

Corix Multi-Utility Services Inc.
Burnaby Mountain District Energy Utility 2020-2023 Revenue Requirement and Rates Application

CORIX MULTI-UTILITY SERVICES INC. RESPONSE TO BCUC INFORMATION REQUEST NO. 1

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A. INTERIM RATE REQUEST FOR JANUARY 1, 2021

- 1.0 Reference: INTRODUCTION
Exhibit B-1, Section 1.3, p. 6; Appendix E
Interim Approval Sought Effective January 1, 2021 for UniverCity**

The response to Question 1 regarding UniverCity’s Interim Rates for January 1, 2021 can be found in the proceeding documents as Exhibit B-6.

- 2.0 Reference: RATE DESIGN
Exhibit B-1, Section 10.1, p. 72; Appendix E; Order G-220-20
Interim Approval Sought Effective January 1, 2021 for SFU**

The response to Question 2 regarding SFU’s Interim Rates for January 1, 2021 can be found in the proceeding documents as Exhibit B-6.

B. THERMAL ENERGY AND LOAD DEMAND FORECAST

- 3.0 Reference: THERMAL ENERGY AND LOAD DEMAND FORECAST
Exhibit B-1, Section 4.1.1, Table 2, p. 20; Corix Application for a Certificate of Public Convenience and Necessity (CPCN) for the Burnaby Mountain District Energy Utility proceeding (2017 BMDEU CPCN Proceeding), Exhibit B-2, BCUC IR 1.10.3
UniverCity Project Build-out Schedule**

In Table 2, Corix provides a comparison between the most recent UniverCity build-out schedule (updated June 2020) with that from the approved 2017 BMDEU CPCN. The Table shows a 2-4 year delay in the build-out schedule compared to 2017. In response to BCUC IR 1.10.3 in the 2017 BMDEU CPCN proceeding, Corix considered that scenario, described as a build-out 20% slower than forecast, the least probable with a likelihood of less than 5%.

- 3.1 Why has the pace of development slowed down significantly since 2017?

Corix Response:

SFU Community Trust is responsible for leasing the parcels to individual developers. They study market absorption rates and make sure there is only a certain number of parcels released for the development to meet the market demand. 2018 and 2019 saw a significant real-estate market slow-down, and the UniverCity development was not an exception. Corix communicates regularly with SFU Trust on any changes to the development schedule and adjusts the capital plan and the infrastructure development accordingly.

- 3.1.1 Is there a risk that a slow down of this magnitude happen again in the near term?

Corix Response:

It is possible for a slowdown in build-out to occur again. However, Corix cannot speculate on the likelihood of a slowdown happening as this depends on a multitude of factors that include, but is not limited to, the overall state of the general economy, developer access to financing at a reasonable cost, property sales-to-active listings ratios, affordability for buyers, immigration, mortgage rates, permitting delays, geotechnical issues and construction delays.

Corix maintains contact with the developers who periodically provides Corix with updates to the build-out schedule. Corix then uses this up-to-date information to inform the development of the UniverCity district energy system. An example of this would be delaying capital expenditure on energy transfer stations where possible to align with the latest build-out schedule.

- 3.2 Please confirm that the buildings located on parcels P17 and P31 have already obtained occupancy or are still on track for occupancy by December 31, 2020, as shown in Table 2. If not, please provide an update.

Corix Response:

P17 and P31 were recently commissioned on November 9th and 10th respectively. Both buildings are now receiving thermal energy service from Corix.

- 3.3 As shown in Table 2, please confirm, or otherwise explain, that at the end of 2020, 55% of the total floor area (118,742 m²) and 63% of the total diversified load (4,930 kW) will be served by the BMDEU.

Corix Response:

Confirmed.

**4.0 Reference: THERMAL ENERGY AND LOAD DEMAND FORECAST
Exhibit B-1, Section 4.1.1, pp. 20, 22
UniverCity Diversified Load**

Table 2 on page 20 shows an updated diversified load of 7,860 kW in 2024 for the UniverCity development.

On page 22, Corix states, “[w]hile the total floor area for UniverCity has only changed by a fraction of a percentage in the updated build-out schedule, the forecast total diversified capacity required by UniverCity has been reduced by 1,331 kW, or 14.5% at full build-out. This updated load demand was developed after the 2017 CPCN application submission using observed peak loads for existing buildings.”

- 4.1 Please confirm, or otherwise explain, that Corix uses the terms “diversified load” and “diversified capacity” interchangeably.

Corix Response:

Not confirmed. Corix used the term “total diversified capacity required by UniverCity” twice in the document to describe the capacity required to meet the diversified load of UniverCity.

Staff prepared the following table comparing the 2017 BMDEU CPCN Application with the 2020 Application in respect of relevant input data to calculate the diversified load:

Inputs to calculate Diversified Load	2017 BMDEU CPCN Application	2020 Application	Difference
Floor Area (m ²)	213,984	214,196	0.1% increase
Average Peak Load Demand (W/m ²)	50 ¹	50 ²	No change

¹ 2017 BMDEU CPCN proceeding, Exhibit B-1, Table 6, p. 29.

² Exhibit B-1, Table 3, p. 20

Diversification Factor	85% ³	85% ⁴	No change
Diversified Load	9,191	7,860	14.5% decrease

- 4.2 Please clarify why the diversified capacity has been reduced by 1,331 kW or 14.5% at full build-out when the inputs used to calculate it have remained the same.

Corix Response:

The forecast peak load was updated using observed peak loads for existing buildings, and future loads were re-forecasted using the updated demand intensities (kW/m²) derived from the observed building peak loads. The methodology to forecast the diversified peak loads and annual energy demand has not changed. We continue to use demand intensities kW/m² to forecast peak load demand and average energy intensities kWh/M²/year for wood frame and concrete buildings respectively using metered averages, and applying any known or planned building efficiency measures (e.g. Step Code). We have also applied a factor representing the observed peak and contracted capacity. It is important to mention that the observed peak at each building was achieved at different times therefor the peak load requirement of the system cannot be calculated as a sum of these observed peaks.

**5.0 Reference: THERMAL ENERGY AND LOAD DEMAND FORECAST
Exhibit B-1, Section 3.1.5, p. 18; Section 4.1.2, pp. 22
UniverCity Load Analysis and Energy Demand Forecast**

On page 18 of the Application, Corix states, “actual consumption at UniverCity from 2015 to 2018 were used to establish an updated Energy Use Intensity (EUI) that was then used to update the forecast load demand and energy forecasts for UniverCity.”

On page 22, Corix states, “based on the measured data collected since 2012 at completed residential buildings, the following average EUI and [Peak Load Demand (PLD)] factors have been establish for high-rise concrete and low-rise wood frame buildings to calculate future system peak load and annual energy demand.”

- 5.1 Please clarify whether Corix used consumption data from the 2015-2018 or the 2012-2018 period to update the EUI and PLD factors.

Corix Response:

Corix used actual observed peaks since 2012 to update the PLD. Each building reached the peak load at different time and those were averaged for concrete and wood frame buildings and used to forecast peak loads for future building. Corix used actual data energy demand data since 2012 to determine energy use intensity used to forecast future buildings energy demand.

- 5.1.1 If the 2015-2018 period was used, please clarify why Corix did not use the consumption data from a longer period (2012 to 2018). Would using a longer period be more representative of the energy demand and increase accuracy of forecasts?

Corix Response:

Corix used data from 2012-2018.

- 5.1.2 Please compare the average EUI and PLD obtained from actual consumption data from

³ 2017 BMDEU CPCN proceeding, Exhibit B-1, Table 6, p. 29.

⁴ Exhibit B-1, Table 3, p. 20

the 2015-2018 and the 2012-2018 periods.

Corix Response:

Please see the table below.

Table 1: Comparison Table responding to question 5.1.2

UniverCity Load and Energy Assumptions	Based on Operational Data collected since 2012 - 2018	Based on Operational Data collected since 2015 - 2018
EUI – high rise concrete (kWh/m ²)	130	142
EUI – low rise wood frame (kWh/m ²)	105	111
PLD – average (kW/h)	50	52

5.1.3 Based on these two average sets, is Corix able to discern a trend in energy use from 2012 to 2018 (increasing or decreasing energy use)?

Corix Response:

When compared, the averages from any given time period will be different. Each year or each heating season is impacted by outside factors, such as weather conditions, occupancy and customer behaviour that are not under utility provider’s control. Therefore, it is more accurate to use the average over a longer period of time that results in a more representative and accurate data.

On page 22, Corix states that it uses operational data for existing buildings in combination with design requirements from the building developers to help determine the EUI and Peak PLD for each new building.

5.2 Please explain the methodology to determine the EUI and PLD of new buildings, including an elaboration on how Corix combines operational data with design requirements from developers.

Corix Response:

During the peer review of the building design, Corix compares information provided by the developer with the actual metered data for the building of the similar type and design approach and requirements (such as energy efficiency). If the building design, and more specifically in-building mechanical systems design is significantly different from the designs applied at other buildings, Corix takes this into consideration when determining the building peak loads and energy demand. To date only two buildings vary significantly from the other buildings being built within UniverCity, the Child Care facility (Living Building meeting net zero energy) and Parcel 21 – Passive house. Parcel 21 will be connected to the BMDEU to receive the domestic hot water service only, the space heating will be provided by electric baseboards. For a typical building, Corix relies on the actual operational data.

5.3 Please complete the table below to compare the EUIs and PLDs derived from operational data since 2012 to those obtained with the method combining operational data with design requirements provided by developers:

UniverCity Load and Energy Assumptions	Based on Operational Data collected since 2012	Combination of Operational Data since 2012 and Design Requirements provided by Developers
EUI – high rise concrete (kWh/m ²)	130	

EUI – low rise wood frame (kWh/m2)	105	
Average Peak Load Demand (W/m2)	50	
Diversified Factor	85%	

Corix Response:

Corix does not have a specific metrics for a combination of operational data and developer’s design requirements and therefore is not able to fill in the table above. The developer design requirements are taken into consideration on a case-by-case basis, e.g. the passive house design requirements.

During a peer review process, the parties agree on the “contracted capacity” required by the building and Corix assures that those capacities can be met. When comparing historical operational data between the contractual capacity and observed peak, the following factors have been observed:

- Average peak vs contracted (concrete) - 68%
- Average peak vs. Contracted (woodframe) - 80%

Corix takes these factors into consideration when determining the plant capacity requirements.

5.3.1 Please discuss any material difference between the operational data collected on existing buildings and the combination method, and any impact this may have on the accuracy of Corix’s load forecast.

Corix Response:

Corix is confident with the use of operational data to forecast peak loads and energy demand. In case of the special design, Corix works closely with a developer to determine the peak loads and energy demand, and adjusts the forecast accordingly. In addition, the new CEP is equipped with VTS SCADA that will be able to monitor the peak plant capacity. This data will be compared with the buildings peaks and the diversification factor adjusted accordingly.

**6.0 Reference: THERMAL ENERGY AND LOAD DEMAND FORECAST
Exhibit B-1, Section 4.1.2, Table 4, p. 23
Sensitivity Analysis**

Corix forecasts UniverCity’s cumulative peak load and annual energy demand as follows:

Table 4: UniverCity Forecast Cumulative Peak Load and Annual Energy Demand (2020-2025)

UniverCity	TEST PERIOD				UNIVERCITY BUILD-OUT	
	2020	2021	2022	2023	2024	2025
Cumulative Diversified Load Demand (kW)	4,507	5,336	6,011	6,750	7,540	7,860
Annual Energy Demand (MWh)	12,922	16,086	18,926	21,447	24,071	25,215

6.1 Please provide the cumulative diversified load demand and annual energy demand from 2020 to 2025 under the following scenarios:

- i) Build-out schedule is consistently 20% slower, 10% slower, 10% faster and 20% faster

than anticipated; and

ii) UniverCity’s annual energy consumption for each year is -20%, -10%, +10% and +20% from forecast.

Corix Response:

Corix has calculated the amounts given the requested Scenarios. Please see the table below, which calculates the variance in each year as either lower or higher based on the scenario requested.

Table 2: Response to Question 6.1

UniverCity	Test Period				UniverCity Build-Out	
	2020	2021	2022	2023	2024	2025
Cumulative Diversified Load Demand (kW)	4,507	5,336	6,011	6,750	7,540	7,860
Annual Energy Demand (MWh)	12,922	16,086	18,926	21,447	24,071	25,215
Scenarios						
Cumulative Diversified Load Demand (kW)						
Build out 20% slower	3,606	4,269	4,809	5,400	6,032	6,288
Build out 10% slower	4,056	4,803	5,410	6,075	6,786	7,074
Build out 10% faster	4,507	5,870	6,612	7,425	8,294	8,646
Build out 20% faster	12,922	6,404	7,213	8,100	9,048	9,247
Annual Energy Demand (MWh)						
Annual Energy Consumption 20% slower	10,338	12,869	15,140	17,158	19,257	20,172
Annual Energy Consumption 10% slower	11,630	14,477	17,033	19,302	21,664	22,693
Annual Energy Consumption 10% faster	4,507	17,694	20,818	23,592	25,215	25,215
Annual Energy Consumption 20% faster	12,922	19,303	22,711	25,215	25,215	25,215

6.2 Please calculate the impact of each of the above scenarios on the revenue requirements, rates (Basic Charge, Variable Rate, Variable Energy Charge, Rate Rider) and deferral account balance for the UniverCity customers for each year within the test period, respectively. Please provide supporting calculations.

Corix Response:

Please note that the diversified load demand and annual energy demand vary are not independent of the incremental floor area associated with the build-out schedule. Please note that in order to provide the requested analyses, the capital costs have been adjusted to take into account changes in the timing of capital expenditure associated with the connection of each building and the various build-out scenarios. Incremental floor area additions also vary with the build-out scenario.

To perform the analysis the assumption was made that each scenario would show a corresponding shift in the capital costs and incremental floor area by the same percentage changes as requested for load demand and annual energy demand. This is a simplifying assumption as different customer connections will add different percentage changes in floor area given the size of the building connected.

Please see the table below which summarizes the impact of each of the above scenarios.

Table 3: Incremental Floor Area and Capital Cost Shifts for Scenarios in Question 6.2

Scenario: Inputs								
Scenarios	Scenarios	Change	2020	2021	2022	2023	2024	2025
Annual Load Demand Diversified (kW) - UniverCity	BASE		4,507	5,336	6,011	6,750	7,540	7,860
Annual Energy Demand (MWh) - UniverCity	BASE		12,922	16,086	18,926	21,447	24,071	25,215
Annual Load Demand Diversified (kW) - UniverCity	A	-20%	3,606	4,269	4,809	5,400	6,032	6,288
Annual Energy Demand (MWh) - UniverCity	A	-20%	10,338	12,869	15,140	17,158	19,257	20,172
Annual Load Demand Diversified (kW) - UniverCity	B	-10%	4,056	4,803	5,410	6,075	6,786	7,074
Annual Energy Demand (MWh) - UniverCity	B	-10%	11,630	14,477	17,033	19,302	21,664	22,693
Annual Load Demand Diversified (kW) - UniverCity	C	10%	4,507	5,870	6,612	7,425	8,294	8,646
Annual Energy Demand (MWh) - UniverCity	C	10%	12,922	17,694	20,818	23,592	25,215	25,215
Annual Load Demand Diversified (kW) - UniverCity	D	20%	4,507	6,404	7,213	8,100	9,048	9,247
Annual Energy Demand (MWh) - UniverCity	D	20%	12,922	19,303	22,711	25,215	25,215	25,215
			2020	2021	2022	2023	2024	2025
Capital Costs UniverCity Build out - Base Case			\$ 1,044,550	\$ 1,584,450	\$ 661,470	\$ 1,124,760	\$ 290,500	\$ -
Incremental floor area (sq metres)			23,474	27,656	17,826	28,182	21,790	-
Approximate shift in Capital Costs (adjustment)	BASE		-	-	-	-	-	-
Incremental floor area (sq metres)	BASE		23,474	27,656	17,826	28,182	21,790	-
Approximate shift in Capital Costs (adjustment)	A	-20%	\$ (208,910)	\$ (316,890)	\$ (132,294)	\$ (224,952)	\$ 391,900	\$ 491,146
Incremental floor area (sq metres)	A	-20%	18,779	22,125	14,261	22,546	17,432	23,786
Approximate shift in Capital Costs (adjustment)	B	-10%	\$ (104,455)	\$ (158,445)	\$ (66,147)	\$ (112,476)	\$ (29,050)	\$ 470,573
Incremental floor area (sq metres)	B	-10%	21,127	24,890	16,043	25,364	19,611	11,893
Approximate shift in Capital Costs (adjustment)	C	10%	\$ 104,455	\$ 158,445	\$ 66,147	\$ (38,547)	\$ (290,500)	\$ -
Incremental floor area (sq metres)	C	10%	25,821	30,422	19,609	31,000	12,076	-
Approximate shift in Capital Costs (adjustment)	D	20%	\$ 208,910	\$ 316,890	\$ (10,348)	\$ (224,952)	\$ (290,500)	\$ -
Incremental floor area (sq metres)	D	20%	28,169	33,187	21,391	33,818	2,362	-

Corix has produced the table on the following page based on the inputs from Tables 2 and 3 above. The table shows the impact to the requested outputs: the revenue requirements, the basic charge, variable rate, rate rider, variable energy charge and the deferral account balance. Therefore if the figure zero (0) is shown as the impact to one of the outputs, then this means the scenario has no impact to that particular output.

For example, Scenario B which is a build-out schedule that is 10% slower coupled with annual energy consumption that is 10% lower:

- Has no impact to the requested Basic Charge in this Application (from 2020 through to 2023);
- Would result in an increase of \$0.0003 per kWh (or 1%) to the proposed 2021 Variable Energy Charge of \$0.0293 per kWh;
- Reduces the 2021 revenue requirement by \$45,917; and
- Results in an increase of \$96,967 to the forecast deferral account balance.

As shown in Table 4, none of the scenarios impacts the proposed Basic Charge due to the existence of the Revenue Deficiency Deferral Account. The impacts occur outside of the period (2024 and 2025) for which Corix is requesting approval of rates.

Table 4: Response to Question 6.2

Base Scenario: As filed							
Rate:	Existing		Proposed				
Effective Date:	Jan 1 st	Sep 1 st	Jan 1 st				
	2020	2020	2021	2022	2023	2024	2025
Basic Charge (\$/m ² per Month)	0.5769	0.5769	1.0482	1.1321	1.2227	1.2473	1.2724
Variable Rate (\$/kWh)	0.0588	0.0588	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
2020 4-month Rate Rider (\$/m ² per Month)	N/A	0.2748	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
Variable Energy Charge (\$/kWh)	N/A	N/A	0.0293	TBD*	TBD*	TBD*	TBD*
Revenue Requirement	\$ 1,293,431	\$ 2,074,691	\$ 3,283,494	\$ 3,461,578	\$ 3,637,780	\$ 3,785,404	\$ 3,854,913
Deferral Account balance	\$ 2,700,852	\$ 3,319,861	\$ 4,680,653	\$ 5,765,992	\$ 5,945,175	\$ 5,746,951	\$ 5,314,646
Scenario A							
Rate:	Existing		Proposed				
Effective Date:	Jan 1 st	Sep 1 st	Jan 1 st				
	2020	2020	2021	2022	2023	2024	2025
Basic Charge (\$/m ² per Month)	0	0	0.0000	0.0000	0.0000	-0.0098	-0.0198
Variable Rate (\$/kWh)	0	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
2020 4-month Rate Rider (\$/m ² per Month)	N/A	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
Variable Energy Charge (\$/kWh)	N/A	N/A	0.0006	TBD*	TBD*	TBD*	TBD*
Revenue Requirement		\$ (74,402)	\$ (92,321)	\$ (108,260)	\$ (119,275)	\$ (140,725)	\$ (146,772)
Deferral Account balance	\$ -	\$ 96,418	\$ 191,595	\$ 360,517	\$ 375,526	\$ 492,948	\$ 503,021
Scenario B							
Rate:	Existing		Proposed				
Effective Date:	Jan 1 st	Sep 1 st	Jan 1 st				
	2020	2020	2021	2022	2023	2024	2025
Basic Charge (\$/m ² per Month)	0	0	0.0000	0.0000	0.0000	-0.0050	-0.0101
Variable Rate (\$/kWh)	0	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
2020 4-month Rate Rider (\$/m ² per Month)	N/A	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
Variable Energy Charge (\$/kWh)	N/A	N/A	0.0003	TBD*	TBD*	TBD*	TBD*
Revenue Requirement		\$ (36,133)	\$ (45,917)	\$ (53,843)	\$ (59,302)	\$ (70,022)	\$ (73,020)
Deferral Account balance	\$ -	\$ 49,307	\$ 96,967	\$ 181,503	\$ 189,089	\$ 248,275	\$ 253,728
Scenario C							
Rate:	Existing		Proposed				
Effective Date:	Jan 1 st	Sep 1 st	Jan 1 st				
	2020	2020	2021	2022	2023	2024	2025
Basic Charge (\$/m ² per Month)	0	0	0.0000	0.0000	0.0000	0.0075	0.0155
Variable Rate (\$/kWh)	0	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
2020 4-month Rate Rider (\$/m ² per Month)	N/A	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
Variable Energy Charge (\$/kWh)	N/A	N/A	-0.0001	TBD*	TBD*	TBD*	TBD*
Revenue Requirement		\$ 252	\$ 48,275	\$ 56,972	\$ 62,954	\$ 33,823	\$ (83)
Deferral Account balance	\$ -	\$ (8,091)	\$ (53,684)	\$ (135,702)	\$ (140,609)	\$ (116,773)	\$ (41,386)
Scenario D							
Rate:	Existing		Proposed				
Effective Date:	Jan 1 st	Sep 1 st	Jan 1 st				
	2020	2020	2021	2022	2023	2024	2025
Basic Charge (\$/m ² per Month)	0	0	0.0000	0.0000	0.0000	0.0154	0.0316
Variable Rate (\$/kWh)	0	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
2020 4-month Rate Rider (\$/m ² per Month)	N/A	0	Discontinued	Discontinued	Discontinued	Discontinued	Discontinued
Variable Energy Charge (\$/kWh)	N/A	N/A	-0.0002	TBD*	TBD*	TBD*	TBD*
Revenue Requirement		\$ 504	\$ 96,447	\$ 113,821	\$ 111,535	\$ 36,440	\$ (2,735)
Deferral Account balance	\$ -	\$ (16,183)	\$ (107,373)	\$ (271,414)	\$ (281,708)	\$ (235,374)	\$ (83,845)

6.3 Please discuss the likelihood of each scenario occurring.

Corix Response:

Corix cannot speculate on the likelihood of a slowdown or acceleration of property development occurring. These circumstances depend on a multitude of factors that include, but is not limited to, the overall state of the general economy, developer access to financing at a reasonable cost,

property sales-to-active listings ratios, affordability for buyers, immigration, mortgage rates, permitting delays, geotechnical issues and construction delays. It is also important to note that the analysis was conducted based on assumptions related to percentage changes in the build-out schedule which does not represent the nature of the UniverCity build-out since floor area is added in fixed increments. While it is likely that UniverCity’s actual energy consumption will vary from forecast in any given year Corix cannot speculate on the likelihood of a particular magnitude of energy consumption variance.

**7.0 Reference: THERMAL ENERGY AND LOAD DEMAND FORECAST
Exhibit B-1, Section 4.1.2, p. 24; Appendix D, Attachment I, Sections 2.1 and 2.2, p. 9
Sensitivity Analysis**

On page 24 of its Application, Corix states that Simon Fraser University’s (SFU) energy requirements were obtained from the SFU DES’ operational data and provides SFU’s baseload and annual energy demand forecast in Table 5:

Table 5: SFU Baseload and Annual Energy Demand Forecast

SFU Baseload and Energy Demand	
Biomass Baseload	10 MW
Annual Average Energy Demand	43,787 MWh

7.1 Please provide the biomass baseload and annual energy demand from 2020 to 2025 under the following scenarios:

7.1.1 SFU’s biomass baseload demand is -20%, -10%, +10% and +20% from forecast.

Corix Response:

SFU’s biomass baseload at -20%, -10%, +10% and +20% from forecast would be 8MW, 9MW, 11MW and 12MW respectively.

However, it should be noted that if SFU’s biomass baseload demand is 8 MW or 9 MW, then SFU would continue to pay for 10 MW as 10 MW is the nominated capacity as per the TESA. A change to the nominated capacity is not contemplated as this would require an amendment to the contract after detailed consideration of the district energy system peak load requirements and system capacity. As such, Corix would continue to uphold it’s contractual obligation of 10 MW in both scenarios where SFU’s biomass baseload is 8 MW or 9 MW.

SFU is contractually limited to a maximum of 10 MW biomass baseload. Additional capacity is provided by SFU’s peaking infrastructure. Therefore, Corix considers that it would not be helpful to provide analyses with SFU’s biomass baseload exceeding 10MW as these scenarios are not feasible.

7.1.2 SFU’s annual energy consumption for each year is -20%, -10%, +10% and +20% from forecast.

Corix Response:

SFU’s annual energy consumption for each year at -20%, -10%, +10% and +20% from forecast would be 35,030 MWh, 39,408 MWh, 48,166 MWh and 52,544 MWh

respectively.

Please note that energy costs for SFU are flowed-through to the customer. BCUC Order C-5-17 approved a Fuel Cost Deferral Account for SFU meant to capture the difference between the forecast and actual costs incurred by Corix for biomass and electricity associated with the provision of service to SFU under the TESA. Section 9.3 of the Application outlines Corix's proposal to use a fixed charge rate rider to recover/refund the balance in the SFU Fuel Cost Deferral Account using a 12-month amortization period. Therefore, a variance in SFU's annual energy consumption from forecast would be captured in the Fuel Cost Deferral Account and would not impact any of the rates proposed in this Application (i.e. Capacity Charge, Consumption Charge, Availability Charge).

- 7.2 Please calculate the impact of each of the above scenarios on the revenue requirements, rates (Capacity Charge, Consumption Charge, Availability Charge, and rate riders) and the deferral account balance for the SFU customer for each year within the test period, respectively. Please provide supporting calculations.

Corix Response:

Due to the contractual obligations outlined in the TESA there will be no impact to the proposed rates if SFU's baseload demand falls below 10MW and SFU's baseload requirement is contractually limited to 10MW. Please see the response to question 7.1.1 for additional information.

Due to the existence of flow-through energy costs, the BCUC-approved SFU Fuel Cost Deferral Account and the proposed approach to address the balance in this deferral account, variances in SFU's consumption when compared to the forecast will have no impact to the rates proposed in this Application.

Directionally, should SFU's consumption result in lower energy costs for SFU than forecast, then this would result in a surplus balance in the Fuel Cost Deferral Account. This surplus balance would be refunded to SFU in equal payments over a 12-month period through a negative fixed charge rate rider. Conversely, should SFU's consumption result in higher energy costs for SFU than forecast, then this would result in a deficit balance in the Fuel Cost Deferral Account. This deficit balance would be recovered from SFU in equal payments over a 12-month period through a positive fixed charge rate rider.

While it is likely that SFU's actual energy consumption will vary from forecast in any given year Corix cannot speculate on the likelihood of a particular magnitude of variance.

- 7.3 Please discuss the likelihood of each scenario occurring.

Corix Response:

Please see the response to Question 7.1.1 and 7.1.2 above.

Section 2.2 of the Amended and Restated Thermal Energy Services Agreement (TESA), related to the provision of thermal energy by Corix, is reproduced below:

2.2 Use of Thermal Energy from the CEP

- (a) While SFU intends to use Thermal Energy generated by Corix from the Biomass fired boilers in the CEP to meet the baseload Thermal Energy requirements of

the Campus Distribution System during the Service Term, SFU will have no obligation to take and use Thermal Energy from the CEP under this Agreement.

- (b) Notwithstanding Section 2.2 (a), the Biomass facilities in the CEP will be designed to operate efficiently at or above the Threshold Capacity and SFU will, subject to having a need for Thermal Energy for the Campus Distribution System, take Thermal Energy from Corix under this Agreement in priority to generating Thermal Energy for the Campus Distribution System from the Existing Campus Plant at times when the Thermal Energy load from the Residents is below the Threshold Capacity until the combined Thermal Energy load from the Campus Distribution System and the Residents reaches the Threshold Capacity. The delivery of Thermal Energy to SFU from the CEP in these low load conditions will be an automated function determined by Corix and SFU during the detailed design of the Infrastructure under the Infrastructure Agreement. Notwithstanding the foregoing, SFU will not be required to take Thermal Energy from Corix in these low load conditions in priority to generating Thermal Energy from the Existing Campus Plant if taking Thermal Energy from Corix is less economic to SFU in comparison to the variable cost to SFU of generating Thermal Energy from the Existing Campus Plant having regard for the cost of natural gas to SFU, including any carbon taxes and the cost of acquiring greenhouse gas offsets, as required. The determination of whether taking Thermal Energy from Corix in these low load conditions is less economic to SFU will be made by SFU at the beginning of the low heating season based on a forecast of these relative costs. [emphasis added]

- 7.4 Considering Section 2.2 (a) and (b) of the Amended and Restated TESA, please discuss the likelihood that SFU will consume 43,787 MWh, or more/less of thermal energy annually during the 2020 to 2023 test period.

Corix Response:

Corix notes that Question 7.3 above requests the same information as Question 7.4. Please see Questions 7.1.2 and 7.2 above for Corix's response.

- 8.0 Reference: THERMAL ENERGY AND LOAD DEMAND FORECAST
Exhibit B-5, Slide 15; Transcript Volume 1, p. 13, Lines 16-24
Biomass Demand Forecast**

Slide 15 shows the Biomass Demand Forecast:

Biomass Demand Forecast

Energy Demand	2020	2021	2022	2023	2024	2025
Annual Energy Demand (MWh) (UniverCity)	12,922	16,086	18,926	21,447	24,071	25,215
Annual Energy Demand (MWh) (UniverCity)	14,596	43,787	43,787	43,787	43,787	43,787
Total Annual Energy Demand (MWh) - BMDEU	27,518	59,873	62,713	65,234	67,858	69,002
Biomass Demand (MWh) - SFU	14,596	43,787	43,787	43,787	43,787	43,787
Biomass Demand (MWh) – UniverCity	3,338	12,465	14,666	16,620	18,653	19,539
Natural Gas Demand (MWh) – UniverCity	9,584	3,621	4,260	4,828	5,418	5,676
Total demand (MWh) - BMDEU	27,518	59,873	62,713	65,234	67,858	69,002
Biomass % of Total Demand	65%	94%	93%	93%	92%	92%
SFU % of Total Biomass Demand	81%	78%	75%	72%	70%	69%
UniverCity % of Total Biomass Demand	19%	22%	25%	28%	30%	31%

During the Workshop presentation, Corix stated:

So this slide presents new information, so this is not in the application but it's been added to the evidentiary record through this medium here. And essentially it breaks down the biomass demand forecasts for both customer groups. So what you'll see here is first we start with a total annual energy demand, then we break it down into the biomass demand for SFU, UniverCity and the natural gas demand for UniverCity.

- 8.1 Please confirm that the second line in the table above refers to SFU’s annual energy demand, not UniverCity’s.

Corix Response:
Confirmed.

- 8.2 Please confirm that Corix’s total biomass demand (MWh) at BMDEU can be calculated by summing SFU’s and UniverCity’s biomass demands in the table above:

	2020	2021	2022	2023	2024	2025
Total Biomass Demand (MWh)	17,934	56,252	58,453	60,407	62,440	63,326

Corix Response:
Confirmed.

- 8.2.1 Please explain how Corix forecasts the total biomass demand from 2020 to 2025. Please provide the supporting calculations.

Corix Response:

The total biomass demand is determined by summing the biomass demand for SFU with the biomass demand for UniverCity, taking into consideration that a portion of UniverCity’s annual energy demand will be provided from the natural gas module within the central energy plant. The annual energy demand is determined using a load duration curve (LDC) for both, SFU and UniverCity. The annual energy is determined as the area under the curve. The load duration curves and approach to determining the demand was discussed in detail in Corix’s responses to BCUC IR No 1. during the CPCN process (IR 9, 10). The calculations for the biomass demand for SFU and UniverCity are provided below.

SFU Annual Energy and Biomass Demand Forecast

SFU’s biomass demand was forecast using the same information and calculations

presented to the BCUC in response to BCUC IR No. 1, Questions 9.2 and 9.3 in the 2017 BMDEU CPCN proceeding.⁵ The information has been copied below.

“The SFU energy demand forecast was established using the following:

- (a) Historical plant thermal peak [30 MWt] as provided by SFU operations.
- (b) The expected thermal energy requirements established using 10 year average gas and oil consumption (April 2006 thru March 2016). The raw input fuel data was normalized to a base year using the heating degree data (HDD) for each year and the thirty year average. The normalized fuel data was then converted to thermal energy requirements by multiplying by a seasonal boiler efficiency of 80%. Please refer to Attachment III (filed with the Commission as a confidential document as noted in IR 9.1 above), and summarized below:
 - i. 10 Year Average Input Fuel Energy: 222,386 GJ (61,774 MWh)
 - ii. HDD Corrected Fuel Data: 231,097 GJ (64,222 MWh)
 - iii. Expected Thermal Requirements: $64,222 \times 80\% = 51,378$ MWht⁶

“SFU Peak Load = 30 MWt, Projected Annual Thermal Energy = 51,378 MWht
SFU Biomass Baseload Capacity = 10 MWt (Table 9, Section 8.1.3, P30)
SFU Demand Baseload % = $10 \text{ MWt} / 30 \text{ MWt} = 33\%$
Total Estimated Biomass Energy Delivered to SFU = 43,787 MWht
SFU % Energy from Biomass = 85%”⁷

This figure has been reviewed with SFU staff prior to the filing of this Application and no changes were made. The amount of biomass required to meet the biomass energy demand (43,787 MWht) is then calculated based on the biomass supply parameters outlined in the Confidential Biomass Supply Agreement. The formula for this is included in the “Fuel Costs” tab of the Confidential Financial Model, filed as Appendix A to the Application.

UniverCity Annual Energy and Biomass Demand Forecast

Annual energy demand for UniverCity is forecasted by multiplying the Gross Floor Area for each building by the relevant annual Energy Use Intensity (“EUI”) figure. Corix uses EUIs that vary by building type. The EUI used for high rise concrete buildings is 130 kWh/m², the EUI used for low-rise wood frame buildings is 105 kWh/m² and the EUI used for Parcel 22 is 120 kWh/m². Parcel 22 is a childcare facility with a unique energy use intensity and represents 0.26% of total annual energy demand for UniverCity, and 0.10% of total annual energy demand for the BMDEU. Given the above, the annual energy demand for Parcel 22 has no material impact to the total demand or the

⁵ 2017 BMDEU CPCN Application Proceeding, Exhibit B-2, Response to BCUC IR No. 1, Questions 9.2-9.3, pp. 20-21.

⁶ 2017 BMDEU CPCN Application Proceeding, Exhibit B-2, Response to BCUC IR No. 1, Question 9.2, pp. 20-21.

⁷ 2017 BMDEU CPCN Application Proceeding, Exhibit B-2, Response to BCUC IR No. 1, Question 9.2, pp. 20-21.

proposed rates.

UniverCity’s annual energy demand is met using both biomass and natural gas. UniverCity’s total energy demand that will be met by biomass is calculated on an annual basis by subtracting SFU’s annual biomass demand from the total biomass demand that is determined using a combined LDC and a corresponding biomass boiler capacity. The remainder of UniverCity’s total energy demand will be met using the natural gas module in the CEP. Please note that the LDC is a dynamic metric and changes every year, so does the amount of energy provided by the biomass and NG boilers.

Table 5: Calculation of Annual Energy Demand for UniverCity, by Building

Parcel	Year	Building Type	GFA (m ²)	Annual Energy Demand Forecast (MWh)
22	2012	Woodframe	553	66
27	2012	Woodframe	6,843	719
28	2012	Woodframe	7,151	751
23	2013	Concrete	6,513	847
29	2013	Woodframe	4,676	491
16 Tower 1	2013	Concrete	9,376	1,219
16 Tower 2	2016	Concrete	9,376	1,219
25 Townhomes	2016	Concrete	3,776	491
26 Apartments	2016	Concrete	13,389	1,741
25 Commercial	2016	Concrete	2,884	375
30	2016	Woodframe	14,251	1,496
18	2018	Concrete	16,480	2,142
17	2020	Concrete	10,684	1,389
31	2020	Woodframe	12,790	1,343
21	2021	Concrete	8,000	1,040
20	2021	Concrete	19,656	2,555
33	2022	Woodframe	9,332	980
19	2022	Concrete	8,494	1,104
34	2023	Woodframe	9,408	988
35	2023	Woodframe	6,139	645
36	2023	Woodframe	6,412	673
37	2023	Woodframe	6,223	653
24	2024	Woodframe	21,790	2,288
Total			214,196	25,215

8.2.2 Please explain how UniverCity’s and SFU’s biomass demand are derived, respectively. Please provide the supporting calculations.

Corix Response:

Please see Corix’s response to BCUC IR No. 1, question 8.2.1 above.

9.0 Reference: **THERMAL ENERGY AND LOAD DEMAND FORECAST**
Exhibit B-5, Slide 15; Transcript Volume 1, p. 14, Lines 12-22;
Exhibit B-1, Appendix D, Schedule 4, p. 3;
Exhibit B-4, Redacted Biomass Supply Contract, p. 16

Confidentiality of Biomass Demand Forecast

During the Workshop, Corix stated:

It's important to note that Corix actually calculates biomass demand in tonnes, and bone dry tonnes. That's how we deal with the fuel supplier. However, the bone dry tonne information is confidential to Corix, especially the price. And that's why we are presenting the data here in megawatt hours.

We convert this to bone dry tonnes based on plant efficiency and moisture content, and higher heating value specifications of the biomass supply, as agreed to in the biomass supply improvements.

On page 3 of Schedule 4 of the Redacted Amended and Restated TESA, Corix states:

- Average annual plant Thermal Energy efficiency of not less than 72%. The efficiency calculated as the following:

$$\text{Efficiency} = (\text{metered plant output energy}) / [\text{HHV of the fuel} * (1 - \text{fuel moisture content}) * \text{estimated amount of fuel used}]$$

Various parameters have an impact on plant Thermal Energy efficiency, the major impact arising from fuel quality (including fuel moisture content, HHV and fuel composition). The average annual plant Thermal Energy efficiency commitment of 72% was calculated as a weighted average of the expected efficiency at certain fuel moisture content over time, assuming an HHV of 19.7 MJ/kg OD, and illustrated as follows:

Running Hours	Fuel MC	Efficiency
1,460	50%	70%
2,690	45%	72%
2,690	43%	73%
1,660	40%	74%
Weighted Average	45%	72%

- The input assumptions above may vary, but the average annual plant Thermal Energy efficiency commitment will be met.

In Schedule A of the Redacted Biomass Supply Contract (Exhibit B-4, p. 16), Corix agreed to the following specifications:

(b) Biomass Moisture Content:

- (i) **The average moisture content will not exceed 45% in any 12-month period during the Term.**
- (ii) **The maximum moisture content at any time will not exceed 55%.**
- (iii) **Higher Heating Value: 19.7 MJ/kg OD @ 50% Wet Basis as calculated over any 12-month period.**

9.1 Please confirm, or otherwise explain, that the formula to convert biomass demand from MWh to bone dry tonnes is shown in the quote above from the Amended and Restated TESA.

Corix Response:

Corix confirms that the formula allows for a calculation of the biomass amount.

9.2 Please confirm, or otherwise explain, that the values for four out of five variables in this formula are publicly available:

- Higher Heating Value: 19.7 MJ/kg
- Average fuel moisture content: 45%
- Average plant efficiency: 72%
- Biomass demand (MWh): available on slide 15 of the Workshop presentation.

Corix Response:

Confirmed.

9.3 Please clarify why Corix considers the biomass demand in bone dry tonne to be confidential when it can be back-calculated from information publicly available in Corix's Application.

Corix Response:

The release, use, or distribution of bone-dry tonne information, when combined with other publicly available information in the Application could subject Corix to substantial harm and loss of competitive advantage resulting in rates or agreements that are unfavorable for existing and/or future customers. BCUC staff's attempt to back-calculate the information does not negate the above reason. When flowing through energy costs to customers, unfavourable biomass supply agreements that lead to higher energy costs result in higher customer rates.

For the reason above, which was included in Section 1.3 of the Application, Corix respectfully requests that the BCUC maintain the confidentiality of the information.

**10.0 Reference: THERMAL ENERGY AND LOAD DEMAND FORECAST
2017 BMDEU CPCN proceeding, Exhibit B-2, BCUC IR 1.8.2 & 1.8.3, pp. 18-19
Conservation Programs**

In response to IR 1.8.2 and 1.8.3 in the 2017 BMDEU CPCN proceeding, Corix stated that it encourages its customers to use energy wisely and reduce energy consumption where possible and to this end, it has posted conservation tips on its website. To a question on whether Corix's information campaign on conservation had any impact on EUIs for connected buildings, Corix responded that while it had noticed a slight declining trend in energy usage for buildings that had been connected the longest, the data set is too small to confirm any trend beyond weather influence.

10.1 Please provide an update regarding existing or planned conservation programs.

Corix Response:

Corix continues to reinforce messaging to customers regarding energy usage and conservation. Corix does have plans to engage directly with individual Strata Corporations and provide educational presentations. However, the COVID-19 pandemic has limited Corix's ability to execute on this initiative due to physical distancing requirements. Corix plans to explore virtual based option in the near future to overcome the current challenges created by COVID-19.

10.2 With more years of operational data available, please discuss whether Corix's education campaigns have had any noticeable impact on energy use.

Corix Response:

Trends remain consistent since the last time Corix provided an update on its conservation awareness efforts for existing building stock. Corix does expect to see better all-around performance with new upcoming building connections given the changes in approach to building construction practices, specifically the BC Energy Step Code. The Step Code specifically focuses on in-building energy performance and management with the intention of lowering Thermal Energy Demand Intensities (TEDI's). However, the City of Burnaby has implemented a staged approach to the BC Step Code roll out and provides options to the developers as follows:

1. Meet Step 3 of the Energy Step Code; or
2. Meet Step 2 of the Energy Step Code, with implementation of a low carbon energy system and defined greenhouse gas intensity (GHGI) limits.

As the BMDEU system provides a required GHGI limits, the developers may choose to follow Step 2.

10.3 Please discuss how Corix takes conservation into account in forecasting future loads.

Corix Response:

Corix utilizes empirical trend data to support future forecasted energy consumption. Using a three-year rolling historic average coupled with known information surrounding code-based changes in building construction approach allows Corix to create what it deems as a reasonable estimation of what to expect future buildings of specific stock type i.e - concrete high rise versus wood-frame mid-rise.

C. CAPITAL COSTS

**11.0 Reference: CAPITAL COSTS
Exhibit B-1, Appendix D, Section 5.1, Schedule 4 and Section 12.1 (d)
Thermal Energy Delivery Parameters and Performance Testing**

Section 5.1 of the TESA states:

Subject to the provisions of this Agreement, the Thermal Energy provided by Corix to SFU under this Agreement will be generated from the Biomass fired boilers in the CEP and provided by Corix to SFU at the Energy Transfer Station up to the Nominated Capacity in accordance with the delivery parameters set out in Schedule 4 - Thermal Energy Delivery Parameters and Performance Testing, including the delivery temperatures at the SFU demand (secondary) side of the Energy Transfer Station in accordance with the temperature reset schedule set out in Schedule 4 - Thermal Energy Delivery Parameters and Performance Testing.

Schedule 4 of the TESA states, "The testing period for each testing condition and various turn-down scenarios as described above, may take place at any time during the 12 months of Service Commence Date."

Schedule 4 of the TESA also states:

The testing of each condition will be completed between October and March, so that a full output capacity of 13.5 MW can be achieved through customer demand or as a combination of the customers demand and the emergency heat dump capacity, but in all instances in accordance with Section 5.2(a) of the Thermal Energy Service Agreement.

11.1 Please provide the Service Commence Date for the new central energy plant (CEP).

Corix Response:

October 23, 2020.

11.2 Please describe the performance testing process and provide a timeline for all associated activities from service commencement to completion of the final engineering report.

Corix Response:

Corix is planning to complete the testing as per the requirement in TESA. We expect that testing for all conditions will be completed in sequence within 2 weeks. Part of the testing will be to confirm all design specifications were met by the technology supplier. In addition, Corix will test all additional scenarios as described in TESA. The following testing conditions will be included:

- 13.5MW capacity demonstrated at design conditions
- Maximum output capacity at various fuel moisture contents
- Confirmation that the process meets emissions requirements under the varying load and MC conditions. This would include steady state 12 hour runs at each MC.
- Demonstrating the biomass module turndown (5:1 per cell)
- The biomass module performance with and without a Flue Gas Recirculation (FGR)
- The economizer demonstrated for performance and the efficiency gain
- NG boilers demonstrated 3MW capacity and steady state production

11.3 Please provide the estimated cost for performance testing and explain whether it will be included in the Evidentiary Update.

Corix Response:

The cost to confirm the system performs and is compliant with design specifications is covered in the technology supplier scope. Any additional testing under various conditions and scenarios would be at additional cost that is currently unknown.

11.3.1 If these costs will not be included in the Evidentiary Update, please explain why not.

Corix Response:

The performance testing for all conditions will not be completed before the Evidentiary Update submission and the cost estimates may not be available by then. Therefore, some of the costs are unlikely to be included in the Evidentiary Update.

11.4 If the testing of each condition were to be completed later than currently targeted, please discuss any impacts (operational and/or financial) that a later completion date would have on Corix, SFU and UniverCity.

Corix Response:

The testing needs to be completed within 12 months from the commencement date. This is a contractual requirement. If the performance testing as contemplated in the TESA would not be completed within the proposed timeline, and unless the parties agree otherwise, the non-compliance would result in a breach of the agreement by Corix. Corix will not delay performance testing beyond a target deadline.

11.5 Please explain any consequence to Corix, SFU or UniverCity, if Corix fails to complete the performance testing within the time specified in the TESA, including but not limited to any financial penalties or liability for any costs associated with a delay.

Corix Response:

Please see the response to Question 11.4 above.

Section 12.1 (d) of the TESA states that a Corix default means:

the Infrastructure or any component thereof fails to pass the performance testing set out in Section 5.2(a) within the time specified therein and Corix fails or is unable to cure such failure within one year of the date on which SFU receives the report of the professional engineer referred to in Section 5.2(a), or within such other period as the Parties agree to in writing;

- 11.6 In a scenario where the CEP fails to pass the performance testing set out in the TESA, please clarify who will bear the risk(s) of any project costs incurred to correct the failure (Corix shareholders or customers) and explain why.

Corix Response:

Corix will approach and apply the principles and standard of prudent utility practice. If the failure was determined to be a matter that should have been within the control of the utility then Corix's shareholders would bear the risk but if it was determined that the extent of the failure was a cause that could not be reasonable foreseen by Corix then it would be Corix's expectation that it would be allowed to recover such costs fairly. If the technology supplier is not able to demonstrate that the system is meeting the performance under the design specifications, the cost to remedy will be borne by the technology supplier.

**12.0 Reference: CAPITAL COSTS
Exhibit B-1, Section 5.5, pp. 29-30
Capital Cost Variance**

On pages 29 and 30 of the Application, Corix states:

The total capital cost variance shows an increase of 16.6% before AFUDC, CIACs and the capitalization of corporate and regional services overhead. This is primarily driven by an increase in Building and Site Preparation costs by approximately 70% (\$4,910,695) due to unforeseen underground conditions in the CEP site area. Detailed geotechnical assessment and recommendations resulted in significantly more excavation and a subsequent fill import, increased cost of material (steel and aluminum tariffs), firewall installation as a result of code requirements, as well as the increased foundations and building concrete wall requirements (buttresses).

- 12.1 Please describe the unforeseen underground conditions in the CEP site area that resulted in the cost overrun.

Corix Response:

The unforeseen underground conditions were discovered primarily in the area of a dense forest, which is part of the project site, and was not accessible during the pre-design geotechnical assessment. This area was further tested following the site clearing. It was discovered that the area had a thick layer of soft and loose wet silty sand with roots and other organic matter, and needed to be stripped to the dense native soil. This resulted in a significant soil matter stripping, disposal, and the fill import to achieve the designed grade. This extra work associated with the additional excavation and removals had a significant impact on the overall civil work costs.

Additionally, the detailed geotechnical assessment also identified high water levels in the soil requiring shoring during construction as well as additional dewatering, under-slab and perimeter drainage, as well as significant seismic pressures that required additional building

walls reinforcement and increased foundations thickness.

12.1.1 Additionally, the site has also proved to require additional dewatering and drainage, as the testing identify significant seismic pressures that had impact on the building design including but not limited to additional reinforcements. Please explain why these conditions were unforeseen by Corix.

Corix Response:

Please see response to IR 12.1 above

12.2 Please elaborate on the geotechnical assessment to better define the underground conditions in the CEP site area, including the timing on when it was conducted and the scope of work. Please comment on how this type of assessment work aligns with the Association for the Advancement of Cost Engineering (AACE) guidelines for the degree of accuracy in the cost estimate.

Corix Response:

A preliminary geotechnical assessment was completed in 2016 to determine the underground conditions and soil quality/density at the CEP site. This led to the site preparation capital cost estimates that were included in the CPCN application. However, this assessment only focused on the accessible part of the site. During the detailed design and following the CPCN issuance, the detailed geotechnical assessment was completed and further refined to include the forested area, which was initially not accessible for a drilling machine, after the site was cleared.

Using the preliminary geotechnical assessment information, the amount of material needed to be excavated, disposed of, and a fill material imported was determined and the cost were estimated by the civil engineer using AACE guidelines.

12.3 Please provide a detailed breakdown of the forecasted Building and Site Preparation costs with a comparison to the cost estimates provided in the 2017 BMDEU CPCN, and an explanation of any cost variances.

Corix Response:

Please see the table below.

Table 6: Building and Site Preparation Cost Analysis

Infrastructure	Budget	Forecasted	Variance/ Change orders	% Difference	Explanation/Comments
Site works					
Upper Area	\$874,000	\$1,190,963	(\$245,016)	81%	Cost difference between the budget and the result of tendering process that included the original scope and contractor PM:
Lower Area	\$2,494,000	\$4,878,083	(\$2,499,283)		<ul style="list-style-type: none"> \$1,206,500
					Savings:
					Removal of the truck scale, removal of the retaining wall
					<ul style="list-style-type: none"> -\$362,400
					Increased costs:
					The extra design work (change orders) required for coordination and changes resulting from the Greenhouse Lane re-alignment project and additional geotechnical work and advisory role:
					<ul style="list-style-type: none"> \$64,700
					Additional costs for architect, water connection modeling, tree cutting permit, Erosion and Sediment Control fee:
					<ul style="list-style-type: none"> \$36,300
					Increased landscaping cost estimate based on the design

Infrastructure	Budget	Forecasted	Variance/ Change orders	% Difference	Explanation/Comments
					<ul style="list-style-type: none"> submitted for PPA, including cut trees replacement: \$97,000 Dewatering, Perimeter drainage, under slab drainage: \$157,900 Additional topsoil stripping and a new fill delivery: \$858,000 Erosion and Sediment Control measures: \$170,100 Delay associated costs (project delayed by one year from the original estimate due to permitting process delay): \$363,100 Landscaping: \$200,000 (allowance)
Fuel Building and Foundations	\$958,000	\$1,386,491	(\$428,491)	45%	<ul style="list-style-type: none"> PPA and BP perming fees proportionally allocated: \$12,300 Architect/Registered Professional proportional fees \$71,700 Increase in building cost due to steel prices increase (tariffs impacting building shell as well as cost of rebar for foundations): \$78,700 Increased foundations and building wall requirements as a result of the geotechnical investigation (foundations depth, building concrete wall structure,): \$260,000
CEP Building and Foundations	\$1,664,000	\$3,547,224	(\$1,883,224)	113%	<ul style="list-style-type: none"> PPA and BP perming fees proportionally allocated \$69,500 Architect/Registered Professional proportional fees: \$215,200 Fire wall addition (requirement of building code) \$545,200 Corix IT and fiber optics: \$117,900 Increased foundations and building wall requirements as a result of the geotechnical investigation (foundations depth, building concrete wall structure, buttresses, and east wall support): \$513,300 Increase in building cost due to steel prices increase (tariffs impacting building shell as well as cost of rebar for foundations): \$152,200 Additional smaller scope including furnishings, control room equipment, new paneling etc. 200,000

**13.0 Reference: CAPITAL COSTS
Exhibit B-1, Section 5.6, p. 31
Capital Cost Allocation**

On page 31 of the Application, Corix states:

While the methodology remains unchanged since the 2017 BMDEU CPCN, there have been updates to capital cost allocation percentages for two capital cost categories due to a change in the building floor area for the natural gas component of the CEP. The capital cost category allocations that have been updated since the 2017 BMDEU CPCN are:

- CEP Building, Foundations and Site Preparation
 - 2017 BMDEU CPCN – SFU allocated 65%; UniverCity allocated 35%
 - This Application – SFU allocated 62%; UniverCity allocated 38%
- Architectural Enhancements
 - 2017 BMDEU CPCN – SFU allocated 67.5%; UniverCity allocated 32.5%
 - This Application – SFU allocated 65%; UniverCity allocated 35%

13.1 Please provide a diagram showing the change in the building floor area for the natural gas component of the CEP.

Corix Response:

The percentage allocation in the CPCN application was determined using a preliminary design building footprint. During the detailed design the footprint was updated. Percentages presented in the rate application were calculated using the design drawings, however a final percentage will be determined using a building and site survey, which is currently being completed and will be submitted in the Evidentiary Update.

The comparison of the NG plant footprint in the CPCN Application and the Rate Application is presented in the table below.

Table 7: Table showing change in building floor area for the natural gas component of the CEP

Building Footprint	CPCN			Rate Application		
	Width (m)	Length (m)	Total (m2)	Width (m)	Length (m)	Total (m2)
Fuel bin	16.3	25	407.5	16.3	25	407.5
Technology building - NG	18	7	126	18	9	162
Technology - biomass	18	50	900	18	46	828
Total building area			1433.5			1397.5

13.2 Please discuss the reason(s) for changing the building floor area for the natural gas component of the CEP.

Corix Response:

The floor area has changed as a result of the detailed design and included updates to the equipment configuration, piping layout etc. As per response to IR 13.1, the final building survey is being completed and the final footprint of the NG and biomass modules will be presented in the Evidentiary Update.

13.3 In addition to the natural gas component of the CEP, has there been any other change(s) to the building floor area of the CEP?

Corix Response:

Please see the responses to Questions 13.1 and 13. 2 above.

13.3.1 If so, please provide a diagram showing the change in floor area and provide an explanation for the change.

Corix Response:

Please see response to Question 13.2 above.

13.4 Please provide information showing Corix’s calculation of capital cost allocation percentages based on building floor area of the CEP components for both the 2017 BMDEU CPCN and this Application.

Corix Response:

Please see the tables below.

Table 8: Building Allocation (CPCN Application)

Building footprint	Width	Length	Total (m ²)	SFU	Uni	Area allocation to SFU (m ²)
Fuel bin	16.3	25	407.5	74%	26%	302
Technology building - NG	18	7	126	0%	100%	0
Technology - biomass	18	50	900	74%	26%	666
CEP total			1026	Total SFU CEP		666
				SFU CEP build. Allocation		65%

Table 9: Building Allocation (Rate Application)

Building footprint	Width	Length	Total (m ²)	SFU	Uni	Area allocation to SFU (m ²)
Fuel bin	16.3	25	407.5	74%	26%	302
Technology building - NG	18	9	162	0%	100%	0
Technology - biomass	18	46	828	74%	26%	613
CEP total			990	Total SFU CEP		613
				SFU CEP build. Allocation		62%

13.5 Please discuss the extent to which Building and Site Preparation costs and Architectural Enhancement costs are impacted by the change in the building floor area of the CEP.

Corix Response:

Corix is not able to determine exact impact of the floor area change on the costs related to the categories mentioned in the Question 13.5 above. For example, Architectural Enhancement costs in the CPCN application were an upset allowance for the architectural features and were not based on detailed architectural design. The architectural features were confirmed during

detailed design stage and approved by the City of Burnaby in the development permit application.

The cost estimates in the CPCN application were pre-detailed design estimates. The agreement with the building supplier was signed after the CPCN was received and already included some design adjustments since the CPCN application was submitted. Further building design adjustments were made during the detailed design and permitting process to address permitting, operational and equipment configuration requirements that had additional impact on the building costs.

D. OPERATING AND MAINTENANCE COSTS

**14.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6, pp. 35, 46)
Historical O&M cost**

On page 35 of the Application, Corix states:

Annual BMDEU operating and maintenance costs are estimated for 2020 and then inflated for the remainder of the test period (2021, 2022 and 2023). For 2020, the annual [Operating and Maintenance (O&M)] costs have been prorated to reflect the CEP’s commissioning (*anticipated August 2020*) and service commencement (*anticipated September 1, 2020*).

On page 46 of the Application, Corix presents Table 19 showing the total BMDEU O&M costs.

14.1 Please expand Table 19 to include i) actual O&M cost for each year since 2017, as applicable; ii) an additional column for the forecast O&M cost for 2020 assuming the CEP’s commissioning and service commencement began on January 1, 2020; and iii) an additional line showing the year-to-year difference (%) for each line item from 2017 through 2023.

Corix Response:

Please see the data below.

TOTAL BMDEU OPERATING COSTS	2017	% Diff.	#VALUE!	% Diff.	2018 Frcst	% Diff. Full Year	2020 Part Year	2020 Full Year	% Diff Full Year	2021	% Diff.	2022	% Diff.	2023	% Diff.	2024	% Diff.	2025
Direct Operating Expenses - SFU																		
ETS Maintenance - SFU	0	N/A	0	N/A	0	N/A	3,071	9,212	2%	9,396	2%	9,584	2%	9,776	2%	9,971	2%	10,171
DPS Maintenance - SFU	0	N/A	0	N/A	0	N/A	2,224	6,671	2%	6,804	2%	6,941	2%	7,079	2%	7,221	2%	7,365
Direct Operating Expenses - UniverCity																		
Natural Gas Plant Operators	78,172	14%	89,342	-22%	70,083	13%	26,400	79,200	2%	80,784	2%	82,400	2%	84,048	2%	85,729	2%	87,443
Natural Gas Boiler Maintenance	119,698	-96%	4,726	72%	8,107	2%	8,269	8,269	2%	8,434	2%	8,603	2%	8,775	2%	8,950	2%	9,129
ETS Maintenance - UniverCity	0	N/A	0	N/A	0	N/A	6,120	6,120	2%	6,242	2%	6,367	2%	6,495	2%	6,624	2%	6,757
DPS Maintenance - UniverCity	0	N/A	0	N/A	0	N/A	6,347	9,521	2%	9,711	2%	9,906	2%	10,104	2%	10,306	2%	10,512
Land lease Costs	12,733	31%	16,692	0%	16,692	141%	40,950	40,147	2%	40,950	0%	40,950	0%	40,950	0%	40,950	0%	40,950
Franchise fees	32,806	-19%	26,673	78%	47,564	36%	50,048	64,847	2%	66,144	24%	82,214	42%	116,744	14%	132,966	7%	141,829
Shared Operating Expenses																		
Biomass Plant Operators	0	N/A	0	N/A	0	N/A	192,700	578,100	2%	589,662	2%	601,455	2%	613,484	2%	625,754	2%	638,269
Biomass Boiler Maintenance	0	N/A	0	N/A	0	N/A	29,055	87,164	2%	88,907	2%	90,686	2%	92,499	2%	94,349	2%	96,236
Building Maintenance	0	N/A	0	N/A	0	N/A	3,289	9,867	2%	10,065	2%	10,266	2%	10,471	2%	10,681	2%	10,894
Utilities, Materials, Vehicles, Safety, Other	25,740	-55%	11,620	-27%	8,467	2%	8,637	8,637	2%	8,810	2%	8,986	2%	9,165	2%	9,349	2%	9,536
Licensing (Permits)	1,697	24%	2,106	86%	3,918	2%	3,996	3,996	2%	4,076	2%	4,157	2%	4,241	2%	4,325	2%	4,412
Chemical Treatment	1,621	125%	3,643	-63%	1,351	899%	13,500	13,500	2%	13,770	2%	14,045	2%	14,326	2%	14,613	2%	14,905
Corporate Services	41,616	2%	42,448	2%	43,297	678%	92,937	336,689	2%	343,423	19%	409,453	2%	417,642	2%	425,995	2%	434,515
Regional Services	52,540	2%	53,591	2%	54,663	244%	73,314	188,019	2%	191,780	-4%	184,135	2%	187,818	2%	191,574	10%	211,565
Liability Insurance	0	N/A	0	N/A	0	N/A	1,222	8,474	0%	8,474	84%	15,613	12%	17,447	21%	21,094	10%	23,105
Property Insurance	11,056	31%	14,463	130%	33,206	83%	11,290	60,669	0%	60,669	5%	63,670	4%	66,388	3%	68,111	2%	69,473
Total Operating Costs - BMDEU	377,679	-30%	265,304	8%	287,348	429%	573,368	1,519,103	2%	1,548,102	7%	1,649,431	4%	1,717,452	3%	1,768,564	3%	1,827,067
Total Operating Costs Allocated to SFU	0		0		0		220,180	649,853		662,186		682,290		696,243		709,672		723,697
Total Operating Costs Allocated to UniverCity	377,679	-30%	265,304	8%	287,348	203%	353,189	869,250	2%	885,916	9%	967,141	6%	1,021,209	4%	1,058,891	4%	1,103,371

14.1.1 Using the annual O&M forecast figures for 2020 above (assuming the CEP has a full year of operation), for each O&M line item that has a variance of larger than +/- 10% between

the actual cost in 2019 versus the forecast cost in 2020, please provide the rationale for the differences.

Corix Response:

Corix provides the modified table to show the differences between 2019 Forecast and the restated 2020 to Jan 1.

Table 10: Response to Question 14.1.1

TOTAL BMDEU OPERATING COSTS	2019 Frctst	% Diff. Full Year	2020 Part Year	2020 Full Year
Direct Operating Expenses - SFU				
ETS Maintenance - SFU	0	N/A	3,071	9,212
DPS Maintenance - SFU	0	N/A	2,224	6,671
Direct Operating Expenses - UniverCity				
Natural Gas Plant Operators	70,083	13%	26,400	79,200
Natural Gas Boiler Maintenance	8,107	2%	8,269	8,269
ETS Maintenance - UniverCity	0	N/A	6,120	6,120
DPS Maintenance - UniverCity	0	N/A	6,347	9,521
Land lease Costs	16,692	141%	40,950	40,147
Franchise fees	47,564	36%	50,048	64,847
Shared Operating Expenses				
Biomass Plant Operators	0	N/A	192,700	578,100
Biomass Boiler Maintenance	0	N/A	29,055	87,164
Building Maintenance	0	N/A	3,289	9,867
Utilities, Materials, Vehicles, Safety, Other	8,467	2%	8,637	8,637
Licensing (Permits)	3,918	2%	3,996	3,996
Chemical Treatment	1,351	899%	13,500	13,500
Corporate Services	43,297	678%	92,937	336,689
Regional Services	54,663	244%	73,314	188,019
Liability Insurance	0	N/A	1,222	8,474
Property Insurance	33,206	83%	11,290	60,669
Total Operating Costs - BMDEU	287,348	429%	573,368	1,519,103
Total Operating Costs Allocated to SFU	0		220,180	649,853
Total Operating Costs Allocated to UniverCity	287,348	203%	353,189	869,250

Explanation of differences:

- **Natural Gas Plant Operators:** Higher costs due to TSBC safety requirements for 24/7 staffing requirements of plant.
- **Land Lease Costs:** Higher costs due to new DPS lines and service connections; land lease costs paid to SFU
- **Franchise fees:** Higher costs due to increase in revenue, franchise fees are 3% of revenue paid to SFU
- **Chemical treatment:** higher costs due to the incremental length of DPS piping and treatment required for entire system; 2019 forecast is low.
- **Corporate Services:** Incremental costs based on estimate from CAM application
- **Regional Services:** Incremental costs based on estimate of Energy services regional administrative costs.
- **Property insurance** is based on gross value of assets. Increase due to incremental rate base additions from BMDEU biomass total project costs and incremental capital additions from UniverCity buildout

14.1.2 Using the annual O&M forecast figures for 2020 above (assuming the CEP has a full year of operation), for each line item that has a year-to-year variance of larger than +/- 10% for any year between 2020 through 2023, please provide the rationale for the difference.

Corix Response:

Corix provides the modified table to show the differences between 2019 Forecast and the restated 2020 to Jan 1.

Table 11: Response to Question 14.1.2

TOTAL BMDEU OPERATING COSTS	2019 Frst	% Diff. Full Year	2020 Part Year	2020 Full Year	% Diff Full Year	2021	% Diff.	2022	% Diff.	2023
Direct Operating Expenses - SFU										
ETS Maintenance - SFU	0	N/A	3,071	9,212	2%	9,396	2%	9,584	2%	9,776
DPS Maintenance - SFU	0	N/A	2,224	6,671	2%	6,804	2%	6,941	2%	7,079
Direct Operating Expenses - UniverCity										
Natural Gas Plant Operators	70,083	13%	26,400	79,200	2%	80,784	2%	82,400	2%	84,048
Natural Gas Boiler Maintenance	8,107	2%	8,269	8,269	2%	8,434	2%	8,603	2%	8,775
ETS Maintenance - UniverCity	0	N/A	6,120	6,120	2%	6,242	2%	6,367	2%	6,495
DPS Maintenance - UniverCity	0	N/A	6,347	9,521	2%	9,711	2%	9,906	2%	10,104
Land lease Costs	16,692	141%	40,950	40,147	2%	40,950	0%	40,950	0%	40,950
Franchise fees	47,564	36%	50,048	64,847	2%	66,144	24%	82,214	42%	116,744
Shared Operating Expenses										
Biomass Plant Operators	0	N/A	192,700	578,100	2%	589,662	2%	601,455	2%	613,484
Biomass Boiler Maintenance	0	N/A	29,055	87,164	2%	88,907	2%	90,686	2%	92,499
Building Maintenance	0	N/A	3,289	9,867	2%	10,065	2%	10,266	2%	10,471
Utilities, Materials, Vehicles, Safety, Other	8,467	2%	8,637	8,637	2%	8,810	2%	8,986	2%	9,165
Licensing (Permits)	3,918	2%	3,996	3,996	2%	4,076	2%	4,157	2%	4,241
Chemical Treatment	1,351	899%	13,500	13,500	2%	13,770	2%	14,045	2%	14,326
Corporate Services	43,297	678%	92,937	336,689	2%	343,423	19%	409,453	2%	417,642
Regional Services	54,663	244%	73,314	188,019	2%	191,780	-4%	184,135	2%	187,818
Liability Insurance	0	N/A	1,222	8,474	0%	8,474	84%	15,613	12%	17,447
Property Insurance	33,206	83%	11,290	60,669	0%	60,669	5%	63,670	4%	66,388
Total Operating Costs - BMDEU	287,348	429%	573,368	1,519,103	2%	1,548,102	7%	1,649,431	4%	1,717,452
Total Operating Costs Allocated to SFU	0		220,180	649,853		662,186		682,290		696,243
Total Operating Costs Allocated to UniverCity	287,348	203%	353,189	869,250	2%	885,916	9%	967,141	6%	1,021,209

Explanation of differences:

- **Franchise fees:** Higher costs due to increase in revenue, franchise fees are 3% of revenue paid to SFU
- **Corporate Services:** Incremental costs based on estimate from CAM application
- **Liability Insurance:** Estimates due to anticipated increase in insurance premiums for 24/7 facility.

**15.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6.1, p. 37
Renewal and replacement (R&R)**

On page 37 of the Application, Corix states, “At this time Corix does not have sufficient equipment maintenance data to create a reasonable R&R capital plan and so all R&R capital have been excluded from the forecast revenue requirement and rates.”

15.1 Please provide an estimate on when a R&R capital plan will be available.

Corix Response:

Corix believes that somewhere between the 5th and 10th year of consistent operations should provide Corix with enough understanding and operational experience to be able to provide long term forecast of expected R&R capital.

15.2 Please provide an estimate of when Corix will begin including R&R capital in its revenue requirement and rates application.

Corix Response:

Please see the response to Question 15.1.

- 15.3 Please explain whether Corix will provide a R&R capital plan and related R&R capital for the 2020 to 2023 period in the evidentiary update, or as part of a future revenue requirements and rates application.

Corix Response:

Please see the response to Question 15.1.

**16.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6.1, p. 36
Biomass Boiler Maintenance cost**

On page 36 of the Application, Corix states:

Corix has refined maintenance estimates to be more reflective of the operational requirements for such equipment, based on information available to Corix at this time. As a result, the biomass boiler maintenance cost estimate was adjusted to 0.6% of the total cost of the installed equipment and only includes routine maintenance activities and normal course operational repairs.

- 16.1 Please provide the annual actual biomass boiler maintenance cost for each year since 2017, both in dollars and as a percentage of total cost of the installed equipment.

Corix Response:

Annual maintenance costs for the biomass boiler have not commenced. The biomass boiler began to provide service in Q4 of 2020 and so there are no historical annual maintenance costs. The estimate for annual maintenance for the first full year of operation was estimated as \$88,907 (split 74.1% SFU/25.7% UniverCity). The \$88,907 was estimated using the forecast total cost (Capital Additions Biomass) and applying the following formula $(\$14,527,357 \times 0.6\%) \times 1.02 = \$88,907$.

- 16.1.1 If the biomass boiler maintenance cost is outside 0.5% to 0.7% of the total cost of the installed equipment in any year since 2017, please explain the factors that resulted during those years and whether those factors are expected to reoccur in the 2020 to 2023 test period.

Corix Response:

The biomass boiler maintenance costs have not commenced. Please see the response to Question 16.1 above.

**17.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6.1, p. 37
Energy Transfer Station (ETS) Maintenance cost**

Corix states on page 37 of the Application:

These are costs associated with the maintenance of energy transfer stations for UniverCity. Corix does not have historical cost data, as it was previously blended with other O&M costs for the UniverCity NUS. An estimated amount is initially set to be \$6,000 (in 2019 dollars) and escalated annually based on inflation. As O&M and R&R plans are finalized and actual costs are tracked, Corix intends to produce future forecasts of this cost based on historical costs and OEM equipment requirements.

- 17.1 Please explain whether it is possible to obtain historical maintenance cost for the energy transfer stations for UniverCity from other means, such as from past invoices or other internal records.

Corix Response:

Historical cost data is available through the NAV accounting system which is no longer in use within Corix or any of its entities. In determining the estimate for forward looking costs historical costs vary as the nature of operations and maintenance has changed from 2011 to 2020 with the use of internal personnel to perform routine maintenance. Using historical costs ignores the UniverCity buildout schedule where 6 building connections are forecast to connect from 2020-2023. That would be a 50% increase in ETS units, 2 per year. The \$6,000 estimated cost takes into consideration the current operational environment and future requirements for timely performance of maintenance activities.

- 17.2 Please explain the rationale for setting the ETS maintenance cost at \$6000 for 2020.

Corix Response:

Please see the response to Question 17.1 above.

**18.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6.1, p. 38
Licensing and Permitting**

On page 38 of the Application, Corix states that the licensing and permitting cost category captures all licensing and permitting costs associated with operating the BMDEU. Costs are based on historical cost, escalated using the target inflation rate and then allocated to each utility based on the output capacity of the BMDEU.

- 18.1 Please explain whether Corix expects any additional licensing and permitting requirements once the CEP is in operation.

Corix Response:

Corix is still in the process of commissioning and obtaining all necessary permitting and licencing. Corix will be able to provide additional information, if required, on the ultimate costs for such licenses and permits in the evidentiary update. The current forecast relies on a forward-test year-based forecast based on known and measurable costs to the extent of Corix is aware of them.

- 18.1.1 If yes, please explain whether these additional costs are reflected in the licensing and permitting cost line item.

Corix Response:

Please see the response to Question 18.1 above.

**19.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6.1, p. 38, Appendix D, Attachment I, pp. 22-23
Insurance**

Corix states on page 38 of the Application:

Liability insurance is estimated within the model which assumes a rate for business continuity insurance & General liability. The estimated premium rate starts at a 2016

\$2.50 per \$1000 of revenue and is inflated to 2019 \$2.65 and annually by inflation afterward. The estimate takes prior year revenue divides by 1000 and multiplies by the estimated premium rate. The allocation to the utilities varies annually based on the ratio of SFU Campus revenue to UniverCity revenue.

Property insurance is estimated within the model which assumes a rate for business continuity insurance & General liability. The estimated premium rate starts at a 2016 \$0.105 per \$100 of asset value and is inflated to 2019 \$0.117 and annually by inflation afterward. The estimate takes prior year gross plant in service amount and divides by 1000 and multiplies by the estimated premium rate.

Section 10 of the TESA filed as Appendix D of the Application lays out the insurance obligation for SFU and Corix.

19.1 Please explain whether the \$2.65 per \$1000 of revenue in liability insurance premium rate in 2019 and the \$0.117 per \$100 of asset value in property insurance premium rate in 2019 reflects the actual insurance cost paid by Corix in 2019.

Corix Response:

The estimates referred to in the question above were unchanged from the 2017 BMDEU CPCN Application. These figures resulted in a forecast that was lower than the actual costs incurred in the most recent insurance policy. As of November 1, 2019 the actual rates charged to Corix were:

- \$2.73 per \$1,000 of revenues of general liability insurance (*versus \$2.71 per \$1,000 used to prepare this Application*); and
- \$0.17 per \$100 of asset value in property insurance (*versus \$0.119 per \$100 used to prepare this Application*).

Corix will update the financial model based on the latest information to reflect this increase in insurance costs in the Evidentiary Update.

19.1.1 If not, please explain why the actual insurance cost in 2019 is not used as the basis for forecasting the insurance cost for the 2020 to 2023 period.

Corix Response:

Please see the response to Question 19.1 above.

19.1.2 If not, please also provide the actual liability insurance and property insurance costs paid by Corix in 2019.

Corix Response:

Please see the response to Question 19.1 above.

19.2 Please provide insurance quotes or invoices for 2020, if available.

Corix Response:

Insurance quotes and/or invoices for 2020 are confidential as this information relates to the entirety of Corix's business.

Corix Response:

Insurance quotes and invoices for BMDEU are not available as they are obtained at a consolidated level for CII's business units.

- 19.3 Please explain whether inflating the annual insurance premium rates is reflective of the terms of the insurance provided to Corix.

Corix Response:

Corix considers that inflating the annual insurance premium is appropriate considering that insurance rates have trended upwards in recent years and Corix typically experiences insurance increases in excess of 2% due to insurance market conditions. As the magnitude of annual insurance rate increases can be unpredictable Corix has resorted to a simplifying assumption of using 2% inflation for both G&O (liability) and property insurance.

- 19.4 Please confirm, or otherwise explain, that only insurance cost incurred by Corix as described under section 10.4 of the TESA is being recovered under the Liability Insurance and Property Insurance line items.

Corix Response:

Confirmed.

- 19.5 Please explain whether the Liability Insurance and Property Insurance line items include recovery of insurance cost in addition to those described under section 10.4 of the TESA.

Corix Response:

Please see the response to Question 19.4 above.

- 19.5.1 If yes, please elaborate on those insurance cost items and explain i) how these costs are allocated between SFU and UniverCity; and ii) why these costs should be recovered from Corix ratepayers.

Corix Response:

Insurance costs for BMDEU are directly related to the insurance policy taken out by Corix. If the Corix insurance policy included no liability insurance or property coverage, then BMDEU would be apportioned no costs. However, if no insurance costs are included in the revenue requirement, then it effectively is self-insurance. With self-insurance customers receive the benefit with a lower revenue requirement. However, if an incident were to occur that would have been covered by the insurance policy then that claim would have to be recovered from the customers who received the benefit of a lower revenue requirement with no liability insurance or property coverage. However, if a legitimate insurance claim is not recoverable from customers but at risk for the utility, then this increased risk should be reflected in the risks taken on by the utility. This would effectively mean increasing the equity risk premium, leading to a higher Return on Equity requirement in order to meet the fair return standard in Canada. In essence, with no insurance costs in the revenue requirements, Corix would effectively become an insurance provider. Since Corix is not an insurance company it would be highly inefficient and costly for Corix to take on the risk for insurance and this would ultimately be to the detriment of ratepayers.

**20.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6.1.1, pp. 39, 40
Corporate service costs**

On page 39 of the Application, Corix states:

Due to the existence of a separate regulatory review process and the fact that the [Corporate Cost Allocation Methodology (CAM)] Application addresses multiple Corix

utilities regulated by the BCUC, the CAM is outside the scope of review for this Application. The approval of the forecast corporate cost allocation figures in this Application is subject to the outcome of the BCUC's review of Corix's CAM Application.

- 20.1 Please confirm, or otherwise explain, that Corix will provide an update to the forecast corporate cost allocation figures in this Application in the evidentiary update if a BCUC final decision regarding the CAM Application is released by February 4, 2021.

Corix Response:

Confirmed.

On page 40 of the Application, Corix states:

The Corporate Services Cost allocated from [Corix Infrastructure Inc. (CII)] to SFU have been reduced to a level equal to that presented to SFU at the time the TESA was executed. The amount had been determined using a different methodology for the corporate overhead allocation than that presented in the CAM application. The amount in the 2017 BMDEU CPCN was a figure of \$42,087 for 2019, which was previously anticipated to be the first year of operations. This annual figure has been prorated to reflect 4 months of operations in 2020 and escalated annually based on the target inflation rate. CII's corporate costs allocated to SFU that exceed these annual figures are forecasted to be borne by the shareholder and have not been reallocated to UniverCity customers or any customers of other Corix utilities. [emphasis added]

- 20.2 Please confirm, or otherwise explain, that any CII's corporate costs allocated to SFU that exceed the forecasted annual figures for each year from 2020 to 2023 will be borne by the shareholder.

Corix Response:

Confirmed.

**21.0 Reference: OPERATING AND MAINTENANCE COSTS
Exhibit B-1, Section 6.1.3, p. 42
Capitalization**

On page 42 of the Application, Corix states that it concludes that costs included in Corporate and Regional Services meet the capitalization criteria for Overheads Capitalized. Corix has reviewed the direct and indirect costs and propose the following capitalization percentages:

- a. 25% of Corporate Services and Regional Services Costs in 2020; and
- b. 10% of Regional Services Costs from 2021 onwards for any year in which capital projects occur.

Table 17 on page 43 of the Application shows Corix anticipates the regional services capitalization amount to be \$19,409, \$16,179, \$15,227, and \$15,532 in each of years 2020 to 2023, respectively.

- 21.1 Please provide the capitalization criteria for Overheads Capitalized.

Corix Response:

In the paragraphs preceding the quotation, taken from Section 6.1.3 of the Application, Corix outlined the criteria for determining whether overheads should be capitalized. The criteria is summarized as follows:

- 1) When capital expenditures are incurred to:
 - a. Construct and develop property, plant and equipment;

- b. Renew and Replace existing assets or key components, resulting in an extension to the service life of these assets; or
 - c. Improve services by adopting new technology or betterment of existing assets.
- 2) When it is not administratively feasible to directly charge every single cost of each corporate and regional activity required to execute the capital project undertaken for the reasons indicated in item 1 above. Examples of these corporate and regional activities include, but are not limited to legal, regulatory, finance, human resources, and procurement.

21.2 Please explain whether, if so when, Corix has conducted a capitalization study.

Corix Response:

Corix has not conducted a capitalization study for the following reasons:

- 1) Capitalization studies are typically costly activities that would result in additional costs being recovered from ratepayers. Capitalization studies can range from approximately \$50,000 to \$200,000.
- 2) Given that Corix proposes to recover overhead capitalized equating to \$46k for 2020, \$16k for 2021 and \$15k for 2022 and 2023 each⁸, the cost of a capitalization study would exceed the costs the utilities proposes to recover.
- 3) It would be more appropriate to conduct a capitalization study to address ongoing overhead associated with the annual operations of a utility. Performing a capitalization study during the construction of a greenfield central energy plant to provide service to a largely new customer base could result in a recommendation of a level of overhead capitalization related specifically to that project. The study would then have to be updated or a new study performed to address the overhead capitalization for the ongoing utility operations. This difference is captured in Corix's Application whereby the proposed overhead capitalization rate for corporate services drops to 0% after the completion of the new CEP, and the proposed overhead capitalization rate for regional services drops from 25% to 10% after the completion of the new CEP.
- 4) Corix considers it appropriate to rely on precedent set by the BCUC as a means to check the reasonableness of Corix's proposed overhead capitalization rates. Precedent regarding the capitalization of overhead costs has been set by the BCUC through decisions for FortisBC Energy Inc. ("FEI"), FortisBC Inc. ("FBC"), Creative Energy Vancouver Platforms Inc. ("CE"), and Pacific Northern Gas ("PNG"). When compared to BMDEU's proposed ongoing capitalized rates of 0% for Corporate Services Costs and 10% for Regional Services Costs, the BCUC has approved higher or equal capitalized overhead rates for FEI, FBC and PNG as follows:
 - a. 12% for FEI from 2014 to 2019⁹, subsequently increasing it to 16% beginning in 2020¹⁰;
 - b. 15% for FBC from 2014 to 2019¹¹, maintaining it at 15% beginning in 2020¹²; and

⁸ Exhibit B-1, Application, Section 6.1.3, Table 17, p. 43.

⁹ Decision for Order G-138-14, regarding the FEI 2014 to 2018 Multi-Year Performance Based Ratemaking Plan, p. 223.

¹⁰ Decision for Orders G-165-20 and G-166-20, regarding the FEI and FBC 2020 to 2024 Multi-Year Rate Plan, p. 144.

¹¹ Decision for Order G-139-14, regarding the FBC 2014 to 2018 Multi-Year Performance Based Ratemaking Plan, p. 218.

¹² Decision for Orders G-165-20 and G-166-20, regarding the FEI and FBC 2020 to 2024 Multi-Year Rate Plan, p. 144.

- c. 10% for 2020 for PNG¹³.

Corix is not opposed to obtaining a capitalization study that recommends the most appropriate rate at which to capitalize overhead costs in the future. However, it should be noted that such studies would result in additional costs to ratepayers.

- 21.2.1 If yes, please provide a copy of the findings.

Corix Response:

Please see the response to Question 21.2 above.

- 21.3 Please explain in detail, including any alternatives considered, how Corix has determined the appropriate capitalization rate for Corporate Services and Regional Services Costs in 2020, as well as for Regional Services Costs from 2021 onwards.

Corix Response:

Corix determined the appropriate capitalization rate based on a combination of management estimates regarding time spent on capital projects and reliance on precedent set in past BCUC decisions as a check for reasonableness. In response to Question 21.2 above Corix provided references to decisions where the BCUC addressed the capitalization of overhead for other utilities in BC.

- 21.4 Please elaborate on the nature and cost of the capital projects that Corix anticipates undertaking in years 2020 through 2023 that would incur Regional Services Costs.

Corix Response:

Please see section 5.8 of the Application which elaborates on the nature and cost of the anticipated ongoing capital expenditures that would attract capitalized overhead through to 2023. These costs are associated with the ongoing build-out of UniverCity.

- 21.5 Please discuss whether there is any administrative cost or efforts required to change the capitalization policy for Regional Service Costs.

Corix Response:

Corix does not have an existing capitalization policy for Regional Services Costs. The significant undertaking of designing and constructing the biomass central energy plant has highlighted the need for a formalized approach to ensuring that indirect costs associated with management time and effort on capital projects are not inappropriately expensed in any given year. Corix considers that there would be some administrative costs and effort to establish a capitalization policy for Regional Service Costs, which would increase significantly if an overhead capitalization study is required as part of this process.

- 21.5.1 In consideration of the forecasted amount to be capitalized, please discuss whether the benefits of changing the capitalization policy outweighs the administrative cost.

Corix Response:

This is the primary benefit of establishing an policy to capitalize a portion of overhead costs is to ensure that indirect costs associated with management time and effort on capital projects are not inappropriately expensed in any given year. The proposed capitalization approach is an attempt to appropriately categorize the utility's spend between O&M costs and fixed assets in accordance with Generally Accepted Accounting Principles. Incorrect apportionment of spend between the categories would not present a fair statement of the financial results of the utility.

¹³ Pacific Northern Gas overheads capitalization by BCUC Order G-92-11.

From a regulatory perspective, costs should be recovered from customers in relation to the expected service value provided. As a portion of management time is associated with capital projects they should be recovered from customers over the life of the assets in that capital project, as opposed to immediate recovery in the year they were incurred. If costs are not appropriately classified between current year's expense and assets (providing future value) there is a mismatch of the economic and service life of assets to the annual expense. Without the appropriate capitalized overhead that was used to bring these assets into service the issue of intergenerational equity between present and future customers arise.

A key benefit of establishing such a policy would be to increase efficiency within the organization. The alternative would be to attempt to use timesheets to directly charge all time spent on a capital project using a high degree of granularity. This transactional approach is time-consuming where the employee would fill out each timesheet and then it is entered into the financial system for charging to the capital project. The proposed approach of using an estimated percentage of corporate and regional costs would require less time and effort allowing the employee more time to work on other tasks.

- 21.6 Please explain why is it appropriate to change the capitalization policy now that the majority of the CPCN capital has been spent?

Corix Response:

This capitalization approach is being proposed at this time because the central energy plant is at the beginning of its service life and future capital costs are anticipated for the continuing buildout of the UniverCity system. Setting the capitalization percentages prior to having an understanding of how management time would be spent on the CEP project, in the absence of an overhead capitalization study, would be based on speculation and could lead to an unfair, unjust and unreasonable estimate. It is appropriate to develop an understanding of management time and effort regarding the major capital project. In addition, the capitalization approach takes into account future capital expenditures and would set overhead capitalization rates for the future years. As these projects are less significant than establishing a new CEP, the capitalization rate is reduced and accounts for a smaller portion of the overhead costs.

**22.0 Reference: OPERATING AND MAINTENANCE COSTS
Transcript Volume 1, pp. 8-9
Impact from COVID-19**

On pages 8 to 9 of the Transcript, Corix states, "There were delays in receiving the developing permit and the building permit as well and there were also delays due to COVID-19's impact on some of the foundation work and equipment supply. Some of our equipment is arriving from places that have been hard hit by COVID-19 and this caused some of the parts and equipment to be delivered at a date later than anticipated."

- 22.1 Based on Corix's operational experience to date, please explain whether the COVID-19 pandemic has any impact on Corix's O&M cost forecast for F2020 through F2023, including but not limited factors such as potential reduction in productivity, supply chain disruptions, protocols on space density that may impact occupancy and demand, and delays on construction

schedule.

Corix Response:

COVID-19 restrictions began while Corix was preparing this Application and so financial forecasts were developed taking the COVID-19 pandemic into consideration. The paragraph below discusses potential impacts of COVID-19 pandemic policies to various aspects of Corix's business.

Impact to Productivity

Corix does not anticipate material impacts to the O&M forecast as a result of impact to productivity from COVID-19. Existing staff has adapted to working with COVID protocols established company-wide. However, training and cross training occurring during the pandemic with distant learning and on-line training can slow down the onboarding and efficiency of new employees. While COVID-19 may reduce the speed at which new employees can be hired and trained, Corix considers this impact to be immaterial when viewed from the perspective of the BMDEU total O&M forecasts.

Impact to Supply Chain

Corix has experienced some equipment supply disruption during construction in 2020 as a result of the COVID-19 pandemic, particularly with equipment that was supplied from overseas. As the new CEP is now completed, any further supply chain impacts would be to the ongoing build-out of the UniverCity distribution piping system. The distribution pipe connecting future buildings at UniverCity is supplied and shipped from factories in Europe, and as such, Corix has allowed additional time for the procurement process to mitigate risk of any potential delays.

Impact to Occupancy and Demand

As Corix does not bill individual unit owners Corix is unable to determine occupancy data from consumption data.

Corix anticipates that individual end-user demand could be higher than anticipated in some cases due end-users staying home to comply with COVID restrictions. However, this may run counter to reduced occupancy levels in some of the residential buildings. The preliminary UniverCity 2020 consumption data shows no specific trend.

In addition, the impact of increased UniverCity consumption-per-end-user could be negated by a reduced class population as SFU relies on online learning. However, the campus is not closed and Corix does not have data regarding the impact of COVID-19 pandemic and associated policies to either customer group's winter consumption.

Construction Schedule

To date, Corix has not received any updates from SFU Trust to the development schedule that indicated any changes to the forecasted build-out.

- 22.2 Are there any other impacts from customers due to COVID-19, such as changes in customer usage, increases in bad debts write-offs, increased billing inquiries, etc., which results in incremental cost increases or reduced revenues for Corix? Please discuss.

Corix Response:

As at October 30, 2020, there were no bill payments outstanding for UniverCity. This data shows

that UniverCity customers have been paying the bills during the COVID-19 period, which began in March 2020. This is coupled with the fact that from January 1, 2020 through to September 30, 2020, there was an overall increase in consumption of 7.4% from UniverCity customers when compared with the same 9-month period for 2019. Corix assumes that the overall increase in consumption is due to the large portion of end-users that are residential end-users. Corix assumes that physical distancing measures implemented throughout the province has resulted in more end-users staying home, resulting in an increase to residential space heating and hot water demand (the services provided by Corix to UniverCity).

E. ENERGY COSTS

23.0 Reference: ENERGY COSTS Exhibit B-1, Section 7.1, p. 49; 2017 BMDEU CPCN Application, Exhibit B-1, Section 8.5, p. 36 Biomass Supply

At page 36 of the 2017 BMDEU CPCN Application, Corix states:

The variable costs include biomass fuel, natural gas, and electricity.

The cost of biomass fuel used to calculate the rates is a 2016 market price. The biomass fuel will be sourced locally and will include wood waste that will meet Metro Vancouver fuel quality requirements. A long-term supply agreement (10 years) with performance guarantees is currently SFU's preferred form of a supply arrangement, which reduces potential risks associated with the fuel availability and cost.

For UniverCity customers, Corix will review fuel availability and cost prior to the plant being put into service, and will select a portfolio of fixed longer-term and fixed and variable shorter-term supply arrangements that balance cost and risk considerations.

At page 49 of the Application, Corix states:

The Biomass Supply Contract is for a 5-year term, with an option to extend the contract for a 5-year period. The Biomass Supply Contract outlines specifications and requirements for Cloverdale Fuel. These include, but are not limited to:

- the size of the biomass particles and the ash content;
- average and maximum moisture content requirements;
- a list of substances that the biomass fuel must not contain; and
- a requirement that the biomass fuel complies with Metro Vancouver's requirements for biomass fuel established by applicable bylaws and air permits.

In order to verify Cloverdale Fuel's adherence to the specifications the Biomass Supply Contract includes testing procedures to be performed by Corix or an independent third party, if and when required.

23.1 Please discuss why the term of the Biomass Supply Contract (Contract) has been reduced from 10 years to five years with an option to renew.

Corix Response:

The 10-year supply agreement was an exclusive requirement under the agreement with SFU and only pertains to their respective part of the biomass fuel supply. As such Corix worked with the

fuel supplier and SFU to obtain pricing for several different terms (10 year, 5 year, 3 year, etc.). The cost associated with a 10-year supply contract was deemed to be disadvantageous as the associated cost premium for fixing the further five years outweighed the benefit of securing a 10-year supply contract. It was decided by SFU that it only wanted to pursue the 5-year term at this time with an option to renew. Please note that it is not a common to see a 10-year term of supply in the biomass fuel supply industry.

The 5-year agreement only pertains to the SFU customer group, the required fuel for UniverCity is an option to the fuel supplier. If the fuel supplier does not want to provide the incremental fuel for UniverCity Corix will outsource its fuel requirements from other vendors.

- 23.2 Please discuss the pros and cons of a 5-year term with renewal option versus a 10-year term, from the perspective of Corix, the fuel supplier and the customers (SFU and UniverCity).

Corix Response:

As discussed in the response to Question 23.1 above, there was an additional cost premium associated with obtaining a 10-year term, when compared to a 5-year term.

From Corix and the customer's perspective, the benefits of a 10-yr contract term versus a 5-year term would be the reduction of fuel availability risk, and predictable fuel rates over a 10-year span. However, these come with the disadvantage of increasing the cost premium of a 10-year term to Corix, which is then passed on to the customers.

From the fuel supplier's perspective, a 10-year term would provide revenue stability and allow the supplier to plan its sourcing requirements with a higher degree of certainty over a longer period of time.

- 23.3 Does the 5-year term contract, with the option to renew, provide the same risk mitigation regarding fuel availability and cost as a 10-year supply agreement? Please discuss.

Corix Response:

Please see the response to Question 23.2 above.

- 23.4 Please confirm, or otherwise explain, that if the contract is extended beyond the initial 5-year term, the terms of the Contract, including pricing, specifications and requirements listed above for the Fuel Supplier, and the testing procedures, remain the same.

Corix Response:

Corix expects that the terms of the contract would remain the same, however pricing and fuel specifications may change in the future. Corix will review the market price of the biomass fuel for then applicable fuel specifications, before initiating a renewal of the contract.

- 23.4.1 Has Corix received assurances that the biomass unit cost will not increase significantly (i.e., by more than 10%) from the last year of the Contract (2025) to the first year of the subsequent term (2026)?

Corix Response:

At this time Corix is unable to speak to any assurances regarding future biomass unit costs in 2026 and beyond.

- 23.5 Please discuss whether it is possible that the parties could not agree to extend the Contract? If so, please discuss why that would be.

Corix Response:

Corix trusts that the agreement could be extended on mutually beneficial terms, however Corix will complete a market assessment before the renewal to provide assurances that the extended Contract terms and conditions are fair to the end user.

- 23.6 In the event Corix cannot successfully extend the term of the Contract after its initial 5-year term, please discuss what options are available to Corix to secure biomass supply in a cost-effective manner.

Corix Response:

The biomass fuel market is evolving and there is already a number of fuel suppliers that could meet the requirements of the BMDEU project. In the event the agreement is not extended, Corix would undertake a public process to select a new fuel supplier.

- 23.7 Please discuss whether there are open markets for acquiring biomass.

Corix Response:

The biomass is typically supplied by smaller size companies specialized in the biomass sourcing and supply. The biomass supply typically addresses specific needs of a particular project or a specific customer, and is sourced through the RFP process or a direct negotiation. To Corix's knowledge there is not currently an open market that would provide an index market price.

- 23.7.1 If yes, please i) provide the index market price for biomass in these markets; and ii) explain whether Corix has access to these biomass markets for acquiring biomass.

Corix Response:

Please see the response to Question 23.7.

- 23.7.1.1 Please discuss how the Contract Price for biomass under the Contract compares with the market index price for biomass in the markets listed above.

Corix Response:

Please see the response to Question 23.7.

- 23.8 Considering the unit price of biomass that is included in the Biomass Supply Contract, did Corix review fuel availability and cost for UniverCity customers prior to the CEP being put into service, with the view to selecting a portfolio of fixed longer-term and fixed and variable shorter-term supply arrangements that balance cost and supply risk considerations?

Corix Response:

Corix evaluated a long-term fixed contract with the term duration exceeding 5 years, however the cost premium for fixing a long-term contract was not considered beneficial for the customers. Corix has negotiated a fixed price contract for a predetermined fuel amount (take or pay) and included a right of first refusal to be granted to the fuel supplier to supply all remaining fuel at the same terms and conditions as the fixed contract. Fixing the UniverCity customers volumes under a take or pay contract would present a substantial risk as the development is not build-out and the risk of development delays still exists. Therefore, Corix has decided to manage the initial 5-year supply contract as a combination of the fixed price and volume with ROFR option for the additional volumes as needed.

- 23.8.1 If yes, please elaborate on this review and how it impacted the selection of the supply portfolio for UniverCity customers.

Corix Response:

Please see the response to Question 23.8 above.

23.8.2 If not, please explain why not.

Corix Response:

Please see the response to Question 23.8 above.

23.9 Considering that the natural gas plant within the CEP will be used as peaking and backup for UniverCity customers only, if the Fuel Supplier fail to deliver the entirety of the biomass fuel requirements, please confirm, or otherwise explain, that Corix would generate thermal energy using natural gas to serve the UniverCity customers only, while SFU would rely on its own gas system for back-up.

Corix Response:

Confirmed

23.9.1 If confirmed, please discuss the rate impacts for UniverCity and for SFU.

Corix Response:

The Fuel Supply Agreement addressed the consequences of the Fuel Supplier’s failure to deliver the biomass fuel. These are confidential provisions and are addressed in the responses to the Confidential IRs.

**24.0 Reference: ENERGY COSTS
Exhibit B-1, Section 7.1, p. 49; Exhibit B-5, Slide 15
Sensitivity Analysis of Biomass Demand**

The following table is derived from the biomass demand forecast presented on Workshop slide 15:

	2020	2021	2022	2023	2024	2025
Biomass Demand (MWh) – SFU	14,596	43,787	43,787	43,787	43,787	43,787
Biomass Demand (MWh) - UniverCity	3,338	12,465	14,666	16,620	18,653	19,539
Total Biomass Demand (MWh)	17,934	56,252	58,453	60,407	62,440	63,326

On page 49 of the Application, Corix states:

The Biomass Supply Contract sets out a minimum quantity in Bone Dry Tonnes (“BDTs”) to be delivered to the BMDEU over a 12-month period beginning with the in-service date of the BMDEU. Based on the forecasted biomass energy demand and the biomass fuel characteristics outlined in the Biomass Supply Contract, the minimum quantity represents 73% of the total quantity required in 2021 to meet the forecast biomass energy demand. This percentage falls annually until full build-out of UniverCity where it represents 65% of the total quantity required to meet the forecasted biomass demand. [...] Actual biomass fuel requirements will depend on a number of factors, including the timing of the build-out of the UniverCity community, the efficiency of the biomass CEP, operating conditions, the biomass moisture content and seasonal weather conditions.

24.1 Please clarify what is meant by “operating conditions”.

Corix Response:

The operating conditions for example include, but are not limited to, a fluctuating demand on the biomass boiler, turn-down scenarios and unplanned shutdowns.

- 24.2 Please confirm, or otherwise explain, that UniverCity’s biomass fuel requirements can be affected by all factors listed in the preamble whereas SFU’s biomass fuel requirements can be affected by all factors except the timing of the build-out of the UniverCity development.

Corix Response:

Confirmed.

- 24.2.1 Please explain how each factor affects actual biomass fuel requirements.

Corix Response:

Timing of the build-out of UniverCity: This factor affects the total UniverCity energy demand. Delays in the build-out of UniverCity would result in lower-than-forecast total annual energy demand, while accelerations would result in higher-than-forecast total annual energy demand. When combined with other factors, this factor could potentially reduce/increase the forecasted biomass fuel requirements depending on the severity of the build-out delays/accelerations.

Efficiency of the biomass CEP: Increased efficiency would result in lower biomass fuel requirements to produce the same quantity of thermal energy. Decreased biomass CEP efficiency would result in higher biomass fuel requirements to produce the same quantity of thermal energy.

Overall efficiency is impacted by a fuel moisture and fuel heating value, operating conditions – e.g. sudden swings in demand that would result in the use of heat dump (when the heat needs to be released from the system in case of no demand, or the system needs to be shut down suddenly)

Biomass Moisture Content: An increase in the biomass moisture content would result in a decrease in the Heating Value of the biomass thereby requiring an increase in the biomass fuel required to produce the same quantity of thermal energy for space heating and domestic hot water. This is because moisture in the biomass fuel must be eliminated before the first stage of combustion can occur, requiring energy and thereby reducing system efficiency. Conversely, a reduction of biomass moisture content would result in less biomass fuel required to produce the same quantity of thermal energy. However, the biomass cost to the customer would not change with the moisture content increased as the fuel supply is calculated to the bone dry ton delivery.

Seasonal Weather Conditions: As Corix is providing space heating and domestic hot water thermal energy services, higher customer demand is typically correlated with a colder winter than usual. Conversely, lower customer demand could stem from a winter that is warmer than usual.

- 24.3 Please state whether additional factors, not listed in the preamble, can affect UniverCity’s or SFU’s biomass fuel requirements. If so, please state what these factors are and how each of them affects actual biomass fuel requirements.

Corix Response:

Corix is unaware of additional factors that could potentially impact UniverCity’s or SFU’s biomass fuel requirements.

24.4 Please provide the annual biomass fuel requirements of each customer under the following scenarios:

- i. Timing of the build-out of the UniverCity community is -20% or +20% of forecast;
- ii. Efficiency of the biomass CEP is at 72% and 80%, respectively;
- iii. Reasonable range of variability for operating conditions;
- iv. The average biomass moisture content is at 40% and 42.5%, respectively;
- v. Reasonable range of variability for seasonal weather conditions; and
- vi. Reasonable range of variability for any additional factors that can affect the actual biomass fuel requirements.

Corix Response:

Please see the table below.

Table 12: Annual biomass fuel requirements

Scenarios	Annual BMDEU Biomass Fuel Requirements (BDT)				
	2021	2022	2023	2024	2025
<u>Timing of the build-out of the UniverCity community:</u>					
• Is -20% of forecast;					
SFU	10,669	10,669	10,669	10,669	10,669
UniverCity	2,430	2,859	3,240	3,636	3,809
Total BMDEU	13,099	13,527	13,909	14,305	14,478
• Is +20% of forecast;					
SFU	10,669	10,669	10,669	10,669	10,669
UniverCity	3,645	4,288	4,761	4,761	4,761
Total BMDEU	14,314	14,957	15,430	15,430	15,430
<u>Efficiency of the biomass CEP:</u>					
• Is at 72%					
SFU	11,113	11,113	11,113	11,113	11,113
UniverCity	3,164	3,723	4,219	4,735	4,960
Total BMDEU	14,277	14,836	15,332	15,848	16,073
• Is at 80%					
SFU	10,002	10,002	10,002	10,002	10,002
UniverCity	2,847	3,350	3,796	4,261	4,463
Total BMDEU	12,849	13,352	13,798	14,263	14,465
<u>Operating conditions</u>					
Plant Down by 20% output					
SFU	8,535	8,535	8,535	8,535	8,535
UniverCity	2,430	2,859	3,240	3,636	3,809
Total BMDEU	10,965	11,394	11,775	12,171	12,344

<u>Average biomass moisture content:</u>					
• Is at 40%					
SFU	10,669	10,669	10,669	10,669	10,669
UniverCity	3,037	3,573	4,049	4,545	4,761
Total BMDEU	13,706	14,242	14,718	15,214	15,430
• Is at 42.5%					
SFU	10,669	10,669	10,669	10,669	10,669
UniverCity	3,037	3,573	4,049	4,545	4,761
Total BMDEU	13,706	14,242	14,718	15,214	15,430
<u>Seasonal weather conditions</u>					
• 10% more demand					
SFU	11,736	11,736	11,736	11,736	11,736
UniverCity	3,341	3,931	4,454	4,999	5,237
Total BMDEU	15,077	15,666	16,190	16,735	16,973
• 15% less demand					
SFU	9,069	9,069	9,069	9,069	9,069
UniverCity	2,582	3,037	3,442	3,863	4,047
Total BMDEU	11,650	12,106	12,511	12,932	13,115
<u>Hypothetical scenario that impacts biomass fuel requirement</u>					
• downtime (20% less output) + 15% less demand + 80% efficiency					
SFU	6,501	6,501	6,501	6,501	6,501
UniverCity	1,851	2,177	2,468	2,769	2,901
Total BMDEU	8,352	8,679	8,969	9,271	9,402

24.4.1 Based on the above analysis, in Corix’s view, what is the likelihood that the total biomass fuel requirements are less than the minimum quantity stipulated in the Biomass Supply Contract (taking into account the cumulative effect of each scenario resulting in less biomass fuel requirements)? What would be the impact of such a scenario on customer rates if Corix’s strategies to mitigate costs fail (e.g., Corix is unable to have the supplier resell the extra amount of biomass to a third party)?

Corix Response:

The minimum quantity stipulated in the contract is approximately 66 % of the estimated annual biomass fuel need. It is very unlikely to operate the plant at lower than 66% output, however we have created a hypothetical scenario presented in the table above.

Based on that scenario, the biomass plant output is approximately 35% lower than forecasted and the efficiency of the plant when operational is higher (80%), the biomass fuel demand is lower than the minimum quantity stipulated in the contract. We have run this scenario continuously for 5 years (worst case scenario), which is extremely unlikely. Under the Fuel Supply agreement, Corix is required to pay for the minimum

amount of the fuel.

There are several mitigating factors:

- Negotiate with the supplier to waive the requirement
- Pay the supplier for storing the fuel at his site and use it the following years
- Sell the excess biomass to other operations, e.g. UBC biomass plants
- in situations when a lower-than-expected fuel consumption is Corix's responsibility due to operational negligence, Corix would pay for the difference between the fuel requirements and stipulated price.

24.4.2 Based on the above analysis, in Corix's view, what is the likelihood that the total biomass fuel requirements exceed the minimum quantity stipulated in the Biomass Supply Agreement (taking into account the cumulative effect of each scenario resulting in more biomass fuel requirements)? What would be the impact of such a scenario on customer rates if Cloverdale Fuel Limited were to supply the excess demand versus if another fuel supplier were to supply the excess demand?

Corix Response:

The forecast fuel requirement is expected to exceed the stipulated minimum amount every year. As mentioned in previous responses, Cloverdale Fuel Ltd. may elect to supply all additional volumes and Corix would grant to the supplier a right of first refusal to supply the additional volumes under the same terms and conditions as the take or pay part of the contract. Should the supplier elect not to supply the additional volumes under the same terms and conditions, Corix would identify alternative biomass fuel sources to secure the additional volumes. Corix has elected this approach rather than sourcing any additional volumes on an annual basis to limit potential fuel shortage risk and fuel quality risk. Current customer rates assume that the entire fuel demand is provided by Cloverdale Fuel Ltd under the same terms as the take or pay part of the contract.

**25.0 Reference: ENERGY COSTS
Exhibit B-1, Section 7.1, p. 50
Biomass Cost Allocation**

On page 50 of the Application, Corix states:

Consistent with the TESA, biomass fuel costs are allocated to SFU and UniverCity based on their respective share of biomass energy produced by the biomass boiler, and subject a risk sharing mechanism negotiated between Corix and SFU. This mechanism allows for a portion of the SFU biomass fuel costs to be fixed at a specified rate (\$/BDT) as per the TESA. The remaining volume needed to satisfy SFU's energy demand would be sourced as variable costs and applied to SFU in accordance with the agreement reached between Corix and SFU in 2019 in lieu of the 10-year fixed contract originally anticipated for the project.

25.1 Please clarify the mechanism in place to share risks between Corix and SFU in relation to biomass costs, with reference to the appropriate TESA sections. Specifically, please describe the cost-related risks borne by Corix and those borne by SFU for different levels of biomass fuel requirements.

Corix Response:

The agreement on the fuel costs risk sharing between SFU and Corix was reached in lieu of the 10-year fuel supply contract that was one of the Infrastructure Agreement's conditions precedent. The terms of the agreement are confidential and will be submitted to the BCUC in the week following the submission of this Response to BCUC IR No. 1. The risk sharing agreement negotiated between SFU and Corix has no implication to the UniverCity customers.

- 25.2 Please state whether UniverCity customers also benefit from a risk-sharing mechanism with Corix. If so, please clarify what the mechanism is, with reference to the appropriate agreement. If not, please explain why not.

Corix Response:

The risk-sharing mechanism exists due to the negotiated agreement between SFU and Corix, approved by the BCUC after a detailed review through the CPCN proceeding. Such an agreement does not exist with UniverCity customers. Please note that Corix has proposed to flow-through energy costs without mark-up for UniverCity. UniverCity would pay what Corix pays for energy costs. As electricity and natural gas rates for BMDEU's suppliers are regulated by the BCUC, customers receive additional protection from significant electricity and natural gas rate increases.

- 25.2.1 Will a portion of the UniverCity customers' biomass fuel costs also be fixed at a specified rate (\$/BDT), with the remaining quantity being sourced at variable rates? If so, please provide references to the appropriate agreement. If not, please explain why not.

Corix Response:

Please see the response to question 25.2 above.

**26.0 Reference: ENERGY COSTS
Exhibit B-1, Section 7.2, p. 51
Electricity**

On page 51 of the Application, Corix states:

At UniverCity's full build-out, the combined electricity consumption for providing service to both SFU and UniverCity was initially forecasted to be approximately 4.291MWh per year, with a peak load of 682kW. However, after taking into account the updated plans involving the removal of a third boiler discussed in the 2017 BMDEU CPCN, the updated electricity consumption forecast is 4.139 MWh per year.

Electricity rates were forecasted for 2020 through to 2023 based on the BC Hydro F2020 – F2021 Revenue Requirements Application. BCUC Order G-32-20 approved a rate decrease of 1.01 percent for BC Hydro on an interim basis effective April 1, 2020. BC Hydro forecasts annual rate changes of 2.7%, - 0.3% and 3.0% effective April 1st of each year beginning in 2021. From 2024 onwards Corix assumes that the electricity rates increase annually at the target inflation rate, which is forecasted to be 2%.

- 26.1 Please explain the method used by Corix to forecast the electricity consumption of the CEP in all years before full build-out (2020 to 2023).

Corix Response:

With no historical data to utilize, Corix assumed that the electricity consumption would increase at a rate equivalent to the increase in total annual energy consumption for the years 2020 through to 2023, culminating in the annual electricity consumption as forecast by the independent engineering consulting firm (discussed on page 51 of the Application). Corix

considered this to be a reasonable approach as electricity costs represent between 18% and 22% of total energy costs. Energy costs are flowed through to SFU and Corix has requested the flow-through of energy costs to UniverCity customers as part of this Application.

- 26.2 Based on information presented in the Financial Model (Fuel Costs Tab), please provide, in a non-confidential table, the annual electricity demand (kW) and consumption (MWh), BC Hydro electricity rates and electricity costs (total and by customer) for the years 2020 to 2025.

Corix Response:

Please see the table below.

Table 13: Electricity Data from Appendix A to the Application

	Test Period				UniverCity Build-Out	
	2020	2021	2022	2023	2024	2025
Electricity Demand (kW)	682	682	682	682	682	682
Electricity Consumption (MWh)	1,679	3,652	3,825	3,979	4,139	4,139
<u>BC Hydro Rates</u>						
Daily rate (Basic Charge), \$ / day	0.2646	0.2717	0.2709	0.2791	0.2846	0.2903
Demand charge, \$ per kW of Billing Demand	12.22	12.55	12.51	12.89	13.15	13.41
Energy charge, \$ / kWh	0.0600	0.0616	0.0614	0.0633	0.065	0.066
Rate Rider (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Cost of Electricity – BMDEU (\$)	134,078	327,847	337,504	357,362	374,851	382,348
<u>Allocation of Electricity Costs</u>						
SFU	53%	73%	70%	67%	65%	63%
UniverCity	47%	27%	30%	33%	35%	37%
Total Cost of Electricity – SFU (\$)	71,116	239,765	235,651	239,872	241,883	242,630
Total Cost of Electricity – UniverCity (\$)	75,342	88,081	101,853	117,490	132,968	139,718

**27.0 Reference: ENERGY COSTS
Exhibit B-1, Section 7.3, p. 51
Natural Gas**

Corix states on page 51 of the Application, “Natural gas costs are forecasted based on forecast consumption, daily demand and natural gas rates.”

- 27.1 Based on information presented in the Financial Model (Fuel Costs Tab), please provide, in a non-confidential table, the annual natural gas consumption (GJ), FortisBC Energy Inc. natural gas rates and natural gas costs for the years 2020 to 2025.

Corix Response:

Please see the table below.

Table 14: Natural Gas Data from Appendix A to the Application

	Test Period				UniverCity Build-Out	
	2020	2021	2022	2023	2024	2025
Annual Natural Gas Consumption (GJ)	43,676	16,500	19,413	21,999	24,690	25,864
Daily Demand (GJ)	300	261	99	116	131	147
FortisBC Energy Inc.						
Rate Schedule	5	3	5	5	5	5
Basic Charge, \$ / month (RS 5), \$ / day (RS 3)	469.0	4.89	487.95	497.71	507.66	517.81
Rate Rider 2, \$ / month (RS 5), \$ / day (RS 3)	0.4000	0.0131	0.4000	0.4000	0.4000	N/A
Demand charge, \$ / GJ of daily demand / month	23.83	N/A	24.79	25.29	25.80	26.31
Delivery Charge, \$ / GJ	0.87	\$3.206	0.91	0.93	0.94	0.96
Commodity cost recovery charge, \$ / GJ	1.853	\$2.279	2.504	2.554	2.605	2.657
Storage & transport charge, \$ / GJ	0.67	\$0.879	0.70	0.71	0.73	0.74
Total variable charges per GJ	3.40	\$6.36	4.11	4.19	4.28	4.36
Carbon tax, \$/GJ	1.986	\$2.483	2.48	2.48	2.48	2.48
Total Cost of Natural Gas – UniverCity Only (\$)	350,210	157,959	176,388	202,413	228,948	245,798

F. REVENUE REQUIREMENTS

28.0 Reference: REVENUE REQUIREMENTS Exhibit B-1, Section 8.1.1, p. 53 Financing assumptions

Corix states on page 53 of the Application, “uses a deemed capital structure of 57.5% debt and 42.5% equity and an equity risk premium of 75 basis points over the benchmark low risk utility rate, in accordance with the BCUC’s determination regarding the minimum default capital structure and equity risk premium for small TES utilities in the Generic Cost of Capital Stage 2 proceeding... In future rate applications Corix will update the deemed interest rate for UniverCity in a manner consistent with the BCUC’s approach outlined in the relevant Order at that time.”

Table 24 on page 53 of the Application shows the financing assumptions for the BMDEU:

Table 24: Financing Assumptions for the BMDEU

CATEGORIES	FINANCING ASSUMPTIONS	2020 ONWARDS
Capital Structure	Debt/capital	57.5%
	Equity/capital	42.5%
Cost of Debt	Interest rate	3.60%
Return on Equity	Benchmark Utility ROE	8.75%
	Equity Risk Premium	0.75%
	Return on equity (ROE)	9.50%
Income Tax	Income tax rate	27.0%
Cost of Capital	Weighted average cost of capital (WACC)	5.55%

- 28.1 Please insert a column in Table 24 to show the financing assumptions using the latest available information (e.g. Corix’s current capital structure; current utility credit spreads for BBB and BBB (low) rated debt and the 10-year Government of Canada bond yield; income tax rate; etc). Please provide all supporting calculations and references.

Corix Response:

Please see the table below. The latest information is based on data at December 31, 2020.

Table 15: Financing Assumptions Comparison

Categories	Financing Assumptions	2020 Onwards		
		Application	Service Commencement	Latest Information
Capital Structure	Debt/Capital	57.5%	57.5%	57.5%
	Equity/Capital	42.5%	42.5%	42.5%
Cost of Debt	Interest Rate	3.60%	3.36%	3.22%
Return on Equity	Benchmark Utility ROE	8.75%	8.75%	8.75%
	Equity Risk Premium	0.75%	0.75%	0.75%
	Return on equity (ROE)	9.50%	9.50%	9.50%
Income Tax	Income Tax rate	27.0%	27.0%	27.0%
Cost of Capital	WACC	5.55%	5.45%	5.39%

The capital structure remains as a deemed capital structure in accordance with the BCUC’s determination regarding the minimum default capital structure and equity risk premium for small TES utilities in the Generic Cost of Capital Stage 2 proceeding.¹⁴ This was done as BMDEU is one department within Corix Multi-Utility Services Inc. (“**Corix**”) and Corix currently has negative shareholder’s equity indicating that since its inception it has not made any cumulative profits. Due to the existence of this negative equity, an actual capital structure for Corix cannot be computed.

The deemed interest rate on debt financing was determined based on utility credit spreads for BBB and BBB (low) rated debt and the 10-year Government of Canada bond yield, consistent with the approach outlined for calculating a “default debt” rate for small TES utilities from the Commission’s GCOC Decision (Stage 1) and confirmed in the Commission’s Stage 2 Decision.¹⁵ The 10-year Government of Canada bond yield is obtained from the Bank of Canada’s website based on the V122543 Monthly Series.¹⁶ Corix has been informed that the corporate spread data it receives from financial institutions is proprietary information and highly confidential and not be shared. Corix uses an average of the 10-year corporate spread for utilities with a BBB or BBB(low) rating. As a result of the reduction in interest rate from the time of filing the cost of capital has been reduced accordingly.

- 28.1.1 Using assumptions in the 2014 Generic Cost of Capital Stage 2 proceeding and the latest available information to date, please discuss whether the financing assumptions presented in Table 24 above remains to be appropriate for setting rates for the 2020 to 2023 test period.

¹⁴ BCUC Generic Cost of Capital Proceeding Stage 2, Order G-47-14, p. 3.

¹⁵ BCUC Generic Cost of Capital Proceeding Stage 2, Decision, p. 123.

¹⁶ https://www.bankofcanada.ca/rates/interest-rates/lookup-bond-yields/?lookupPage=lookup_bond_yields.php&startRange=2008-12-03&dFrom=&dTo=&rangeType=range&rangeValue=1&rangeWeeklyValue=1&rangeMonthlyValue=20&series%5B%5D=LOOKUPS_V122543&submit_button=Submit

Corix Response:

Corix considers that the financing assumptions presented in Table 24 in the Application should be updated based on the information available at the service commencement date. This information is presented in the response to question 28.1 above and results in a reduction of 24 basis points in the interest rate, which results in an indirect reduction of the weighted average cost of capital by 10 basis points. This approach is consistent with the terms of the TESA, approved through C-5-17.

28.1.2 Please discuss the impact on the test period revenue requirements, rates, and deferral account balances using the latest available information to date.

Corix Response:

Corix has considered the impact on the test period forecasts of using the financing assumptions at the time of service commencement.

For SFU

- This would result in a reduction of the forecast revenue requirement for SFU by 1% (≈12k) in 2020 and 0.8% (≈\$26k) in each year from 2021 through to 2023.
- This would result in a reduction to the proposed Capacity Charges by 1.87% in 2020, 1.4% in 2021 and 1.3% in 2022 and 2023 each. There would be no impact to the Consumption Charge or Availability Charges.

For UniverCity

- There will be no change to the proposed rates for UniverCity due to the existence of the revenue deficiency deferral account (“RDDA”). Impacts to rates exist outside of the proposed test period.
- This would result in a reduction to the forecast annual revenue requirement of UniverCity by approximately 0.9% for each year of the test period.
- This would result in a reduction to the forecast RDDA peak balance by \$140,354 or 2.4%, which would occur in 2023.

**29.0 Reference: REVENUE REQUIREMENTS
Exhibit B-1, p. 58, Order G-220-19 dated September 11, 2019, Appendix A, p. 7
Disposition of TEC1 assets**

On page 58 of the Application, Corix states:

Corix has forecast the reduction to UniverCity’s Utility Plant at the time the [Temporary Energy Centre No. 1 (TEC1 Assets)] are anticipated to be disposed to Dockside Green Energy based on the projected net book value of the TEC1 Assets at that time. This results in a 2021 reduction of Utility Plant by \$84,938, representing 1.7% of the Natural Gas Plant utility plant.

In Order G-220-29 dated September 11, 2019, the BCUC states on page 7 of Appendix A:

The Panel directs Corix to remove the net book value of the TEC1 Assets from the UniverCity portion of the BMDEU rate base and revenue requirement at the time the disposition occurs. Further, Corix is directed to file with the BCUC, within 30 days of the disposition, a compliance filing which includes a summary of the value of the assets removed from the BMDEU rate base

29.1 Please provide an estimate of when the disposition of TEC1 Assets is expected to occur.

Corix Response:

Corix currently anticipates a disposition of TEC1 Assets in late spring to early summer of 2021.

29.1.1 If Corix has already disposed the TEC1 Assets from BMDEU, please provide i) the date of when that occurred; ii) the net book value of the TEC1 Asset at the time of disposition; and iii) provide a copy of the compliance filing as directed by Order G-220-19. If the compliance filing is not available, please explain why not.

Corix Response:

Not Applicable. Please see the response to 29.1.

**30.0 Reference: REVENUE REQUIREMENTS
Exhibit B-1, Sections 8.2.3, 8.3.3, pp. 57, 60
Revenue requirement forecast variances**

Corix presents SFU’s and UniverCity’s revenue requirements for years 2020 to 2023 in Tables 28 and 31, respectively.

Section 9 of the Application describes the SFU Fuel Cost Deferral Account, SFU Property Tax Deferral Account, UniverCity Energy Cost Reconciliation Account, and UniverCity Revenue Deficiency Deferral Account.

30.1 For each revenue requirements component listed under Table 28 and 31 for SFU and UniverCity, respectively, in a table format, please explain i) whether the line item is subject to deferral account treatment; ii) if yes, which deferral account is applicable; and iii) if yes, explain what is the amount to be accrued (e.g. difference between forecast and actuals).

Corix Response:

Please see the table with the response below. As discussed in Section 9.2 of the Application, SFU’s revenue requirement excludes property taxes which would be addressed through the BCUC-approved Property Tax Deferral Account for SFU.

Table 16: SFU Revenue Requirement Components and Deferral Account Applicability

SFU Rev. Req. Line Item	Subject to Deferral Account Treatment?	Applicable Deferral Account	Amount to be Accrued
Operating Costs	No	Not Applicable	Not Applicable
Biomass Fuel	Yes	Fuel Cost Deferral Account approved through C-5-17	Difference between forecast and actual energy costs subject to confidential adjustment in certain situations, as described in Section 9.1 of the Application.
Electricity Costs	Yes		
Property Tax (CEP)	Yes	Property Tax Deferral Account approved through C-5-17	Full cost of 1 st Property Tax Assessment, if applicable
Income Tax	No	Not Applicable	Not Applicable
Interest on Debt	No	Not Applicable	Not Applicable
Return on Equity	No	Not Applicable	Not Applicable

Table 17: UniverCity Revenue Requirement Components and Deferral Account Applicability

SFU Rev. Req. Line Item	Subject to Deferral Account Treatment?	Applicable Deferral Account	Amount to be Accrued
Operating Costs	Yes	RDDA, approved by C-7-11	Difference between forecast and actual costs*
Land Lease	Yes		
Franchise Fees	Yes		
Biomass Fuel	Yes	Proposed Energy Cost Reconciliation Account	
Natural Gas	Yes		
Electricity	Yes		
Property Tax	Yes	RDDA, approved by C-7-11	
Depreciation	Yes		
Amortization – CIACs	Yes		
Income Tax	Yes		
Interest on Debt	Yes		
Return on Equity	Yes		

* Corix does not accrue Corporate or Regional Allocations above the approved amounts.

30.1.1 If the deferral treatment for each revenue requirement component is not consistent across all years of the test period, please elaborate on the difference in deferral treatment and explain why.

Corix Response:

The deferral treatment for each revenue requirement component identified in response to question 30. 1 above is consistent throughout the test period. Please note that all three deferral accounts have previously been approved by the BCUC as follows:

- SFU Fuel Cost Deferral Account, approved through C-5-17;
- SFU Property Tax Deferral Account, approved through C-5-17; and
- UniverCity’s Revenue Deficiency Deferral Account, approved through C-7-11.

The proposals regarding the UniverCity ECRA results in a similar deferral treatment of energy cost variances between forecast and actuals for SFU and UniverCity to the extent possible. As SFU has a negotiated agreement with Corix there is an additional adjustment to SFU’s FCDA that does not occur with the UniverCity ECRA. This was approved by the BCUC through C-5-17.

Any differences between the deferral treatment for revenue requirement components between SFU and UniverCity stem from their differences in customer groups.

30.2 Please discuss the extent to which the deferral accounts as explained in section 9 of the Application mitigates any forecast uncertainty regarding the revenue requirements components for SFU and UniverCity.

Corix Response:

The SFU FCDA and the UniverCity ECRA, as discussed in Section 9 of the Application, are designed to flow-through actual energy costs to the respective customer groups, subject to the confidential adjustment to the FCDA, thereby eliminating forecast uncertainty.

The Property Tax Deferral Account for SFU is designed to recover/refund any difference between the forecast and actual property taxes for SFU, incurred between the Service Commencement Date and receipt of the first property tax assessment for the Infrastructure (if any such taxes are payable). Therefore, this is designed to eliminate forecast uncertainty for the first property tax assessment for infrastructure related to SFU.

Please note that the likelihood and magnitude of this property tax is uncertain, and this approach was approved through C-5-17 in recognition of the Panel determination that it would not be reasonable for Corix to bear the forecast risk for property taxes until the initial assessment was completed.

The purpose of the UniverCity RDDA, approved through C-7-11, is to allow for a rate levelization plan which is typically used for greenfield utilities with a customer base that is scheduled to build out over time.

G. DEFERRAL ACCOUNTS, RECONCILIATION ACCOUNTS AND RATE RIDERS

31.0 Reference: DEFERRAL ACCOUNTS, RECONCILIATION ACCOUNTS AND RATE RIDERS Exhibit B-1, Section 9.1, p. 66 Fuel Cost Deferral Account – SFU

On page 66 of the Application, Corix states:

In the Decision for BCUC Order C-5-17, the BCUC approved a Fuel Cost Deferral Account [FCDA] for the BMDEU to capture the difference between the forecast and actual costs incurred by Corix for biomass and electricity associated with the provision of service to SFU under the TESA, with the recovery or refund of any such differences in future periods through adjustments to SFU's capacity charge.

31.1 Please specify the cost items and revenues that are recorded in the FCDA for SFU.

Corix Response:

Cost items include: (i) Biomass Fuel costs; and (ii) Electricity Costs allocated to SFU. Revenues include Consumption Charge Revenue.

31.2 Please confirm, or otherwise explain, that fuel costs are recorded separately and sorted by fuel type (i.e. biomass and electricity) in the FCDA.

Corix Response:

Confirmed.

32.0 Reference: DEFERRAL ACCOUNTS, RECONCILIATION ACCOUNTS AND RATE RIDERS Exhibit B-1, Sections 8.3.3, 8.5.2, and 9.2, pp. 60, 65-66; TESA, p. 14 Property Tax Deferral Account – SFU

On page 66 of the Application, Corix states:

In the Decision for BCUC Order C-5-17, the BCUC approved a Property Tax Deferral Account for Corix to recover/refund any difference between the forecast and actual property taxes for SFU, incurred between the Service Commencement Date and receipt of the first property tax assessment for the Infrastructure (if any such taxes are payable).

Corix indicates that at the time of filing, the initial property tax assessment has not yet occurred. Corix has not included forecast property taxes for SFU or for UniverCity for their respective revenue requirement. Corix proposes that any property taxes relevant to SFU that have been paid by Corix be added to the SFU Property Tax Deferral Account for future recovery.

Below is an excerpt of Table 31: UniverCity Revenue Requirements on page 60:

BMDEU REVENUE REQUIREMENT	2020	2021	2022	2023
Property Tax – Energy Centre	71,589	73,021	74,481	75,971
Property Tax – Residential Distribution	23,239	27,734	31,399	37,830
Subtotal Property Taxes	94,828	100,755	105,880	113,800

The same figures above are shown in Table 33: Combined Revenue Requirement for the BMDEU on page 66, which indicates that the Property Tax pertaining to Energy Centre and Residential Distribution are related to UniverCity customers only.

- 32.1 Corix has indicated that it has not included forecast property taxes for SFU or for UniverCity in their respective revenue requirements. Please clarify what are the “Property Tax – Energy Centre” and “Property Tax – Residential Distribution” line items as shown in Tables 31 and 33.

Corix Response:

Please see Exhibit B-5 (dated October 13, 2020), where Corix provides a correction stating that only SFU’s property taxes were excluded from the revenue requirement. The items referred to in this question are property tax line items related to UniverCity.

On page 14, the TESA states:

Corix and SFU will cooperate and work with governmental authorities in British Columbia in an effort to exempt the Infrastructure facilities dedicated to SFU from property, school and municipal and other local government taxes under Section 54 of the *University Act* (British Columbia) on the basis that the Infrastructure will be held or used by or on behalf of SFU for university purposes...

- 32.2 Please provide an update on Corix’s progress with SFU and with governmental authorities to exempt the infrastructure facilities dedicated to SFU from property, school and municipal and other local government taxes.

Corix Response:

This is currently under evaluation. Corix has no progress updates available at this time.

- 32.3 If Corix incurs school and municipal and other local government taxes, please clarify whether these costs will be recorded in the SFU Property Tax Deferral Account.

Corix Response:

To date, Corix’s infrastructure was not assessed and the property taxes were not issued. We cannot speculate whether or not Corix incurs any school, municipal or other local government taxes in the future.

**33.0 Reference: DEFERRAL ACCOUNTS, RECONCILIATION ACCOUNTS AND RATE RIDERS
Exhibit B-1, Section 9.3, pp. 67-68
Recovery/refund of balances in SFU deferral accounts**

On page 67 of the Application, Corix proposes to recover/refund the balance in the SFU FCDA through

SFU Rider 1 and the Property Tax Deferral Account (PTDA) through SFU Rider 2 using a 12-month amortization period, in units same as the Capacity Charge: \$/MW of Nominated Capacity/Month. The 12-months amortization period of the balance begin on July 1st of the year following the year in which the balance was accrued. The rider will be adjusted through an annual compliance filing to the BCUC no later than June 1st of each year.

On page 68 of the Application, Corix illustrates that if the SFU FCDA has a balance of (\$12,000) at December 31, 2021, then SFU Rider 1 effective July 1, 2022 until June 30, 2023 will be (\$100) per MW of Nominated Capacity per month for a nominated capacity of 10 MW. For the PTDA, if it has a balance of \$60,000 at December 31, 2021, then the SFU Rider 2 effective July 1, 2022 until June 30, 2023 will be \$500 per MW of Nominated Capacity per month for a nominated capacity of 10 MW.

- 33.1 Please clarify whether the 10 MW nominated capacity is a fixed or variable component in the calculation of the SFU Rider 1 and Rider 2.

Corix Response:

The 10 MW nominated capacity is a fixed component in the calculation of the SFU rate riders.

- 33.1.1 If the nominated capacity varies between months, please clarify how Corix will apply to the BCUC to set a variable rate rider for July 1st of each year. How will the rate riders be shown in the tariff? How will be rate riders be shown on customers' bills?

Corix Response:

Please see the response to 33.1 above. A hypothetical example of how Corix would apply to the BCUC to set the SFU rate riders each year was provided in Section 9.3 of the Application.

Corix provided Tariff pages for SFU in Appendix D of the Application which illustrate how the rate riders will be displayed in the tariff.

Corix's preference is to show each rate rider and the associated charges separately on the bill for SFU, which is the sole customer to which these rate riders apply.

- 33.2 Please explain why Corix proposes a 12-month amortization period for the FCDA and PTDA. Has Corix considered longer or shorter amortization periods other than 12-months? Please discuss.

Corix Response:

Corix proposes a 12-month amortization period as:

- It strikes a reasonable balance between managing the magnitude of the balance in the deferral account and the frequency of rate changes (where applicable); and
- It is consistent with the amortization period typically approved by the BCUC for accounts designed to flow-through costs directly to customers. For example, when establishing the BCUC's Gas Cost Reconciliation Account Guidelines the BCUC found that a one-year period for amortization is reasonable under normal circumstances for flowing through commodity costs to customers.¹⁷

- 33.3 Please explain whether Corix has considered a maximum deferral account balance threshold for the FCDA and PTDA. If so, please provide the thresholds for each deferral account. If not, please explain why a maximum threshold is not necessary?

Corix Response:

Corix considers that a maximum threshold is not necessary as:

¹⁷ BCUC Gas Cost Reconciliation Account Guidelines, Appendix I to L-5-01, p. 3.

- Corix forecasts energy costs using consumption forecasts based on data provided by SFU and the latest rate information available (the biomass fuel rate is known for the test period); and
- Corix proposes an annual adjustment to the associated rate rider for amortizing the balance in the FCDA.

The annual adjustment will mitigate against balances in the FCDA that cannot be amortized in a reasonable timeframe.

Given the uncertainty surrounding the forecast property taxes for SFU, as described in Section 9.2 of the Application, a maximum threshold would run counter to the purpose of the PTDA.

- 33.4 If Corix submits a filing on June 1st of each year for the two SFU rate riders to be effective July 1st, please specify the latest cut-off date for when Corix requires a BCUC decision to implement the rate riders effective July 1st.

Corix Response:

Corix considers the latest cut-off date for a decision from the BCUC to be at least 5 business days prior to July 1st. So if 2021 was used as an example, Corix considers that the BCUC decision should be issued by the end of day June 23rd.

This results in 5 business days prior to July 1st, including June 24, 25, 28, 29, 30.

- 33.4.1 Please indicate whether Corix is able to file the rate rider application earlier than June 1st for the rate riders to take effect July 1st. If so, when is the earliest date that Corix is able to submit the filing?

Corix Response:

Corix is unable to file the rate rider application prior to June 1st. Corix submits 8 annual financial reports to the BCUC each year, all of which are due April 30th. The staff that prepares these annual financial reports are the same staff that would prepare the rate rider application. This means that Corix is unable to start the rate rider applications until May each year. Furthermore, actual historical data used in the rate rider application will be obtained from the information used to prepare the annual financial reports.

- 33.4.2 Please discuss Corix's proposal in terms of the review process and timeline if it chooses to depart from the rate rider setting mechanism.

Corix Response:

Corix does not anticipate choosing to depart from the proposed rate rider setting mechanism.

**34.0 Reference: DEFERRAL ACCOUNTS, RECONCILIATION ACCOUNTS AND RATE RIDERS
Exhibit B-1, Sections 9.4, 10.2, pp. 68-69, 73-74
Energy Cost Reconciliation Account – UniverCity**

Corix requests to establish an ECRA for UniverCity customers to record the difference between the actual energy costs and the revenue collected through the proposed Variable Energy Charge.

On page 68 of the Application, Corix submits that energy costs at BMDEU, for both SFU and UniverCity, are variable costs that are impacted by customer consumption and energy prices. Energy costs can fluctuate with market prices and are outside of Corix's control. Corix states:

In order to minimize the possibility of large balances in the ECRA, Corix proposes to amortize the balance in the UniverCity ECRA over a 1-year period, which is consistent with the length of time outlined in BCUC's Guidelines for Setting Gas Cost Recovery Rates outlined in L-5-01. L-5-01 applies to natural gas utilities. While the BMDEU is not a natural gas utility, Corix considers the 1-year amortization period reasonable in normal circumstances.

These proposals, along with the Variable Energy Charge (*please see Section 10.3.1*), results in an efficient method to flow through energy costs to customers. Corix's proposals enhance energy cost transparency and send the appropriate price signal to customers. A one-year amortization period strikes a balance between minimizing the balance in the ECRA and providing rate stability.

- 34.1 Please clarify if there are any differences in the purpose and nature of the ECRA for UniverCity customers versus the FCDA for SFU as both accounts are meant to flow-through energy costs which Corix has no effective control.

Corix Response:

There is no difference in the purpose of the ECRA for UniverCity customers versus the FCDA for SFU as both accounts are meant to flow-through energy costs to customers.

In terms of the nature of the two accounts:

- SFU's FCDA has a confidential adjustment that is not applicable to UniverCity's ECRA as it is a term outlined in the TESA; and
- SFU's FCDA excludes natural gas costs since the natural gas boilers provide service to UniverCity only. FortisBC Energy Inc. may update its natural gas rates as much as 4 times per year, whereas biomass fuel and electricity rates are typically updated once per year. Therefore, there is potential for natural gas rates to exhibit more variability throughout the year when compared to biomass rates and electricity rates.

- 34.1.1 Recognizing that the unit price for biomass supply is a negotiated price between Corix and the biomass supplier, please clarify whether the market price fluctuations that are outside of Corix's control would be for electricity and natural gas, but not biomass.

Corix Response:

While the biomass rate is known for the test period, unknown market price changes for biomass may occur through negotiations for rates after the current biomass supply contract period. It should be noted that the deferral accounts are designed to flow-through energy costs to customers, regardless of the frequency of the unitized rates for each of these costs.

- 34.2 Please explain why Corix is proposing to dispose the ECRA balance to set the Variable Energy Charge by way of using the BCUC's Guidelines for Setting Gas Cost Recovery Rates (e.g. 0.95 and 1.05 Trigger Ratios) but not for the FCDA to set the SFU Rider 1.

Corix Response:

Corix has not proposed to address the ECRA balance to set the Variable Energy Charge "by way of using the BCUC's Guidelines for Setting Gas Cost Recovery Rates (e.g. 0.95 and 1.05 Trigger Ratios)." The BCUC's Guidelines for Setting Gas Cost Recovery Rates were established through L-5-01 and updated through L-40-11 for FortisBC Energy Inc. and subsequently adopted by some natural gas and propane utilities in the province (GCRA Guidelines). The BMDEU is a Stream B TES utility. While Corix's proposal is consistent with some aspects of the BCUC's GCRA

Guidelines, Corix does not propose to use the GCRA Guidelines for rates at BMDEU. Please see Section 10.2.1 on pages 73 and 74 of the Application for details of Corix's proposal for the Variable Energy Charge.

SFU's rate structure was negotiated as part of the TESA. The rate riders were proposed in order to maintain the approved rate structure. Trigger ratios are not required for SFU since rate riders are being used and the existing consumption charge will not be changed at July 1st. Corix proposes trigger ratios for the UniverCity ECRA as these would prompt a change to the existing Variable Energy Charge, as no rate riders are used.

34.2.1 Please discuss whether it is appropriate to use a similar trigger ratio to review the FCDA to set the SFU Rider 1. If not, please explain why.

Corix Response:

It would not be appropriate to use a similar trigger ratio due to the use of a rate rider for SFU. A trigger ratio is not required since the consumption charge will not be adjusted.

34.3 Please specify the cost items and revenues that will be captured in the ECRA for UniverCity. Will Corix show the fuel cost by fuel type (i.e. biomass, natural gas, and electricity) in the ECRA filing to set the Variable Energy Charge? Provide a list of reporting items, and if possible, a sample filing.

Corix Response:

Cost items include: (i) Biomass Fuel costs; (ii) Natural Gas Costs; and (iii) Electricity Costs allocated to UniverCity. Revenues include the Variable Energy Charge Revenue.

Corix will show the fuel cost by type in the ECRA filing.

Corix is unable to produce a sample filing at this time. In the proposed filing Corix would include historical and forecast monthly figures for the relevant time period showing:

1. Biomass Fuel Costs;
2. Natural Gas Costs;
3. Electricity Costs;
4. Customer consumption;
5. Variable Energy Charge Revenue; and
6. ECRA balances.

Corix would also include calculations showing the rate change required to amortize the balance in the ECRA over 12-months based on all the above information, as well as indicative bill impacts to end-users of UniverCity.

34.4 Please explain whether Corix has considered a maximum threshold for the ECRA balance. If so, please provide the maximum threshold. If not, why is a maximum threshold not necessary?

Corix Response:

Corix has not proposed a maximum threshold for the ECRA because the use of trigger ratios negates the requirement for a maximum threshold. Upon reviewing the relevant data and calculating the trigger ratios, Corix would request a change in the Variable Energy Charge if the ECRA Ratio is lower than the 0.95 Trigger Ratio or higher than the 1.05 Trigger Ratio. The proposed change would result in the 12-month amortization of the balance in the ECRA. In other words, at least once per year Corix would perform calculations to ensure that the rates are set so

as to amortize the balance in the ECRA within 12 months.

On page 74 of the Application, Corix proposes to establish a Variable Energy Charge Rate Setting Mechanism for UniverCity's Variable Energy Charge, based on Trigger Ratios (0.95 and 1.05), which equate to a ±5 percent dead-band range for the ECRA Ratio. The ECRA Ratio is defined below:

$$ECRA\ Ratio = \frac{12\ mth\ Forecast\ Variable\ Energy\ Charge\ Revenue}{(12\ mth\ Forecast\ Energy\ Costs + ECRA\ Balance\ at\ beginning\ of\ 12\ mth\ Forecast\ period)}$$

34.4.1 Please specify what information will be used to determine the "12 mth Forecast Energy Costs".

Corix Response:

Corix will use existing and forecast energy supply rates for biomass, electricity and natural gas, coupled with forecast biomass, natural gas and electricity demand to meet the forecast customer energy consumption.

34.4.2 Please clarify whether Corix has considered implementing an additional minimum +/- dollar per kWh threshold beyond the Trigger Ratio. If so, what is the proposed \$/kWh threshold and what is the rationale? If not, why not?

Corix Response:

Corix considered but does not propose an additional minimum \$ per kWh threshold beyond the trigger ratios. The GCRA Guidelines was originally established in 2001 and operated without a minimum rate change threshold until it was established in 2011. The BCUC added this second parameter of a minimum rate change threshold to keep the trigger ratio deadband from becoming too narrow during periods when the price of natural gas remained low, as there was the potential for rate changes each quarter of the year. The minimum rate change threshold provides slightly more stability to the existing GCRA rate setting mechanism during low price environments for natural gas.

The proposals for the UniverCity ECRA and the Variable Energy Charge are intended to result in one rate change per year, which Corix considers to provide rate change stability and consistency while mitigating against significant ECRA balances that are burdensome to recover/refund.

On page 74 of the Application, Corix states:

Corix proposes to submit a compliance filing, no later than March 1st of each year, that provides information on the year-end balance in the ECRA, the forecast energy costs, the forecast revenue at existing rates and, if required, requests a change in the Variable Energy Charge effective April 1st with the aim of amortizing the balance in the deferral account within 12 months.

34.5 Please explain whether Corix has considered resetting the ECRA ratio every quarter or every six-months. Please discuss how a more frequent review of the Variable Energy Charge may enhance energy cost transparency and send the appropriate price signal to customers.

Corix Response:

Corix considered a more frequent review of the Variable Energy Charge. However, from 2021

onwards between 66% and 68% of the UniverCity's energy costs will be driven by biomass and electricity costs. The underlying rates for these costs change once per year. Therefore, resetting the Variable Energy Charge once per year would send the appropriate price signal to customers. It would be inefficient for Corix to have a more frequent ECRA ratio reset frequency that is not aligned with the underlying drivers. This inefficiency would ultimately lead to increased costs being passed on to UniverCity ratepayers.

- 34.6 If Corix submits a filing on March 1st of each year for the Variable Energy Charge to be effective April 1st, please specify the latest date that Corix requires a BCUC decision by to implement a rate effective April 1st.

Corix Response:

Corix considers the latest cut-off date for a decision from the BCUC to be at least 5 business days prior to April 1st. So if 2021 was used as an example, Corix considers that the BCUC decision should be issued by the end of day March 24th.

This results in 5 business days prior to April 1st, including March 25, 26, 29, 30, 31.

- 34.6.1 Please indicate whether Corix is able to file a rate change request earlier than March 1st for rates effective April 1st. If so, when?

Corix Response:

Corix is unable to file a rate change request earlier than March 1st due to work associated with year-end accounting procedures.

- 34.7 Please discuss what would Corix propose in terms of a review process and the timeline if it chooses to depart from the Variable Energy Charge Rate Setting Mechanism for UniverCity's Variable Energy Charge.

Corix Response:

Corix does not anticipate choosing to depart from the proposed Variable Energy Charge Rate Setting Mechanism for UniverCity's Variable Energy Charge.

- 34.8 Please discuss the rationale for the SFU deferral accounts and the rate riders, particularly the FCDA, reviewed and set effective July 1st of each year.

Corix Response:

By no later than April 30, 2022, Corix would submit its BMDEU annual financial report to the BCUC, which would include the 2021 year-end balance for these deferral accounts. This would provide Corix one month during which Corix could prepare the application regarding the rate riders to submit to the BCUC by June 1st for approval by July 1st. This approach allows Corix to incorporate actual historical data consistent with the annual financial report and also manage Corix's internal resources who work on 8 annual financial reports for the BCUC due April 30th each year.

- 34.9 Please discuss the rationale for the ECRA to be reviewed and the Variable Energy Charge set effective April 1st of each year

Corix Response:

A March 1st ECRA filing to reset the Variable Energy Charge on April 1st would:

- provide Corix sufficient time to review year-end figures for the previous year;
- allow Corix to take into consideration supplier rate changes effective January 1st of each year; and
- allow Corix to manage its regulatory filing workload given its limited resources.

34.9.1 Would it be possible and more efficient to align the review timeline and effective dates for the FCDA and the ECRA? Please discuss.

Corix Response:

It would be possible, though not necessarily more efficient to combine the FCDA and the ECRA filing dates. Combining the filing dates results in a larger filing once per year, as opposed to two smaller filings per year. Given the differences between the two filings and Corix's limited resources, Corix considers it more appropriate to separate the two filings as proposed in the Application. If Corix considers that it is more appropriate to combine the two filings in the future then Corix will seek the necessary approvals from the BCUC at that time.

**35.0 Reference: DEFERRAL ACCOUNTS, RECONCILIATION ACCOUNTS AND RATE RIDERS
Exhibit B-1, section 9.5, pp. 69-71, section 11.2, p. 77; Exhibit B-5, slide 32
Revenue Deficiency Deferral Account – UniverCity**

The UniverCity Revenue Deficiency Deferral Account (RDDA) was approved by Order C-7-11. On pages 69 and 70 of the Application, Corix notes that the RDDA was approved to capture the revenue requirement variances under a 20-year levelized rate approach scheduled to end by the end of 2031. In 2016, the BCUC approved the continued use of the RDDA with a new 15-year levelized rate approach to recover the balance in the RDDA by the end of 2026.

Corix reports that the RDDA balance was \$2,700,852 as at December 31, 2019 and states:

The addition of the CEP and forecast additional capital associated with the build-out of the UniverCity development necessitates the extension of the levelization period to the original period, which is the end of 2031. Based on the forecast costs and revenues included in this proposal and in the financial model beyond the test period, Corix expects that the balance in the RDDA would be fully recovered by the end of 2031. This equates to a levelization period of just over 11 years from the service commencement date of the CEP.

On slide 32 of the Corix workshop presentation, Corix submits that the RDDA excludes the impact of energy costs or associated Variable Energy Charge revenue from Jan. 1, 2021 onwards, and that there are no changes to the treatment of the RDDA balance.

35.1 Please clarify whether Corix is seeking BCUC approval in this Application regarding the timing for the recovery of the RDDA balance or for an extension of the levelization period.

Corix Response:

Corix is not seeking approval for the timing of the recovery of the RDDA balance. Corix is seeking approval to set rates from September 1, 2020 through to December 1, 2023.

In previous Applications Corix specifically requested approval of a 20-year levelized rate plan (approved through C-7-11) and subsequently a 15-year levelized rate plan (approved through G-48-16A). Each rate plan coincided with the reduction of the balance in the RDDA to zero by the end of the rate plan. In this Application, Corix is requesting approval of rates to the end of 2023, with the understanding that at this time the RDDA will still have an outstanding balance. A subsequent rate application would be filed to address customer rates from 2024 onwards, which would take into consideration the RDDA balance at December 31, 2023.

35.2 Please clarify what revenue and costs items will be recorded in the RDDA during the test period.

Corix Response:

Please see BCUC IR No. 1, Question 30.1 for the cost items. Only revenue from the Basic Charge will be included in the RDDA. Please note that the RDDA attracts financing costs at Corix's weighted average cost of capital.

35.3 Please confirm, or otherwise explain, that Corix has not amortized any RDDA balance in the calculation of the proposed rates for the test period.

Corix Response:

Not confirmed. While a revenue deficiency is forecast for 2020, 2021 and 2022, a revenue surplus, which begins the amortization of the balance in the RDDA, is forecast for 2023.

On page 77, Corix states that the proposed rates result in a forecast RDDA peak balance of \$5,945,175 in 2023, which is also the first year UniverCity revenue is forecasted to exceed the annual revenue requirement (excluding consideration for the RDDA balance).

35.4 Please explain what factors will influence the RDDA balance and the timing of the RDDA peak balance. How sensitive is the RDDA peak balance in case of a delay or acceleration of the build-out schedule, high or low load growth, or high or low customer consumption, etc.?

Corix Response:

Please see the response to BCUC IR No. 1 Question 3.1.1 and Questions 6.1, 6.2 and 6.3.

H. RATE DESIGN

**36.0 Reference: RATE DESIGN
Exhibit B-1, section 10.2, pp. 73-76, section 11.2, pp. 77-78
Rate Design and customer bill impact – UniverCity**

On page 73 of the Application, Corix states:

Currently Corix recovers UniverCity's costs through a two-part rate structure with a Basic Charge per square metre per month (fixed charge) and a Variable Rate per kilowatt-hour (variable charge). In this Application Corix proposes to retain the two-part rate structure but to replace the Variable Rate with a Variable Energy Charge that will facilitate the recovery of total energy costs (biomass, natural gas and electricity) from UniverCity customers on a flow-through basis. The balance of the Revenue Requirements would then be addressed through the Basic Charge.

On pages 77 to 78, Table 37 provides the estimated impact of Corix's proposed rates to a typical UniverCity end-user, including examples of 1,000, 800, and 600 square feet residential suites. Corix states, "[t]hese calculations are provided as estimates only since Corix's district energy customers are typically strata corporations, who in turn bill individual unit owners in accordance with their strata bylaws and rules."

36.1 Please assess the existing and proposed UniverCity rate designs using the Bonbright¹⁸ rate

¹⁸ James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates (2nd Edition; Public Utilities Report, Inc.: Arlington, Virginia, 1988).

design principles.

Corix Response:

Please see the table below. Due to the nature of the Bonbright principles Corix has responded to this question in the context of rates that are designed for full annual recovery of total annual revenue requirements. This approach removes the RDDA, which could result in an inappropriate rate design analysis.

Table 18: Assessment of existing and proposed UniverCity rate design

Item	Bonbright Rate Design Principles	Existing UniverCity Rate Structure	Proposed UniverCity Rate Structure
1	Practical	It is simple with a high degree of understandability.	It is simple with a high degree of understandability.
2	Uncontroversial as to interpretation	Some confusion caused by interpreting the rate as some of the fixed costs are recovered through the variable rate. Therefore, it is unclear what the variable rate represents.	No confusion/controversies caused by interpreting the rates. The fixed charge recovers fixed costs and the variable energy charge recovers variable energy costs.
3	Effectively yield total revenue requirements	Due to the variable rate recovering a portion of fixed costs there is a risk that low customer consumption would not effectively yield total revenue requirements.	Effectively yields total revenue requirements.
4	Provide revenue stability from year to year	Fixed Rate and Variable Rate designed for full cost recovery each year. Revenue stability susceptible to variations in customer consumption.	Fixed Charge and Variable Energy Charge designed for full cost recovery each year.
5	Provide rate stability	Variable rates less stable than proposed since it is influenced by both energy costs and fixed costs.	Use of ECRA and rate setting mechanism increases rate stability while providing revenue stability.
6	Fairness among customer classes	Applied equally to all customers in UniverCity	Applied equally to all customers in UniverCity
7	Avoid undue discrimination	Avoids undue discrimination between customers	Avoids undue discrimination between customers
8	Promote economic efficiency and discourage wasteful use of service	Does not provide the appropriate price signal to customers. Does not discourage wasteful use of service since lower customer consumption does not necessarily lead to lower costs for customers.	Provides the appropriate price signal to customers by flowing through costs. Discourages wasteful use of service since higher customer consumption leads to higher costs for customers and lower customer consumption leads to lower costs for customers.

36.2 Please re-state Table 37 to show the fixed and variable components in percentages for the three suite sizes. For example, in the 1,000 square feet residential suite table, the fixed/variable split is 50/50¹⁹ in 2019 and in the new rate design the fixed/variable split is 78/22²⁰ in 2021.

Corix Response:

Please see the table below. Corix has shown the 1,000 sq. ft. residential suite only, because the estimated fixed/variable split will be the same for all three suite sizes.

¹⁹ Fixed component: \$644/\$1,283 * 100% = 50.2%; Variable component: \$639/\$1,283 * 100% = 49.8%.

²⁰ Fixed component: \$1,170/\$1,495 * 100% = 78.3%; Variable component: \$325/\$1,495 * 100% = 21.7%.

Table 19: Fixed and variable components of estimated end-user bills

	2019	2020	2021	2022	2023
Basic Charge (\$/m ² per Month)	0.5770	0.5769	1.0482	1.1321	1.2227
2020 Fixed Charge 4-month Rider (\$ / m ² per month)		0.2748			
Variable Rate (\$/kWh)	0.0576	N/A	N/A	N/A	N/A
Variable Energy Charge (\$/kWh)	N/A	0.0588	0.0293	0.0290	0.0295
Annual Change in Basic Charge (%)	N/A	-0.02%	81.70%	8.00%	8.00%
Annual Change in Variable Charge (%)	N/A	2.08%	-50.19%	-1.07%	1.72%
1,000 sq. ft. Residential Suite	2019	2020	2021	2022	2023
Basic Charge Cost (\$)	644	644	1,170	1,263	1,364
2020 Fixed Charge 4-month Rider Cost (\$)		102			
Variable Energy Charge Cost (\$)	639	652	325	321	327
Total Annual Bill (\$)	1,283	1,398	1,495	1,585	1,691
Annual Change in Bill (\$)	N/A	115.40	96.58	90.11	106.61
Annual Change in Bill (%)	N/A	9.00%	6.91%	6.03%	6.73%
Fixed Component (for all suite sizes)	50%	53%	78%	80%	81%
Variable Component (for all suite sizes)	50%	47%	22%	20%	19%

36.2.1 Please explain whether Corix has received customer feedback or has consulted with customers regarding the proposed rate structure. If so, provide a summary of the customer feedback. If not, why not?

Corix Response:

Corix did not solicit customer feedback on the change in rate structure prior to filing the rate application. This is not a legislative or BCUC requirement for rate applications and could add additional costs to the revenue requirement application.

The public review process established by the BCUC provides customers an opportunity to review the material in detail, ask questions to the utility and submit an argument. Customers were notified of the proceeding through several medium and currently there are 3 of 11 customers registered as interveners.

36.2.2 Please discuss the nature of Corix's cost structure to serve UniverCity customers. For instance, excluding fuel costs, what is the estimated proportion of Corix's remaining costs that are fixed in order to serve UniverCity customers?

Corix Response:

All remaining costs are considered fixed in the near term as they are not anticipated to vary significantly/proportionally with/to the amount of energy service provided to customers within the test period.

36.3 Please discuss why Corix has chosen to show the annual bill impact from the perspective of an end-user when Corix's actual customers are typically strata and commercial customers.

Corix Response:

Corix has chosen to show the annual bill impact from the perspective of a typical end-user as the consumption for each actual customer varies widely. This is seen in response to BCOAPO IR No.

1, Question 2.1, Table 2 where the minimum annual customer consumption in 2019 was 77 MWh and the maximum was 2,550 MWh in 2019. Using an average annual customer consumption would not provide information that would be helpful to either customers or end-users. Alternatively, typical utility rate applications do not present bill impacts for all customers. Furthermore, Corix’s actual strata corporation customers subsequently bill each individual unit owner. Corix’s analysis attempts to provide indicative end-user bill impacts for a typical residential end-user.

36.3.1 To the extent possible, please state a comparable table as Table 37 to show the annual bill impact for Corix’s actual customers (e.g. strata and commercial accounts).

Corix Response:

Please see the table below. These indicative bill impacts are based on actual 2019 consumption for each parcel and their gross floor area on record. However, customers may have unique circumstances that skew the annual bill impact away from what the typical customer would experience. For example, Parcel 25S uses BMDEU as a secondary source of thermal energy service, resulting in an unusually low consumption for the given floorspace. However, Corix’s system is designed to provide this customer service at its required peak demand and thus fixed costs are incurred despite the customer’s low consumption. Similarly, Parcel 30 has experienced issues within its building that has resulted in lower than anticipated consumption. Once these issues are addressed, its consumption would return to normal and the anticipated bill impact would be aligned with other customers.

Table 20: Annual Bill Impact for Corix’s Actual Customers

	2019	2020	2021	2022	2023
Basic Charge (\$/m ² per Month)	0.5770	0.5769	1.0482	1.1321	1.2227
2020 Fixed Charge 4-month Rider (\$ / m ² per month)		0.2748			
Variable Rate (\$/kWh)	0.0576	N/A	N/A	N/A	N/A
Variable Energy Charge (\$/kWh)	N/A	0.0588	0.0293	0.0290	0.0295
Annual Change in Basic Charge (%)	N/A	-0.02%	81.70%	8.00%	8.00%
Annual Change in Variable Charge (%)	N/A	2.08%	-50.19%	-1.07%	1.72%
Parcels		2020	2021	2022	2023
22		8%	3%	6%	7%
27		9%	7%	6%	7%
28		9%	9%	6%	7%
23		9%	4%	6%	7%
29		9%	4%	6%	7%
16 Tower 1 and 2		9%	3%	6%	7%
25N Townhomes		9%	10%	6%	7%
25S Apartments		9%	4%	6%	7%
25S Commercial		11%	25%	7%	7%
30		10%	15%	6%	7%
18		9%	6%	6%	7%

36.4 Please confirm, or otherwise explain, that the \$0.0293/kWh 2022 variable energy charge and \$0.0295/kWh 2023 variable energy charge shown in Table 37 are for illustrative purposes only as the variable energy charge would be set based on the proposed Variable Energy Charge Rate Setting Mechanism.

Corix Response:

Confirmed.

- 36.5 Please calculate the Basic Charge and Variable Rate under the current rate design if the BCUC denies Corix's new rate design proposal including the 2020 Fixed Charge 4-month Rider. Please also show a summary of the rates calculation and re-state Table 37 to show the customer bill impact for the typical UniverCity end-users.

Corix Response:

This scenario requires significant changes to the financial model as the rate design and deferral account section would have to undergo a full redesign. Due to resource constraints and given that the Basic Charge and Variable Charge calculated in this scenario will be impacted by the Evidentiary Update, Corix respectfully proposes to submit its response to this question and the subsequent question 39.5.1 along with its response to IR No. 2.

- 36.5.1 To the extent possible, please provide the same customer bill impact for actual Corix customers (e.g. strata and commercial accounts).

Corix Response:

Please see the response to Question 36.5 above.

**37.0 Reference: RATE DESIGN
Exhibit B-1, section 10.2.2, p. 75, section 11.2, p. 78; Exhibit B-5, slide 35
2020 4-month Rate Rider – UniverCity**

On page 75 of the Application and slide 35 of the Corix workshop presentation, Corix explains that its proposal to add a 2020 4-month rate rider of \$0.2748 per m² per month, effective from September 1, 2020 to December 31, 2020 is to (i) smoothen the impact of the CEP going into service; (ii) transition UniverCity customers to flow-through energy costs; and (iii) reduce the \$2.7 million deficit in the RDDA.

On page 78, Table 37 shows the annual bill impact to UniverCity customers.

- 37.1 Please explain and show how Corix calculates the 4-month rate rider of \$0.2748 per m² per month for UniverCity customers.

Corix Response:

The 4-month fixed charge rate rider for UniverCity customers was set using an iterative process to establish a 4-month revenue target designed to achieve the following goals, while ensuring that the typical end-user would experience an annual 2020 bill impact of less than 10%.

- smoothen the impact of the CEP going into service September 1, 2020;
- reduce the existing deficit in the RDDA; and
- transition UniverCity customers to flow through energy costs and a Variable Energy Charge with an associated reconciliation account.

A 4-month revenue target was set. If the above conditions were not met, the target would be adjusted through an iterative process until all the conditions were met.

- 37.2 Please discuss whether Corix has considered a rate rider that spans more than 4-months (e.g. 8 to 12 months) to further smooth out the transition period or to reduce the RDDA balance.

Corix Response:

Due to Corix's proposal regarding the flow-through of energy costs to UniverCity customers, a new rate structure would come into effect January 1, 2021. In addition, 2021 would see UniverCity's rate base increasing to \$21 million which in turn has a significant impact to UniverCity's revenue requirements. In addition, UniverCity's RDDA had a balance of \$ 2,700,852

at December 31, 2019. Due to the above circumstances Corix has employed a different rate smoothing technique beginning January 1, 2021 whereby the significant rate increase required in 2021 is spread out over multiple years, while attempting to minimize the peak RDDA balance. Continuation of the rate rider to smooth the transition period would result in a duplication of rate smoothing approaches and risk further increasing the RDDA balance increasing the impact to future customers of the district energy system. If excessive rate smoothing is employed, the risk of unrecovered RDDA balances increases. Given that the indicative bill impact shows that typical end-users (*see Table 37 in Application*) and typical customers based on 2019 actual consumption (*See response to Question 36.3.1*) would experience total annual bill impacts of less than 10% for each year from 2020 through to 2023 Corix considers that its approach mitigates against exceptionally high bill impacts while minimizing the RDDA peak balance and therefore additional rate smoothing is not required.

37.2.1 Please calculate an 8-month rate rider that spans from September 1, 2020 to April 30, 2021. Provide the anticipated impact on the RDDA balance.

Corix Response:

Please see the response to Question 40.2 above.

37.2.2 Re-state Table 37 to show the annual bill impact to UniverCity customers if the 8-month Rate Rider is to be implemented. Discuss the pros and cons of this alternative.

Corix Response:

Please see the response to Question 40.2 above.

37.2.3 Please calculate a 12-month Rate Rider that spans from September 1, 2020 to August 31, 2021. Provide the anticipated impact on the RDDA balance.

Corix Response:

Please see the response to Question 40.2 above.

37.2.4 Re-state Table 37 to show the annual bill impact to UniverCity customers if the 12-month Rate Rider is to be implemented. Discuss the pros and cons of this alternative.

Corix Response:

Please see the response to Question 40.2 above.

37.3 In the absence of the 4-month Rate Rider, please recalculate a new Basic Charge and re-state Table 37 to show the annual bill impact to UniverCity customers.

Corix Response:

Please see the table below. There would be no changes to the proposed rates for 2021 through to 2023. This scenario would mean that there would be no adjustment to customer rates for increased costs associated with the new central energy plant going into service in 2020. Thus, the removal of the 4-month rate rider would result in a total bill increase of 15.3% in 2021 and also increase the RDDA peak balance by 2.3% to approximately \$6.1 million in 2024. By eliminating the 4-month rate rider, there would be an increase of approximately \$20,000 in financing costs to be recovered by UniverCity customers, which is included in the new RDDA peak balance of \$6.1 million.

Table 21: Updated Bill Impact Analysis with 4-month Rate Rider Removed

	2019	2020	2021	2022	2023
Basic Charge (\$/m ² per Month)	0.5770	0.5769	1.0482	1.1321	1.2227
Variable Rate (\$/kWh)	0.0576	N/A	N/A	N/A	N/A
Variable Energy Charge (\$/kWh)	N/A	0.0588	0.0293	0.0290	0.0295
Annual Change in Basic Charge (%)	N/A	-0.02%	81.70%	8.00%	8.00%
Annual Change in Variable Charge (%)	N/A	2.08%	-50.19%	-1.07%	1.72%
1,000 sq. ft. Residential Suite					
	2019	2020	2021	2022	2023
Basic Charge Cost (\$)	644	644	1,170	1,263	1,364
Variable Energy Charge Cost (\$)	639	652	325	321	327
Total Annual Bill (\$)	1,283	1,296	1,495	1,585	1,691
Annual Change in Bill (\$)	N/A	13.19	198.79	90.11	106.61
Annual Change in Bill (%)	N/A	1.03%	15.34%	6.03%	6.73%
800 sq. ft. Residential Suite					
	2019	2020	2021	2022	2023
Basic Charge Cost (\$)	512	512	931	1,005	1,086
Variable Energy Charge Cost (\$)	508	519	258	256	260
Total Annual Bill (\$)	1,021	1,031	1,189	1,261	1,346
Annual Change in Bill (\$)	N/A	10.50	158.17	71.70	84.83
Annual Change in Bill (%)	N/A	1.03%	15.34%	6.03%	6.73%
600 sq. ft. Residential Suite					
	2019	2020	2021	2022	2023
Basic Charge Cost (\$)	388	388	704	761	822
Variable Energy Charge Cost (\$)	385	393	196	193	197
Total Annual Bill (\$)	772	780	900	954	1,018
Annual Change in Bill (\$)	N/A	7.94	119.70	54.26	64.20
Annual Change in Bill (%)	N/A	1.03%	15.34%	6.03%	6.73%

- 37.4 Please discuss whether Corix has considered any other alternatives to the fixed 4-month rate rider, such as a variable rate, that may also achieve the three stated objectives above.

Corix Response:

The 4-month rate rider is a product of Corix's circumstances with the proposed flow-through of energy costs to UniverCity customers and the significant increase in rate base due to new central energy plant. It further aligns the types of costs incurred with the method of cost recovery; fixed costs are recovered through fixed charges and variable energy costs are recovered through variable energy charges. Alternatives which include a variable rate were not considered as they would inappropriately align fixed costs with recovery through variable charges resulting in incremental risk of cost recovery. With an inherent risk of recovery with a forecasted RDDA peak balance of approximately \$5.95 million in the base case scenario and the proposed alignment of cost recovery with the types of costs (fixed versus variable energy costs), Corix considered that a fixed charge rate rider would be most appropriate.