

Fred James

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October 18, 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:

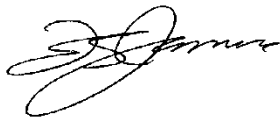
**RE: Project No. 1598990
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Fiscal 2020 to Fiscal 2021 Revenue Requirements Application**

BC Hydro writes in accordance with BCUC Order No. G-218-19 to publicly release the following:

- Information previously considered Confidential – Responses to Round 2 Intervener IRs (CEABC IR 2.30.3, GJOSHE IRs 2.9.2, 2.15.1 Attachment 1, ZONE II RPG IR 2.32.2);
- Information previously considered Confidential – Responses to Round 3 BCUC IRs (3.314.3); and
- Information previously considered Confidential – Response to Round 3 CONFIDENTIAL BCUC IRs (3.1.1, 3.1.2, 3.2.1, 3.3.1, 3.3.2, 3.3.3, 3.4.1, 3.4.2, 3.5.1, 3.5.2, 3.5.3, 3.5.4, 3.6.1, 3.6.2, 3.6.3, 3.6.4 and 3.7.1).

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

Clean Energy Association of B.C. Information Request No. 2.30.3 Dated: August 1, 2019 British Columbia Hydro & Power Authority REVISED PUBLIC Response issued October 18, 2019	Page 1 of 1
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30.0 Reference: Miscellaneous – The impact of Amended Special Direction 10

Amended Special Direction 10 changed BC Hydro’s planning criteria for its Heritage Assets from “critical water” to “average water”.

2.30.3 Under the current operational criteria, reflecting market and system conditions, what is the assumed annual generation from the Heritage Assets?

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RESPONSE:

~~This response includes confidential information that pertains to our August 2019 Cost of Energy Evidentiary Update, in accordance with Order No. G-146-19, which has been redacted in the public version of this response. The un-redacted version of the response is being made available to the BCUC only.~~

Special Direction 10 is focussed on planning, and has no impact to BC Hydro’s Operational View of energy available from the Heritage Assets. In addition, there is no specific criteria for defining the annual energy in the Operational View. Instead, the Energy Studies forecast what energy is available energy to meet load and forecast the optimal dispatch of the system including imports/exports to meet load.

The Heritage Hydro GWh forecast for fiscal 2020 to fiscal 2024 is provided in the table below:

GWh	F2020 EU	F2021 EU	F2022 Forecast	F2023 Forecast	F2024 Forecast
Heritage Energy	39,075	44,467	45,864	46,202	46,003

Edlira Gjoshe Information Request No. 2.9.2 Dated: August 1, 2019 British Columbia Hydro & Power Authority REVISED PUBLIC Response issued October 18, 2019	Page 1 of 2
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9.0 Reference: Gjoshe IR 1.4.2

2.9 Thank you for the two versions (respectively redacted and unredacted) of the answer to Gjoshe IR 1.4.2. Further to the information provided:

2.9.2 Please provide annual energy supply profiles of the aggregate energy supply of the IPP portfolio (whereby supply profiles show GWh's supplied in each month as a percentage of the annual energy supply), at five-year snapshots from F2002-F2021 (snapshots for each of F2002, F2007, F2012, F2017, and F2021- forecast).

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RESPONSE:

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The table below provides the percentage of annual IPP energy delivered¹ in each month for the requested fiscal years. The last row in the table provides the forecast values for fiscal 2021 consistent with the Evidentiary Update (EU).

¹ Values in the table for fiscal 2021 are forecast.

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%	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
F2002 Actual	5.0	8.9	7.9	8.6	8.6	7.9	8.4	8.7	10.6	10.3	7.7	7.4	100
F2007 Actual	8.7	9.1	8.1	11.6	10.0	6.8	6.6	7.3	7.5	7.4	7.8	9.0	100
F2012 Actual	6.4	8.4	8.8	10.0	10.8	9.3	8.5	7.6	8.3	8.2	6.6	7.1	100
F2017 Actual	8.0	11.8	9.7	10.6	9.6	8.2	7.9	9.4	7.1	6.2	5.4	6.2	100
F2021 RRA	7.3	10.3	10.6	10.8	9.9	8.4	8.4	7.7	7.4	7.1	6.1	5.8	100
F2021 EU	7.7	10.2	10.5	10.6	10.2	7.9	7.7	7.3	7.9	7.7	6.2	6.1	100

Edlira Gjoshe Information Request No. 2.15 Dated: August 1, 2019 British Columbia Hydro & Power Authority REVISED Response issued October 18, 2019	Page 1 of 1
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15.0 References: Gjoshe IR 1.2.3 and Gjoshe IR 1.9.1

2.15 Please provide in a Table format, the annual spend by Fiscal Year over the period F2002-F2021 for serving the non-integrated area of Ft. Nelson, itemizing and capturing the major cost items of a) Ft. Nelson Generation; b) AESO FTS (Ft. Nelson Area Transmission Service) cost; and where applicable cost of energy imports from Alberta.

RESPONSE:

The data requested for fiscal 2004 to fiscal 2019 is provided in Attachment 1 to this response. BC Hydro is unable to provide the data for fiscal 2002 and fiscal 2003 as the data is not easily accessible in our financial systems.

~~For fiscal 2020 and fiscal 2021, BC Hydro is redacting that information as it is confidential and pertains to our August 2019 Cost of Energy Evidentiary Update, in accordance with Order No. G-146-19. The un-redacted version of the response is being made available to the BCUC only.~~

**Fort Nelson costs
F2004 to F2021
\$million**

	F2004 Actual	F2005 Actual	F2006 Actual	F2007 Actual	F2008 Actual	F2009 Actual	F2010 Actual	F2011 Actual	F2012 Actual	F2013 Actual	F2014 Actual	F2015 Actual	F2016 Actual	F2017 Actual	F2018 Actual	F2019 Actual	F2020 EU	F2021 EU
a) Fort Nelson Generation costs:																		
Domestic gas purchases	10.2	11.6	15.6	11.3	11.5	15.9	7.2	6.5	3.7	2.6	8.4	6.8	3.1	1.2	1.1	1.4	2.3	2.8
Motor Fuel Tax	0.4	0.9	1.2	1.2	1.0	1.1	0.5	0.5	0.3	0.2	0.8	0.7	0.7	0.3	0.3	0.6	0.7	0.7
Carbon Tax	-	-	-	-	-	0.8	1.3	1.9	1.6	1.7	2.9	3.0	2.9	1.2	1.4	3.2	3.8	4.6
Other ¹	0.3	0.3	0.2	0.4	1.4	0.2	0.3	0.3	0.4	0.2	0.4	0.3	0.4	0.3	0.1	0.4	0.4	0.4
	10.8	12.8	17.0	12.9	13.9	18.1	9.4	9.2	6.0	4.7	12.5	10.7	7.1	2.9	3.0	5.6	7.2	8.5
b) AESO FTS costs	0.2	0.2	0.3	0.5	0.4	0.7	0.7	0.5	1.0	1.2	1.3	0.8	1.2	2.9	3.1	1.6	1.3	1.4
c) Cost of energy imports from Alberta	8.2	10.3	12.7	9.7	10.9	8.3	5.5	4.7	2.5	2.1	2.7	1.4	1.3	0.3	0.9	17.7	2.6	1.9
Total	19.2	23.2	30.0	23.1	25.2	27.1	15.6	14.4	9.5	7.9	16.5	13.0	9.6	6.1	6.9	24.8	11.1	11.9

¹ includes transportation costs, water consumption costs and chemical costs.

Zone II Ratepayers Group Information Request No. 2.32.2 Dated: August 1, 2019 British Columbia Hydro & Power Authority REVISED PUBLIC Response issued October 18, 2019	Page 1 of 2
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32.0 Topic: Cost of Energy – NIA Forecast Increases
Reference: Exhibit B-1 Application, Exhibit B-6, Zone II RPG IR 1.5.4

On page 4-34 of Exhibit B-1 of its F2020-F2021 Application, BC Hydro provides the following:

Table 4-14 Non-Integrated Area Generation Costs

Non-Integrated Area (\$ million)	Schedule Reference	F2017 RRA	F2017 Actual	F2018 RRA	F2018 Actual	F2019 RRA	F2019 Forecast	F2020 Plan	F2021 Plan
NIA – BC Hydro Diesel Generating Stations		15.4	15.0	18.5	16.3	22.0	18.0	21.3	23.5
NIA - IPPs		9.2	9.9	8.8	10.2	9.2	8.8	10.2	10.1
Total	4.0 L30	24.6	25.0	27.4	26.5	31.1	26.9	31.6	33.6

In BC Hydro’s response to Zone II RPG IR 1.5.4, BC Hydro provides the following:

The diesel price forecast used by BC Hydro for the test period is as follows (from the [REDACTED]):

- F2020 Plan – [REDACTED]; and
- F2021 Plan – [REDACTED].

2.32.2 Provide the actual, or forecast if actuals not available, total diesel expenditures in (\$ million) for F2017, F2018, F2019.

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RESPONSE:

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BC Hydro interprets the question to refer to total diesel expenditures for the NIA Cost of Energy forecast. Table 4-14 of the Application provides the NIA diesel expenditures inclusive of transportation cost and tax. The table below provides the Cost of Energy for diesel in the NIA for fiscal 2017 to fiscal 2019, as well as BC Hydro’s forecast Cost of Energy for diesel in the NIA for the Test Period in the Application and in the Evidentiary Update.

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\$millions	F2017 Actual	F2018 Actual	F2019 Actual	F2020 Plan	F2020 EU	F2021 Plan	F2021 EU
NIA – BC Hydro Diesel Generating Stations	15.0	16.3	19.7	21.3	20.6	23.5	20.4

British Columbia Utilities Commission Information Request No. 3.314.3 Dated: September 19, 2019 British Columbia Hydro & Power Authority REVISED PUBLIC Response issued October 18, 2019	Page 1 of 2
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314.0 E. CHAPTER 4 – COST OF ENERGY

Reference: COST OF ENERGY
Exhibit B-11, pp. 7–8; California Independent System Operator (ISO), Western Energy Imbalance Market (EIM), Quarterly Gross Benefits;¹ BC Hydro Letter Agreement between BC Hydro and Powerex Corp. – Forward Electricity Purchases, as amended (Amended 2018 Letter Agreement), dated May 23, 2019,² p. 2; BC Hydro Application for 2019 Letter Agreement with Powerex Corp. (2019 Letter Agreement) proceeding, Exhibit B-1, p. 4
Market opportunities

On page 4 of the application to the BC Hydro 2019 Letter Agreement proceeding, it states:

As noted above, and in contrast to the 2018 Letter Agreement, BC Hydro's intention in entering into the 2019 Letter Agreement was to proactively ensure appropriate measures are in place to respond to future physical supply issues.

BC Hydro states in the Evidentiary Update:

The Cost of Energy forecast in the Application was based on BC Hydro's October 2018 energy study, The Cost of Energy forecast in the Evidentiary Update is based on the June 2019 energy study.

Dry conditions and lower water inflows have decreased planned hydroelectric generation (water rentals) and purchases from IPPs and Long-Term Commitments.

3.314.3 Please explain whether water inflows per the June 2019 Energy Study are higher or lower relative to what was forecast in the energy study used to inform the Amended 2018 Letter Agreement. As part of the response, please discuss why forecast water inflows in the June 2019 Energy Study are higher or lower.

¹ <https://www.westerneim.com/Pages/About/QuarterlyBenefits.aspx>.

² <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/fep/00-2019-05-23-bchydro-bcuc-wm.pdf>.

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RESPONSE:

~~BC Hydro is filing part of this response in confidence with the BCUC, as the information remains confidential up to October 18, 2019, when the Cost of Energy Evidentiary Update will be publicly released.~~

The Amended 2018 Letter Agreement was based on results from the November 2018 Energy Study. At that time, snowpack had yet to be built across winter 2018 to 2019, and fiscal 2020 forecast precipitation was not yet known. Therefore, average System Inflow from the November 2018 Energy Study was forecast to be 100 per cent of Normal. Fiscal 2020 System Inflow is forecast to be 87 per cent of Normal in the June 2019 Energy Study. This reduction is due to drier than average weather during the first part of fiscal 2019, and below average snowpack during winter 2018 to 2019, especially in the Williston basin.

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1.0 Reference: COST OF ENERGY
Exhibit B-1, Application, p. 4-20; Exhibit B-11-1, Confidential Evidentiary Update, Appendix C, p. 2; Appendix A, Schedule 4.0
Heritage energy – costs and volumes

British Columbia Hydro and Power Authority (BC Hydro) states in the Application:

Water rental fees on the generation of energy are calculated as the actual energy output of the license holder from the prior calendar year multiplied by the current year water rental rates. The current year rates are calculated as the previous year rate times the annual percentage change in B.C.s Consumer Price Index. There are two tiers of water rental rates charged by the Government of B.C., which vary depending on the volume of energy produced.

The volume and costs classified as Heritage Energy in Schedule 4.0 of Appendix A to the Evidentiary Update is provided below:

Cost of Energy (\$ million)		F2019			F2020			F2021		
Line	Column	RRA	Actual	Diff	Plan	Update	Diff	Plan	Update	Diff
		1	2	3 = 2 - 1	4	5	6 = 5 - 4	7	8	9 = 8 - 7
Sources of Supply (GWh)										
Heritage Energy										
1	Water Rentals	46,368	42,341	-4,027	44,262	39,368	-4,894	44,999	44,522	-477
2	Natural Gas for Thermal Generation	234	191	-43	192	181	-11	193	195	2
3	Exchange Net	-354	-155	200	-171	-473	-302	-196	-250	-54
4	Total	46,248	42,377	-3,871	44,283	39,075	-5,207	44,996	44,467	-529
Unit Costs (\$/MWh)										
16	Water Rentals	7.7	8.5	0.9	7.8	8.4	0.6	7.8	7.3	(0.5)
17	Natural Gas for Thermal Generation	45.9	40.0	(6.0)	42.4	41.8	(0.6)	44.3	43.7	(0.6)
18	IPPs and Long-Term Commitments	94.7	87.5	(7.2)	99.6	92.8	(6.8)	99.8	92.6	(7.2)
19	Non-integrated Areas	258.9	281.0	22.1	268.4	259.1	(9.3)	280.9	250.7	(30.2)
20	Market Electricity Purchases	38.5	61.4	23.0	26.6	41.5	14.8	28.1	32.9	4.8
21	Surplus Sales	(28.6)	(51.6)	(23.0)	(40.3)	(5.0)	35.3	(36.1)	(47.0)	(10.9)
22	Total Weighted Cost	33.5	29.0	(4.5)	35.2	36.2	1.0	36.1	32.6	(3.5)
Cost of Energy (\$ million)										
Heritage Energy										
23	Water Rentals	356.4	363.1	6.7	343.1	329.3	(13.8)	349.1	323.2	(25.9)
24	Natural Gas for Thermal Generation	10.7	7.6	(3.1)	8.1	7.5	(0.6)	8.5	8.5	(0.0)
25	Domestic Transmission - Other	22.1	22.3	0.2	22.5	24.5	2.0	22.4	24.4	2.0
26	Non-Treaty Storage and Libby Coordination Agreements	(7.2)	(181.9)	(174.7)	3.3	15.0	11.7	(2.5)	(11.7)	(9.3)
27	Remissions and Other	(33.1)	(33.9)	(0.8)	(28.1)	(25.2)	0.9	(26.8)	(26.7)	0.1
28	Total	349.0	177.2	(171.8)	350.9	351.2	0.3	350.8	317.7	(33.1)

British Columbia Utilities Commission (BCUC) staff have created the table below based on information provided in Schedule 4.0:

Change in Water Rentals	F2020	F2021
[A] Cost (\$ million) (Line 23)	\$13.8	\$25.9
[B] Volume (GWh) (Line 1)	4,894	477
Average Cost ([A]/[B])	\$2.80	\$54.30

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Line 16 in Schedule 4.0 shows the average cost of water rentals for Fiscal 2020 and Fiscal 2021 (F2020 and F2021) as \$8.40/MWh and \$7.30/MWh, respectively.

- 3.1.1 Please explain the difference between the average cost of the change in water rentals (i.e. \$2.82/MWh and \$54.30/MWh) and the average cost of water rentals on line 16 in Schedule 4.0 (i.e. \$8.40/MWh and \$7.30/MWh) for the Test Period. As part of the response, please discuss the monthly periods over which the level of generation has changed.

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RESPONSE:

The change in the average unit cost of water rentals of \$2.80/MWh in fiscal 2020 and \$54.30/MWh in fiscal 2021 is not a meaningful comparison because:

- Water rental costs include fixed charges such as plant capacity charges, miscellaneous water license costs and adjustments under the coordination agreements which do not vary with the volumes reported on line 1 of Schedule 4.0; and
- Water rental costs include costs based on generation output of the prior calendar year, which means that there is no direct correlation between the costs as shown on line 23 of Schedule 4.0 and the volumes as shown on line 1 of Schedule 4.0 for the respective years.

BC Hydro has calculated the change in the average unit cost of water rentals between the Evidentiary Update and the Application as \$0.6/MWh for fiscal 2020 and \$(0.5)/MWh for fiscal 2021, as shown on line 16 of Schedule 4.0 (columns 6 and 9).

This is calculated by subtracting the average cost of water rentals in the Evidentiary Update (line 16 of Schedule 4.0 column 5 for fiscal 2020) from the average cost of water rentals in the Application (line 16 of Schedule 4.0 column 4). The average cost of water rentals is calculated by dividing the water rental costs on line 23 of schedule 4.0 (numerator) by the hydro generation volumes on line 1 of Schedule 4.0 (denominator). However, because the water rental costs on the generation of energy are calculated using prior year calendar generation, the cost variance in the numerator will not correlate to the change in current year's volumes in the denominator. The change in the average unit costs will vary year

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over year depending on the hydro generation volumes in those years, even if costs do not vary.

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1.0 Reference: COST OF ENERGY
Exhibit B-1, Application, p. 4-20; Exhibit B-11-1, Confidential Evidentiary Update, Appendix C, p. 2; Appendix A, Schedule 4.0
Heritage energy – costs and volumes

British Columbia Hydro and Power Authority (BC Hydro) states in the Application:

Water rental fees on the generation of energy are calculated as the actual energy output of the licence holder from the prior calendar year multiplied by the current year water rental rates. The current year rates are calculated as the previous year rate times the annual percentage change in B.C.s Consumer Price Index. There are two tiers of water rental rates charged by the Government of B.C., which vary depending on the volume of energy produced.

The volume and costs classified as Heritage Energy in Schedule 4.0 of Appendix A to the Evidentiary Update is provided below:

Cost of Energy (\$ million)			F2019			F2020			F2021		
Line	Column	Reference	RRA	Actual	Diff	Plan	Update	Diff	Plan	Update	Diff
			1	2	3 = 2 - 1	4	5	6 = 5 - 4	7	8	9 = 8 - 7
Sources of Supply (GWh)											
Heritage Energy											
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4	Total		46,248	42,377	-3,871	44,283	39,075	-5,207	44,998	44,467	-529
Unit Costs (\$/MWh)											
16	Water Rentals		7.7	8.5	0.9	7.8	8.4	0.6	7.5	7.3	(0.5)
17	Natural Gas for Thermal Generation		45.9	40.0	(6.0)	42.4	41.8	(0.6)	44.3	43.7	(0.6)
18	PPs and Long-Term Commitments		94.7	87.5	(7.2)	99.6	92.8	(6.8)	99.8	92.6	(7.2)
19	Non-Integrated Area		259.9	281.0	22.1	269.4	259.1	(9.3)	280.9	250.7	(30.2)
20	Market Electricity Purchases		35.5	61.4	23.0	26.6	41.5	14.8	28.1	32.9	4.8
21	Surplus Sales		(28.6)	(51.6)	(23.0)	(40.3)	(5.0)	35.3	(36.1)	(47.0)	(10.9)
22	Total Weighted Cost		33.5	29.0	(4.5)	35.2	36.2	1.0	36.1	32.6	(3.5)
Cost of Energy (\$ million)											
Heritage Energy											
23	Water Rentals		356.4	363.1	6.7	343.1	329.3	(13.8)	349.1	323.2	(25.9)
24	Natural Gas for Thermal Generation		10.7	7.6	(3.1)	8.1	7.5	(0.6)	8.5	8.5	(0.0)
25	Domestic Transmission - Other		22.1	22.3	0.2	22.6	24.5	2.0	22.4	24.4	2.0
26	Non-Treaty Storage and Libby Coordination Agreements		(7.2)	(181.9)	(174.7)	-3.3	15.0	11.7	(2.5)	(11.7)	(9.3)
27	Remissions and Other		(33.1)	(33.9)	(0.8)	(26.1)	(25.2)	0.9	(25.8)	(26.7)	0.1
28	Total		349.0	177.2	(171.8)	350.9	351.2	0.3	350.8	317.7	(33.1)

British Columbia Utilities Commission (BCUC) staff have created the table below based on information provided in Schedule 4.0:

Change in Water Rentals	F2020	F2021
[A] Cost (\$ million) (Line 23)	\$13.8	\$25.9
[B] Volume (GWh) (Line 1)	4,894	477
Average Cost ([A]/[B])	\$2.80	\$54.30

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Line 16 in Schedule 4.0 shows the average cost of water rentals for Fiscal 2020 and Fiscal 2021 (F2020 and F2021) as \$8.40/MWh and \$7.30/MWh, respectively.

- 3.1.2 Please explain the difference in the average cost of the change in water rentals between F2020 and F2021 (i.e. \$2.80/MWh compared to \$54.30/MWh). In other words, why is the cost of each MWh of water rentals saved in F2021 approximately 1900 percent greater than in F2020.

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RESPONSE:

Please refer to BC Hydro's response to BCUC CONF IR 3.1.1 for an explanation of the difference in the average cost of the change in water rentals in fiscal 2020 and fiscal 2021.

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2.0 Reference: COST OF ENERGY
Exhibit B-5-1, BCUC IR 14.2; Exhibit B-11-1, Appendix A,
Schedule 4.0
Independent Power Producer (IPP) cost breakdown

In response to BCUC IR 14.2, BC Hydro provided Table 1: “IPP and Long-Term Purchase Volumes for the Integrated System (October 2018 Forecast)” and Table 3: “Breakdown of IPP and Long-Term Commitments for the Integrated System (October 2018 Forecast).”

Lines 5 and 29 of Schedule 4.0 of Appendix A to the Evidentiary Update shows the updated volumes and dollars associated with IPPs and Long-Term Commitments, including accounting adjustments.

3.2.1 Please update Table 1 and Table 3 provided in response to BCUC IR 14.2 to reflect the F2019 Actual, F2020 Update and F2021 Update columns of the volumes and costs of IPPs and Long-Term Commitments as per Schedule 4.0 of Appendix A to Evidentiary Update.

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RESPONSE:

This response includes commercially sensitive information which has been redacted in this public version of the response. The un-redacted version of this response has been made available to the BCUC only as public disclosure could impact BC Hydro’s and the IPP’s commercial interests.

Table 1 and Table 3 from BC Hydro’s response to BCUC IR 1.14.2 have been updated below.

Table 1: IPP and Long-Term Purchase Volumes for the Integrated System (Evidentiary Update)

Category (GWh)	F2015 RRA	F2015 Actual	F2016 RRA	F2016 Actual	F2017 RRA	F2017 Actual	F2018 RRA	F2018 Actual	F2019 RRA	F2019 Actual	F2020 Update	F2021 Update
Existing IPPs												
New IPPs – First Nations commitment												
New IPPs – Other												
IPP Renewals – Biomass												
IPP Renewals – Hydro												
IPP Renewals – Other												
Other												
Total												

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3.0 Reference: COST OF ENERGY
Exhibit B-5-1, BCUC IR 18.3; Exhibit B-11-1, p. 9; Appendix A, Schedule 4.0;
Appendix C, p. 3; Appendix G, p. 4
Non-heritage energy – volumes

The response to BCUC IR 18.3 contained a list of the existing IPP contracts included in the cost of energy forecast for the Test Period. Based on this information, BCUC staff have prepared the following summary:

Resource Type	Number of Contracts
Non-Storage Hydro	71
Biomass	19
Storage Hydro	12
Wind	8
Biogas	7
Gas Fired Thermal	3
Solar	2
Other	7
Total	129

3.3.1 Please confirm the accuracy of the table above after the Evidentiary Update or correct where necessary.

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RESPONSE:

The table provided above does not accurately reflect the number of EPAs and potential EPAs included in BC Hydro’s forecast during the Test Period. BC Hydro’s response to BCUC IR 1.18.3 is based on the October 2018 forecast, as shown in Table 4-12 of the Application, which is reflective of 134 EPAs (not the 129 total noted above) on the integrated system.

The corresponding table for the Evidentiary Update should include a total of 132 contracts. A corrected table is provided below:

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Resource Type	Number of Contracts RRA	Number of EU
Non-Storage Hydro	71	69
Biomass	19	19
Storage Hydro	12	12
Wind	8	8
Biogas	7	7
Gas Fired Thermal	3	3
Solar	2	2
Other:	12	12
MSW/ERG	5	5
SOP (expected)	7	7
Misc. Power Purchases	0	0
Total	134	132

Note 1: The SOP (expected) number of contracts, as provided in the table above, are for “Expected SOP Projects and other First Nations Commitments” as set out in Table 4-12 of the Application.

BC Hydro notes the following with respect to the information provided above:

- The “Other” category in the table in the preamble to the question appears to be missing 5 EPAs: Based on the resource type categories identified in BC Hydro’s response to BCUC IR 1.18.3, there are 5 contracts for the “MSW” and “ERG” categories which we understand are included in “Other”. Additionally, as provided in Table 4-12 of the Application, there are 7 potential EPAs listed for the Expected SOP Projects and other First Nations Commitments, and there are no Miscellaneous Power Purchases because these agreements are not accounted for as IPP EPAs. For a description of the miscellaneous power purchases please refer to BC Hydro’s response to CEC IR 1.19.2;
- The “Non-Storage Hydro” category now has two less EPAs: Since the filing of the Application in February 2019, which was based on information as of October 1, 2018, two EPAs (Seaton Creek Hydro and Morehead Creek Hydro) have expired and have not been renewed. Please refer to footnote 111 of the Application. Both of these EPAs were for non-storage hydro facilities. Thus, based on the information for the Evidentiary Update the number of non-storage hydro contracts should be reduced from 71 to 69; and

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- There were no other changes which would impact the other values in the table above.

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3.0 Reference: COST OF ENERGY
Exhibit B-5-1, BCUC IR 18.3; Exhibit B-11-1, p. 9; Appendix A, Schedule 4.0;
Appendix C, p. 3; Appendix G, p. 4
Non-heritage energy – volumes

The response to BCUC IR 18.3 contained a list of the existing IPP contracts included in the cost of energy forecast for the Test Period. Based on this information, BCUC staff have prepared the following summary:

Resource Type	Number of Contracts
Non-Storage Hydro	71
Biomass	19
Storage Hydro	12
Wind	8
Biogas	7
Gas Fired Thermal	3
Solar	2
Other	7
Total	129

3.3.2 Please expand the table above with the number of actual contracts by resource type for F2019.

Line 5 of Schedule 4.0 in Appendix A to the Evidentiary Update shows the following volumes for IPPs and Long-Term Commitments (in GWh): F2019 Actual = 14,248; F2020 Update = 13,949; F2021 Update = 15,238.

On page 9 of the confidential Evidentiary Update, BC Hydro states:

- First, supply from IPPs and Long-Term Commitments is lower. This is due to:
 - dry conditions and low water inflows, which decrease hydro generation; and
 - lower forecast deliveries, based on updated historical delivery averages and delayed commercial operation dates.
- Second, the full implementation of IFRS 16, discussed further in Appendix F, shifts costs from IPPs and Long-Term Commitments (Cost of Energy) to Amortization and Finance Charges.

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RESPONSE:

BC Hydro has interpreted “the number of actual contracts by resource type for F2019” to mean the number of actually executed EPAs as of March 31, 2019. Accordingly, the seven potential EPAs listed for the “Expected SOP Projects and other First Nations Commitments” are not included in the table below because they are not executed EPAs as of March 31, 2019.

The table below has provided the number of EPAs in accordance with the above interpretation:

Resource Type	Number of executed EPAs (as of Mar. 31, 2019)
Non-Storage Hydro	69
Biomass	19
Storage Hydro	12
Wind	8
Biogas	7
Gas Fired Thermal	3
Solar	2
Other:	5
MSW/ERG	5
SOP (expected)	0
Misc. Power Purchases	0
Total	125

Note 1: The SOP (expected) number of contracts, as provided in the table above, are for “Expected SOP Projects and other First Nations Commitments” as set out in Table 4-12 of the Application.

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- 3.0 Reference: COST OF ENERGY**
Exhibit B-5-1, BCUC IR 18.3; Exhibit B-11-1, p. 9; Appendix A, Schedule 4.0;
Appendix C, p. 3; Appendix G, p. 4
Non-heritage energy – volumes

The response to BCUC IR 18.3 contained a list of the existing IPP contracts included in the cost of energy forecast for the Test Period. Based on this information, BCUC staff have prepared the following summary:

Resource Type	Number of Contracts
Non-Storage Hydro	71
Biomass	19
Storage Hydro	12
Wind	8
Biogas	7
Gas Fired Thermal	3
Solar	2
Other	7
Total	129

- 3.3.3 Please provide a table that shows the volume of energy (in GWh) supplied by each IPP resource type listed in the table above for F2019 actuals and the F2020 and F2021 forecasts as updated by the Evidentiary Update. Please ensure that the total volumes of energy agree with the volumes provided on Line 5 of Schedule 4.0 in Appendix A to the Evidentiary Update.

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RESPONSE:

The table below is based on the corrected table provided in BC Hydro’s response to BCUC CONF IR 3.3.1, and reflects those energy volumes BC Hydro expects to receive from those IPP projects which have reached commercial operations. For the seven potential EPAs listed for the “Expected SOP Projects and other First Nations Commitments”, there is one EPA which is expected to reach commercial operations in fiscal 2020 and one EPA which is expected to reach commercial operations in fiscal 2021.

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Resource Type	F2019 Actual (GWh)	F2020 (GWh)	F2021 (GWh)
Non-Storage Hydro	6,122	6,239	6,696
Biomass	2,400	2,773	2,735
Storage Hydro	2,713	1,260	2,636
Wind	1,574	1,626	1,660
Biogas	94	94	98
Gas Fired Thermal	959	1,543	994
Solar	2	2	3
Other	385	411	417
Total	14,248	13,948	15,238

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- 4.0 Reference: COST OF ENERGY**
Exhibit B-11-1, Appendix A, Schedule 4.0; Appendix C, p. 3;
Appendix G, p. 4;
Exhibit B-5, BCUC IR 18.3;
Non-heritage energy – costs

BC Hydro stated in Appendix C to the Evidentiary Update:

Total costs for IPPs and Long-Term Commitments are forecast to be \$1,294.7 million in fiscal 2020 and \$1,410.8 million in fiscal 2021. This represents a decrease of \$243.8 million in fiscal 2020 and \$190.3 million in fiscal 2021 compared to the forecast in the Application. This reduction is due to a number of factors, such as:

- A change in accounting treatment under IFRS 16 (capital leases) for two Electricity Purchase Agreements not previously identified as capital leases (please refer to Appendix F for further discussion on the adoption of IFRS 16 and its implications);
- Lower forecast inflows for hydro IPPs due to dry weather conditions, as described above;
- Updates to historical average deliveries to incorporate the fiscal 2019 actual deliveries for operating projects, which resulted in a lower IPP forecast compared to the Application; and
- Delays in projects reaching commercial operation.

- 3.4.1 Please quantify the effect of each factor listed above with respect to the decrease in costs for IPPs and Long-Term Commitments in each of F2020 and F2021 as compared to the Application.

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RESPONSE:

The table below provides an estimated breakdown for the effect of each factor listed in Appendix C to the Evidentiary Update.

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	F2020 (\$million)	F2021 (\$million)
Change in accounting treatment under IFRS 16 (capital leases)	(87.3)	(89.0)
Lower forecast inflows and historical update for hydro IPPs	(92.9)	(69.5)
Historical update for Non-hydro IPPs	(24.7)	(24.3)
Delays in projects reaching commercial operation	(19.8)	(10.1)

BC Hydro notes that there are also factors, other than those listed above, that impact the difference between the Evidentiary Update and the Application. These other factors may result in increases or decreases in the difference between the two cost estimates. Also, it is difficult to quantify the impact of one factor in isolation of other factors. Accordingly, the total estimated impact associated with the four factors listed above will not exactly match the cost differences identified in the preamble.

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4.0 Reference: COST OF ENERGY
Exhibit B-11-1, Appendix A, Schedule 4.0; Appendix C, p. 3;
Appendix G, p. 4;
Exhibit B-5, BCUC IR 18.3;
Non-heritage energy – costs

Table G-3 on page 4 of Appendix G to the Evidentiary Update shows that actual IPP and Long-Term Commitments for F2019 were \$1,247.2 million.

3.4.2 Please complete the table below to quantify the increase in cost of IPP and Long-Term Commitments from F2019 to F2020, and from F2020 to F2021, broken down by the effects of volumes and prices on the total change in cost of IPPs and Long-Term Commitments. As part of the response, please discuss any qualitative factors that explain the variances.

	[A] F2019 Actual	[B] F2020 Update	[C] F2021 Update	[B] – [A]	[C] – [B]
Change due to changes in volume					
Change due to changes in price					
Total change	\$1,247.2M	\$1,294.7M	\$1,470.8M	\$47.5M	\$176.1M

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RESPONSE:

BC Hydro notes that the stated amount for fiscal 2021 (in the table to the preamble) is not consistent with the provided number in schedule 4.0 of Appendix A. Please see the corrected numbers highlighted in red in the table below.

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	[A] F2019 Actual	[B] F2020 Update	[C] F2021 Update	[B] – [A]	[C] – [B]
Change due to changes in volume				(\$26.3)M	\$119.6M
Change due to changes in price				\$73.8M	(\$3.5)M
Total change	\$1,247.2M	\$1,294.7M	\$1,410.8M	\$47.5M	\$116.1M

BC Hydro also notes that the information provided in the table included in the preamble is based on the Cost of Energy values included in schedule 4 of Appendix A which are the costs after accounting adjustments have been taken into account.

BC Hydro expects a decrease in energy deliveries by IPPs during fiscal 2020 as compared to fiscal 2019 (i.e., the column denoted as “[B] – [A]”). Broadly speaking, BC Hydro observes the following:

- The reduction of approximately \$26.3 million is mostly attributed to lower energy delivery volumes from EPAs which have lower energy prices, as compared to the portfolio’s weighted average price;
- The cost reduction attributed to the change in volume is offset by an increase in EPA costs (i.e., \$73.8 million) attributed to factors such as EPA price escalation and increased deliveries from EPAs with a higher price than the portfolio’s weighted average price; and
- As a result, there is a net cost increase of approximately \$47.5 million despite the energy delivery reduction.

In contrast, BC Hydro expects increased energy deliveries by IPPs during fiscal 2021 as compared to fiscal 2020 (i.e., the column denoted as “[C] – [B]”). Broadly speaking, BC Hydro observes the following:

- The increase of approximately \$119.6 million is mostly attributed to increased energy deliveries volumes (e.g., resources which had reduced volumes in fiscal 2020 that are no longer forecast to have reduced volumes, and new IPP projects achieving commercial operation);
- The cost increase attributed to the change in volume is partially offset by a decrease in EPA costs related to price (i.e., \$3.5 million). This cost decrease generally reflects that EPA energy price increases, such as escalation, are

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likely offset by EPA energy price decreases, such as the lower energy prices achieved by EPA renewals; and

- Accordingly, it appears that the change in volume is the main driver for the cost increase of \$116.1 million.

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- 5.0 Reference: COST OF ENERGY**
Exhibit B-11-1, Appendix A, Schedule 4.0; Appendix C, pp. 2-3; Appendix G, p. 4; Exhibit B-5, BCUC IR 18.3; BC Hydro Letter Agreement between BC Hydro and Powerex Corp. – Forward Electricity Prices, as amended (Amended 2018 Letter Agreement), dated May 23, 2019,¹ Attachment 1, December 6, 2018 filing, p. 3 of 13 (PDF p. 10)
Non-treaty storage and Libby Coordination Agreements

In the Amended 2018 Letter Agreement, BC Hydro states:

BC Hydro has experienced low system inflows of its water to its reservoirs this year, particularly at Williston where the forecast is 75 per cent of normal for F19 (4th lowest since 1958). System inflows (Williston and Kinbasket) are forecast at 88 per cent for F19. Forecasts have dropped across the fall, as dry conditions at the Williston basin have resulted in four successive months of low inflows, with September, October and November inflows being the 3rd, 2nd, and 4th lowest inflows since 1958. With freezing conditions in the Williston basin, these low inflows are anticipated to stay low across the winter as any precipitation will likely come as snow which will not flow into the reservoirs until next spring during freshet.

BC Hydro states in Appendix C to the Evidentiary Update:

Total costs for Non-Treaty Storage and Libby Coordination Agreements are forecast to be \$11.7 million higher in fiscal 2020 and \$9.3 million lower in fiscal 2021, compared to the Application. Higher water releases occurred during the winter of fiscal 2019 which drew down BC Hydro's storage accounts under these agreements. As a result, BC Hydro needs to store water back into the accounts during fiscal 2020, which increases forecast costs. Higher water releases and lower costs are expected to occur in fiscal 2021.

In Appendix G to the Evidentiary Update, it states:

Fiscal 2019 actual gross Cost of Energy was \$244.2 million or 14 per cent lower than the fiscal 2019 RRA Plan. This was primarily due to:

- Line 4 - Higher recoveries from water transactions associated with Non-Treaty Storage and Libby Coordination agreements due to high water releases that primarily occurred in July 2018, August 2018, and February 2019 when market prices were high;

¹ <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/fep/00-2019-05-23-bchydro-bcuc-wm.pdf>.

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- Line 7 - Lower costs from Independent Power Producers primarily resulting from lower deliveries from hydro projects due to low water inflows, delayed Commercial Operation Date for several projects, suspension of the Standing Offer Program, lower deliveries from wind projects, and the termination of several Electricity Purchase Agreements; and
- Line 15 - Lower domestic transmission charges as a result of fewer surplus sales during the year.

3.5.1 Please further explain the reasons for the “high water releases” associated with Non-Treaty Storage and Libby Coordination Agreements in February 2019, given the high market prices to purchase energy and the low water inflows experienced in September to November of 2018 and in the winter months leading into the spring freshet.

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RESPONSE:

All transactions under the current Non-Treaty Storage and Libby Coordination Agreements have been settled financially. As such, there have been are no energy transactions under these agreements. The cost of these financial transactions is listed on line 26 of Schedule 4.0.

The “high water releases” associated with Non-Treaty Storage and Libby Coordination Agreements in February 2019 were as a result of high market prices that BC Hydro was able to monetize, under the agreements, for the benefit of ratepayers. The amount of water stored or released under the agreements is dependent on operational constraints and market prices. Low inflows may influence the operational constraints of the agreements, but low inflows did not limit the releases under these agreements in February 2019.

For responses to other questions on these agreements, please refer to BC Hydro’s response to BCUC IR 1.27.1, CEABC IRs 1.19.2 and 2.45.1 through 2.45.6, and AMPC IR 3.4.1. A copy of the current Non-Treaty Storage Agreement can be found in Attachment 1 to BC Hydro’s response to CEABC IR 1.19.2.

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Non-treaty storage and Libby Coordination Agreements

In the Amended 2018 Letter Agreement, BC Hydro states:

BC Hydro has experienced low system inflows of its water to its reservoirs this year, particularly at Williston where the forecast is 75 per cent of normal for F19 (4th lowest since 1958). System inflows (Williston and Kinbasket) are forecast at 88 per cent for F19. Forecasts have dropped across the fall, as dry conditions at the Williston basin have resulted in four successive months of low inflows, with September, October and November inflows being the 3rd, 2nd, and 4th lowest inflows since 1958. With freezing conditions in the Williston basin, these low inflows are anticipated to stay low across the winter as any precipitation will likely come as snow which will not flow into the reservoirs until next spring during freshet.

BC Hydro states in Appendix C to the Evidentiary Update:

Total costs for Non-Treaty Storage and Libby Coordination Agreements are forecast to be \$11.7 million higher in fiscal 2020 and \$9.3 million lower in fiscal 2021, compared to the Application. Higher water releases occurred during the winter of fiscal 2019 which drew down BC Hydro's storage accounts under these agreements. As a result, BC Hydro needs to store water back into the accounts during fiscal 2020, which increases forecast costs. Higher water releases and lower costs are expected to occur in fiscal 2021.

In Appendix G to the Evidentiary Update, it states:

Fiscal 2019 actual gross Cost of Energy was \$244.2 million or 14 per cent lower than the fiscal 2019 RRA Plan. This was primarily due to:

- Line 4 - Higher recoveries from water transactions associated with Non-Treaty Storage and Libby Coordination agreements due to high water releases that primarily occurred in July 2018, August 2018, and February 2019 when market prices were high;

¹ <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/fep/00-2019-05-23-bchydro-bcuc-wm.pdf>.

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- Line 7 - Lower costs from Independent Power Producers primarily resulting from lower deliveries from hydro projects due to low water inflows, delayed Commercial Operation Date for several projects, suspension of the Standing Offer Program, lower deliveries from wind projects, and the termination of several Electricity Purchase Agreements; and
- Line 15 - Lower domestic transmission charges as a result of fewer surplus sales during the year.

3.5.2 Please discuss whether higher water releases expected in F2021 are correlated with higher market prices. As part of the response, please include a description of forecast water inflows and weather conditions in F2021, as well as a discussion on the monthly periods when Mid-C prices are expected to be higher.

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RESPONSE:

Higher water releases are expected to occur in fiscal 2021, compared to fiscal 2020 because low initial storage at the beginning of fiscal 2020 required BC Hydro to store water back into the Non-Treaty Storage and Libby Coordination storage accounts. The low initial storage at the beginning of fiscal 2020 was due to the storage accounts being drafted in fiscal 2019 to take advantage of high market prices.

Average inflows and weather conditions are expected in fiscal 2021. Within a given year, Mid-C prices are generally expected to be higher during the summer and winter months while lower Mid-C prices are expected during the spring and fall.

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- 5.0 Reference: COST OF ENERGY**
Exhibit B-11-1, Appendix A, Schedule 4.0; Appendix C, pp. 2-3; Appendix G, p. 4; Exhibit B-5, BCUC IR 18.3; BC Hydro Letter Agreement between BC Hydro and Powerex Corp. – Forward Electricity Prices, as amended (Amended 2018 Letter Agreement), dated May 23, 2019,¹ Attachment 1, December 6, 2018 filing, p. 3 of 13 (PDF p. 10)
Non-treaty storage and Libby Coordination Agreements

In the Amended 2018 Letter Agreement, BC Hydro states:

BC Hydro has experienced low system inflows of its water to its reservoirs this year, particularly at Williston where the forecast is 75 per cent of normal for F19 (4th lowest since 1958). System inflows (Williston and Kinbasket) are forecast at 88 per cent for F19. Forecasts have dropped across the fall, as dry conditions at the Williston basin have resulted in four successive months of low inflows, with September, October and November inflows being the 3rd, 2nd, and 4th lowest inflows since 1958. With freezing conditions in the Williston basin, these low inflows are anticipated to stay low across the winter as any precipitation will likely come as snow which will not flow into the reservoirs until next spring during freshet.

BC Hydro states in Appendix C to the Evidentiary Update:

Total costs for Non-Treaty Storage and Libby Coordination Agreements are forecast to be \$11.7 million higher in fiscal 2020 and \$9.3 million lower in fiscal 2021, compared to the Application. Higher water releases occurred during the winter of fiscal 2019 which drew down BC Hydro's storage accounts under these agreements. As a result, BC Hydro needs to store water back into the accounts during fiscal 2020, which increases forecast costs. Higher water releases and lower costs are expected to occur in fiscal 2021.

In Appendix G to the Evidentiary Update, it states:

Fiscal 2019 actual gross Cost of Energy was \$244.2 million or 14 per cent lower than the fiscal 2019 RRA Plan. This was primarily due to:

- Line 4 - Higher recoveries from water transactions associated with Non-Treaty Storage and Libby Coordination agreements due to high water releases that primarily occurred in July 2018, August 2018, and February 2019 when market prices were high;

¹ <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/fep/00-2019-05-23-bchydro-bcuc-wm.pdf>.

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- Line 7 - Lower costs from Independent Power Producers primarily resulting from lower deliveries from hydro projects due to low water inflows, delayed Commercial Operation Date for several projects, suspension of the Standing Offer Program, lower deliveries from wind projects, and the termination of several Electricity Purchase Agreements; and
- Line 15 - Lower domestic transmission charges as a result of fewer surplus sales during the year.

3.5.3 Please reconcile the statement: “[h]igher water releases and lower costs are expected to occur in fiscal 2021” with Lines 16 and 23 of Schedule 4.0 in Appendix A, which reflect a lower \$/MWh and lower total Water Rental fees, respectively, relative to both the F2021 Plan and the F2020 Update.

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RESPONSE:

The statement “[h]igher water releases and lower costs are expected to occur in fiscal 2021” refers to releases out of Arrow Lakes Reservoir under the current Non-Treaty Storage and Libby Coordination Agreements and the associated costs under those agreements (line 26 of Schedule 4.0). All transactions under these agreements are settled financially.

While water rental fees (line 23 of Schedule 4.0) have decreased in the Evidentiary Update relative to the Application, these activities and costs are unrelated to the Non-Treaty Storage and Libby Coordination Agreements.

The 185 MW generating facility at Arrow Lakes Reservoir is not owned by BC Hydro and is not the primary driver of the reservoir operations. The release of water from Arrow Lakes Reservoir is driven by requirements under the Columbia River Treaty and agreed-to releases under the current Non-Treaty Storage and Libby Coordination Agreements.

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- 5.0 Reference: **COST OF ENERGY**
Exhibit B-11-1, Appendix A, Schedule 4.0; Appendix C, pp. 2-3; Appendix G, p. 4; Exhibit B-5, BCUC IR 18.3; BC Hydro Letter Agreement between BC Hydro and Powerex Corp. – Forward Electricity Prices, as amended (Amended 2018 Letter Agreement), dated May 23, 2019,¹ Attachment 1, December 6, 2018 filing, p. 3 of 13 (PDF p. 10)
Non-treaty storage and Libby Coordination Agreements

Line 26 of Schedule 4.0 of Appendix A to the Evidentiary reflects the following costs associated with Non-Treaty Storage and Libby Coordination Agreements:

F2019 Actual: (\$181.9) million

F2020 Update: \$15.0 million

F2021 Update: (\$11.7) million

- 3.5.4 Please explain where the volumes associated with Non-Treaty Storage and Libby Coordination Agreements are included in Schedule 4.0, and if applicable, present these volumes separately in Schedule 4.0.

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RESPONSE:

All transactions under the current Non-Treaty Storage and Libby Coordination Agreements have been settled financially and have not involved a transfer of energy. Accordingly, no volumes associated with Non-Treaty Storage and Libby Coordination Agreements are included in Schedule 4.0.

Energy deliveries (instead of financial settlements) are an option under the Non-Treaty Storage Agreement. If energy deliveries were to occur, these deliveries would form part of the Total Sources of Supply and would be included in BC Hydro's Cost of Energy in Schedule 4.0.

¹ <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/regulatory-filings/fep/00-2019-05-23-bchydro-bcuc-wm.pdf>

6.0 Reference: COST OF ENERGY
Exhibit B-1, Appendix DD, p. 14; Exhibit B-11-1, Appendix A, Schedule 4.0
Market energy – monthly costs and volumes

The volume and costs classified as Market Energy in Schedule 4.0 of Appendix A to the Evidentiary Update is reproduced below:

Cost of Energy (\$ million)				F2019			F2020			F2021		
Line	Column	Reference		RRA	Actual	Diff	Plan	Update	Diff	Plan	Update	Diff
				1	2	3=2-1	4	5	6=5-4	7	8	9=8-7
Sources of Supply (GWh)												
Market Energy												
8	Market Electricity Purchases			934	2,035	1,101	1,504	5,104	3,600	648	1,326	678
9	Surplus Sales			-4,517	-2,230	2,287	-2,403	-84	2,325	-3,087	-2,065	1,022
10	Net Purchases (Sales) from Powerex			105	647	542	177	468	290	90	-279	-369
11	Total			-3,478	452	3,930	-727	5,488	6,215	-2,349	-1,078	1,331
Market Energy												
34	Market Electricity Purchases			35.9	125.0	89.1	40.0	211.6	171.5	18.2	43.7	25.4
35	Surplus Sales			(129.2)	(115.0)	14.2	(37.1)	(0.4)	36.7	(111.4)	(37.0)	14.4
36	Net Purchases (Sales) from Powerex			0.7	25.0	24.3	(0.5)	33.1	33.6	0.5	6.1	5.6
31	Domestic Transmission - Export			29.9	18.5	(11.4)	17.4	1.1	(16.3)	21.0	17.0	(4.0)
38	Total			(62.6)	53.5	116.1	(40.2)	245.3	285.5	(71.7)	(30.3)	41.4
Unit Costs (\$/MWh)												
16	Water Rentals			7.7	8.6	0.9	7.8	8.4	0.6	7.8	7.3	(0.5)
17	Natural Gas for Thermal Generation			45.9	40.0	(6.0)	42.4	41.8	(0.6)	44.3	43.7	(0.6)
18	FPFs and Long-Term Commitments			34.7	87.5	(7.2)	39.6	92.8	(6.8)	39.8	92.6	(7.2)
19	Non-Integrated Area			258.9	281.0	22.1	268.4	259.1	(9.3)	260.9	250.7	(30.2)
20	Market Electricity Purchases			38.5	61.4	23.0	26.6	41.5	14.8	28.1	32.9	4.8
21	Surplus Sales			(28.6)	(51.8)	(23.0)	(40.3)	(5.0)	35.3	(36.1)	(47.0)	(10.9)
22	Total Weighted Cost			33.5	29.0	(4.5)	35.2	36.2	1.0	36.1	32.6	(3.5)

BCUC staff have prepared the table below based on information contained in Schedule 4.0:

Change in Surplus Sales	F2020	F2021
[A] Cost (\$ million) (Line 35)	\$96.7	\$14.4
[B] Volume (GWh) (Line 9)	2,325	1,022
Average Revenue ([A]/[B])	\$41.59	\$14.09
Change in Market Electricity Purchases	F2020	F2021
[C] Cost (\$ million) (Line 34)	\$171.5	\$25.4
[D] Volume (GWh) (Line 8)	3,600	678
Average Cost ([C]/[D])	\$47.64	\$37.46

Line 21 in Schedule 4.0 shows that the average revenue generated through surplus sales has changed from \$40.3/MWh to \$5.0/MWh in F2020 and from \$36.1/MWh to \$47.0/MWh in F2021.

3.6.1 Please discuss why the change in average unit revenue from surplus sales of \$41.59/MWh is greater than the average unit revenues from surplus sales of \$5.0/MWh in F2020. As part of the response, please provide the monthly volumes and prices that contribute to the change in average unit revenue.

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RESPONSE:

This response includes monthly actual generation and System Storage data which is considered commercially sensitive and which has been redacted in this public version of the response. Publication of this information would enable third-parties to model BC Hydro's system to estimate the depth of BC Hydro's energy need and to predict BC Hydro's import and export requirements. Given the high degree of sensitivity around these numbers, and the significant potential for harm that would result from inadvertent disclosure, the un-redacted version of this response has been made available to the BCUC only.

The change in the average unit price of revenue from Surplus Sales in fiscal 2020 is a decrease of \$35.30/MWh, as shown on line 21 of Schedule 4.0 in Appendix A (column 6).

This calculation more appropriately reflects the change in the average unit price of Surplus Sales than the calculation provided in the question of \$41.59/MWh because the calculation in the question assumes that the variance per unit is the same throughout the year. In other words, it assumes that the change in the costs is correlated to the change in the volumes and does not consider the timing of when sales are made and the respective volumes and prices at those times.

For example, the average unit price of Surplus Sales in the Evidentiary Update of \$5.0/MWh as shown on line 21 of Schedule 4.0 in Appendix A (column 5) was due to the timing of when Surplus Sales occurred in fiscal 2020. Surplus Sales in the Application were forecast to occur throughout the year at various prices based on the forward market price curve at that time (October 15, 2018). In the Evidentiary Update, the Surplus Sales consisted of only a small volume of forced exports made during the freshet (May 2019), when market prices were low. No other Surplus Sales were forecast to occur in fiscal 2020 in the Evidentiary Update due to continued dry conditions and low water inflows resulting in decreased hydro generation.

Therefore, the change in the average unit price of revenue from Surplus Sales in fiscal 2020 of \$35.30/MWh is due to the difference in the timing and prices at which Surplus Sales occurred in the forecast provided in the Evidentiary Update as compared to the Application.

The tables below provide the monthly volumes, sales and average unit price of Surplus Sales for fiscal 2020 in the Evidentiary Update and in the Application.

6.0 Reference: COST OF ENERGY
Exhibit B-1, Appendix DD, p. 14; Exhibit B-11-1, Appendix A, Schedule 4.0
Market energy – monthly costs and volumes

The volume and costs classified as Market Energy in Schedule 4.0 of Appendix A to the Evidentiary Update is reproduced below:

Cost of Energy (\$ million)				F2019			F2020			F2021		
Line	Column	Reference		RRA	Actual	Diff	Plan	Update	Diff	Plan	Update	Diff
				1	2	3=2-1	4	5	6=5-4	7	8	9=8-7
Sources of Supply (GWh)												
Market Energy												
8			Market Electricity Purchases	934	2,035	1,101	1,504	5,104	3,600	648	1,326	678
9			Surplus Sales	-4,517	-2,230	2,287	-2,403	-84	2,325	-3,087	-2,065	1,022
10			Net Purchases (Sales) from Powerex	105	647	542	177	468	290	90	-279	-369
11			Total	-3,478	452	3,930	-727	5,488	6,215	-2,349	-1,078	1,331
Market Energy												
34			Market Electricity Purchases	35.9	125.0	89.1	40.0	211.6	171.5	18.2	43.7	25.4
35			Surplus Sales	(129.2)	(115.0)	14.2	(37.1)	(0.4)	36.7	(111.4)	(37.0)	14.4
36			Net Purchases (Sales) from Powerex	0.7	25.0	24.3	(0.5)	33.1	33.6	0.5	6.1	5.6
31			Domestic Transmission - Export	29.9	18.5	(11.4)	17.4	1.1	(16.3)	21.0	17.0	(4.0)
38			Total	(62.6)	53.5	116.1	(40.2)	245.3	285.5	(71.7)	(30.3)	41.4
Unit Costs (\$/MWh)												
16			Water Rentals	7.7	8.6	0.9	7.8	8.4	0.6	7.8	7.3	(0.5)
17			Natural Gas for Thermal Generation	45.9	40.0	(6.0)	42.4	41.8	(0.6)	44.3	43.7	(0.6)
18			FPFs and Long-Term Commitments	34.7	87.5	(7.2)	39.6	92.8	(6.8)	39.8	92.6	(7.2)
19			Non-Integrated Area	258.9	281.0	22.1	268.4	259.1	(9.3)	260.9	250.7	(30.2)
20			Market Electricity Purchases	38.5	61.4	23.0	26.6	41.5	14.8	28.1	32.9	4.8
21			Surplus Sales	(28.6)	(51.8)	(23.0)	(40.3)	(5.0)	35.3	(36.1)	(47.0)	(10.9)
22			Total Weighted Cost	33.5	29.0	(4.5)	35.2	36.2	1.0	36.1	32.6	(3.5)

BCUC staff have prepared the table below based on information contained in Schedule 4.0:

Change in Surplus Sales	F2020	F2021
[A] Cost (\$ million) (Line 35)	\$96.7	\$14.4
[B] Volume (GWh) (Line 9)	2,325	1,022
Average Revenue ([A]/[B])	\$41.59	\$14.09
Change in Market Electricity Purchases	F2020	F2021
[C] Cost (\$ million) (Line 34)	\$171.5	\$25.4
[D] Volume (GWh) (Line 8)	3,600	678
Average Cost ([C]/[D])	\$47.64	\$37.46

Line 21 in Schedule 4.0 shows that the average revenue generated through surplus sales has changed from \$40.3/MWh to \$5.0/MWh in F2020 and from \$36.1/MWh to \$47.0/MWh in F2021.

3.6.2 Please discuss why the change in the average unit revenue from surplus sales of \$14.09/MWh is lower than average unit revenues from surplus sales of \$47.0/MWh in F2021. As part of the response, please provide the monthly volumes and prices that contribute to the change in average unit revenue.

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RESPONSE:

This response includes monthly actual generation and System Storage data which is considered commercially sensitive and which has been redacted in this public version of the response. Publication of this information would enable third-parties to model BC Hydro's system to estimate the depth of BC Hydro's energy need and to predict BC Hydro's import and export requirements. Given the high degree of sensitivity around these numbers, and the significant potential for harm that would result from inadvertent disclosure, the un-redacted version of this response has been made available to the BCUC only.

The change in the average unit price of revenue from Surplus Sales in fiscal 2021 is an increase of \$(10.90)/MWh, as shown on line 21 of Schedule 4.0 in Appendix A (column 9).

The reason that this calculation more appropriately reflects the change in the average unit price of surplus sales than the calculation provided in the question of \$14.09/MWh is explained in BC Hydro's response to BCUC CONF IR 3.6.1.

The change in the average unit price of revenue from Surplus Sales in fiscal 2021 in the Evidentiary Update of \$(10.90)/MWh is because the forward market price curve for electricity at Mid-C was higher at the time the Evidentiary Update was prepared. The Evidentiary Update was based on the forward market price curve as of June 6, 2019 and the Application was based on forward market prices as of October 15, 2018.

The tables below provide the monthly volumes, sales and average unit price of surplus sales for fiscal 2021 in the Evidentiary Update and in the Application.

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Monthly breakdown of Surplus Sales - Evidentiary Update

Fiscal 2021 Evidentiary Update	Schedule Reference	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	F2021 Update
Surplus Sales (\$million)	4.0 L35													
Surplus Sales (GWh)	4.0 L9													
Surplus Sales (\$/MWh)														

Monthly breakdown of Surplus Sales – Application

Fiscal 2021 RRA	Schedule Reference	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	F2021 Plan
Surplus Sales (\$million)	4.0 L35													
Surplus Sales (GWh)	4.0 L9													
Surplus Sales (\$/MWh)														

6.0 Reference: COST OF ENERGY
Exhibit B-1, Appendix DD, p. 14; Exhibit B-11-1, Appendix A, Schedule 4.0
Market energy – monthly costs and volumes

The volume and costs classified as Market Energy in Schedule 4.0 of Appendix A to the Evidentiary Update is reproduced below:

Cost of Energy (\$ million)				F2019			F2020			F2021		
Line	Column	Reference		RRA	Actual	Diff	Plan	Update	Diff	Plan	Update	Diff
				1	2	3=2-1	4	5	6=5-4	7	8	9=8-7
Sources of Supply (GWh)												
Market Energy												
8	Market Electricity Purchases			934	2,035	1,101	1,504	5,104	3,600	648	1,326	678
9	Surplus Sales			-4,517	-2,230	2,287	-2,403	-84	2,325	-3,087	-2,065	1,022
10	Net Purchases (Sales) from Powerex			105	647	542	177	468	290	90	-273	-363
11	Total			-3,478	452	3,930	-727	5,488	6,215	-2,349	-1,078	1,331
Market Energy												
34	Market Electricity Purchases			35.9	125.0	89.1	40.0	211.6	171.5	18.2	43.7	25.4
35	Surplus Sales			(129.2)	(115.0)	14.2	(37.1)	(0.4)	36.7	(111.4)	(37.0)	14.4
36	Net Purchases (Sales) from Powerex			0.7	25.0	24.3	(0.5)	33.1	33.6	0.5	6.1	5.6
31	Domestic Transmission - Export			29.9	18.5	(11.4)	17.4	1.1	(16.3)	21.0	17.0	(4.0)
38	Total			(62.6)	53.5	116.1	(40.2)	245.3	285.5	(71.7)	(30.3)	41.4
Unit Costs (\$/MWh)												
16	Water Rentals			7.7	8.6	0.9	7.8	8.4	0.6	7.8	7.3	(0.5)
17	Natural Gas for Thermal Generation			45.9	40.0	(6.0)	42.4	41.8	(0.6)	44.3	43.7	(0.6)
18	FPFs and Long-Term Commitments			34.7	87.5	(7.2)	39.6	92.8	(6.8)	39.8	92.6	(7.2)
19	Non-Integrated Area			258.9	281.0	22.1	268.4	259.1	(9.3)	260.9	250.7	(30.2)
20	Market Electricity Purchases			38.5	61.4	23.0	26.6	41.5	14.8	28.1	32.9	4.8
21	Surplus Sales			(28.6)	(51.8)	(23.0)	(40.3)	(5.0)	35.3	(36.1)	(47.0)	(10.9)
22	Total Weighted Cost			33.5	29.0	(4.5)	35.2	36.2	1.0	36.1	32.6	(3.5)

BCUC staff have prepared the table below based on information contained in Schedule 4.0:

Change in Surplus Sales	F2020	F2021
[A] Cost (\$ million) (Line 35)	\$96.7	\$14.4
[B] Volume (GWh) (Line 9)	2,325	1,022
Average Revenue ([A]/[B])	\$41.59	\$14.09
Change in Market Electricity Purchases	F2020	F2021
[C] Cost (\$ million) (Line 34)	\$171.5	\$25.4
[D] Volume (GWh) (Line 8)	3,600	678
Average Cost ([C]/[D])	\$47.64	\$37.46

Line 21 in Schedule 4.0 shows that the average revenue generated through surplus sales has changed from \$40.3/MWh to \$5.0/MWh in F2020 and from \$36.1/MWh to \$47.0/MWh in F2021.

3.6.3 Please explain why the change in average unit cost from market purchases (i.e. \$47.64/MWh and \$37.64/MWh) is higher than the average unit cost of market purchases shown on line 20 on Schedule 4.0 (i.e. \$41.50/MWh and \$32.90/MWh) in F2020 and F2021, respectively. As part of the response, please provide the

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monthly volumes and prices that contribute to the change in average unit cost.

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RESPONSE:

This response includes monthly actual generation and System Storage data which is considered commercially sensitive and which has been redacted in this public version of the response. Publication of this information would enable third-parties to model BC Hydro's system to estimate the depth of BC Hydro's energy need and to predict BC Hydro's import and export requirements. Given the high degree of sensitivity around these numbers, and the significant potential for harm that would result from inadvertent disclosure, the un-redacted version of this response has been made available to the BCUC only.

The change in the average unit cost of market purchases in fiscal 2020 and fiscal 2021 is an increase of \$14.80/MWh and \$4.80/MWh, respectively as shown on line 20 of Schedule 4.0 in Appendix A.

The reason that this calculation more appropriately reflects the change in the average unit price of market purchases than the calculation provided in the question of \$47.64/MWh and \$37.46/MWh is explained in BC Hydro's response to BCUC CONF IR 3.6.1.

The change in the average unit price of market purchases in fiscal 2020 and fiscal 2021 of \$14.80/MWh and \$4.80/MWh, respectively, is because the forward market price curve for electricity at Mid-C was higher at the time the Evidentiary Update was prepared. The Evidentiary Update was based on the forward market price curve at June 6, 2019 and the Application was based on the forward market prices as of October 15, 2018.

The tables below provide the monthly volumes, costs and average unit price of market purchases and for fiscal 2020 and fiscal 2021 from both the Evidentiary Update and in the Application.

British Columbia Utilities Commission CONFIDENTIAL Information Request No. 3.6.3 Dated: September 19, 2019 British Columbia Hydro & Power Authority PUBLIC Response issued October 18, 2019	Page 3 of 4
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Monthly breakdown of Market Electricity Purchases - Evidentiary Update – Fiscal 2020

Fiscal 2020 Evidentiary Update	Schedule Reference	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	F2020 Update
Market Purchases (\$million)	4.0 L34													
Market Purchases (GWh)	4.0 L8													
Average Unit Cost (\$/MWh)	4.0 L20													

Monthly breakdown of Market Electricity Purchases – Application – Fiscal 2020

Fiscal 2020 RRA	Schedule Reference	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	F2020 Plan
Market Purchases (\$million)	4.0 L34													
Market Purchases (GWh)	4.0 L8													
Average Unit Cost (\$/MWh)	4.0 L20													

Monthly breakdown of Market Electricity Purchases - Evidentiary Update – Fiscal 2021

Fiscal 2021 Evidentiary Update	Schedule Reference	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	F2021 Update
Market Purchases (\$million)	4.0 L34													
Market Purchases (GWh)	4.0 L8													
Average Unit Cost (\$/MWh)	4.0 L20													

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Monthly breakdown of Market Electricity Purchases – Application – Fiscal 2021

Fiscal 2021 RRA	Schedule Reference	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	F2021 Plan
Market Purchases (\$million)	4.0 L34													
Market Purchases (GWh)	4.0 L8													
Average Unit Cost (\$/MWh)	4.0 L20													

6.0 Reference: COST OF ENERGY
Exhibit B-1, Appendix DD, p. 14; Exhibit B-11-1, Appendix A, Schedule 4.0
Market energy – monthly costs and volumes

The volume and costs classified as Market Energy in Schedule 4.0 of Appendix A to the Evidentiary Update is reproduced below:

Cost of Energy (\$ million)				F2019			F2020			F2021		
Line	Column	Reference		RRA	Actual	Diff	Plan	Update	Diff	Plan	Update	Diff
				1	2	3=2-1	4	5	6=5-4	7	8	9=8-7
Sources of Supply (GWh)												
Market Energy												
8	Market Electricity Purchases			934	2,035	1,101	1,504	5,104	3,600	648	1,326	678
9	Surplus Sales			-4,517	-2,230	2,287	-2,403	-84	2,325	-3,087	-2,065	1,022
10	Net Purchases (Sales) from Powerex			105	647	542	177	468	290	90	-273	-363
11	Total			-3,478	452	3,930	-727	5,488	6,215	-2,349	-1,078	1,331
Market Energy												
34	Market Electricity Purchases			35.9	125.0	89.1	40.0	211.6	171.5	18.2	43.7	25.4
35	Surplus Sales			(123.2)	(115.0)	14.2	(37.1)	(0.4)	36.7	(111.4)	(37.0)	14.4
36	Net Purchases (Sales) from Powerex			0.7	25.0	24.3	(0.5)	33.1	33.6	0.5	6.1	5.6
31	Domestic Transmission - Export			29.9	18.5	(11.4)	17.4	1.1	(16.3)	21.0	17.0	(4.0)
38	Total			(62.6)	53.5	116.1	(40.2)	245.3	285.5	(71.7)	(30.3)	41.4
Unit Costs (\$/MWh)												
16	Water Rentals			7.7	8.6	0.9	7.8	8.4	0.6	7.8	7.3	(0.5)
17	Natural Gas for Thermal Generation			45.9	40.0	(6.0)	42.4	41.8	(0.6)	44.3	43.7	(0.6)
18	FPFs and Long-Term Commitments			34.7	87.5	(7.2)	39.6	92.8	(6.8)	39.8	92.6	(7.2)
19	Non-Integrated Area			258.9	281.0	22.1	268.4	259.1	(9.3)	260.9	250.7	(30.2)
20	Market Electricity Purchases			38.5	61.4	23.0	26.6	41.5	14.8	28.1	32.9	4.8
21	Surplus Sales			(28.6)	(51.8)	(23.0)	(40.3)	(5.0)	35.3	(36.1)	(47.0)	(10.9)
22	Total Weighted Cost			33.5	23.0	(4.5)	35.2	36.2	1.0	36.1	32.6	(3.5)

BCUC staff have prepared the table below based on information contained in Schedule 4.0:

Change in Surplus Sales	F2020	F2021
[A] Cost (\$ million) (Line 35)	\$96.7	\$14.4
[B] Volume (GWh) (Line 9)	2,325	1,022
Average Revenue ([A]/[B])	\$41.59	\$14.09
Change in Market Electricity Purchases	F2020	F2021
[C] Cost (\$ million) (Line 34)	\$171.5	\$25.4
[D] Volume (GWh) (Line 8)	3,600	678
Average Cost ([C]/[D])	\$47.64	\$37.46

Line 21 in Schedule 4.0 shows that the average revenue generated through surplus sales has changed from \$40.3/MWh to \$5.0/MWh in F2020 and from \$36.1/MWh to \$47.0/MWh in F2021.

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- 3.6.4 Please provide the reasons for the following difference in change in respective average unit revenue and average unit costs per MWh:
- a) Surplus sales: \$41.59 in F2020 compared to \$14.09 in F2021; and
 - b) Market electricity purchases: \$47.64 in F2020 compared to \$37.46 in F2021.

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RESPONSE:

As discussed in BC Hydro's response to BCUC CONF IR 3.6.1, a more appropriate comparison of the change in the average unit price of Surplus Sales and Market Electricity Purchases is BC Hydro's calculation of the change which is shown on line 21 of Schedule 4.0 in Appendix A (columns 6 and 9) for Surplus Sales, and line 20 of Schedule 4.0 in Appendix A (columns 6 and 9) for Market Electricity Purchases.

The explanation for the change in Surplus Sales is provided in BC Hydro's response to BCUC CONF IRs 3.6.1 and 3.6.2.

The explanation for the change in Market Electricity Purchases is provided in BC Hydro's response to BCUC CONF IR 3.6.3.

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**7.0 Reference: COST OF ENERGY
Exhibit B-5-1, BCUC IR 18.3
Natural gas purchases – Island Generation**

BC Hydro’s response to BCUC IR 18.3 provided the average nominal prices (\$/MWh) for the following gas fired thermal generators:

Houweling Nurseries (Delta) Cogeneration:	██████████
Island Generation	██████████
McMahon Generating	██████████

3.7.1 Please explain why the average nominal price for Island Generation is higher than the nominal price for Houweling Nurseries (Delta) Cogeneration and McMahon Generating by approximately 3,600 percent and 5,300 percent, respectively.

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RESPONSE:

A component of the preamble to the question includes commercially sensitive information which has been redacted in the public version of the response. The un-redacted version of this response is being made available to the BCUC only as public disclosure could impact BC Hydro’s and the IPP’s commercial interests.

The Average Price (\$/MWh Nominal) for each EPA is calculated by dividing the total costs (which includes the deemed energy cost as mentioned in BC Hydro’s response to BCUC IR 1.18.3) by the energy delivered (i.e., excluding deemed energy).

For the Island Generation facility, the total cost of energy includes the EPA cost (primarily a fixed EPA annual charge), the fixed gas transportation costs and the variable gas commodity costs. The facility is forecast to be only dispatched for reliability and economic reasons resulting in low forecast energy deliveries. Based on the low forecast operation, the total cost of energy is expected to be mostly comprised of the fixed EPA and gas transportation costs.

Accordingly, the average price per MWh calculated using delivered energy only will be disproportionately high as compared to the average price of energy from facilities that are run on a continuous basis, such as McMahon and Houweling.