNG and Mining electrification, with most showing up before 2030

- 1.1 Since BC Hydro's Reference Case scenario (the one used in its March 2020 Load Forecast), does not include any of these additional loads, please confirm that the Reference Case will fall at least 15,000 GWh short of achieving the CleanBC GHG reduction goals by 2030.
 - 1.1.1 If BC Hydro has a greater or lesser calculation of the estimated shortfall, please explain that calculation.
 - 1.1.1.1 How many tonnes of GHG emissions will that shortfall of electrification represent?
 - 1.1.2 If BC Hydro has no estimate of the shortfall between the Reference Case and the full achievement of the GHG reduction goals, please explain why BC Hydro has not done such a calculation.
- 1.2 Why has BC Hydro adopted a Reference Case for its planning that does not reflect sufficient load to achieve the Government's GHG reduction goals as laid out in the CleanBC Plan?
 - 1.2.1 Given the necessity to include the additional scenarios in its planning, in order to meet the GHG reduction goals, will BC Hydro take steps, or has it taken steps, to rectify this situation and include those additional electrification loads in its long term planning?
 - 1.2.2 Has it included any of those additional loads in the F2022 RRA, such as by making adjustments to the March 2020 Load Forecast numbers similar to those shown in Tables 3-4 through 3-7 in Chapter 3 of the Application?
- 1.3 Is it BC Hydro's view that the Government of B.C.'s policies are not "strong policies" and, therefore, do not have a high "level of probability" of causing the electricity loads to "materialize" as required in the Navius scenarios, in order to achieve the GHG reduction goals set in the CleanBC Plan?
- 1.4 If that is BC Hydro's view, would it not be appropriate for BC Hydro to assist the Government in making policies that will meet the definition of "strong policies", and then to incorporate in its plans the measures necessary to serve the additional loads that would result?
- 1.5 Please explain, in BC Hydro's view, what is missing from the Government's policies that would be necessary to meet BC Hydro's definition of "strong policies," that in turn, would be able to achieve the Government's GHG reduction goals with a higher probability. In other words, how can the policies be strengthened so that BC Hydro will view them as having a "higher level of probability" of achieving the required GHG reductions?
- 1.6 The Navius report appears to contain analyses that were not included in the compilation of the March 2020 Load Forecast, upon which this F2022 RRA is based. However, even though many of the required electrification sales may not occur within the F2022 test period, it is assumed that there must be resources being allocated in the test period to achieve those later results. Please describe what actions are being taken within the test

period, and what resources are being allocated, in order to achieve those additional electrification scenarios pointed out by the Navius report.

- 1.7 Why was the Navius report omitted from the background evidence for this proceeding? Please provide a copy of it for this proceeding.
- 2.0 Reference: Exhibit B-2, Section 1.3.2, “We Use Performance Metrics to Manage Operations and Inform Decisions (Directive 68)”, and Exhibit B-2-2, Appendices O and Q.**

BC Hydro states:

“In its Decision, the BCUC directed BC Hydro to include in the Application the metrics it uses to manage its operations. Appendix O provides a list of the performance measures and targets that we use to manage operations at the Business Group level. Appendix Q provides BC Hydro’s Service Plan performance measures and targets.

These Business Group metrics and Service Plan performance measures are used by the Executive team to monitor how the business is performing. Business Group metrics and targets are determined annually for the upcoming fiscal year...”

In Appendix Q, BC Hydro’s F21-F23 Service Plan, under Strategic Direction and Alignment with Government Priorities, on page 6 BC Hydro states:

“BC Hydro is aligned with the Government’s key priorities:

And as one of the bullets in the table following, it includes the statement:

“Supporting 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, buildings and industry. (Strategy under Objective 4.1)”

And under Objective 4.1, BC Hydro states:

“Support the implementation of the CleanBC plan to increase British Columbians’ use of clean energy in key sectors of the economy and shift away from reliance on fossil fuels for transportation, buildings and industry.”

And it includes the following table showing the performance metrics being used:

Performance Measure(s) ¹	2018/19 Actuals	2019/20 Forecast	2020/21 Target	2021/22 Target	2022/23 Target
4.a Energy Conservation Portfolio (New incremental GWh/year) ²	868	734	700	500	500
4.b Clean Energy (%)	97.4 ³	96.4	93.0	93.0	93.0

- 2.1 Please confirm whether metric 4.a is a summary of the load reductions attributed to BC Hydro’s DSM programs, and confirm that it is showing load reductions of approximately 3,300 GWh over the 5 year period, and specifically 500 GWh expected during the F2022 test period.
- 2.1.1 Please provide a similar table showing the total amounts spent (or to be spent) on DSM programs and administration over the same 5-year period.
- 2.1.2 If the numbers in the above table have been updated, please provide the actual final numbers and a breakdown of those annual

GWh savings by major customer sector over the same 5 year period.

- 2.2 Where is the metric that displays the targets and actuals for BC Hydro's support of "the CleanBC plan to increase British Columbians' use of clean energy in key sectors of the economy and shift away from reliance on fossil fuels..." as stated in Objective 4.1? Does that metric appear somewhere else, or is it still in the planning stages?
- 2.2.1 Please provide a similar table showing the GWh of load added (or expected to be added) over the same 5-year period, due to BC Hydro's programs in support of the CleanBC plan to increase the use of clean energy and shift away from reliance on fossil fuels.
- 2.2.2 Please also include in this table the amounts spent or planned to be spent on these programs in each of the same 5 years.

3.0 Reference: Exhibit B-2, Section 3.3 Load Forecast Results

In Table 3.1, BC Hydro provides its Load Forecast results for the 5-year period from F2021 to F2025, by Major Customer Sector, before and after adjustment by the Covid-19 Scenario A, which is the Scenario being used for the F2022 RRA.

[Table 3-1 condensed]

Fiscal Year:	Billed Sales After Rate Impacts and After Demand-Side Management									
	March 2020 Load Forecast					COVID-19 Scenario A				
	F2021	F2022	F2023	F2024	F2025	F2021	F2022	F2023	F2024	F2025
Main Customer Sectors:										
Residential	18,623	18,836	19,123	19,380	19,683	19,078	18,836	19,123	19,380	19,683
Commercial	14,438	14,366	14,313	14,239	14,159	13,300	14,366	14,313	14,239	14,159
Light Industrial	4,708	5,002	5,012	4,955	4,978	4,203	4,546	4,554	4,955	4,978
Large Industrial	14,122	14,108	14,398	15,225	16,666	12,107	12,982	13,511	14,435	15,877
Other Loads:										
Irrigation & Street Lighting	301	291	279	273	272	301	291	279	273	272
Inter Utility Sales	1,105	1,098	1,135	1,163	1,201	1,105	1,098	1,135	1,163	1,201
Total Firm Exports	313	311	311	311	313	313	311	311	311	313
Total Domestic Sales	53,610	54,013	54,571	55,546	57,272	50,406	52,430	53,225	54,756	56,482

Then in Tables 3-4, 3-5, 3-6, and 3-7, BC Hydro presents the results for each Major Customer sector for the single test year, F2022, showing the build-up due to a number of other adjustments, which include Demand-Side Management, Rate Impacts, Loss Reductions, EV Load Additions, Fuel Switching Additions, and Codes Overlap.

Table 3-4 Fiscal 2022 Residential Billed Sales
Build-up for COVID-19 Scenario A

Number of Accounts	Use per Account (kWh/account)	Model projection (GWh) ¹	Codes overlap adjustments (GWh)	EV Load Additions (GWh)	Fuel Switching Additions (GWh)	Rate Impacts ² (GWh)	DSM (GWh)	Loss Reduction (GWh)	Residential Load Forecast ³ (GWh)
1,921,842	9,865	18,959	127	271	36	76	(621)	(12)	18,836

Table 3-5 Fiscal 2022 Commercial Billed Sales
Build up for COVID-19 Scenario A

Model projection (GWh) ¹	Codes overlap adjustment (GWh)	EV load addition (GWh)	Fuel switching load addition (GWh)	Rate impacts ² (GWh)	DSM (GWh)	Loss reductions (GWh)	Commercial Load Forecast ³ (GWh)
14,584	92	48	48	58	(455)	(9)	14,366

Table 3-6 Fiscal 2022 Light Industrial Billed Sales Build-up for COVID-19 Scenario A

Light industrial model projections (GWh ¹)	Cannabis-crypto currency load addition (GWh)	Construction load addition (GWh ²)	Fuel switching load addition (GWh)	Rate impacts ³ (GWh)	DSM (GWh)	Loss reductions (GWh)	Light Industrial Load Forecast (GWh)
4,280	221	106	0	18	79	-158	4,546

Table 3-7 Fiscal 2022 Large Industrial Billed Sales Build-up for COVID-19 Scenario A¹

Fiscal Year	Mining		Forestry			Oil and Gas and LNG (GWh)	Other ² Large Industrial (GWh)	Total Large Industrial (GWh)
	Metal Mines (GWh)	Coal Mines (GWh)	Pulp and Paper (GWh)	Wood Products (GWh)	Chemical (GWh)			
F2022	3,356	632	2,543	1,097	1,359	2,806	1,189	12,982

- 3.1 Since Table 3-7 does not present the Large Industrial loads with the same build-up categories as the other sectors, it is not possible to see how the various adjustments are impacting the final load forecasts. Please provide a more comprehensive table (including the working Excel model), showing how the various adjustments have been made in producing the final load figures for each of the Large Industrial sub-sectors shown in Table 3-7.
- 3.2 Please explain why DSM impacts cause an increase in the loads for the Light Industrial sector, while they cause a reduction in the loads for the Residential and Commercial sectors. What is their impact on the various Large Industrial sub-sectors?
- 3.3 How much are the impacts of BC Hydro's Low Carbon Electrification programs on each of the Major Customer sectors, and where are these impacts accounted for in the above tables? Why are these impacts not shown as a separate adjustment? For comparison purposes, how much were these impacts in the F2020 and F2021 years?
- 3.4 Please explain why the Rate Impact adjustments are causing an increase in the loads rather than a decrease.
- 3.5 Please give a more detailed discussion explaining the Construction load addition and the Cannabis-crypto currency load additions.
- 3.6 Please give a more detailed description as to what is involved in the Codes Overlap adjustment. How is this adjustment arrived at, and why does it cause an increase in the forecast loads?
- 3.7 Loss Reductions, which represent efficiency savings in the distribution substations which minimize line losses, appear to be causing reductions in customer billings. Please explain why substation efficiency savings should cause any effect on the billed sales to the customers, much less a reduction of customer billings as appears to be shown in the tables.
- 4.0 **Reference: Order in Council 657, CleanBC Industrial Electrification Rates (RS 1894 and 1895), and Exhibit B-2, Section 3.3 Load Forecast Results**
- OIC 657, enacted December 21, 2020, lays out two new BC Hydro electricity rates intended to incentivize increased industrial electrification (RS 1894 - Clean

Energy and Innovation, and RS 1895 - Fuel Switching). It is presumed that BC Hydro has been working with the Government for some period of time to design these rates, but their costs and benefits would not have been included in the March 2020 Load Forecast. However, since they are available as of December 21, 2020, they will be in force for the entirety of the F2022 test year, and it is appropriate to have any costs and benefits included in the F2022 RRA.

- 4.1 These new rates, together, are approved to provide up to 5,000 GWh of new load. How much additional load is BC Hydro forecasting to achieve from these new rates during the test period, and where in the build-up tables is there an adjustment for that incremental load? Also, what are BC Hydro's estimated costs and revenues from that incremental service, and are those recorded in the F2022 RRA? If so, where are they included? If not, what adjustments can be made to include both the incremental load and the incremental costs and revenues expected to come from these new rates?
- 4.2 RS 1894 applies where a New Customer Plant uses a process to remove greenhouse gases from the atmosphere or produces a renewable low-carbon fuel. How would these new loads be considered relative to the Navius report's additional scenarios?
- 4.3 RS 1895 applies for New Electrification projects that expect to use over 20 GWh per year. How would these new loads be considered relative to the Navius report's additional scenarios?

5.0 Reference: Exhibit B-2, Section 3.3 Load Forecast Results relative to actual gas production according to the BC Oil & Gas Commission

The BC Oil & Gas Commission published its 2018 Production Report, January 24, 2020. In that report, it presented the Raw Gas Production 2007 to 2018 in the following figure:

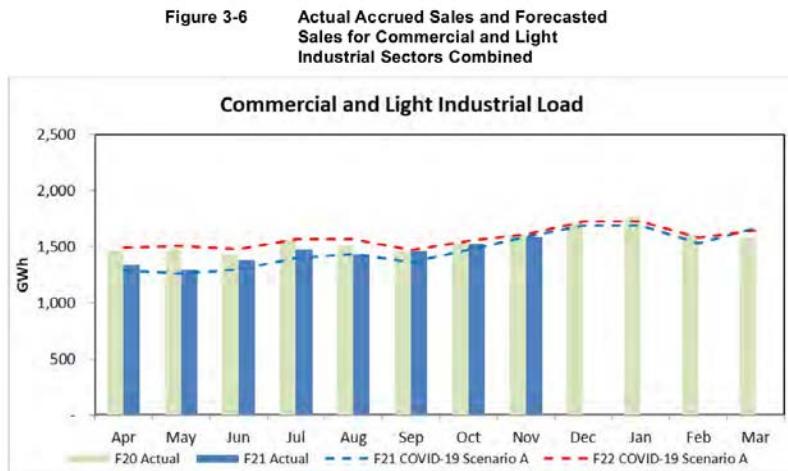
Figure 5: Unconventional vs. Conventional Raw Gas Production 2007 to 2018



- 5.1 Is the Oil & Gas load forecast in the March 2020 Load Forecast based on this January 24, 2020 Oil & Gas Commission actual production data? If not, what actual production data was used as the basis for the forecast? Please provide that data.
- 5.2 Is the March 2020 Load Forecast document provided somewhere in the evidentiary record of this proceeding? If not, please provide it.

6.0 Reference: Exhibit B-2, Section 3.3 Load Forecast Results

In Chapter 3, BC Hydro presented the impact of its Covid-19 Scenario A on each of the Major Customer Sectors in a chart similar to the following:



This chart gives a very good view of how Scenario A tracks with the historic loads and adjusts the forecast loads.

- 6.1 Please provide a chart similar to Figures 3-5, 3-6, and 3-7, to show the impact of Scenario A on the total BC Hydro load.
- 6.2 Please also provide the working Excel model containing the data needed to produce all of these charts.

7.0 Reference: Exhibit B-2, Section 1.4.3, page 1-19, and Section 7.2.5, page 7-12, and Appendix C, Electric Vehicle Costs Regulatory Account.

BC Hydro is seeking approval of a Regulatory Account for the deferral of the costs of building and operating its network of EV charging stations on the grounds that they are Prescribed Undertakings under section 5 of the Greenhouse Gas Reduction Regulation (GGRR). In section 7.2.5, BC Hydro states that:

"BC Hydro expects total costs of \$4.8 million over fiscal 2020 to fiscal 2021 for electric vehicle charging stations that are prescribed undertakings under the GGRR. In order for BC Hydro to recover the expenditures incurred with respect to electric vehicle charging station prescribed undertakings over fiscal 2020 and fiscal 2021, these costs were deferred to a new regulatory account. Under section 18 of the Clean Energy Act, the BCUC must set rates that allow BC Hydro to collect sufficient revenue to recover costs incurred for implementing prescribed undertakings."

Therefore, BC Hydro requests BCUC approval to establish an Electric Vehicle Costs Regulatory Account to defer any actual operating costs, amortization, and cost of energy amounts related to electric vehicle charging stations that meet the definition of a prescribed undertaking under the GGRR for fiscal 2020 and fiscal 2021; apply interest to the balance of the account based on BC Hydro's current weighted average cost of debt and recover the forecast interest charged..."

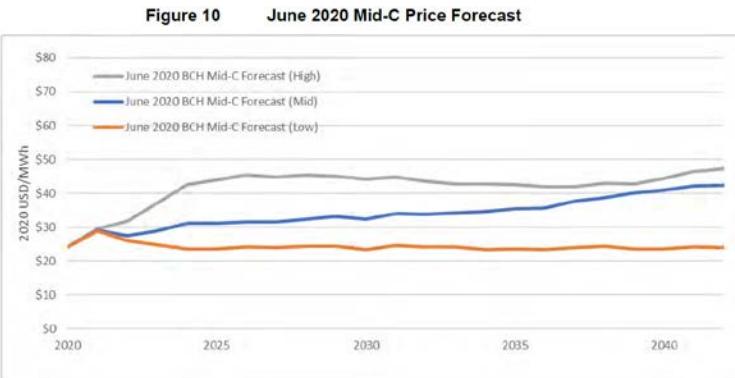
Appendix C provides a listing of BC Hydro's current and planned charging stations.

- 7.1 Please provide the tables in Appendix C in a working Excel model.
- 7.2 It appears that 4 stations are either decommissioned or scheduled to be decommissioned. Two of these are in Surrey. Why have each of these been decommissioned?
- 7.2.1 Please describe BC Hydro's decision criteria pertaining to locating a charging station, or to decommissioning a station.
- 7.3 How many locations are currently in operation and how many charging ports do they have?
- 7.3.1 What was the total capital cost of these stations and how much of that capital was contributed by each of BC Hydro, the federal government, the provincial government, or other parties?
- 7.3.2 Does BC Hydro receive any government or other-party contributions to operating costs?
- 7.3.3 What was the total MWh of sales from these locations over the past year and what was the average kWh of sales per month per charging port?
- 7.3.4 What is expected to be the total MWh of sales from these locations over the next year?
- 7.3.5 At what price(s) has BC Hydro sold this electricity to the consumers since the startup of these stations? Please translate this price into a price per kWh.
- 7.3.5.1 Does BC Hydro expect to continue selling to consumers at that price? If not, then what price does BC Hydro expect to charge, and why?
- 7.4 How many new locations are planned to be added over the F2022 year and how many charging ports at those locations? How many new charging ports are scheduled to be added at existing locations?
- 7.4.1 What is the expected capital cost of these stations and how much of that capital will be contributed by each of BC Hydro, the federal government, the provincial government, or other parties?
- 7.4.2 What is expected to be the total MWh of sales from these locations over the next year?
- 7.5 Who are the competitors with charging stations in B.C. and how many stations/charging ports do each of them have?
- 7.5.1 Are the government contributions to capital costs the same for BC Hydro's competitors as they are for BC Hydro?
- 7.5.2 Do these competitors receive any government or other-party contributions to operating costs?
- 7.5.3 How many total GWh of electricity has BC Hydro sold to these competitors over the past year and what sales volume to these customers/competitors is expected during the F2022 test period?
- 7.5.4 At what price does BC Hydro sell this electricity to these customers/competitors?

- 7.6 If all the costs are to be recorded in a Regulatory Account (including operating costs, amortization, interest, and cost of energy), then will the sales revenues from the charging stations also be recorded there?
- 7.6.1 If not, why not? And, if not, where will those revenues be recorded and how can they be matched up with the costs?
 - 7.6.2 How is the cost of energy to be determined for entry into this Regulatory Account? Will it be calculated at the opportunity cost of a sale at Mid C (net of charges for wheeling and losses)? If not, why not? If not, then at what other value, and why?
 - 7.6.3 With this Regulatory Account treatment, will it be possible to determine the profit or loss from BC Hydro's EV charging business overall, and for each location, in particular?
 - 7.6.4 What profit or loss is BC Hydro forecasting for its EV charging business during each of the years F2020, F2021, and F2022?

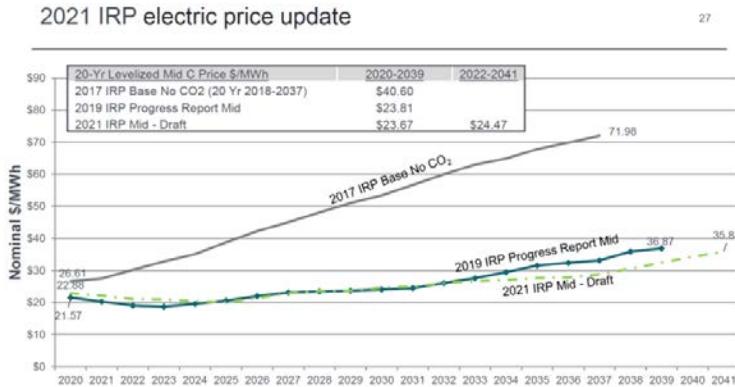
8.0 Reference: Exhibit B-8, filed in the Long Term Resource Plan Filing Date (LTRP or IRP) proceeding, page 13 Mid-C Price Forecast

At page 13 (of Exhibit B-8 in the LTRP Filing Date proceeding), as part of its planning context, BC Hydro presented the following chart showing its June 2020 forecast of Mid-C prices over the 20-year planning period:



- 8.1 Please confirm that this figure represents the Mid-C Price Forecast that has been used within the F2022 RRA.

Also in June, 2020, as part of its planning context, Puget Sound Energy (PSE) published the following chart showing its forecast of Mid-C prices over a similar period:



Slide 27 from PSE's 2021 IRP Webinar #2, June 10, 2020, available at [Title Slide \(windows.net\)](#)

Both charts are in USD, but the BC Hydro chart is in real 2020 USD, i.e. un-inflated, or levelized USD.

- 8.2 Please confirm that the lowest line on BC Hydro's forecast, captioned "June 2020 BCH Mid-C Forecast (Low)" is approximately equal to PSE's line captioned "2021 IRP Mid-Draft" which has a Levelized Mid-C Price of about \$24. I.e. BC Hydro's "Low" forecast is roughly the same as PSE's Mid or expected forecast.
- 8.3 Is BC Hydro using its "Low" forecast or its "Mid" forecast in the F2022 RRA and in the development of its LTRP?
- 8.4 Has BC Hydro made a change to its forecast of Mid-C prices since its June 2020 forecast? If so please provide the current forecast.
 - 8.4.1 If not, then please explain why PSE's expected forecast is so much lower than BC Hydro's. What reasons could there be for such a difference in forecasts?

9.0 Reference: Exhibit B-2-2, Appendix W, BC Hydro's DSM Annual Report for Fiscal 2020, page 12, Table 5

BC Hydro summarizes the Benefit/Cost Ratios of its DSM programs in Table 5:

**Table 5 Benefit Cost Ratios of Electricity Savings:
Fiscal 2020**

	Benefit Cost Ratios ¹			
	LRMC (\$105 per MWh)			Market Price (\$30 per MWh)
	Modified Total Resource Cost Test ²	Total Resource Cost Test excluding NEBs	Ratepayer Impact Measure Test ³	Utility Cost Test
Rate Structures				
Residential Inclining Block Rate	n/a	n/a	n/a	n/a
General Service Rate	n/a	n/a	n/a	n/a
Transmission Service Rate	4.7	4.7	1.0	23.2
Total Rate Structures	4.7	4.7	1.0	23.2
DSM Programs				
<i>Residential Sector</i>				
Low Income ⁴	4.5	4.7	0.9	1.2
Non Integrated Areas ⁵	0.6	0.6	0.4	0.5
Retail	3.7	3.8	1.1	2.1
Home Renovation Rebate	1.8	1.4	0.9	2.0
<i>Residential Sector Total</i>	2.5	2.2	0.9	1.6
<i>Commercial Sector</i>				
LEM-C	3.4	2.1	1.1	1.8
New Construction	1.8	1.5	1.1	1.7
<i>Commercial Sector Total</i>	2.9	1.9	1.1	1.8
<i>Industrial Sector</i>				
LEM-I	5.3	3.8	1.1	2.2
Thermo-Mechanical Pulp	n/a	n/a	n/a	n/a
<i>Industrial Sector Total</i>	5.3	3.8	1.1	2.2
Total Programs	3.4	2.5	1.1	1.8
Energy Management Activities	n/a	n/a	n/a	n/a
Supporting Initiatives ⁶	n/a	n/a	n/a	n/a
Codes & Standards	n/a	n/a	n/a	n/a
Portfolio Total⁷	2.5	2.0	0.9	1.1

- 9.1 Please explain why an avoided cost of \$105 per MWh was used to calculate the Ratepayer Impact Measure Test (RIM).
- 9.2 Since, in the near term, BC Hydro is facing an energy surplus which must be sold on the export market, please provide an augmented table in which the RIM test is reevaluated using an avoided cost assumption of \$30/MWh and also using \$24/MWh. Please provide the working Excel spreadsheet.

10.0 Reference: Exhibit B-2, Chapter 6, Capital Expenditures and Additions, and Exhibit B-8 filed in the Long Term Resource Plan Filing Date (LTPR or IRP) proceeding, pages 13-14, Weighted Average Cost of Capital

In Exhibit B-8 of the LTRP Filing Date proceeding, BC Hydro describes its method of determining its Weighted Average Cost of Capital (WACC) as follows (pp 13, 14):

Weighted Average Cost of Capital

Another important input into the evaluation of any resource options is the Weighted Average Cost of Capital (**WACC**), which in turn establishes the discount rate used to determine the present value of future costs and benefits. The WACC is determined by the cost of equity and debt associated with the financing of any resource option.

For the 2021 IRP, BC Hydro is assuming that the cost of capital is the same regardless of whether a resource option is advanced by BC Hydro or by the private sector. Although BC Hydro does not have direct visibility into the financial

parameters of potential private sector developments, we have assumed that in general private sector developers have access to similar borrowing rates as BC Hydro.

The key inputs into BC Hydro's WACC are:

- A five-year forecast of 10-year borrowing rates from the Government of B.C.'s Treasury Board;
- Historical spread between 30-year and 10-year Province of B.C. debt;
- The BCUC's benchmark utility's post-tax Return on Equity of 8.75 per cent; and
- BC Hydro's target capital structure of 60 per cent debt and 40 per cent equity.

Based on these inputs, BC Hydro's WACC, and discount rate, is 5.04 per cent which rounds to 5.0 per cent.

10.1 Please explain how BC Hydro is applying this WACC and the discount rate of 5.0% to the capital projects set out in Chapter 6 of the Application, including Site C.

10.2 If the calculations outlined in the description are performed, the following is the result:

$$(40\% \times 8.75\%) + (60\% \times 2.57\%) = 3.5\% + 1.54\% = 5.04\%$$

Is this a correct representation of the calculations summarized in the description? If not, please provide the actual calculations used.

10.2.1 Please confirm that, in this calculation, 8.75% represents the post-tax Return on Equity of the BCUC's benchmark utility.

10.2.2 Please confirm that, in this calculation, 2.57% represents the B.C. Government's 10-year borrowing rate adjusted by the spread between 30-year and 10-year Province of B.C. debt. In other words, 2.57% represents BC Hydro's assumed borrowing rate for 30-year debt. If not confirmed, please provide the full explanation of the 2.57% in detail.

10.2.3 If BC Hydro's portfolio of hedge derivatives were marked-to-market with a 30-year borrowing rate of 2.57%, what would be the marked-to-market gain or loss on the whole portfolio of hedges?

11.0 Reference: Weighted Average Cost of Capital from the F2017-F2019 RRA

In its response to CEABC IR 1.12.4 in the F2017-F2019 Revenue Requirements Application proceeding (Exhibit B-10 in the F17-F19 RRA), BC Hydro gave the following explanation of its calculation of its WACC:

The nominal discount rate of the Weighted Average Cost of Capital is based on:

- A deemed capital structure of 70 per cent debt and 30 per cent equity established by Special Direction HC2;
- The average of BC Hydro's forecasted cost of incremental debt over the next five years as provided by the Treasury Board;
- Allowed return on equity which is based on the pre-tax return on equity of FortisBC Energy Inc.; and

The result is then rounded to the nearest 25 basis points and only changed if the movement is greater than 50 basis points from the previous discount rate. The calculation for fiscal 2017 is:

$\text{WACC} = (\text{Return on Equity} \times \text{Target Equity Ratio}) + (\text{Forecast Average Cost of Debt} \times \text{Target Debt Ratio})$

For fiscal 2017, $\text{WACC} = (11.84\% \times 30\%) + (4.75\% \times 70\%)$, or $(3.55\% + 3.33\%) = 6.88\%$. This is then rounded to 7.00%. Since the fiscal 2017 WACC is not more than 50 basis points different from the F2016 WACC of 7.00%, the WACC remains at 7.00% for F2017.

The real Weighted Average Cost of Capital is based on an average forecasted inflation of 2 per cent (per the Treasury Board) and is calculated as:

$\text{Real WACC} = (1 + \text{Nominal WACC}) / (1 + \text{average forecasted inflation})$, or $(1.07 / 1.02) = 1.0490$, or 4.90% and rounded to 5.00%.

In this description, BC Hydro converts the 8.75% **post-tax** return allowed for FortisBC Energy Inc. into the **pre-tax** rate of 11.84% (since BC Hydro is not taxable), before applying the Target Equity Ratio of 30%.

- 11.1 The Target Equity Ratio has now changed from 30% to 40% because the Government has agreed to increase its Equity share up to the 40% level over time. However, please explain why BC Hydro's latest WACC calculation does not convert the post-tax allowed return (of 8.75%) into a pre-tax rate (of 11.84%), as was done in the F2017 calculation. Has BC Hydro's tax-exempt status changed since 2017?

12.0 Reference: BC Hydro 2020/21 Second Quarter Report

On page 5 of this report it says:

"Domestic Energy Costs

Domestic energy costs for the three months ended September 30, 2020 were \$459 million, \$6 million (or 1 per cent) lower than the same period in the prior fiscal year. The decrease was primarily due to lower Non-Treaty and Co-ordination agreements costs due to higher net water storage in the prior year.

Under the Non-Treaty and Co-ordination agreements, storage of water at the Kinbasket Reservoir (Arrow Lakes) results in costs while releases of water downstream to the United States results in recoveries to BC Hydro..."

- 12.1 Is there a difference between the Non-Treaty Storage Agreement between BC Hydro and the Bonneville Power Administration and "Co-ordination agreements"? If yes, please explain and provide copies of, or links to, all the "Co-ordination agreements".
- 12.2 Please explain in detail how the storage of water at the Kinbasket Reservoir (Arrow Lakes) results in costs while releases of water downstream to the United States result in recoveries to BC Hydro under the Non-Treaty Storage Agreement and any Co-ordination agreements.
- 12.3 Please explain how these costs and recoveries are calculated.
- 12.4 What decision process does BC Hydro use to decide whether to store or release water under the Non-Treaty Storage Agreement and any Co-ordination agreements, including any restrictions contained in these agreements. Please explain in detail any restrictions
- 12.5 How are these agreements included in BC Hydro's Energy Study models?