

June 8, 2017

British Columbia Utilities Commission  
Sixth Floor, 900 Howe Street, Box 250  
Vancouver, British Columbia V6Z 2N3

Attention: Patrick Wruck, Commission Secretary & Manager Regulatory Services

Dear Mr. Wruck:

**Re: Application for a Certificate of Public Convenience and Necessity for the Burnaby Mountain District Energy Utility filed February 28, 2017 (the "Application")**

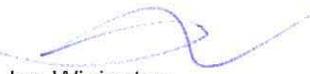
In respect of the Application, Corix Multi-Utility Services Inc. ("Corix") submits its responses to the Information Request No. 2 received from: the British Columbia Utilities Commission (BCUC), the British Columbia Old Age Pensioners' Organization (BCOAPO), and FortisBC Energy Inc. / FortisBC Inc. (collectively, FortisBC).

Please find 10 copies of each of the following documents enclosed:

- **Corix's Response to BCUC IR No. 2;**
- Corix's Response to BCUC Confidential IR No. 2 - *filed as confidential*;
- Corix's Response to BCOAPO IR No. 2; and
- Corix's Response to FortisBC IR No. 2.

Should you have any questions or require any additional information, please contact me at 604-697-6702.

Yours truly,



Ian Wigington  
Director, Regulatory

**CORIX MULTI-UTILITY SERVICES INC.**  
**RESPONSE TO**  
**BRITISH COLUMBIA UTILITIES COMMISSION**  
**INFORMATION REQUEST NO. 2**  
**BURNABY MOUNTAIN DISTRICT ENERGY UTILITY - CPCN APPLICATION**

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**A. PROJECT**

**30.0 Reference: PROJECT ALTERNATIVES**  
**Exhibit B-2, BCUC IR 1.1, 2.1, 2.2; Corix 2010 UniverCity Burnaby Mountain NUS CPCN Application, Executive Summary, p. 6**  
**Project alternatives**

Corix Multi-Utility Services Inc. (Corix) stated in response to BCUC IR 1.1: "Phases 1 and initial portion of Phase 2 of the development, also known as East Highlands, were constructed between 2003 and 2009. These buildings use electricity (electric baseboards) for heating and natural gas for domestic hot water and ventilation."

Corix further stated: "Phases 1 and part of Phase 2 were developed prior to the creation by SFU [Simon Fraser University] Trust of new Development Guidelines and Requirements...The new Development Guidelines and Requirements applied to Phases 3 and 4 of the development."

On page 6 of the Corix 2010 UniverCity Burnaby Mountain Neighbourhood Utility Service (NUS) Certificate of Public Convenience and Necessity (CPCN) Application,<sup>1</sup> Corix states:

Phases 1 & 2 have already been constructed and heating in these existing buildings is provided by electric baseboards and domestic hot water by natural gas fired boilers and storage tanks located in each building. The buildings of Phases 1 & 2 will not be connected to the proposed DES [District Energy System], and natural gas and electricity will continue to be provided by Terasen Gas and BC Hydro respectively.

30.1 Did Corix consider the use of electricity (electric baseboards) for heating and natural gas for domestic hot water and ventilation for Phases 2(b), 3 and 4 of the UniverCity development in place of the Biomass Project? Please explain.

**CORIX RESPONSE:**

No. This is not Corix's decision. The use of electric baseboards and natural gas for hot water and ventilation are not consistent with the SFU Trust's Development Guidelines and Requirements.

Corix stated the following in response to BCUC IR 2.1:

The original CPCN application submitted by Corix in 2010 for the development of the UniverCity NUS included a detailed description of the screening process of the alternative energy technologies, such as cost comparison, environmental impacts, suitability of the source, and recommendations. Please refer to Section 3.3 of the 2010 CPCN application...

...The technologies were evaluated for the alternative energy base load of 2.1 MW; however, since

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<sup>1</sup> Corix Multi-Utility Services Inc. (Corix) Application for a Certificate of Public Convenience and Necessity for the Neighbourhood Utility Service at UniverCity, Burnaby, Exhibit B-1.

that time, the base load assumption has changed. In combination with SFU, the new base load requirement is 13.5 MW.

The British Columbia Utilities Commission's (Commission) 2015 CPCN Application Guidelines, approved by Order G-20-15, outline the expected information to be provided related to project alternatives when filing a CPCN application.<sup>2</sup>

- 30.2 In consideration of the significant change in base load assumptions since Corix's filing of its 2010 UniverCity Burnaby Mountain NUS CPCN Application, please provide a detailed comparative analysis of all the alternative energy sources/technologies considered.

**CORIX RESPONSE:**

The change in baseload attributable to UniverCity increased to 3.5 MW from the original 2.1 MW assumed in the 2010 NUS CPCN Application. The remaining 10 MW increase is entirely attributable to service requested by SFU.

Corix did not directly assess alternatives for SFU's baseload for several reasons. First, the most promising alternative to biomass on Burnaby Mountain is waste heat from a potential university data centre. This resource does not have sufficient capacity to satisfy the SFU baseload and the construction of a data centre is uncertain. Further, SFU considered its own internal alternatives to cost-effectively satisfy its carbon reduction requirements.

In the absence of a joint biomass plant, there would be no combined system and Corix would be left exploring alternatives for UniverCity only. There was no evidence that the increase in baseload from 2.1 MW to 3.5 MW would alter the ranking of stand-alone alternatives, and none of these alternatives would be less costly than the proposed combined system given the large economies of scale.

- 30.3 If Corix has not undergone a revised screening process of the alternative energy technologies since the 2010 UniverCity Burnaby Mountain NUS CPCN Application, please explain why not, given the change in base load assumptions and given the amount of time which has elapsed since the 2010 UniverCity Burnaby Mountain NUS CPCN Application was developed.

**CORIX RESPONSE:**

See the response to IR 30.2.

In addition, since 2010 several factors have further confirmed the resource selection:

- The cost of electricity associated with the use of heat pump technology has increased since 2010.
- Metro Vancouver has banned wood waste from landfills pursuant to the 2015 Clean Wood Disposal Ban.

- 30.4 Please provide an updated graph that relates to the proposed 13.5 MW base load. Please include the following information in the updated graph:

- All technologies which were considered for the new proposed 13.5 MW base load; and

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<sup>2</sup> British Columbia Utilities Commission, 2015 Certificate of Public Convenience and Necessity Application Guidelines, Appendix A to Order G-20-15, pp. 4–5.

- A comparison of each of the technologies' greenhouse gas (GHG) emissions over the 25-year life span for Phases 2(b), 3 and 4, starting from construction.

**CORIX RESPONSE:**

Based on responses to IR 30.2 and IR 30.3, this is not applicable.

Corix stated in response to BCUC IR 2.2, regarding the options which were considered for reducing the GHG emissions on the current gas boilers, that it "assumes this question is with respect to reducing emissions from SFU's current gas boilers."

Commission staff note that BCUC IR 2.2 was referring to the current gas boilers associated with the UniverCity development, not SFU.

- 30.5 Please discuss whether Corix considered the option of utilizing gas boilers with potential GHG reduction technology as the permanent energy source for Phases 2(b), 3 and 4.

**CORIX RESPONSE:**

The potential GHG reduction technologies and approaches using natural gas boilers would include increasing efficiency and burning alternative fuels such as renewable natural gas (RNG). The boilers used in the temporary energy centres (TECs) were recently installed and are current in terms of their energy efficiency. Based on the current price for RNG from FortisBC, it was determined that the lifecycle costs using RNG would be higher when compared to the biomass option for achieving the desired GHG reduction targets.

- 30.6 Please provide a comparison between the use of natural gas boilers with GHG reduction technology versus biomass in terms of environmental impact, GHG emissions and cost.

**CORIX RESPONSE:**

A comparison between the biomass stand-alone scenario and RNG scenario is set out below.

The comparison assumes the following:

- The RNG scenario uses the same natural gas displacement percentage as the biomass stand-alone scenario.
- The current cost of the RNG as posted on the FortisBC website.
- Escalation was assumed at 2% annually.
- Availability of sufficient supply of RNG.

Note the GHG reduction target of 78% is consistent for both scenarios.

Rate Base (2018)	UniverCity Stand Alone Biomass		UniverCity RNG Plant	
Building	\$	3,018,560	\$	2,465,072
Biomass plant		6,228,950		228,950
Biomass development costs		671,109		371,109
Gas plant		5,554,261		5,554,261
Residential distribution		3,298,618		4,226,046
Residential equipment		2,658,130		2,658,130
Working capital		100,916		100,557
Deferral account		2,084,280		2,083,933
<b>Total rate base</b>		<b>23,614,824</b>		<b>17,688,057</b>
Annual Costs	(2019)	(2022) - full build-out	(2019)	(2022) - full build-out
Operating costs	\$ 487,703	\$ 525,066	\$ 386,031	\$ 417,901
Land lease	23,627	23,627	23,627	23,627
Biomass	270,138	370,272	-	-
Natural gas	157,146	223,259	1,017,291	1,537,383
Electricity	106,899	124,402	106,899	124,402
Property tax on energy centre	157,278	166,905	128,440	136,301
Property tax on residential distribution	57,392	57,696	66,091	66,394
<b>Total Annual Costs</b>	<b>\$ 1,260,185</b>	<b>\$ 1,491,227</b>	<b>\$ 1,728,378</b>	<b>\$ 2,306,008</b>

**31.0 Reference: PROJECT ALTERNATIVES  
Exhibit B-2, BCUC IR 2.3, 2.4; Exhibit B-1, Application, Table 18, p. 38  
UniverCity stand-alone versus combined biomass**

In response to BCUC IR 2.3, Corix provided a capital cost breakdown for the UniverCity Stand-alone Biomass scenario, which shows a total capital cost of \$18,986,555 (excluding working capital and the deferral account).

In response to BCUC IR 2.4, Corix provided another capital cost breakdown for the UniverCity Stand-alone Biomass scenario, which shows a total capital cost of \$23,614,824 (including working capital and the deferral account).

31.1 Please provide a line-by-line reconciliation and explanation for the differences in capital costs between the UniverCity Stand-alone Biomass scenarios provided in response to BCUC IR 2.3 and BCUC IR 2.4.

**CORIX RESPONSE:**

The response to BCUC IR 2.3 compares the total capital costs that would be spent between 2016 - 2021 for the UniverCity stand-alone biomass plant and the UniverCity stand-alone permanent natural gas plant. The response to BCUC IR 2.4 compares the 2018 rate base for the UniverCity stand-alone biomass plant and the combined biomass solution. The updated table below provides a proper comparison using the 2018 rate base for both scenarios.

Rate Base (2018)	UniverCity Stand Alone Biomass		UniverCity Natural Gas	
Building	\$	3,018,560	\$	2,465,072
Biomass plant		6,228,950		
Biomass development costs		671,109		371,109
Gas plant		5,554,261		5,554,261
Additional natural gas module				228,950
Residential distribution		3,298,618		4,226,046
Residential equipment		2,658,130		2,658,130
Working capital		100,916		100,557
Deferral account		2,084,280		2,083,933
<b>Total rate base</b>		<b>23,614,824</b>	<b>\$</b>	<b>17,688,057</b>
<b>Annual Costs</b>	<b>(2019)</b>	<b>(2022) - full build-out</b>	<b>(2019)</b>	<b>(2022) - full build-out</b>
Operating costs	\$ 487,703	\$ 525,066	\$ 386,031	\$ 416,401
Land lease	23,627	23,627	23,627	23,627
Biomass	270,138	370,272	-	-
Natural gas	157,146	223,259	672,507	965,409
Electricity	106,899	124,402	106,899	124,402
Property tax on energy centre	157,278	166,905	128,440	136,301
Property tax on residential distrib	57,392	57,696	66,091	66,394
<b>Total Annual Costs</b>	<b>\$ 1,260,185</b>	<b>\$ 1,491,227</b>	<b>\$ 1,383,595</b>	<b>\$ 1,732,535</b>

Table 18 on page 38 of the Application shows the Residential rate base for 2019 to be \$21,445,591.

31.2 Please provide a line-by-line reconciliation and explanation for the differences in capital costs between the Combined Biomass (UniverCity Allocation) scenario provided in response to BCUC IR 2.4 of \$20,551,114 and the Residential rate base amount provided in Table 18 of the Application.

**CORIX RESPONSE:**

The response to BCUC IR 2.4 uses 2018 rate base. Table 18 of the Application uses 2019 rate base. This results in the difference in capital costs.

**32.0 Reference: PROJECT DESCRIPTION  
Exhibit B-2, BCUC IR 5.1, 5.2  
Biomass supplier selection process**

Corix stated in response to BCUC IR 5.1: "A competitive process to select a preferred supplier was completed in 2011."

Corix further explained the competitive process it underwent to select a supplier in response to BCUC IR 5.2.

32.1 Given the time which has elapsed since the competitive selection process in 2011 and the filing of the current Application, please explain why Corix did not undergo a more recent selection process to ensure the preferred supplier still provides the best overall value.

**CORIX RESPONSE:**

The fuel supply market is continuously evolving and developing more sources of supply that could meet the requirements of Metro Vancouver's by-laws concerning biomass fuel. However, Corix does not believe there was value in reopening the selection process for the reasons set out below.

The preferred fuel supplier:

- is able to meet the biomass volume requirements;
- has extensive experience, including supplying biomass fuel to the Bioenergy Research and Demonstration Facility at the University of British Columbia ("UBC Facility");
- is willing to provide performance guarantees;
- is well located to supply the biomass to the Burnaby Mountain DEU;
- has been in business since 1945; and
- has proven ability to meet stringent fuel specifications as demonstrated in supplying the UBC Facility and has recently been re-engaged to do so.

**B. ANNUAL LOAD AND ANNUAL ENERGY DEMAND**

**33.0 Reference: LOAD DEMAND AND ENERGY FORECAST  
Exhibit B-2, BCUC IR 9.1, 9.3  
SFU base load needs**

In response to BCUC IR 9.1, Corix stated that the biomass energy allocated to SFU based on its base load allocation is calculated as 44,387 megawatt hours (MWh).

In response to BCUC IR 9.3, Corix stated that the total estimated biomass energy delivered to SFU is 43,787 MWh.

33.1 Please reconcile the amount of biomass energy delivered to SFU referenced above.

**CORIX RESPONSE:**

The higher biomass energy allocated to SFU, as provided in the response to BCUC IR 9.1 assumed 97% plant availability. However, allowance for an annual two week maintenance (shut-down) period was not included in the calculation. Shut-down would be scheduled during the summer period when energy load demand is lowest and would result in an avoided send-out estimated at 509 MWh of biomass energy.

The correct value with allowance for the shutdown period is  $44,387 - 509 = 43,878$  MWh.

**34.0 Reference: LOAD DEMAND AND ENERGY FORECAST  
Exhibit B-5, BCOAPO IR 3.2  
Historical forecast vs actual**

Corix stated in response to BCOAPO IR 3.2:

The difference in forecasted and actual energy demand shown in the table included in IR 3.1 above is attributed to the delay in the completion and connection of new buildings to the district energy system. However, when comparing the forecasted and actual energy data by building, they do correspond with forecasted demand for years 2015 and 2016.

34.1 Please provide the forecasted and actual completion and connection date of new buildings to the district energy system in years 2015 and 2016.

**CORIX RESPONSE:**

	2015		2016	
	Forecasted	Actual	Forecasted	Actual
<b>Connected Parcels</b>	Parcel 22, Parcel 23, Parcel 27, Parcel 28, Parcel 29, Parcel 16 - one tower	Parcel 22, Parcel 23, Parcel 27, Parcel 28, Parcel 29 Parcel 16 - one tower	Parcel 22, Parcel 23, Parcel 27, Parcel 28, Parcel 29, Parcel 25 (beginning of 2016) Parcel 16- second tower (beginning of 2016)	Parcel 22, Parcel 23, Parcel 27, Parcel 28, Parcel 29 Parcel 25 (July 2016) Parcel 16 – second tower (March 2016)

34.2 In table form, please provide the forecasted and actual energy data by building and include a column with the difference between forecasted and actual (in terms of MWh and percent).

**CORIX RESPONSE:**

	Energy Demand (MWh) 2015		2015 Difference		Energy Demand (MWh) 2016		2016 Difference	
	Forecasted	Actual	MWh (%)	(%)	Forecasted	Actual	MWh	(%)
Parcel 22	64	80	16	25%	64	66	2	3%
Parcel 23	847	841	-6	-1%	847	827	-20	-2%
Parcel 27	718	796	78	11%	718	772	54	8%
Parcel 28	751	686	-65	-9%	751	645	-106	-14%
Parcel 29	490	560	70	14%	490	557	67	14%
Parcel 16 - one tower	1,219	1,037	-182	-15%				
Parcel 16 - both towers					2,438	1,834	-604	-25%
Parcel 25					2,639	593	-2,046	-78%

34.2.1 If any of the buildings has a difference between forecasted and actual energy by larger than 5 percent, please explain how the values support Corix’s statement in the preamble.

**CORIX RESPONSE:**

Corix would like to clarify its response to BCOAPO IR 3.2:

*“However, when comparing the forecasted and actual energy data by building, they do correspond with forecasted demand for years 2015 and 2016”.*

It was our intention to compare the forecasted and actual energy data by building, to OVERALL (annual) forecasted demand for years 2015 and 2016. Some of the buildings consume less energy than forecasted, some buildings have a pattern to consume more energy. On a cumulative basis, the actual annual energy demand is within an acceptable forecast range, allowing for the exogenous impacts of weather, building occupancy levels

and customer behavior. These exogenous factors also result in variations in EUIs between buildings (see response to BCUC IR 8.1).

The table in the response to IR 34.2 above captures the difference in energy demand per building. The major difference between forecast and actual demand in 2016 occurs in Parcel 16 and Parcel 25. The energy consumption did not materialize as forecasted due to the late connection to the system. Parcel 22 had a significantly higher consumption in 2015 that was due to the in-building system set-up and upgrades. The building is now expected to perform close to forecasted demand.

**35.0 Reference: VARIABLE OPERATING COST  
Exhibit B-2, BCUC IR 11.1–11.3; Exhibit B-5, BCOAPO IR 5.2  
Biomass cost**

In response to BCUC IR 11.1, Corix provided the following biomass/tonne unit costs for 2019 to 2023:

MISCELLANEOUS COST INPUTS	2019	2020	2021	2022	2023
Biomass (tonnes)	27,263	27,973	28,738	29,223	29,223
Biomass / tonne	\$ 38.70	\$ 39.47	\$ 40.26	\$ 41.07	\$ 41.89

In response to BCUC IR 11.2, Corix stated that the cost of biomass is calculated based on \$66 per bone dry tonne (BDT).

In response to BCUC IR 11.3, Corix stated that the biomass price per tonne includes delivery to the central energy plant (CEP).

35.1 Please confirm, or explain otherwise, that the biomass/tonne amounts provided in response to BCUC IR 11.1 are calculated by applying a moisture content percentage to the \$66 per BDT cost.

**CORIX RESPONSE:**

Confirmed.

35.1.1 If confirmed, please provide the percentage moisture content used to determine the biomass/tonne cost and explain how this percentage was determined.

**CORIX RESPONSE:**

The average moisture content is assumed to be 45%. The moisture content will vary between 25% - 50%, with more biomass fuel used within the range of 35% - 50%. The biomass fuel will be purchased on a price per bone dry tonne basis (\$/BDT).

35.2 Approximately what percentage of the biomass price per tonne is related to the delivery cost? Please explain.

**CORIX RESPONSE:**

The cost of biomass was quoted as fuel delivered to the biomass plant. Corix does not have information about the exact amount related to delivery.

Corix stated in response to BCOAPO IR 5.2 that “for all other ongoing cost items an annual escalation rate of 2.0% is applied from 2018 onwards.”

35.3 Please confirm, or otherwise explain, that a 2 percent annual escalation is applied to the unit cost of biomass (biomass/tonne) as shown in the table provided in response to BCUC IR 11.1.

**CORIX RESPONSE:**

Confirmed.

- 35.4 Please confirm, or explain otherwise, that Corix will update the escalation factor and biomass cost as part of the anticipated rate application to be filed with the Commission later in 2017 to reflect the actual biomass cost and escalation rate reflected in the finalized biomass supply contract.

**CORIX RESPONSE:**

Corix confirms that it will update the escalation factor and biomass cost as part of the upcoming rate application to be filed with the Commission. Based on current timing projections for the in-service date of the biomass facility, Corix anticipates filing the rate application in late 2018.

**C. THERMAL ENERGY SERVICES AGREEMENT (TESA)**

- 36.0 Reference: THERMAL ENERGY SERVICES AGREEMENT  
Exhibit B-2, BCUC IR 9.6; Exhibit B-1, p. 46  
SFU energy usage**

Corix stated in response to BCUC IR 9.6 that “the decision of how much actual energy to take from the shared CEP remains with SFU, and given the proposed rate structure this decision has no impact on other customers of Burnaby Mountain DEU.”

On page 46 of the Application, Corix describes the proposed SFU Commodity Charge as “intended to recover the biomass fuel and electricity costs that are allocated to SFU.”

- 36.1 Under a scenario where SFU elects not to take any energy from the shared CEP in a given year, please explain if the associated biomass fuel and electricity costs to serve SFU would be zero. In other words, does Corix only incur biomass and electricity costs if SFU takes energy from the shared CEP? Please explain.

**CORIX RESPONSE:**

Under the terms of the TESA, SFU is obliged to take energy should the combined load of UniverCity and SFU drop below 3 MW. Assuming this condition is met and SFU elects not to take energy, the utility would incur zero biomass costs related to SFU.

For CEP electricity, there is major equipment dedicated to SFU’s service (i.e. pumps, controls, etc.) that would not run if SFU did not take service, however, the majority of the CEP equipment would still run in order to produce thermal energy for the UniverCity customer group. The portion of the CEP electricity needed to run the biomass module that would otherwise be recovered from SFU via Consumption Charges, will not be passed on to UniverCity customers and will be covered by the utility.

- 36.2 Please confirm, or explain otherwise, that if SFU elects not to take energy from the shared CEP, the biomass fuel and electricity costs charged to UniverCity ratepayers remain the same (i.e. the biomass fuel and electricity costs charged to UniverCity ratepayers remain the same regardless of the amount of energy taken by SFU).

**CORIX RESPONSE:**

Confirmed.

**37.0 Reference: THERMAL ENERGY SERVICES AGREEMENT  
Exhibit B-1, Appendix II, Sections 2.2(a) and (b); Exhibit B-2, BCUC IR 13.1.2  
Use of thermal energy from the CEP**

In response to BCUC IR 13.1.2, Corix stated the following:

Under the proposed rate structure for SFU, there is minimal if any impact on UniverCity ratepayers if SFU does not take thermal energy... The only possible exception is that under very low load conditions (e.g. summer months), SFU's decision not take energy could result in Corix not being able to dispatch the plant for UniverCity residents because UniverCity load is under the turn down ratio for the plant. However, Section 2.2(b) provides some constraints on SFU's discretion under low load conditions to ensure no impact on UniverCity residents.

37.1 Based on the constraints in Section 2.2(b) of the TESA and the threshold for "very low load conditions," please discuss the likelihood of Corix not being able to dispatch the plant for UniverCity ratepayers.

**CORIX RESPONSE:**

The possibility of Corix not being able to dispatch the biomass plant for UniverCity ratepayers is mitigated through the SFU contractual commitment under the TESA to take biomass energy if the total system load is below the Threshold Capacity of 3 MW.

37.2 Please provide a more detailed explanation of the impact on UniverCity ratepayers if a scenario occurred where Corix was not able to dispatch the plant and quantify the impact where possible.

**CORIX RESPONSE:**

As noted in the response to IR 37.1, the TESA stipulates that SFU is required to take energy in order so that the biomass plant can continue to operate at or above the 3 MW threshold. However, should such a scenario occur, Corix has designed redundancy into the CEP allowing service to be provided to the UniverCity customer group through natural gas if biomass dispatch is not possible. Natural gas would likely have higher variable costs than biomass and these costs would be passed on to customers. These situations are not expected to occur on a frequent basis.

37.3 Please discuss the frequency and duration with which the aforementioned very low load conditions would have to occur in order for the impact on UniverCity ratepayers to be adverse.

**CORIX RESPONSE:**

As discussed in the response to IR 37.1, SFU is contractually obligated through the TESA to take an amount of energy to ensure the biomass facility operates at or above the 3 MW threshold. Therefore, any adverse impact on UniverCity ratepayers due to a very low load condition event is extremely unlikely.

37.4 If a situation occurred where it was consistently (i.e. over numerous low heating seasons) determined by SFU that it was less economic to take thermal energy from Corix and therefore the biomass plant was not available for UniverCity ratepayers due to the load being under the turn down ratio for the plant, what steps would Corix take to mitigate the impact on UniverCity ratepayers?

**CORIX RESPONSE:**

As discussed in the responses to IR 37.1, IR 37.2 and IR 37.3, the scenario described in the question is unlikely to occur. However, if this scenario were to occur, it is assumed that SFU has elected to operate its system on natural gas and purchase GHG offsets. If thermal energy from

biomass is not economic for SFU, it is also not likely to be economic for the UniverCity customers, and it is therefore assumed Corix would elect to provide service to UniverCity customers using natural gas.

37.4.1 Under the aforementioned scenario, what would be the impact on UniverCity ratepayers in the short and long run in terms of energy costs?

**CORIX RESPONSE:**

The only impact on UniverCity customers would be the change in the variable cost associated with providing service through natural gas.

**38.0 Reference: THERMAL ENERGY SERVICES AGREEMENT  
Exhibit B-2, BCUC IR 14.2  
Use of thermal energy from the CEP**

In response to BCUC IR 14.2, regarding the impact on the capital and fixed operating cost allocation percentages in a situation where SFU decreases its nominated capacity, Corix stated:

SFU's [capital and fixed operating cost allocation percentages] would decrease. UniverCity's would increase if UniverCity needs the reallocated capacity and UniverCity's would remain the same if the excess capacity is allocated to another customer.

38.1 Please clarify what the impact would be on UniverCity's capital and fixed operating cost allocation percentages if all three of the following occurred: (i) SFU decreased its nominated capacity; (ii) UniverCity did not need the reallocated capacity; and (iii) the excess capacity was not able to be reallocated to another customer.

**CORIX RESPONSE:**

As per the Section 2.4 of the TESA, SFU is only allowed to decrease its nominated capacity, subject to the Commission's approval, if UniverCity was able to take the reallocated capacity, and/or the excess capacity was able to be reallocated to another customer. Therefore, the scenario described is prohibited under the TESA.

In the event all three of the factors outlined above were to take place, the impact on UniverCity customers would be nil because SFU would still be contractually obligated to continue to pay its share of capital and fixed operating costs.

**39.0 Reference: THERMAL ENERGY SERVICES AGREEMENT  
Exhibit B-2, BCUC IR 17.1, 17.5  
Cost of service parameters – deferral account treatment – property taxes**

Corix stated in response to BCUC IR 17.1: "Because the likelihood and magnitude of property taxes are both uncertain Corix and SFU have made no determination as to an appropriate period of time to recover a variance, which would only affect SFU and does not apply to other customer groups."

39.1 In the event that property taxes become payable on SFU's portion of the plant and an amount is recorded in the deferral account, does Corix intend to apply to the Commission for approval of the amortization period and the mechanism with which to recover the deferral account balance from SFU? If not, please explain why not.

**CORIX RESPONSE:**

Yes, Corix would seek the approval of the Commission.

39.2 Please discuss the potential mechanisms which Corix may use to recover any property taxes from SFU which are recorded in the deferral account. For instance, would the balance be recovered through the Consumption Charge? Please discuss.

**CORIX RESPONSE:**

In the case where property tax becomes payable on the SFU portion of the infrastructure, the property taxes recorded in the SFU deferral account, as well as future forecasted property taxes will be recovered from SFU through the fixed charge (Capacity Charge).

Corix stated, in response to BCUC IR 17.5, that it is proposing similar treatment for any variances between forecast and actual property taxes recovered from UniverCity ratepayers.

39.3 Please clarify if Corix is proposing to utilize the currently approved Revenue Deficiency Deferral Account (RDDA) to record variances between forecast and actual property taxes recovered from UniverCity ratepayers.

**CORIX RESPONSE:**

Confirmed.

39.3.1 If Corix is not proposing to utilize the RDDA for these variances, please clarify if Corix is requesting approval of a separate property tax deferral account for UniverCity ratepayers as part of the current Application, or if Corix intends to request approval at the time of filing the rate application.

**CORIX RESPONSE:**

Not applicable.

39.3.1.1 If Corix is requesting approval of this deferral account as part of the current Application, please provide the following information for this deferral account:

- The term of the deferral account (i.e. how long the deferral account will be in place for);
- The proposed carrying cost for the deferral account;
- The proposed amortization period; and
- The mechanism for recovery of the balance in the deferral account (i.e. rate rider, amortization expense, other).

**CORIX RESPONSE:**

Not applicable.

**40.0 Reference: THERMAL ENERGY SERVICES AGREEMENT  
Exhibit B-2, BCUC IR 13.1.1, 18.1, 18.2, 18.5  
Cost of service parameters – deferral account treatment – fuel costs**

Corix stated in response to BCUC IR 18.1 that it is “requesting approval of the deferral account for both biomass and electricity pricing variances as well as any volume variances that are not captured in the Consumption Charges on the basis that these costs are not controllable by Corix.”

- 40.1 Please clearly distinguish between: (i) volume variances which would be captured in the Consumption Charge; and (ii) volume variances which would not be captured in the Consumption Charge and would therefore be recorded in the proposed deferral account.

**CORIX RESPONSE:**

The Consumption Charge will capture the volume of biomass based on forecast average annual efficiency expected to be achieved during operation of the system. Corix and SFU agreed in the TESA to a “floor efficiency.” The volume attributable to fluctuations in system efficiency within the range between the floor efficiency and expected efficiency, and above expected efficiency would be captured in the SFU deferral account.

All volumes related to efficiencies below the floor efficiency will not be captured in the SFU deferral account and will be the cost at risk to Corix. The efficiency of the plant is always subject to prudence review by the Commission.

Corix stated in response to BCUC IR 18.2 that “the largest determinant of variances would be system efficiency. System efficiency can vary with a wide range of factors including load conditions throughout the year and fuel characteristics (e.g., moisture levels). Maintenance and dispatch decisions can also affect efficiency.”

- 40.2 Please further explain why Corix is not able to reasonably control the level of system efficiency and therefore limit the variability of forecast versus actual costs related to system efficiency.

**CORIX RESPONSE:**

Corix is able to and intends to control system efficiency levels through prudent operational processes and procedures, as well as through provisions in the biomass supply contract.

However, system efficiency is also influenced by outside/uncontrollable circumstances such as weather and abnormal load conditions. Provisions in the biomass supply contract will limit the range of variability in moisture content and caloric value of the fuel, but both parameters will fluctuate. Corix expects that the system will typically operate at the expected efficiency agreed to by Corix and SFU in the TESA.

Corix stated in response to BCUC IR 18.5 that it “expects that the Consumption Charge will be adjusted on an annual basis” to reflect the refund/recovery of any differences in biomass and electricity costs.

- 40.3 Please confirm, or explain otherwise, that based on Corix’s response to BCUC IR 18.5, the annual variance between forecast and actual biomass and electricity costs will be fully recovered through the subsequent year’s Consumption Charge (i.e. a one-year amortization period).

**CORIX RESPONSE:**

While this was our intent, SFU and Corix have reconsidered this mechanism since it requires an accurate forecast of the SFU consumption in the following year. SFU and Corix would propose amending Schedule 1 of the TESA so that this deferral is applied to the Capacity Charge (credit or charge as the case may be) in the subsequent year. Corix and SFU would only amend the TESA following a final decision from the Commission.

- 40.4 Based on Corix’s response to BCUC IR 18.5, please clarify if the only adjustments to the Consumption Charge on an annual basis will be to refund/recover the balance in the deferral account, or if the Consumption Charge will also be adjusted annually to reflect changes in forecast fuel costs.

**CORIX RESPONSE:**

As stated in the response to IR 40.3, Corix would propose adjusting the Capacity Charge to recover the balance in the deferral account. The Consumption Charge will be adjusted annually to reflect changes in the forecasted fuel costs.

- 40.5 Please clarify if Corix intends to apply for Commission-approval annually to adjust the Consumption Charge, either as a result of refunding/recovering a balance in the deferral account or as a result of a change in the annual forecast for fuel costs.

**CORIX RESPONSE:**

Yes, as stated in the response to IR 40.3, Corix intends to apply for the Commission's approval if there is adjustment required to the Consumption Charge resulting from a change in forecasted variable costs. Corix would also apply to the Commission for changes to the Capacity Charge related to the true-up of the deferral.

- 40.5.1 If Corix does not intend to apply for Commission-approval prior to adjusting the Consumption Charge, please explain why Corix does not consider Commission-approval of these changes to be necessary.

**CORIX RESPONSE:**

Not applicable; see response to IR 40.5.

Corix stated in response to BCUC IR 13.1.1: "in the event SFU does not take any energy then its Consumption Charges would be nil because they are based on a rate per metered MWh consumed by SFU. The Consumption Charge only recovers fuel costs, which would be avoided in the event SFU does not elect to take thermal energy."

- 40.6 Please confirm, or explain otherwise, that under a scenario described in the above preamble in which SFU does not elect to take thermal energy, the result would be that the variance between the forecast and actual fuel costs would be recorded in the deferral account.

**CORIX RESPONSE:**

The deferral account is proposed for variances in biomass fuel prices, electricity prices and system efficiencies. The Consumption Charge is equivalent to the forecast fuel costs that would be incurred by the utility in providing each unit of energy service to SFU and is collected based on actual energy taken. If SFU does not take any energy there would be no fuel consumed for SFU and therefore no variance between actual and forecast to be captured in the deferral account.

- 40.6.1 Please provide a numerical example to illustrate the impact of SFU electing not to take thermal energy. As part of this example, please include what the Consumption Charge billed to SFU would be during the period of time that SFU elects not to take service (with supporting calculations), the resulting addition (either positive or negative) to the deferral account, and the impact/change to the Consumption Charge in the subsequent year (with supporting calculations).

**CORIX RESPONSE:**

As discussed in the response to IR 40.6, for the proposed rate structure whereby the Consumption Charge is equal to the utility's variable costs and billing is based on actual consumption, the result is zero variance.

SFU Consumption Charge = variable costs incurred by the utility = \$0.

- 40.7 Please discuss the risk that the balance in the deferral account builds up to a level where it is no longer reasonable to recover the balance over one year through an adjustment to the Consumption Charge.

**CORIX RESPONSE:**

The deferral account is proposed for variances in biomass fuel prices, electricity prices and system efficiencies. As discussed in Corix's response to IR 40.3 above, the annual true-up would be applied as an adjustment to the Capacity Charges in the following year rather than the Consumption Charge. With a long term biomass supply contract to mitigate unanticipated fluctuation to biomass prices, Corix does not anticipate that fluctuations in system efficiencies or any unforeseen annual changes to electricity prices will result in large deferral balances.

- 40.7.1 If such a situation were to occur, please explain how Corix would respond. For instance, if Corix determined it was necessary to adjust the amortization period for the deferral account, would Corix apply to the Commission for approval to make this adjustment? Please discuss.

**CORIX RESPONSE:**

Yes, any requirement to adjust the amortization period for the deferral account would be subject to the Commission's approval.

Table 23 on page 45 of the Application shows the forecast revenue requirement for SFU for years 2019 through 2023.

- 40.8 Using the forecast assumptions and the amounts provided in Table 23 of the Application for years 2019 and 2020, please qualitatively and quantitatively explain the impact on each of the following if SFU's actual demand in 2019 was 50 percent less than forecast:

- The Consumption Charge paid by SFU in 2019;
- The balance recorded in the fuel cost deferral account at the end of 2019; and
- The Consumption Charge paid by SFU in 2020 (assuming the forecasts for 2020 are consistent with the amounts provided in Table 23 for 2020).

**CORIX RESPONSE:**

If SFU's demand in 2019 is 50% less than forecast:

- The Consumption Charges for 2019 would be lower by 50%.
- The balance recorded in the fuel cost deferral account at the end of 2019 should not be materially impacted since the 50% reduction in Consumption Charges is expected to be offset by a 50% reduction in variable costs. The only variance would be in relation to the forecast unit cost of fuel cost and plant efficiency versus actual unit cost of fuel and plant efficiency for the thermal energy actually consumed by SFU. There is no variance to be recovered on fuel costs for energy not produced or consumed by SFU.
- Since there is no change in the deferral account, the SFU rates for 2020 would not need to be adjusted if the forecast unit costs of fuel and the forecast plant efficiency equal actuals.

The above scenario is based on the assumption that changes in SFU demand do not impact the forecast efficiency of the system. If there is a balance in the deferral account due to a change in efficiency, then the 2020 rates would need to be changed to recover that amount.

**41.0 Reference: THERMAL ENERGY SERVICES AGREEMENT  
Exhibit B-2, BCUC IR 19.3; Exhibit B-1, p. 41  
Cost allocation and rate design principles – construction and project management**

Corix stated in response to BCUC IR 19.3: “Corix and SFU spent a substantial amount of time on the allocation principles and details that are covered by each item... As the allocation principles are complicated, Corix considered it useful to provide clarity by adding a detailed explanation of each principle in the Application.”

The description of the allocation principle for shared project management, construction management and project development costs provided on page 41 of the Application states: “Proposed split equally between the customer groups due to the fact that these costs are mostly fixed and do not change with the size of the plant, and would also apply to the UniverCity standalone biomass plant.”

41.1 Please provide an analysis of other potential methods of allocating the construction/project management and project development costs and explain why these alternative methods were determined to be less appropriate than the chosen 50/50 allocation.

**CORIX RESPONSE:**

The development costs and project and construction management costs are related to all new infrastructure proposed for the Burnaby Mountain DEU, including biomass CEP (including fuel bin), natural gas CEP for UniverCity residents, Campus Connection, Campus ETS and UniverCity Connection.

Of all of the allocation factors presented in the Application, we believe that 50/50 split is the most appropriate approach. This takes into consideration the total installed capacity (10 MW to SFU and 11.8 MW to UniverCity), connection pipelines that will serve respective customers and Campus ETS that will serve SFU. Considering the amount of effort for each of the infrastructure components and their respective allocation, the 50/50 split is fair in comparison to other allocation factors. For example, the construction management of the biomass plant is going to be provided by the supplier who will cooperate with Corix construction and project managers whose tasks related to the biomass infrastructure will be limited to the oversight and alignment with other works on site that will be directly managed by Corix (natural gas CEP, both connection pipelines and Campus ETS).

41.2 Please discuss the appropriateness of using the same allocation factor for the construction/project management and project development costs as is proposed for the Lower Site Area CEP Civil Works and Buildings and Foundations costs.

**CORIX RESPONSE:**

The Lower Site Area CEP only covers the biomass and natural gas CEP and does not include the biomass fuel building and equipment, the UniverCity Connection, Campus Connection and Campus ETS. As these components of the Burnaby Mountain DEU infrastructure are part of the overall project assessment (project development costs) and will be directly managed by Corix, the allocation factor based on the Lower Site Area CEP Civil Works and Building and Foundations is not considered appropriate.

**D. FINANCIAL MODELING AND INPUTS**

**42.0 Reference: CAPITAL COSTS  
Exhibit B-2, BCUC IR 19.7, 24.1; Attachment V  
Project development and project/construction management costs**

In response to BCUC IR 19.7, Corix stated the following:

Through experience Corix has found that the method referenced in the 2015 UniverCity NUS CPCN proceeding is only applicable to smaller scale projects, being generally \$4MM [million] or less, yielding a cap of approximately \$250,000 which would typically cover the cost of assigning a dedicated Project Management and Construction Management for the duration of the project.

Corix further stated in response to BCUC IR 19.7: “The \$690,000 forecasted for Project and Construction Management reflects the allocation of a dedicated PM/CM team to the project during the design, construction and commissioning phases of the project.”

Attachment V provided in response to BCUC IR 24.1 shows project and construction management costs for the combined biomass plant ranging annually from \$28,600 to \$373,000 during the years 2014 through 2019.

42.1 Given that the project and construction management costs for the combined biomass plant are not based on a percentage of capital costs, please provide a detailed breakdown and explanation for the annual construction and project management costs incurred (forecast to be incurred) in each of the years 2014 through 2019.

**CORIX RESPONSE:**

See the response to IR 42.1.1 below.

42.1.1 As part of the above response, please include the number of project team members, the roles of each team member and whether the annual labor costs incurred were based on hourly rates or on a percentage of annual salaries.

**CORIX RESPONSE:**

The cost estimates provided in the table below were determined by year for each job function based on expected time involvement. Total annual labour cost estimates are based on a percentage of annual salaries.

<b>Project &amp; Construction Management</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>Total</b>
<b>Personnel time estimates on an annual basis</b>							
<b>Project Director</b>	2%	5%	10%	10%	15%	5%	
<b>Project Manager</b>	15%	15%	30%	25%	55%	20%	
<b>Construction Manager</b>	0%	0%	0%	0%	100%	35%	
<b>Project Coordinator</b>	0%	0%	5%	5%	80%	20%	
<b>Administration</b>	0%	0%	0%	5%	15%	3%	
<b>Total Labour Costs:</b>	\$28,600	\$36,400	\$75,000	\$62,000	\$373,000	\$115,000	<b>\$690,000</b>

42.2 Please confirm, or explain otherwise, that consistent with Corix’s description of the calculation of project and construction management costs provided in the 2015 UniverCity NUS CPCN

proceeding,<sup>3</sup> the project and construction management costs related solely to UniverCity (as provided in the green and orange sections of Attachment V) are based on a percentage of the UniverCity capital costs.

**CORIX RESPONSE:**

Confirmed.

42.2.1 If not confirmed, please provide an analysis consistent with the analysis requested in BCUC IR 42.1 and 42.1.1.

**CORIX RESPONSE:**

Not applicable.

42.3 Please explain why, in 2017, the feasibility study and external consultant costs are forecast to only be \$28,000 for the combined biomass while the forecast amount for UniverCity for the same time period is \$100,000.

**CORIX RESPONSE:**

The amount of \$100,000 was an error. The correct forecast for UniverCity is \$20,000.

42.4 Why does Corix continue to forecast feasibility study/external consultant costs in years 2019 through 2021 for UniverCity when there are no feasibility study/external consultant costs forecast in these years for the combined biomass?

**CORIX RESPONSE:**

The UniverCity development is not be expected to be completed until 2022. The estimated amount is related to the external consultants required during ongoing phases of the UniverCity development. After 2019, there will be no further feasibility assessment related to the Campus ETS, Campus Connection and biomass CEP.

42.4.1 Please provide a similar explanation for the construction and project management costs forecast for UniverCity for years 2020 and 2021.

**CORIX RESPONSE:**

The forecasted costs for project management and construction management are related to the development and additions to the UniverCity portion of the infrastructure that will be implemented between 2019 and 2022.

**43.0 Reference: REVENUE DEFICIENCY DEFERRAL ACCOUNT  
Exhibit B-2-2, BCUC IR 25.1  
Fixed operating costs**

In response to BCUC IR 25.1, Corix provided the variance between forecast and actual fixed operating costs for UniverCity ratepayers for the years 2015 and 2016.

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<sup>3</sup> Corix Application for a Certificate of Public Convenience and Necessity for Additional Capital and Amended Rates for UniverCity Neighbourhood Utility Service on Burnaby Mountain.

43.1 Please confirm, or explain otherwise, that based on the currently approved RDDA, all variances between the UniverCity forecast and actual fixed operating costs are recorded in the RDDA.

**CORIX RESPONSE:**

Confirmed.

**44.0 Reference: FINANCIAL ASSUMPTIONS  
Exhibit B-2, BCUC IR 26.3  
Depreciation**

Corix stated in response to BCUC IR 26.3 that the depreciation percentages in the current Application have changed compared to the percentages provided in the 2015 UniverCity NUS CPCN Application due to “reconsideration of asset lives going forward.”

44.1 Please confirm, or explain otherwise, that by decreasing the percentage depreciation rates in the current Application, Corix’s assumptions are that the assets’ useful lives will be longer than what was originally forecast in the 2015 UniverCity NUS CPCN Application.

**CORIX RESPONSE:**

Confirmed.

44.2 Please expand on the response to BCUC IR 26.3. What factors and events resulted in Corix revising the expected useful lives of the assets? Please provide a response for each of the asset classes with which the expected useful life has been revised.

**CORIX RESPONSE:**

	UniverCity	UBC	UniverCity/SFU
Building	50 years	66.7 years	66.7 years
Distribution Systems	50 years	66.7 years	66.7 years
Central Energy Plant	25 years	33.3 years	33.3 years
Equipment	25 years	33.3 years	33.3 years

Corix has a number of projects in progress and has been using different assumptions for the projects as listed above. The accounting and rates should be aligned and, while we believe that either end of the range for each line item is a reasonable estimate of asset life, we propose to align this project with the rates already in place at UBC and as already agreed with SFU in the TESA.

44.2.1 Given that the assets associated with the UniverCity NUS and the combined biomass plant have either only been in-service for a short period of time or have not yet been entered into service, why is it reasonable at this time to revise the expected useful lives?

**CORIX RESPONSE:**

See response to IR 44.2.