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April 1, 2021

Mr. Patrick Wruck
Commission Secretary and Manager
Regulatory Support
British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

RE: British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
Fiscal 2020 to Fiscal 2021 Revenue Requirements Application
Compliance Filing

BC Hydro writes to provide its responses to Round 1 BCUC Staff information requests.

For further information, please contact Chris Sandve at 604-974-4641 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

Fred James
Chief Regulatory Officer

cs/rh

Enclosure

1.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
British Columbia Hydro and Power Authority Fiscal 2020 to Fiscal 2021 Revenue Requirements Application Compliance Filing dated December 1, 2020 (Compliance Filing), Section 3.1.3, 3.2.1, pp. 29, 33
Resource Mix

On page 29 of the Compliance Filing, British Columbia Hydro and Power Authority (BC Hydro) states:

> Over a number of years, the generation from BC Hydro's hydroelectric facilities must be about equal to the inflows that have occurred, subtracting inflow that is spilled.
>
> BC Hydro's mix of resources is set through long-term planning, such as Integrated Resource Plans, or through planning decisions such as whether to renew or enter into IPP contracts or upgrade BC Hydro facilities. The Energy Studies do not inform these planning decisions.

1.1.1 Please clarify whether the Energy Studies, rather than the Integrated Resource Plans, determines the amount of inflow to spill.

RESPONSE:

The Integrated Resource Plan determines the mix of resources to meet load and therefore influences the volume of energy and spill risk. The amount of inflow spilled largely depends on the weather and the timing of the inflow relative to available storage and load. The Energy Studies forecast the volume of spill in the operational time frame for the subset of BC Hydro's facilities whose dispatch is modeled in the Energy Studies.

1.0 A. SECTION 3 – ENERGY STUDIES MODELS

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1.1.2 Please confirm, or explain otherwise, that the Energy Studies influence the resource mix for operational purposes.

RESPONSE:

The Energy Studies do not affect the resource mix that is available to meet load in the operational time frame. The Energy Studies models forecast and influence the operation of the dispatchable resources available to the system such as Island Generation and the generation from BC Hydro system storage.

1.0 A. SECTION 3 – ENERGY STUDIES MODELS

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> BC Hydro's mix of resources is set through long-term planning, such as Integrated Resource Plans, or through planning decisions such as whether to renew or enter into IPP contracts or upgrade BC Hydro facilities. The Energy Studies do not inform these planning decisions.

1.1.3 Please explain how BC Hydro reconciles the mix of resources set through long-term planning versus the mix that it ends up using to meet domestic load.

RESPONSE:

The Integrated Resource Plan determines the mix of resources and is not influenced by the monthly Energy Studies. The monthly Energy Studies are used to determine the operation of the dispatchable resources available to the system such as Island Generation and the generation from BC Hydro system storage.

1.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
British Columbia Hydro and Power Authority Fiscal 2020 to Fiscal 2021 Revenue Requirements Application Compliance Filing dated December 1, 2020 (Compliance Filing), Section 3.1.3, 3.2.1, pp. 29, 33
Resource Mix

BC Hydro further shows in Table 3-14 that in F2020 and F2021, the dispatchable percentage of cost of energy is 27 percent and 9 percent, respectively.

1.1.4 Please explain what causes the year-to-year difference in the percentage of dispatchable cost of energy between F2020 and F2021.

RESPONSE:

With reference to Table 3-14 in the Compliance Filing, most of the difference between the percentage of dispatchable cost of energy between fiscal 2020 and fiscal 2021 is due to the difference in Market Electricity Purchases ($151 in fiscal 2020 and $44 in fiscal 2021) and Surplus Sales ($0 in fiscal 2020 and $165 in fiscal 2021).

The primary driver of the differences was the low system inflow in fiscal 2020, which required imports and limited sales, compared to the fiscal 2021 forecast in the Evidentiary Update.

2.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.2.4, p. 41
Jurisdiction Review

On page 41 of the Compliance Filing, BC Hydro states its system optimization objective is consistent with the approach taken for other large hydroelectric systems based on its attendance at conferences in hydropower optimization and correspondents with other experts from peer utilities.

1.2.1 Please provide a summary of BC Hydro's jurisdictional review as described in the preamble above.

RESPONSE:

BC Hydro reviewed descriptions of the operational planning models from peer utilities that have hydroelectric dominated systems. These included Manitoba Hydro, Ontario Power Generation, Hydro Quebec, and several utilities in the U.S. (i.e., Tennessee Valley Authority, Puget Sound Energy, Tacoma Power, and the hydro operations at New York Power Authority).

`3.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
BC Hydro Fiscal 2020 to Fiscal 2021 Revenue Requirements Application Decision and Order G-246-20 dated October 2, 2020 (BC Hydro RRA Decision), Section 6, p. 198
Compliance Filing, Section 3.2.3, pp. 37-38
Jurisdiction review

Under Directive 8 contained in the BC Hydro RRA Decision, the BCUC directed BC Hydro to address, in its compliance filing, how price risk and availability risk are recognized in the system optimization objective.

On pages 37 and 38 of the Compliance Filing, BC Hydro describes the nature of price risk and states BCH takes a "risk neutral approach."

1.3.1 Please elaborate on how price risk is recognized in the system optimization objective through BC Hydro's "risk neutral approach."

RESPONSE:

By taking a risk neutral approach, BC Hydro's system optimization objective to maximize expected CNRO adequately manages both sides of market price risk.

BC Hydro stated on page 37 that "risk neutral" is an economic concept and refers to an approach that is neither risk averse nor risk seeking. It assumes each of the modeled possible outcomes is equally likely and is based on the expected outcome, with no bias towards or against any particular outcome.

The Energy Studies consider a range of potential market prices. Price risk is implicitly recognized in BC Hydro's system optimization objective because the objective is to maximize <u>expected</u> Consolidated Net Revenue from Operations (CNRO) across all modelled outcomes, which incorporates different price outcomes. This is a risk neutral approach.

As BC Hydro explained in the Compliance Filing on page 37, "expected" is a statistical term that is short for the "expected value of a variable with a probability distribution". It is not the same as more common definitions such as "likely" or "anticipated" but rather is akin to "average".

4.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.2.3, pp. 38–39
Energy Studies Models Constraints

On pages 38 and 39 of the Compliance Filing, BC Hydro explains the risk of having too little or too much water is managed through constraints into the Energy Studies models. However, BC Hydro will make decisions to not follow economic, risk neutral price signals in order to reduce the risk of too little or too much water.

1.4.1 Please explain how BC Hydro determines the appropriate constraints to establish in the Energy Studies Models in order to manage water levels.

RESPONSE:

BC Hydro must operate its facilities within all appropriate constraints of the water licences it holds pursuant to the *Water Sustainability Act* and related Water Use Plan Orders issued by the British Columbia Comptroller of Water Rights. These constraints are the physical constraints of the BC Hydro system, such as minimum and maximum reservoir levels, as well as other physical constraints such as fisheries flow targets or reservoir elevations for recreation.

In addition to the physical constraints of the BC Hydro system, meeting domestic load is also a constraint in the Energy Studies models.

4.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.2.3, pp. 38–39
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1.4.2 Please elaborate under what circumstance would BC Hydro make decisions to not follow economic, risk neutral price signals in order to reduce the risk of too little or too much water.

RESPONSE:

The circumstances under which BC Hydro would make decisions to not follow economic, risk neutral price signals are described on page 40 of the Compliance Filing. Specifically:

- **Too little water: The risk of too little water may result in BC Hydro drafting the Williston reservoir level lower than the preferred minimum level of 2150 ft, if a sufficient volume of imports can't be obtained. BC Hydro is always monitoring the probability of drafting below 2150 ft and will make decisions to not follow economic price signals as the probabilities of drafting below 2150 ft increase; and**
- **Too much water: BC Hydro also constantly monitors system spill increases. While BC Hydro's hydroelectric facilities were generally designed to be able to spill significant volumes of water, spilling can impact fish health and habitat and cause flood damage downstream. It also generates immense dynamic forces on the spillway structures and downstream features of the river channel. These forces can damage the concrete and rock that form those structures as well as the natural features in the area. BC Hydro is always monitoring the probability of spill and will make decisions to not follow economic price signals as the probability of the spill increases.**

It is rare for BC Hydro to not follow economic, risk neutral price signals in order to reduce the risk of too little or too much water and there have been only two instances in the last 10 years. Specifically:

- **In March/April 2020, BC Hydro deliberately drafted the system storage lower by exporting to reduce spill risk which had increased due to load reduction and uncertainty as a result of the COVID-19 pandemic; and**
- **BC Hydro did not follow economic, risk neutral price signals during the 2018 Enbridge gas pipeline event.**

4.0 A. SECTION 3 – ENERGY STUDIES MODELS

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Energy Studies Models Constraints

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1.4.2.1 Please comment on how frequently BC Hydro makes decisions to not follow economic, risk neutral price signals in order to reduce the risk of too little or too much water.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.4.2.

4.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.2.3, pp. 38–39
Energy Studies Models Constraints

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1.4.3 Please clarify whether the Energy Study Models, in conjunction with the constraints established, would produce an output in accordance with economic, risk neutral price signals that would put BC Hydro's system at risk of having too much or too little water.

RESPONSE:

The risk of having too much or too little water is a factor associated with hydroelectric systems. Every year there is a probability of having too much or too little water. The Energy Studies are used as a guide to balance those probabilities following the risk neutral price signals and provide an indication of the imports and exports that will be required if there is either too little water or too much water. That is why BC Hydro is constantly updating its forecasts and taking action when required.

The circumstances under which BC Hydro may make decisions to not follow those economic price signals are described in BC Hydro's response to BCUC Staff IR 1.4.2. Note that the Energy Studies do not include forecasts of extreme events that may significantly disrupt resource availability or load, such as the Enbridge T South pipeline rupture and the COVID-19 pandemic.

While it is possible to adjust the objective function or constraints to bias towards or against certain outcomes, doing so obscures the actual risk likelihood and does not eliminate the risk of too much or too little water. For example, financial penalties could be added for certain conditions or the minimum reservoir elevations in the model could be raised. Doing so would make the results of the Energy Studies harder to interpret and monitor because the arbitrary penalty weightings or constraints would be buried in the model. In addition, making such changes would come at a net cost. Accordingly, BC Hydro has no plans to take such an approach.

The Energy Studies provide an appropriate level of information to inform risk mitigation. As noted on page 10 of the Energy Studies Process Internal Audit (Appendix DD of the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application): "The Energy Studies suite of models is appropriate, and the methodologies applied are in line with leading practices." This includes the risk-neutral approach.

4.0 A. SECTION 3 – ENERGY STUDIES MODELS

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1.4.3 Please clarify whether the Energy Study Models, in conjunction with the constraints established, would produce an output in accordance with economic, risk neutral price signals that would put BC Hydro's system at risk of having too much or too little water.

1.4.3.1 If yes, please discuss whether the constraints and/or the objective function of the Energy Study Models can be adjusted to reduce the risk described above.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.4.3.

5.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.2.5, pp. 41–43
Alternative Systems Optimization Objective

On page 41 of the Compliance Filing, BC Hydro states: "In response to the BCUC's Decision, BC Hydro tested an alternative system optimization objective to underscore why maximizing CNRO is a desirable objective from the perspective of ratepayers. The results indicated that using the alternative objective could increase the annual cost of energy by approximately $30 million to $50 million, on average.

On page 42of the Compliance Filing, BC Hydro describes the alternative system optimization:

> Specifically, we conducted a test to determine the difference between BC Hydro's system optimization objective of maximizing expected CNRO and an objective where there is a preference to serve load using BC Hydro owned or contracted resources and to discourage wholesale electricity trade unless it is necessary to manage surpluses and deficits". However, BC Hydro notes it "[d]id not change the objective function of the model; rather, BC Hydro changed the input market price so that exports were given a low price and imports were given a much higher price. Under this approach, the model still imports or runs thermal generation or meet any deficits (to meet load) and still exports surplus (to avoid spill) but has no economic incentive to take advantage of wholesale electricity market opportunities.

BC Hydro also states on page 43 that: "The variability of inflow that between a low water year and high water year (+/- 7,000 GWh/year) means that there will always be large swings in BC Hydro's Cost of Energy. The Cost of Energy can change by +/- $200 million to $400 million each year due to do the uncertainty around key drivers of inflow, load, and market prices."

1.5.1 Please confirm, or otherwise explain, that exports were given a low price and imports were given a much higher price as a way to simulate the alternative objective function without changing the objective function in the model.

RESPONSE:

BC Hydro confirms that altering the input prices, as described in the Compliance Filing, was the mechanism used to discourage wholesale electricity trade unless it was necessary to manage surpluses and deficits.

The effect of the price change was a reduction in both forecast imports and forecast exports. BC Hydro did not examine any other price combinations as part of this test run as it was not necessary to do so. The prices used were US$10/MWh for export and US$90/MWh for import, which BC Hydro considered sufficient to accomplish the purpose of the exercise.

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1.5.1 Please confirm, or otherwise explain, that exports were given a low price and imports were given a much higher price as a way to simulate the alternative objective function without changing the objective function in the model.

1.5.1.1 Please comment on the effect of the assumption of higher import and lower export prices on the modelled cost of energy.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.5.1.

5.0 A. SECTION 3 – ENERGY STUDIES MODELS

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1.5.1 Please confirm, or otherwise explain, that exports were given a low price and imports were given a much higher price as a way to simulate the alternative objective function without changing the objective function in the model.

1.5.1.2 Did BC Hydro conduct a sensitivity analysis with respect to the import/export pricing assumptions?

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.5.1.

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1.5.2 Please explain whether it is possible to change the objective function of the model to reflect the alternative objective function.

RESPONSE:

BC Hydro is not aware of any utility that has an objective of limiting imports and exports and does not see any potential benefit or value from initiating such an approach.

Changing the Energy Study models to reflect a different objective function would be a significant change. It would require considerable analysis and testing as well as the development of a number of new models. The new models would then have to be run in parallel with the suite of Energy Studies models, to understand the implications of the change. Accordingly, BC Hydro is not able to provide the requested analysis using historical market price data.

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1.5.2 Please explain whether it is possible to change the objective function of the model to reflect the alternative objective function.

1.5.2.1 If the objective function of the model is changed to reflect the alternative objective function and the market price assumptions were reversed, i.e. imports are given a low price and exports were given a high price, would the alternative system optimization still result in an increase to the annual cost of energy?

RESPONSE:

BC Hydro conducted the test described in the preamble to the question to demonstrate that maximizing CNRO is a desirable objective from the perspective of ratepayers in comparison to an approach where wholesale electricity trade is discouraged unless it is necessary to manage surpluses and deficits.

BC Hydro did not change the objective function to conduct this test. Rather, BC Hydro applied high import and low export prices as a proxy to achieve the desired result.

While this test was suitable for demonstrating the value of maximizing CNRO in comparison to an approach where wholesale electricity trade is discouraged unless it is necessary to manage surpluses and deficits, applying the reverse assumptions (i.e., low import and high export prices) would not provide any meaningful information or result because it would obscure the proper economic price signals. For further discussion, please refer to BC Hydro's response to BCUC Staff IR 1.4.3.

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1.5.2 Please explain whether it is possible to change the objective function of the model to reflect the alternative objective function.

1.5.2.2 Is it possible to run the alternative objective function on historical data that uses actual market prices?

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.5.2.

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1.5.2.2 Is it possible to run the alternative objective function on historical data that uses actual market prices?

1.5.2.2.1 If yes, please provide the analysis on the alternative objective function using historical market price data in the most recent one-year period.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.5.2.

6.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.4.1, p. 52
Amazon Web Service

On page 52 of the Compliance Filing, BC Hydro identifies the update of the Amazon Web Service as its third priority (ahead of back testing) in order to remain current due to technology changes.

1.6.1 Please elaborate on how the Amazon Web Service is relied upon in running BC Hydro's Energy Studies models.

RESPONSE:

BC Hydro uses the Amazon Web Service (AWS) for efficient parallelized execution of the Columbia optimization model (Mureo). The model requires considerable computer processing resources to perform complex calculations. To run the model in a reasonable amount of time (~1 hour), it needs to be run in a parallel environment on ~250 computer cores. Mureo only runs for five to 10 hours a month so any dedicated hardware would sit idle for much of the time. Accordingly, in 2014, BC Hydro determined that it did not have sufficient in-house computer resources to run Mureo on parallel cores, and that owning such resources would be expensive to build and maintain for the frequency of use.

The fiscal 2022 upgrade is required as the existing AWS integration software was built in 2014/2015 and is out of date and no longer supported. This has resulted in increasing maintenance and support challenges. As updating the AWS interface is necessary to support the continued publishing of the monthly Energy Studies, it has a higher priority than back testing.

6.0 A. SECTION 3 – ENERGY STUDIES MODELS

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Compliance Filing, Section 3.4.1, p. 52
Amazon Web Service

On page 52 of the Compliance Filing, BC Hydro identifies the update of the Amazon Web Service as its third priority (ahead of back testing) in order to remain current due to technology changes.

1.6.2 Please explain why updating the Amazon Web Service is a higher priority than back testing.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.6.1.

7.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.4.1, p. 52
Load Variability Model

On page 52 of the Compliance Filing, BC Hydro states that its Load Variability Model needs to be redeveloped due to the complexity of the architecture of the existing model, to incorporate functional improvements and to address succession planning within the team.

1.7.1 Please explain whether the redevelopment of BC Hydro's Load Variability Model would impact the load forecasting models and process. If yes, please explain how.

RESPONSE:

The redevelopment of the Energy Studies Load Variability Model will not impact the models and process used by the Load Forecasting Department.

The Load Variability Model uses the approved Load Forecast as an input and has no outputs that influence or change the load forecast models used by the Load Forecasting Department.

8.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
Compliance Filing, Section 3.4.2, p. 56 and Section 3.4.3. p. 56 Benchmarking and Back Testing

On page 56 of the Compliance Filing, BC Hydro states that its "operational planning models and tools meet all of BC Hydro's operational requirements. They are regularly improved, validated and updated."

On page 56, BC Hydro also provides the following summary of the estimates to complete the benchmarking and back testing work:

Table 3-18 Summary of Resources Required for Benchmarking and Back Testing Plan

Resource	Cost and Time Estimate
1 FTE (consultant)	3 years at $55 per hour = $340,000
Internal subject matter experts	~1200 hours over 3 years at $125 per hour = $150,000
UBC Program (Professor Shawwash)	$100,000
Project Manager	~1/2 day per week for 3 years at $120 per hour = $75,000
Total	**$665,000**

1.8.1 What is BC Hydro's current budget for Energy Studies model testing and benchmarking? Please identify what, if any, portions of this are incremental to BC Hydro's planned budget.

RESPONSE:

The costs in Table 3-18 of the Compliance Filing were an estimate of the cost to complete the benchmarking and back testing work described in BC Hydro's response to Directive No. 10 from the BCUC's Decision on the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application.

The $515,000 for a consultant, Professor Shawwash, and the Project Manager is incremental to the original planned fiscal 2022 budget for the Generation System Operations KBU.

The internal subject matter expert cost of 1200 hours, over the three years, is not an incremental cost. The work will be done by existing subject matter experts within the Generation System Operations KBU. However, this work means that other model development work will be deferred.

Please note that BC Hydro's filing on the Energy Studies model development plan, in response to Directive No. 9 from the BCUC's Decision on the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, will provide an updated budget and schedule for this work. BC Hydro is filing this submission on April 1, 2021.

9.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
BC Hydro RRA Decision, Section 6, p. 199; Compliance Filing, Appendix D, p. 2
Within Month Model Review Frequency

Directive 12 from the BC Hydro RRA Decision included the following:

5. Provide a brief description for each of the within-month planning tools used, which includes:
   a. the age of each tool;
   b. how frequently each tool is reviewed and updated;
   c. whether source code or documentation exists that supports each tool;

On page 2 of Appendix D to the Compliance Filing, BC Hydro states under review frequency, the SOPHOS and Ultralight Models' review was included in 2019 Energy Studies internal audit.

1.9.1 Please elaborate on whether the SOHPOS and Ultralight Models are reviewed on a regular basis. If yes, please provide the review frequency. If not, please explain why not.

RESPONSE:

The results of the models are validated through weekly and monthly comparison with other models and with observed operations. Enhancements are identified and implemented as required.

10.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
BC Hydro RRA Decision, Section 6, p. 199; Compliance Filing, Section 3.4.3, p. 58
Audit Report

Directive 12 from the BC Hydro RRA Decision included the following:

6. Provide the most recent audit report that identifies the scope and results of the review of the within-month planning tools.

In response, BC Hydro states on page 58 of the Compliance Filing that it has not conducted an audit of this nature.

1.10.1 Please discuss the cost and internal resources required to conduct an audit that identifies the scope and results of the review of the within-month planning tools.

RESPONSE:

BC Hydro assumes that "audit" refers to an external review by an independent consultant. We do not have an estimate of the costs and internal resources required to conduct an external review of the within-month planning tools as this would depend on the exact scope and objectives of the review. As a point of reference, the contract with SINTEF for two consultants as part of the internal audit of the Energy Studies model totalled approximately $93,000, including expenses; however, this does not include internal staff resources and time.

BC Hydro recognizes the importance of engaging external expertise and does so regularly, across the business, and particularly in areas that require specialized technical expertise. For example, BC Hydro has a partnership with the National Research Council and the University of Waterloo for the stewardship and ongoing development of hydrologic model used to produce the inflow forecasts.

It is important to recognize however, that the engagement of external expertise is only effective when managed and supported by internal staff with the experience and knowledge necessary to inform and guide the work. With regard to the Energy Studies models and tools, the staff with the necessary experience and knowledge are the operational staff that work with the models and tools each day. These staff spend most of their time operating the system and the time they have outside of their operational duties must be prioritized and focused on work that will have the greatest impact.

BC Hydro is not planning to conduct an external review of the within-month planning tools at this time. Other work, as set out in the Compliance Filing, such as improving the short-term model, Ultralight, and increasing automation of tasks, is a higher priority. Conducting an external review of the within-month planning tools would delay this work as well as work, already planned and underway, to upgrade the tools. Accordingly, BC Hydro does not see any value in conducting an external review of the within-month planning tools at this time.

10.0 A. SECTION 3 – ENERGY STUDIES MODELS

Reference: ENERGY STUDIES MODELS
BC Hydro RRA Decision, Section 6, p. 199; Compliance Filing, Section 3.4.3, p. 58
Audit Report

Directive 12 from the BC Hydro RRA Decision included the following:

6. Provide the most recent audit report that identifies the scope and results of the review of the within-month planning tools.

In response, BC Hydro states on page 58 of the Compliance Filing that it has not conducted an audit of this nature.

1.10.2 Please explain whether BC Hydro has plans to conduct an audit as described above in the future. If yes, please provide an estimate on the scope and timeline. If not, why not?

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.10.1.

11.0 B. SECTION 5 – LOAD FORECAST

Reference: LOAD FORECAST
BC Hydro RRA Decision, Section 6, p. 198; Compliance Filing, Section 5.1.1, p. 69
Forecast Types

Directive 5 from the BC Hydro RRA Decision states that "BC Hydro is directed to, as part of its compliance filing:

1. Provide the BCUC with general time estimates to prepare: a comprehensive load forecast, "partial updates" and "adjustments"…;

On page 69 of the Compliance Filing, BC Hydro provides Table 5-21 which includes the following forecast types: Comprehensive, Update, and COVID-19 Scenarios. "Adjustment" is not included as one of the forecast types.

1.11.1 Please confirm, or explain otherwise, that BC Hydro does not perform a forecast "adjustment."

RESPONSE:

When warranted, BC Hydro may perform, within a fiscal year, adjustments to a load forecast for financial forecasting purposes, as described in our response to BCUC IR 2.209.1 in the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application.

BC Hydro would like to clarify that "or adjustments" should have been included in the sentence on page 68, row 5 of the Compliance Filing: " Load forecast updates or adjustments can take as little as a few weeks or as long as a few months, depending on the purpose of the update and which sectors are being updated."

BC Hydro has not made any load forecast adjustments within the fiscal year in recent years. This is why adjustments were not listed in Table 5-21. Adjustments to load projections made as a result of BCUC decisions, such as the decision on the Fiscal 2020 to Fiscal 2021 Revenue Requirements Application, are considered separate from load forecast adjustments that we initiate internally and are not considered in the above discussion.

11.0 B. SECTION 5 – LOAD FORECAST

Reference: LOAD FORECAST
BC Hydro RRA Decision, Section 6, p. 198; Compliance Filing, Section 5.1.1, p. 69
Forecast Types

Directive 5 from the BC Hydro RRA Decision states that "BC Hydro is directed to, as part of its compliance filing:

1. Provide the BCUC with general time estimates to prepare: a comprehensive load forecast, "partial updates" and "adjustments"…;

On page 69 of the Compliance Filing, BC Hydro provides Table 5-21 which includes the following forecast types: Comprehensive, Update, and COVID-19 Scenarios. "Adjustment" is not included as one of the forecast types.

1.11.2 Please explain when did BC Hydro introduced "COVID-19 Scenarios" as one of the forecast types.

RESPONSE:

BC Hydro developed two COVID-19 Scenarios (A and B) in March and April 2020 to estimate the potential impacts on electricity demand of an unprecedented global pandemic. BC Hydro describes both scenarios in our Fiscal 2022 Revenue Requirements Application and the fiscal 2022 test period is based on Scenario A. We don't consider the COVID-19 Scenarios as a type of forecast. They were developed to estimate the potential "what if" impacts from the pandemic to the March 2020 Load Forecast.

11.0 B. SECTION 5 – LOAD FORECAST

Reference: LOAD FORECAST
BC Hydro RRA Decision, Section 6, p. 198; Compliance Filing, Section 5.1.1, p. 69
Forecast Types

Directive 5 from the BC Hydro RRA Decision states that "BC Hydro is directed to, as part of its compliance filing:

1. Provide the BCUC with general time estimates to prepare: a comprehensive load forecast, "partial updates" and "adjustments"…;

On page 69 of the Compliance Filing, BC Hydro provides Table 5-21 which includes the following forecast types: Comprehensive, Update, and COVID-19 Scenarios. "Adjustment" is not included as one of the forecast types.

1.11.2.1 Please explain whether the "COVID-19 Scenarios" will continue to be a forecast type in place to respond to other similar extraordinary circumstances after the COVID019 pandemic.

RESPONSE:

The COVID-19 Scenarios were a one-time response to an unprecedented global pandemic, which began around the time the March 2020 Load Forecast was finalized. As the pandemic's effects were not reflected in the March 2020 Load Forecast, an expedited scenario approach was developed to estimate the pandemic's potential impacts on electricity demand.

12.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.1, 7.4, Table 7-24, pp. 86-87, 91
BCHPA Captive Insurance Company Ltd.

On page 86 of the Compliance Filing, BC Hydro states:

> BCHPA CIC is part of BC Hydro's regulated business in that BCHPA CIC serves as an intermediary to provide BC Hydro access to the global reinsurance market in support of BC Hydro's overall insurance requirements (i.e., it sells BC Hydro insurance at market rates).

On page 87 of the Compliance Filing, BC Hydro states:

> The day to day management of BCHPA CIC [BCHPA Captive Insurance Company Ltd.] is outsourced to Aon Insurance Managers. The work of Aon Insurance Managers is overseen by BC Hydro's Treasury Department. Aon Insurance Managers is responsible for bookkeeping, preparation of financial statements, tax filings, license renewal, actuarial work, and issuance of insurance policies.
>
> BC Hydro's revenue requirements do not include BCHPA CIC costs or revenues, and as a result, BC Hydro ratepayers do not receive the benefit of BCHPA CIC's planned net income or loss. The planned costs of insurance procured by BC Hydro from BCHPA CIC, which reflect market rates, are included in BC Hydro's revenue requirements.

Table 7-24 of the Compliance Filing shows that the net losses of Edmonds Centre Developments Limited and Fauquier Water and Sewerage Corporation are included in BC Hydro's revenue requirement. Further on page 91 of the Compliance Filing, BC Hydro states that these companies are part of BC Hydro's regulated business.

1.12.1 Please explain why BCHPA CIC's costs and revenues are not included in BC Hydro's revenue requirements given that it is part of BC Hydro's regulated business and other subsidiaries' net losses that are part of BC Hydro's regulated business, such as Edmonds Centre Developments Limited and Fauquier Water and Sewage Corporation, are included.

RESPONSE:

BCHPA CIC serves as an intermediary to provide BC Hydro access to the global reinsurance market in support of BC Hydro's overall insurance requirements (i.e., it sells BC Hydro insurance at market rates). BCHPA CIC only provides insurance services to BC Hydro. BC Hydro is unable to directly access the global re-insurance market itself.

The services provided by each of BCHPA CIC and BC Hydro to the other are valued at market rates such that the parties are transacting as arm's length parties would.

Currently, only the planned costs of insurance procured by BC Hydro from BCHPA CIC are included in BC Hydro's revenue requirement as this is a direct cost paid by BC Hydro to BCHPA CIC. Going forward, starting with the Fiscal 2023 to Fiscal 2025 Revenue Requirements Application, BC Hydro proposes to include the planned net income of BCHPA CIC in the revenue requirement.

As BCHPA CIC's planned net income is equal to planned revenues less planned costs (e.g., if planned revenues were $100 and planned costs were $90 then planned net income would be $10), BC Hydro intends to include one line in the revenue requirement for the planned net income of BCHPA CIC which will result in the same impact to ratepayers as if BC Hydro separately included the planned costs and revenues. Since planned amounts are included, variances between actual and plan amounts are to the account of the Shareholder.

For context, BC Hydro notes that BCHPA CIC's net income in fiscal 2019 and fiscal 2020 was $89,950 and $27,475, respectively, as per BCHPA CIC's audited financial statements which were included in Appendix F-3 of BC Hydro's Compliance Filing.

12.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.1, 7.4, Table 7-24, pp. 86-87, 91
BCHPA Captive Insurance Company Ltd.

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On page 87 of the Compliance Filing, BC Hydro states:

> The day to day management of BCHPA CIC [BCHPA Captive Insurance Company Ltd.] is outsourced to Aon Insurance Managers. The work of Aon Insurance Managers is overseen by BC Hydro's Treasury Department. Aon Insurance Managers is responsible for bookkeeping, preparation of financial statements, tax filings, license renewal, actuarial work, and issuance of insurance policies.
>
> BC Hydro's revenue requirements do not include BCHPA CIC costs or revenues, and as a result, BC Hydro ratepayers do not receive the benefit of BCHPA CIC's planned net income or loss. The planned costs of insurance procured by BC Hydro from BCHPA CIC, which reflect market rates, are included in BC Hydro's revenue requirements.

Table 7-24 of the Compliance Filing shows that the net losses of Edmonds Centre Developments Limited and Fauquier Water and Sewerage Corporation are included in BC Hydro's revenue requirement. Further on page 91 of the Compliance Filing, BC Hydro states that these companies are part of BC Hydro's regulated business.

1.12.2 Please discuss whether the costs related to the oversight of BCHPA CIC is embedded within various BC Hydro budgets and included in the revenue requirement.

RESPONSE:

The costs related to the oversight of BCHPA CIC are embedded within BC Hydro's annual budgets and included in the revenue requirements.

Given the circumstances and purpose of BCHPA CIC, which are explained in BC Hydro's response to BCUC Staff IR 1.12.1, BC Hydro considers it appropriate to recover these costs from ratepayers.

BC Hydro does not track costs related to the oversight of BCHPA CIC. However, an estimate of the hours and corresponding labour costs based on the fiscal 2021 standard labour rates is shown in the table below.

		Hours	Annual Costs
1	Treasury	290	$25,900
2	Financial Reporting	10	$1,000
3	Accounting services	30	$2,100
4	Senior Leaders	10	$1,400
5	Total	340	$30,400

12.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.1, 7.4, Table 7-24, pp. 86-87, 91
BCHPA Captive Insurance Company Ltd.

On page 86 of the Compliance Filing, BC Hydro states:

> BCHPA CIC is part of BC Hydro's regulated business in that BCHPA CIC serves as an intermediary to provide BC Hydro access to the global reinsurance market in support of BC Hydro's overall insurance requirements (i.e., it sells BC Hydro insurance at market rates).

On page 87 of the Compliance Filing, BC Hydro states:

> The day to day management of BCHPA CIC [BCHPA Captive Insurance Company Ltd.] is outsourced to Aon Insurance Managers. The work of Aon Insurance Managers is overseen by BC Hydro's Treasury Department. Aon Insurance Managers is responsible for bookkeeping, preparation of financial statements, tax filings, license renewal, actuarial work, and issuance of insurance policies.
>
> BC Hydro's revenue requirements do not include BCHPA CIC costs or revenues, and as a result, BC Hydro ratepayers do not receive the benefit of BCHPA CIC's planned net income or loss. The planned costs of insurance procured by BC Hydro from BCHPA CIC, which reflect market rates, are included in BC Hydro's revenue requirements.

Table 7-24 of the Compliance Filing shows that the net losses of Edmonds Centre Developments Limited and Fauquier Water and Sewerage Corporation are included in BC Hydro's revenue requirement. Further on page 91 of the Compliance Filing, BC Hydro states that these companies are part of BC Hydro's regulated business.

1.12.2 Please discuss whether the costs related to the oversight of BCHPA CIC is embedded within various BC Hydro budgets and included in the revenue requirement.

1.12.2.1 If yes, please quantify the annual cost included in BC Hydro's revenue requirement and the rationale for recovering these costs from BC Hydro's ratepayers.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.12.2.

13.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.2, p. 88; Appendix F-5
Columbia Hydro Constructors Ltd.

On page 88 of the Compliance Filing, BC Hydro states:

> BC Hydro provides limited financial accounting and oversight services on behalf of CHC [Columbia Hydro Constructors Ltd.].
>
> […]
>
> When CHC is active and engaged by BC Hydro, its costs flow through to BC Hydro and are included in the cost of the associated capital project(s). BC Hydro's revenue requirement does not include planned costs, revenues or net income of CHC. BC Hydro prepares unaudited financial statements on behalf of CHC, which are provided in Appendix F-5.

CHC's Statements of Operations and Retained earnings in Appendix F-5 does not show any general and administration expenses in fiscal 2020.

1.13.1 Please confirm, or explain otherwise, that CHC is currently not active.

RESPONSE:

Confirmed. As described in the Compliance Filing, BC Hydro has not used CHC for construction work since September 2017. However, BC Hydro has the ability to activate CHC as required to perform work on generation capital projects.

13.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.2, p. 88; Appendix F-5
Columbia Hydro Constructors Ltd.

On page 88 of the Compliance Filing, BC Hydro states:

> BC Hydro provides limited financial accounting and oversight services on behalf of CHC [Columbia Hydro Constructors Ltd.].
>
> […]
>
> When CHC is active and engaged by BC Hydro, its costs flow through to BC Hydro and are included in the cost of the associated capital project(s). BC Hydro's revenue requirement does not include planned costs, revenues or net income of CHC. BC Hydro prepares unaudited financial statements on behalf of CHC, which are provided in Appendix F-5.

CHC's Statements of Operations and Retained earnings in Appendix F-5 does not show any general and administration expenses in fiscal 2020.

1.13.2 Please clarify whether the cost of providing financial accounting and oversight services to CHC is embedded within various BC Hydro budgets and included in the revenue requirement.

RESPONSE:

This response also answers BCUC Staff IRs 1.13.2.1 and 1.13.2.2.

CHC was established to provide qualified construction labour under a single collective agreement on select BC Hydro capital projects. In addition, CHC can be engaged by Columbia Power Corporation (which is not a BC Hydro subsidiary). Neither BC Hydro nor Columbia Power Corporation have used CHC for construction work since September 2017. No employees are currently retained by CHC but BC Hydro has the ability to activate CHC, if required to perform work.

When CHC is engaged in construction work, the services provided by each of CHC and BC Hydro to the other are valued at market rates such that the parties are transacting as arm's length parties would.

Currently, no planned revenues or costs of CHC are included in BC Hydro's revenue requirement. Going forward, starting with the Fiscal 2023 to Fiscal 2025 Revenue Requirements Application, BC Hydro proposes to include any planned net income of CHC in the revenue requirement. BC Hydro notes that, as CHC has

not been engaged in construction work in recent years, it has not incurred a net income or net loss since fiscal 2019.

The cost for providing financial accounting and oversight services to CHC is embedded within BC Hydro's budget and included in the revenue requirement.

BC Hydro does not track costs related to financial accounting and oversight of CHC and these costs are not compensated by CHC. However, an estimate of the hours and corresponding labour costs based on the fiscal 2021 standard labour rates is shown in the table below. As the cost of providing financial accounting and oversight of CHC is small (i.e., estimated at $1,700/year) BC Hydro considers that a transfer pricing arrangement is not warranted.

		Hours	Annual Costs
1	Accounting services	10	$ 1,100
2	Financial Reporting	3	$ 400
3	Senior Leaders	1	$ 200
4	Total		$ 1,700

13.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.2, p. 88; Appendix F-5
Columbia Hydro Constructors Ltd.

On page 88 of the Compliance Filing, BC Hydro states:

> BC Hydro provides limited financial accounting and oversight services on behalf of CHC [Columbia Hydro Constructors Ltd.].
>
> […]
>
> When CHC is active and engaged by BC Hydro, its costs flow through to BC Hydro and are included in the cost of the associated capital project(s). BC Hydro's revenue requirement does not include planned costs, revenues or net income of CHC. BC Hydro prepares unaudited financial statements on behalf of CHC, which are provided in Appendix F-5.

CHC's Statements of Operations and Retained earnings in Appendix F-5 does not show any general and administration expenses in fiscal 2020.

1.13.2 Please clarify whether the cost of providing financial accounting and oversight services to CHC is embedded within various BC Hydro budgets and included in the revenue requirement.

1.13.2.1 If yes, please quantify the annual cost included in BC Hydro's revenue requirement and the rationale for recovering these costs from BC Hydro's ratepayers.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.13.2.

13.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.2, p. 88; Appendix F-5
Columbia Hydro Constructors Ltd.

On page 88 of the Compliance Filing, BC Hydro states:

> BC Hydro provides limited financial accounting and oversight services on behalf of CHC [Columbia Hydro Constructors Ltd.].
>
> […]
>
> When CHC is active and engaged by BC Hydro, its costs flow through to BC Hydro and are included in the cost of the associated capital project(s). BC Hydro's revenue requirement does not include planned costs, revenues or net income of CHC. BC Hydro prepares unaudited financial statements on behalf of CHC, which are provided in Appendix F-5.

CHC's Statements of Operations and Retained earnings in Appendix F-5 does not show any general and administration expenses in fiscal 2020.

1.13.2 Please clarify whether the cost of providing financial accounting and oversight services to CHC is embedded within various BC Hydro budgets and included in the revenue requirement.

1.13.2.2 If no, please clarify where these costs are included in CHC's Statements of Operations and Retained earnings.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.13.2 where we confirm that the cost of providing financial accounting and oversight services to CHC is embedded within BC Hydro budgets and included in the revenue requirement.

13.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.2, p. 88; Appendix F-5
Columbia Hydro Constructors Ltd.

On page 88 of the Compliance Filing, BC Hydro also states:

> The Columbia Power Corporation also retains the ability to retain CHC to perform work on its generation capital projects. In instances where Columbia Power Corporation has engaged CHC on its projects, Columbia Power Corporation will enter into an agreement with BC Hydro to cover payroll or administration costs required to operate CHC.

1.13.3 When Columbia Power Corporation retains CHC to perform work on its generation capital projects, please discuss whether BC Hydro's revenue requirement would include any costs related to the payroll or administration costs to operate CHC and any related recoveries from Columbia Power Corporation.

RESPONSE:

This response also answers BCUC Staff IRs 1.13.3.1 and 1.13.3.1.1.

When Columbia Power Corporation (which is a separate entity and is not a subsidiary of BC Hydro) retains CHC to perform work on its generation capital projects, all associated payroll or administrative costs to operate CHC are recovered from Columbia Power Corporation and therefore BC Hydro's revenue requirement does not include any net costs related to the payroll or administration costs to operate CHC or any related recoveries from Columbia Power Corporation.

13.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.2, p. 88; Appendix F-5
Columbia Hydro Constructors Ltd.

On page 88 of the Compliance Filing, BC Hydro also states:

> The Columbia Power Corporation also retains the ability to retain CHC to perform work on its generation capital projects. In instances where Columbia Power Corporation has engaged CHC on its projects, Columbia Power Corporation will enter into an agreement with BC Hydro to cover payroll or administration costs required to operate CHC.

1.13.3 When Columbia Power Corporation retains CHC to perform work on its generation capital projects, please discuss whether BC Hydro's revenue requirement would include any costs related to the payroll or administration costs to operate CHC and any related recoveries from Columbia Power Corporation.

1.13.3.1 If yes, please confirm, or explain otherwise, that the amounts recovered from Columbia Power Corporation would fully offset any costs incurred by BC Hydro.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.13.3.

13.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.2, p. 88; Appendix F-5
Columbia Hydro Constructors Ltd.

On page 88 of the Compliance Filing, BC Hydro also states:

> The Columbia Power Corporation also retains the ability to retain CHC to perform work on its generation capital projects. In instances where Columbia Power Corporation has engaged CHC on its projects, Columbia Power Corporation will enter into an agreement with BC Hydro to cover payroll or administration costs required to operate CHC.

1.13.3.1 If yes, please confirm, or explain otherwise, that the amounts recovered from Columbia Power Corporation would fully offset any costs incurred by BC Hydro.

1.13.3.1.1 If not confirmed, please discuss whether any shortfall would be recovered from BC Hydro's ratepayers and the rationale for recovery from BC Hydro's ratepayers.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.13.3.

14.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.3, p. 90; Section 7.1, Table 7-23, p. 84; Appendix F-7
Tongass Power and Light Company

On page 90 of the Compliance Filing, BC Hydro states:

> BC Hydro includes Tongass' [Tongass Power and Light Company] planned revenue as part of line 1 17 of Schedule 14 of Appendix A ($132,540 in fiscal 2020 and $141,508 in fiscal 2021)….
>
> BC Hydro incurs but does not separately track the costs it incurs in support of Tongass (e.g., operations, maintenance, emergency repairs, or capital replacement costs). Instead, these costs are embedded within various BC Hydro budgets. Tongass has no employees, staff or management. Most of the field workers used to support Tongass are from BC Hydro's offices in Terrace, British Columbia. The result is that ratepayers are receiving the benefit of the planned revenues for Tongass and are paying for the planned costs within BC Hydro budgets to support Tongass' operations. Other costs within Tongass' financial statements are not included within BC Hydro's revenue requirements.

The footnote to Table 7-23 of the Compliance Filing states: "In addition to this inclusion, costs incurred by BC Hydro in support of the operations of Tongass Power and Light Company (e.g., cost of energy, certain personnel expenses, maintenance, etc.) are embedded in BC Hydro's revenue requirement."

Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.1 Please discuss whether it is possible to separately track the costs BC Hydro incurs in support of Tongass (e.g. cost of energy, operations, maintenance, emergency repairs, or capital replacement costs). Why or why not?

RESPONSE:

This response also answers BCUC Staff IR 1.14.1.1.

BC Hydro considers that it is possible to separately track certain discrete costs related to Tongass but other costs that are not discrete would be difficult to separately track or estimate.

BC Hydro is not currently tracking discrete costs related to Tongass but has estimated them in the table below:

Description of Expense	Hours	F2020 (C$)
Accounting and financial reporting	38	4,000
U.S. tax return preparation	N/A – prepared by third party	4,000
Inspection and maintenance cost for distribution assets in Hyder, Alaska	17	1,700
Total		9,700

Non-discrete costs that are difficult to estimate are discussed below.

Energy costs: Under the Transfer Pricing Agreement between BC Hydro and Tongass, BC Hydro sells energy to Tongass at tariff rates plus a 10 per cent premium, and Tongass in turn sells energy to customers in Hyder, Alaska, at tariff rates plus a 10 per cent premium. The 10 per cent premium is to compensate BC Hydro for the cost it incurs to support Tongass.

BC Hydro does not track energy costs for individual customers, as energy is procured from different sources and many customers share the same grid. However, based on the BC Hydro's average energy cost per MWh, estimated planned annual energy costs for Tongass are $35,000. These costs are included in BC Hydro's revenue requirement.

Inspection, maintenance and depreciation cost for generation and transmission assets: BC Hydro's transmission lines end in Stewart, B.C., and only distribution lines serve Hyder, Alaska. Although Hyder residents indirectly receive benefit from BC Hydro's generation and transmission assets, BC Hydro customers also receive benefit from these assets. Tongass is paying a 10 per cent premium to BC Hydro tariff rates for the energy it receives from BC Hydro. The 10 per cent premium is to compensate BC Hydro for the cost it incurs to support Tongass.

14.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
Compliance Filing, Section 7.3.3, p. 90; Section 7.1, Table 7-23, p. 84; Appendix F-7
Tongass Power and Light Company

On page 90 of the Compliance Filing, BC Hydro states:

> BC Hydro includes Tongass' [Tongass Power and Light Company] planned revenue as part of line 1 17 of Schedule 14 of Appendix A ($132,540 in fiscal 2020 and $141,508 in fiscal 2021)….
>
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The footnote to Table 7-23 of the Compliance Filing states: "In addition to this inclusion, costs incurred by BC Hydro in support of the operations of Tongass Power and Light Company (e.g., cost of energy, certain personnel expenses, maintenance, etc.) are embedded in BC Hydro's revenue requirement."

Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.1 Please discuss whether it is possible to separately track the costs BC Hydro incurs in support of Tongass (e.g. cost of energy, operations, maintenance, emergency repairs, or capital replacement costs). Why or why not?

1.14.1.1 To the best of your abilities, please provide an estimate of these costs.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.14.1 for an estimate of costs BC Hydro incurs in support of Tongass.

14.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
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Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.2 Please confirm, or explain otherwise, that Tongass' forecast energy costs, depreciation costs and finance charges as provided in its Statements of Operations and Deficit are not included in BC Hydro's revenue requirement.

RESPONSE:

This response also answers BCUC Staff IRs 1.14.2.1 and 1.14.2.2.

Not confirmed.

Tongass' fiscal 2020 actual energy costs, depreciation costs and finance charges as provided in its Statement of Operations and Deficit are not included in BC Hydro's revenue requirements; however, the corresponding estimated fiscal 2020 plan amounts are included in BC Hydro's revenue requirements and are presented in the table below.

Description of Expense (in Canadian $)	Estimated F2020 plan amounts included in BC Hydro's Revenue Requirements ($)	F2020 actual results as per Tongass' Financial Statements (Not in RRA) ($)
Energy costs	**35,000**	**94,278**
Depreciation costs	**-**	**1,905**
Finance charges	**-**	**117,431**
Total	**35,000**	**213,614**

As shown in the table above, the estimated fiscal 2020 planned costs included in BC Hydro's revenue requirement were approximately $35,000. As discussed in BC Hydro's response to BCUC Staff IR 1.14.1, this is an estimate based on BC Hydro's average energy cost per MWh.

As discussed in BC Hydro's response to BCUC Staff IR 1.14.1, energy costs of $94,278 in Tongass' Statement of Operations and Deficit are based on the Transfer Pricing Agreement between BC Hydro and Tongass where Tongass' cost of energy is based on BC Hydro tariff rates plus 10 per cent.

Depreciation costs of $1,905 in the Statement of Operations and Deficit relate to the distribution assets in Hyder, Alaska, and are not included in BC Hydro's revenue requirement as these assets are owned by Tongass.

Finance charges in the Statement of Operations and Deficit are not included in BC Hydro's revenue requirement as they are intercompany charges based on an outstanding balance that Tongass owes BC Hydro.

14.0 C. SECTION 7 – SUBSIDIARIES

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Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.2 Please confirm, or explain otherwise, that Tongass' forecast energy costs, depreciation costs and finance charges as provided in its Statements of Operations and Deficit are not included in BC Hydro's revenue requirement.

1.14.2.1 If confirmed, please explain how the energy costs in Tongass' Statements of Operations and Deficit differs from the cost of energy that is embedded in BC Hydro's revenue requirement.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.14.2 where we explain the difference between the energy costs in Tongass' financial statements and the energy costs included in BC Hydro's revenue requirement.

14.0 C. SECTION 7 – SUBSIDIARIES

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Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.2 Please confirm, or explain otherwise, that Tongass' forecast energy costs, depreciation costs and finance charges as provided in its Statements of Operations and Deficit are not included in BC Hydro's revenue requirement.

1.14.2.2 If not confirmed, please identify the "other costs" within Tongass' financial statements that are not included within BC Hydro's revenue requirement.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.14.2.

14.0 C. SECTION 7 – SUBSIDIARIES

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Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.2 Please confirm, or explain otherwise, that Tongass' forecast energy costs, depreciation costs and finance charges as provided in its Statements of Operations and Deficit are not included in BC Hydro's revenue requirement.

1.14.2.3 Please explain why the costs BC Hydro incurs in support of Tongass (e.g. cost of energy, operations, maintenance, emergency repairs, or capital replacement costs) should be included in BC Hydro's revenue requirement while the "other costs" within Tongass' financial statements are not included.

RESPONSE:

Tongass' business is to provide electricity service to approximately 110 residential and commercial customers in Hyder, Alaska. The services provided by each of Tongass and BC Hydro to the other are valued at market rates through the Transfer Pricing Agreement.

Under the Transfer Pricing Agreement between BC Hydro and Tongass, BC Hydro sells energy to Tongass at tariff rates plus a 10 per cent premium. Tongass then sells energy to customers in Hyder, Alaska, at tariff rates plus a 10 per cent premium.

The energy cost portion of the charge is equivalent to BC Hydro's tariff rates, which recognizes that BC Hydro's sale of electricity to Tongass at the border should be assessed on the same basis as comparable customers within BC Hydro's service area. The 10 per cent premium is to compensate BC Hydro for the cost it incurs to support Tongass in serving its customers in Hyder, Alaska and represents the "transfer price" for these services BC Hydro provides.

BC Hydro submits that the 10 per cent premium included in the Transfer Pricing Agreement between BC Hydro and Tongass provides reasonable compensation to ratepayers. While a typical transfer pricing model may see BC Hydro's costs being precisely tracked and cross-charged to Tongass, certain costs related to Tongass are difficult to separately track or estimate, as explained further in BC Hydro's response to BCUC Staff IR 1.14.1.

BC Hydro considers that this approach provides sufficient protection to ratepayers and an alternative approach would be administratively burdensome and would not provide any incremental ratepayer protection or benefit. In fiscal 2020 BC Hydro included $132,540 in planned Tongass revenues in its revenue requirements application; $12,049 of this planned revenue corresponds to the 10 per cent premium. When compared against the costs that BC Hydro planned to support Tongass, as estimated in BC Hydro's response to BCUC Staff IR 1.14.1 (i.e., approximately $9,700), the 10 per cent premium of $12,049 adequately compensates BC Hydro ratepayers for the support services provided. Accordingly, BC Hydro considers its current approach to Tongass in the revenue requirements to be appropriate.

14.0 C. SECTION 7 – SUBSIDIARIES

Reference: SUBSIDIARIES
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Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.3 Please confirm, or explain otherwise, that all of Tongass' revenues in its Statements of Operations and Deficit are included in BC Hydro's revenue requirement.

RESPONSE:

This response also answers BCUC Staff IR 1.14.3.1.

Not confirmed. Tongass' <u>planned</u> revenues are included in BC Hydro's revenue requirements as part of BC Hydro's revenues on line 17 of Schedule 14 of

Appendix A of the Compliance Filing. Tongass' Statements of Operations and Deficit for fiscal 2020 includes <u>actual</u> revenues, which are different from planned revenues.

14.0 C. SECTION 7 – SUBSIDIARIES

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Tongass' Statements of Operations and Deficit in Appendix F-7 of the Compliance Filing shows revenues consisting of residential, commercial and interest income and expenses consisting of energy costs, depreciation costs and finance charges.

1.14.3 Please confirm, or explain otherwise, that all of Tongass' revenues in its Statements of Operations and Deficit are included in BC Hydro's revenue requirement.

1.14.3.1 If not confirmed, please identify which revenues are not included and the rationale for not including these revenues in BC Hydro's revenue requirement.

RESPONSE:

Please refer to BC Hydro's response to BCUC Staff IR 1.14.3, where we confirmed that Tongass' planned revenues are included in BC Hydro's revenues in its revenue requirement applications (and not actual revenues).