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October 8, 2020

Sent via email/eFile

<b>BC HYDRO 2020 TRANSFER PRICING AGREEMENT</b>
<b>APPLICATION EXHIBIT A-5</b>

Mr. Fred James  
Chief Regulatory Officer  
British Columbia Hydro and Power Authority  
16th Floor – 333 Dunsmuir Street  
Vancouver, BC V6B 5R3  
bhydroregulatorygroup@bhydro.com

**Re: British Columbia Hydro and Power Authority (BC Hydro) – 2020 Transfer Pricing Agreement Application – BCUC IR No. 1**

Dear Mr. James:

Further to your May 29, 2020 filing of the above-noted application, enclosed please find BCUC Information Request No. 1 to British Columbia Hydro and Power Authority. In accordance with the Regulatory Timetable, please file your responses no later than Thursday, November 19, 2020.

Sincerely,

*Original signed by:*

Marija Tresoglavic  
Acting Commission Secretary

/CMV



British Columbia Hydro and Power Authority  
2020 Transfer Pricing Agreement Application

**INFORMATION REQUEST NO. 1 TO BRITISH COLUMBIA HYDRO AND POWER AUTHORITY**

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**A. BACKGROUND**

**1.0 Reference: BACKGROUND**  
**Exhibit B-1, Appendix A, p. 10; *Utilities Commission Act, Section 71***  
**Termination of the 2003 TPA**

Section 2.3 of the 2020 Transfer Pricing Agreement (TPA) addresses early termination of the TPA. Section 2.5 of the 2020 TPA further states that:

Notwithstanding any termination of this Agreement, provisions respecting obligations which have arisen or accrued prior to the date of termination will continue in full force and effect in accordance with their respective terms until such obligations have been fully satisfied.

Under section 71(2) of the *Utilities Commission Act* (UCA), “The commission may make an order under subsection (3) if the commission, after a hearing, determines that an energy supply contract to which subsection (1) applies is not in the public interest.”

Further, under section 71(3), it states, “the commission may (a)by order, declare the contract unenforceable, either wholly or to the extent the commission considers proper, and the contract is then unenforceable to the extent specified...”

- 1.1 Please confirm, or otherwise explain, that the 2003 TPA has been terminated.
- 1.2 Please discuss what options are available to British Columbia Hydro and Power Authority (BC Hydro) in the event of an early termination of the 2020 TPA (e.g. the 2003 TPA takes effect in place of the 2020 TPA, or any other arrangement).
- 1.3 Hypothetically, if the BCUC orders the 2020 TPA unenforceable as of a future date, please explain how it may impact: i) BC Hydro and Powerex’s operation and trading activities; ii) the

records of historical transactions since April 1, 2020; and iii) the records of any future sales and purchases between BC Hydro and Powerex.

**2.0 Reference: BACKGROUND**  
**Exhibit B-1, pp. 4, 45; Exhibit B-5, p. 17**  
**Internal Oversight**

On page 4 of the 2020 TPA Application, BC Hydro states, “Powerex has full flexibility, vis-à-vis BC Hydro, to decide the locations, parties and prices for its transactions.” For example, BC Hydro states on page 45 that “Flexible Export Schedule is a schedule of electricity from BC Hydro to Powerex, at Powerex’s request.”

BC Hydro explains in the workshop on slide 17 that “the Powerex Board is appointed by BC Hydro’s Board of Directors, where the Powerex Board oversees the companies’ strategic direction. BC Hydro Directors and BC Hydro senior management must always exceed 50% of Powerex Board membership.”

- 2.1 Please explain the roles and responsibilities of the Powerex Board and BC Hydro’s Board of Directors, respectively. If there is any overlap between the roles and responsibilities of the two boards, please elaborate on the reporting structure and how the two boards collaborate.
  - 2.1.1 Please explain whether BC Hydro’s Board of Directors has more authority regarding system planning, corporate strategic direction, and trading activities than the Powerex Board. If yes, please elaborate. If not, why not?
- 2.2 Please explain whether and if so which decisions are made jointly by the Powerex Board and BC Hydro’s Board of Directors.
  - 2.2.1 If there are decisions made by both boards, please explain in detail the process used to reach a final decision, including the process to resolve any difference in opinion between the two boards.
- 2.3 Please explain in detail what internal oversight is in place regarding the decisions made by Powerex that impact BC Hydro’s system and its ratepayers, including any communication and reporting between Powerex and BC Hydro before and after a decision is made.
- 2.4 In the event BC Hydro does not agree with decisions made by Powerex, please explain whether there is any personnel or functional group at BC Hydro that has the authority to override Powerex’s decisions.
  - 2.4.1 If yes, please explain how this process occurs and how frequently BC Hydro administers this authority.
  - 2.4.2 If no, please explain how the current internal oversight structure protects the interests of BC Hydro ratepayers.

**3.0 Reference: BACKGROUND**  
**Transcript Volume 1, p. 94**  
**Resource allocation between BC Hydro and Powerex**

On page 94 of Transcript Volume 1, Ms. Matthews states that “Yes, so the TPA is the only agreement that is around the transfer for the energy and the costs related to that energy transaction... So there's no other agreement.”

- 3.1 Please elaborate on what resources (both internal and external to BC Hydro) are necessary to enable the energy transactions enabled by the 2020 TPA, including but not limited to the use of system assets, transmission rights and entitlement, entitlement to natural gas transportation capacity, information technology, and staffing.

- 3.1.1 Out of the resources outlined above, please explain whether BC Hydro or Powerex has ownership over those resources. For any resources that are jointly owned by BC Hydro and Powerex, please elaborate on the breakdown of the ownership and cost structure.
- 3.1.2 Please explain how costs are allocated between BC Hydro and Powerex for the use of the resources described above.
  - 3.1.2.1 Please elaborate on whether the cost allocation differs depending on the type of transaction (non-flexible versus flexible) and/or the objective of the transaction (for mitigating system surplus/deficit versus for trade).
- 3.2 For costs that are allocated to Powerex from BC Hydro, please explain how those costs are recorded and reported, both internally and externally.
- 3.3 Please explain how any under or over cost allocation from BC Hydro to Powerex impacts BC Hydro ratepayers, BC Hydro shareholders, and Powerex's profitability and trader compensation, respectively.

**B. SYSTEM OPERATIONS, QUANTITY AND NEED**

**4.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, pp. 1, 9  
Residual System Capability**

In footnote 4, on page 1 of the Application, BC Hydro states:

“Residual System Capability” is defined in the 2020 TPA as “...at any time and as determined by BC Hydro in its sole discretion, the capability of the BC Hydro System while all Domestic Load requirements and Interutility Agreement obligations (including pursuant to operating procedures) are being satisfied and System Constraints are being responded to, to allow purchases of electricity products and services by BC Hydro from Powerex and/or to allow sales of electricity products and services from BC Hydro to Powerex...”.

- 4.1 Please explain BC Hydro's process to determine the Residual System Capability, including but not limited to input data, modeling, internal oversight, review process and frequency.

In footnote 5, on page 1 of the Application, BC Hydro states:

Powerex operates across multiple time horizons depending on the market and product or service. Powerex may enter into third-party commitments that are ultimately delivered from the BC Hydro system in future BC Hydro operating time horizons

Further on page 9, BC Hydro states that one of the benefits of the 2020 TPA is:

Enabling Powerex to better utilize the Residual System Capability across a range of time horizons, generating net income that offsets BC Hydro's revenue requirements and rates.

- 4.2 Please explain whether under the 2020 TPA, Powerex will provide any inputs to how Residual System Capability is determined considering Powerex's third-party commitments may be ultimately delivered from the BC Hydro system.
  - 4.2.1 If yes, please explain the nature of the input Powerex provides, as well as how and to whom the input is provided.
  - 4.2.2 If no, please explain why not.

**5.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, p. 46; Appendix A, pp. 13, 14  
Specified Quantity Request**

BC Hydro states on page 46 of the Application:

“Specified Quantity Request” is described in Section 4.5 of the 2020 TPA as “...BC Hydro may in its discretion from time to time request in writing that Powerex schedule a specified aggregate quantity of electricity to or from the B.C. Hydro System over a specified period of time for the purposes of serving Domestic Load requirements, satisfying Interutility Agreement obligations (including under any operating procedures), and responding to System Constraints.

Pages 13-14 of Appendix A to the Application states:

- Subject to the conditions listed in Section 4.4, Powerex will schedule the aggregate amount of electricity subject to a Specified Quantity Request to or from the B.C. Hydro System during the specified period of time, provided that Powerex will in its discretion determine when and in what quantities each hour to schedule such aggregate amount of electricity in order to satisfy its obligation to B.C. Hydro under this Section 4.5.
- 5.1 Please explain in detail the process for requesting a “Specified Quantity Request”. In your response please clearly lay out the roles and responsibilities of both BC Hydro and Powerex, as well as any communication between BC Hydro and Powerex in this process.
  - 5.2 Please explain the factors considered by BC Hydro to determine the need for any Specified Quantity Request.
  - 5.3 Once a Specified Quantity Request is made by BC Hydro to Powerex, is BC Hydro able to revise or change its request if there are any changes in its operating environment? Please explain this process and factors that may lead to revisions and changes to the Specified Quantity Request.
    - 5.3.1 If yes, please explain whether the earlier Specified Quantity Request will be first cancelled and explain the risks of such changes and revisions to each BC Hydro, ratepayers and Powerex and how these are mitigated.
    - 5.3.2 If no, please explain whether offsetting or duplicated requests will be made and how these will be managed. Please also explain the risks to BC Hydro and its ratepayers of such approach and how these are mitigated.
  - 5.4 Please elaborate on whether BC Hydro relies on forecasted surplus/deficit on the system in determining whether to make a Specified Quantity Request.
    - 5.4.1 Please provide details on all inputs and assumptions used in making these forecasts.
    - 5.4.2 Please provide the forecast time horizon covered by the forecast explained above and explain why that time horizon is appropriate.
    - 5.4.3 Please explain in detail the process by which BC Hydro communicates with Powerex about the surplus or deficit on the system.
    - 5.4.4 Please explain how BC Hydro manages the risk of over or under acquiring energy due to forecast inaccuracies.
  - 5.5 Please explain whether the quantities of energy requested under Specified Quantity Request is incorporated into BC Hydro’s Energy Studies models.
  - 5.6 Please explain how providing Powerex the discretion to determine the hourly periods in which a Specified Quantity Request is delivered to BC Hydro benefits ratepayers, from both an

operational risk and financial risk perspective, and from each of BC Hydro's and Powerex's perspectives.

**6.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, p. 45  
Flexible Import and Export Schedules**

In footnotes 55 and 57, on page 45 of the Application, respectively, BC Hydro states:

In summary, a Flexible Export Schedule is a schedule of electricity from BC Hydro to Powerex, at Powerex's request. If an export is scheduled in response to a Specified Quantity Request from BC Hydro, it is considered to be flexible unless it is determined to be in response to an Extraordinary Event, in which case it will be considered to be non-flexible.

In summary, a Flexible Import Schedule is a schedule of electricity from Powerex to BC Hydro, at Powerex's request, or a Skagit Schedule. If an import is scheduled in response to a Specified Quantity Request from BC Hydro, it is considered to be flexible unless it is determined to be in response to an Extraordinary Event, in which case it will be considered to be non-flexible.

- 6.1 Please explain in detail the process for executing a "Flexible Import and Flexible Export Schedule". In your response, please clearly lay out the roles and responsibilities of both BC Hydro and Powerex in this process.
- 6.2 Please confirm, or explain otherwise, that a Specified Quantity Request will either be fulfilled by Powerex as a "Flexible Import/Export Schedule" or a "Non-flexible Import/Export Schedule". In other words, a Specified Quantity Request is not a type of energy transaction under the 2020 TPA.

**7.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, Appendix A, pp. 14-15  
Skagit Schedule**

Section 4.7 on pages 14 to 15 of Appendix A to the Application, states:

The parties acknowledge that, pursuant to certain agreements among the Province of British Columbia, the City of Seattle (including its division Seattle City Light) and B.C. Hydro, B.C. Hydro is the assignee of certain obligations to deliver electricity to Seattle City Light, and that B.C. Hydro subsequently assigned to Powerex certain of the operating obligations as they relate to delivery of electricity (the "Skagit Agreements"). In connection with Powerex delivering electricity under the Skagit Agreements, Powerex has the discretion whether to supply electricity to Seattle City Light from the B.C. Hydro System or from sources outside of the B.C. Hydro System. If, in an hour, Powerex schedules energy to Seattle City Light that it has acquired from sources outside of the B.C. Hydro System to satisfy the obligations under the Skagit Agreements (each, a "Skagit Schedule"):

4.7.1. the Skagit Schedule in that hour will be deemed to be a Flexible Import Schedule for the purposes of Section 3.1.1 of Appendix A; and

4.7.2. B.C. Hydro will pay Powerex the amount obtained by multiplying each MWh associated with the Skagit Schedule in that hour by the applicable Flexible

Import Price. For greater certainty, the MWh associated with the Skagit Schedule will not be included in the Net Delivered Quantity to B.C. Hydro calculated in Section 4.8.1 for the hour, and no additional amounts will be payable under Section 4.10 in respect of the MWh associated with the Skagit Schedule.

In the event that B.C. Hydro and Powerex enter into any similar agreement whereby Powerex supplies electricity to a party located outside of the B.C. Hydro System and has the discretion to supply such electricity from a source outside of the B.C. Hydro System, the parties agree that the provisions of this Section 4.7 will apply similarly to any such agreement.

- 7.1 Please explain in detail the process by which BC Hydro determines the need for and the appropriate volume of energy to schedule under the Skagit Agreements, including any decision to schedule from either within or outside the BC Hydro system.
  - 7.1.1 Please explain whether it is BC Hydro's or Powerex's decision to schedule delivery of electricity under the Skagit Agreements from within or outside BC Hydro's system. If it is a joint decision from BC Hydro and Powerex, please elaborate on any communication and process to reach a decision among the two entities.
- 7.2 Please compare the risks and benefits of meeting BC Hydro's obligations under the Skagit Agreement by scheduling delivery from outside versus within the BC Hydro system to BC Hydro's ratepayers.
- 7.3 Please explain whether the provisions of Section 4.7 apply only to agreements where BC Hydro has assigned its commitments to Powerex.
- 7.4 Please explain whether Powerex is able to enter into similar agreements to the Skagit Agreements to deliver energy to a party located outside of the BC Hydro System at its own discretion.
  - 7.4.1 If Powerex is able to enter into such agreements on its own discretion, please explain the risks and benefits to BC Hydro ratepayers.

**8.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, pp. 45, 46  
Non-flexible Import/Export Schedule**

In footnotes 58 and 59, on pages 45 and 46 of the Application, respectively, BC Hydro states:

In summary, a Non-Flexible Export Schedule is a schedule of electricity from BC Hydro to Powerex, at BC Hydro's request, for the purposes of responding to System Constraints. If an export is scheduled in response to a Specified Quantity Request from BC Hydro, it is considered to be non-flexible if it is in response to an Extraordinary Event (see section 4.6 of the 2020 TPA). An example of a Non-Flexible Export would be forced exports during the spring freshet if BC Hydro's minimum generation is higher than its Domestic Load requirements.

In summary, a Non-Flexible Import Schedule is a schedule of electricity from Powerex to BC Hydro, at BC Hydro's request, for the purposes of serving Domestic Requirements. An example of a Non-Flexible Import would be a request from BC Hydro to import during cold days in winter to meet high peak loads.

- 8.1 Please explain in detail the process by which BC Hydro determines and requests a "Non-Flexible Import and Non-Flexible Export Schedule". In your response, please clearly lay out the roles and

responsibilities of both BC Hydro and Powerex in this process.

**9.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED  
Transcript Volume 1, p. 120; Exhibit A2-2, p. 53  
Energy Studies**

Page 120 of Transcript Volume 1 states:

So how BC Hydro determines the residual capacity, it's through the modeling efforts and the tools that we do. And to answer the question from Tom, it's not like there's one point in time where you can define that it's this up to a certain point and now that's residual. In the RRA I talked a lot about how we planned the system in the operational timeframe and we do that at different time scales and using different tools. So the energy studies is one of those tools, it's looking out across the next three years of what the generation will be from the units or what the import or export requirements are. So we're looking at the three years, we're looking at it one year out, (audio drops) out the next couple months and then within the months we're looking at the two-week period, the next-day period. And it's a continual process and there's different tools that are defining it.

Page 53 of Exhibit A2-2 states:

The first year of the modelling timeframe is the most important for current operational decisions. In the Energy Studies optimization, the forecast of drivers (inflows, load, market prices, etc.) and system conditions that are closer in time to the present will generally have a larger impact on the near-term results than those same factors further out in time.”

- 9.1 Please explain how the Energy Study described in the preamble informs the need for Specified Quantity Requests, Flexible Schedules, and Non-Flexible Schedules as described in the Application.
- 9.2 Please discuss whether the Specified Quantity Requests, Flexible Schedules, and Non-Flexible Schedules are inputs and/or outputs of the monthly Energy Study models.
- 9.3 Please discuss how Energy Studies and other tools that serve within-month operational planning needs ensure that the 2020 TPA allows for the management of short-term operational needs and opportunities.
- 9.4 Please explain whether BC Hydro uses a volumetric threshold limit to trigger a sales request in order to manage a forecast system surplus.
  - 9.4.1 If yes, please indicate whether separate surplus threshold limits are applied depending on the period of time over which a surplus exists (i.e. month ahead, the next four months, the next 12 months, etc.) or whether separate limits are applied depending on how far forward a purchase or sale is transacted (i.e. monthly, quarterly, annually, etc.).
  - 9.4.2 If no, please explain why surplus threshold limits are not used.
- 9.5 Please explain whether BC Hydro uses a volumetric threshold limit to trigger a purchase request in order to meet a forecast system deficit.
  - 9.5.1 If yes, please indicate whether separate deficit threshold limits are applied depending on the duration of a deficit (i.e. month ahead, the next four months, the next 12 months, etc.) or whether separate limits are applied depending on how far forward a purchase is required (i.e. monthly, quarterly, annually, etc.).
  - 9.5.2 If no, please explain why deficit threshold limits are not used.

**10.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, pp. 1, 8  
Operating Time Horizon**

In footnote 5, on page 1 of the Application, BC Hydro states:

The operating time horizon of the BC Hydro system is, at any time, the balance of the current fiscal year and the following two fiscal years. The planning time horizon is longer-term (i.e., 20 years). BC Hydro builds and procures resources to meet its Domestic Requirements on a planning basis. Within the operating time horizon, BC Hydro dispatches those resources and undertakes imports and exports to cost-effectively meet its Domestic Requirements. Powerex operates across multiple time horizons depending on the market and product or service. Powerex may enter into third-party commitments that are ultimately delivered from the BC Hydro system in future BC Hydro operating time horizons. However, Powerex's third-party commitments for future time horizons do not impact decisions by BC Hydro in its planning time horizon.

- 10.1 Please explain if Powerex may enter into third-party commitments that are ultimately delivered from the BC Hydro system in future operating time horizons into the planning time horizon.
- 10.1.1 If yes, please explain how and why these transactions do not impact BC Hydro's planning time horizon.
- 10.2 Please explain in detail the potential impacts and risks to BC Hydro's planning and system operation of Powerex's third-party commitments that may be ultimately delivered beyond BC Hydro's operating time horizon.
- 10.3 Please explain if there are any safeguards, under the 2020 TPA or otherwise, to ensure that BC Hydro and its ratepayers are protected from risks of Powerex's commitments beyond the operating time horizon.
- 10.4 Please explain whether, if so how, Powerex's third-party commitments for the operating time horizon and/or the planning time horizon impact BC Hydro's Energy Studies and any other models for the purposes of making a Specified Quantity Request, Flexible Schedule, or Non-Flexible Schedule under the 2020 TPA.

Further on page 8 of the Application, BC Hydro states:

The fact that the effect of the 2020 TPA is limited to the operating time horizon of the BC Hydro system is important. In particular, the 2020 TPA does not and cannot have any effect on BC Hydro's long-term load-resource balance and it is not a resource that will be considered by BC Hydro in its next Integrated Resource Plan. In other words, the 2020 TPA has no effect on BC Hydro's planning time horizon.

- 10.5 Please explain whether the 2020 TPA: i) provides a definition of "operating time horizon"; and ii) stipulates that transactions under the 2020 TPA do not and cannot have any effect on BC Hydro's long-term load-resource balance.
- 10.5.1 If yes, please provide references to the 2020 TPA with the above.
- 10.5.2 If no, please explain why this has not been stated in the 2020 TPA.

**11.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, p. 2**

## BC Hydro Operations

On page 2 of the Application, BC Hydro states, “BC Hydro operates its system to meet its Domestic Requirements first.” However, BC Hydro also states that “[Powerex] has full flexibility, vis-à-vis BC Hydro, to decide the locations, parties and prices for its transactions”

11.1 Please provide a summary comparing how BC Hydro’s system operations were managed under the 2003 TPA and under the 2020 TPA. Please highlight and explain any difference.

**12.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, p. 18; Appendix A, p. 26  
Forward Contracts**

BC Hydro states on page 18 of the Application:

... increasingly, some of the best opportunities for Powerex to make sales of electricity products are arising in the forward markets. Specifically, there is increasing demand for transactions lasting an entire month, or season, which are often entered into months in advance of the delivery period.

Section 8.1 of the 2020 TPA states that:

B.C. Hydro and Powerex may from time to time enter into forward fixed-price, fixed volume contracts for the purpose of managing market risk associated with expected Annual Flexible Surplus/Deficit volumes or with expected Non-Flexible Import Schedules and Non-Flexible Export Schedules or managing market risk associated with purchases of Gas to meet Domestic Load, satisfy B.C. Hydro’s obligations under Interutility Agreements or Gas Utility Contracts or respond to System Constraints. Such forward contracts will be executed at agreed-upon prices based on prevailing market conditions and will be financially-settled against an agreed-upon market index.

- 12.1 Please explain BC Hydro’s objective in entering into forward purchase contracts through Powerex. Specifically, does BC Hydro enter into forward contracts for security of supply to meet Domestic Requirements within the operational horizon, or for speculative trading to achieve financial gains?
- 12.2 Please discuss the factors considered by BC Hydro to determine the need for any forward purchase and sales contracts.
- 12.2.1 If the factors considered, or the importance of those factors, differs depending on the purpose of the forward contracts (import/export needs versus financial gains), please explain any difference.
- 12.3 Please elaborate on whether BC Hydro relies on forecasted surplus/deficit on the system to determine whether to enter into forward contracts.
- 12.3.1 Please explain in detail the process by which BC Hydro communicates with Powerex about the surplus or deficit on the system in order to enter into forward contracts.
- 12.3.2 Within the context of forward transactions, please explain how BC Hydro manages the risk of over or under acquiring energy due to forecast inaccuracies.
- 12.4 Please explain the relationship between the Energy Study described in the preamble to IR 9.0 above and the decisions to enter into forward contracts through Powerex. Specifically, please discuss whether the forward contracts are inputs or outputs of the monthly Energy Study.
- 12.4.1 Please discuss whether the forward contracts volumes are factored into the Energy

Study to inform future system surplus or deficit.

- 12.5 Please explain how BC Hydro manages any physical delivery and drawdown of energy from its system at the time of forward contract physical delivery.
- 12.5.1 Hypothetically, if BC Hydro is experiencing a system surplus at the time physical delivery of a forward purchase contract occurs, please explain what options are available to BC Hydro to manage the system surplus and/or its obligation to accept delivery of energy under the forward purchase contract.
- 12.5.2 Similarly, if BC Hydro is experiencing a system deficit at the time a physical delivery of a forward sales contract occurs, please explain what options are available to BC Hydro to manage the system deficit and/or its obligation to deliver energy under the forward sales contract.
- 12.6 Please explain how BC Hydro determines the appropriate volume, time horizon, and price of any forward purchase and sales contracts.
- 12.6.1 Please discuss what alternatives are there to forward purchases (e.g. generation curtailment, rate design such as freshet rate, spillage), and the cost and risks associated with these alternatives to BC Hydro.
- 12.7 For forward contracts that have a financial impact on BC Hydro's ratepayers (such as through a reduced BC Hydro revenue requirement) and/or a physical impact to BC Hydro's system, please explain the nature of the forward transactions that Powerex enters into in the forward market. Specifically, please address how the forward contracts are transacted, the underlying, any guarantees required, liquidity of the transactions, any implicit or explicit transaction costs, and when and how the contracts are settled (e.g. financially or physically).
- 12.7.1 If the nature of the forward transactions that Powerex enters into differs between the 2003 TPA and after the execution the 2020 TPA, please elaborate on any differences.
- 12.8 Please discuss the risk associated with Powerex's forward transactions, including but not limited to counterparty risk, price risk between the exercise price and spot price at the time of settlement, and interest rate risk as applicable.
- 12.8.1 Please explain BC Hydro and its ratepayers' exposure to the risks described above.
- 12.8.1.1 Please explain whether BC Hydro and its ratepayers' risk exposure differs between the 2003 TPA and after the execution of the 2020 TPA.
- 12.8.2 Please explain the measures that BC Hydro and Powerex take, respectively, to mitigate the risks discussed above.
- 12.9 With increasing opportunities for Powerex to make sales of electricity products in the forward markets, please explain whether Powerex has observed any changes to the risk profile of forward transactions in the forward market over time.

**13.0 Reference: SYSTEM OPERATIONS, QUANTITY AND NEED  
Exhibit B-1, pp. 5, 28-29  
Forward Contracts Supported by BC Hydro's System**

BC Hydro states on page 29 of the Application that "Powerex has long been an active participant in forward markets and will continue to participate in these markets based on market conditions. The 2020 TPA allows Powerex to better use the BC Hydro system to support both forward third-party purchase and sale transactions (instead of relying on third-party forward purchases to serve its third-party forward sales)."

- 13.1 Please explain, using an illustrative example where possible, how Powerex used "third-party

- forward purchases to serve its third-party forward sales” prior to the 2020 TPA.
- 13.2 Please explain how Powerex uses BC Hydro’s system to support forward third-party purchase and sales transactions under the 2020 TPA.
- 13.2.1 Please elaborate on how the 2020 TPA allows Powerex to “better use the BC Hydro system” to support both forward third-party purchase and sale transactions.
- 13.3 Please explain whether, and if so how, the use of BC Hydro’s system absorbs or mitigates risks associated with forward purchases and sales transactions.
- 13.4 From the perspective of managing BC Hydro’s system, please explain any risks associated with using BC Hydro’s system to support both forward third-party purchase and sales transactions (e.g. uncertainty of future system storage levels due to forward deliveries, use of the system to absorb any imbalance between forward sales and forward purchases).
- 13.5 Please explain any difference in risk exposure by Powerex and BC Hydro, respectively, between using BC Hydro’s system to support forward purchases and sales rather than relying on third-party forward purchases to serve its third-party forward sales.
- 13.6 Please explain whether, and if so how, there are forward transactions or any other financial derivatives that are made possible or more attractive to enter into by Powerex with the support of BC Hydro’s system.
- 13.6.1 If yes, please elaborate on the risk profile of these additional contracts, including how any risks are absorbed or mitigated by BC Hydro’s system, and how the remaining risk exposure is allocated to BC Hydro and Powerex, respectively.

In footnote 5, on page 5 of the Application, BC Hydro states:

Powerex may enter into third-party commitments that are ultimately delivered from the BC Hydro system in future BC Hydro operating time horizons.

- 13.7 Considering that Powerex may enter into third-party commitments for future periods that may be ultimately delivered from BC Hydro’s system, please explain what Powerex’s roles and responsibilities are in the forecasting for surplus/deficit on the BC Hydro system, including any inputs received from Powerex to make such forecasts.

In footnote 45, on page 28 of the Application, BC Hydro states:

If Powerex commits to a forward purchase or sale supported by the BC Hydro system and BC Hydro’s needs change from what had been expected, Powerex would import or export electricity to/from the BC Hydro system, in response to these evolving needs.

- 13.8 Please explain in detail the process of communicating the changes highlighted in the preamble above and the roles and responsibilities of the BC Hydro and Powerex in this process.
- 13.9 Please explain whether there is any additional risk exposure and costs, respectively, to Powerex and ultimately BC Hydro and its ratepayers, if the forward purchase or sales committed by Powerex are changed in response to BC Hydro’s evolving needs.
- 13.10 Please discuss the frequency with which BC Hydro evaluates forward purchase and sales requests to meet periods of surplus and deficit over the operating time horizon.
- 13.11 Please discuss the frequency with which BC Hydro evaluates forward purchase and sales requests to commit BC Hydro’s system to support Powerex trading activity.
- 13.11.1 Please elaborate on whether committing BC Hydro’s system to support Powerex trading activity could decrease the availability of BC Hydro’s system to support domestic load requirements.

**14.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED  
Exhibit B-1, p. 22; Phase I Final Report on the Comprehensive Review of BC Hydro, p. 6  
Availability of Supply**

Page 22 of the Application states:

From a BC Hydro domestic perspective, the transfer price risk inherent in the 2003 TPA and current day-ahead market conditions made it less certain whether, at any particular period of time, there would be sufficient demand or supply in the day-ahead market to meet its Domestic Requirements and to meet those requirements cost-effectively.

Page 6 of the Phase I Final Report on the Comprehensive Review of BC Hydro states:

In addition to the foregoing context on rates, over a number of years, BC Hydro has secured energy through power acquisitions from Independent Power Producers, the addition of Site C, and, to a lesser extent, through upgrades to its existing facilities. While electrification to support the CleanBC Plan will consume some of this surplus energy, growth in demand from existing electricity use is slowing, which means BC Hydro expects to remain in surplus into the 2030s.

14.1 Please explain why entering commitments to purchase energy through forward contracts from Powerex is necessary if BC Hydro is expected to be in a surplus position until at least 2030.

**15.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED  
Exhibit B-5, p. 31; Transcript Volume 1, pp. 40-41  
Allocation of Operational Benefits/Risks**

Page 31 of Exhibit B-5 states, "Forward and Day-Ahead markets generally transact greater volumes."

Pages 40 to 41 of Transcript Volume 1 to the BC Hydro Workshop describes each of the three general timeframes of wholesale electricity markets trading timelines inherent to the wholesale electricity markets, as described on page 31 of Exhibit B-5, and are summarized below:

- The duration of transactions in forward markets ranges from the balance of a month, to quarterly, seasonal, annual and periods longer than one year;
- The duration of transactions in day-ahead markets is for the next day or, in cases where there is a weekend or holiday, the next two days; and
- Transactions in the real-time markets occur intra-day, often for the next hour. The real-time market also includes 15-minute and 5-minute transactions.

15.1 Please discuss the following risks from participating in each of the real-time, day-ahead and forward markets:

- i) Risk of short supply in BC Hydro's system;
- ii) Risk of oversupply in BC Hydro's system;
- iii) Risk of price volatility; and
- iv) Risk of liquidity.

15.2 Please explain how each of the risks listed above is managed by BC Hydro and Powerex.

**16.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED  
Exhibit B-1, pp. 3-4; Exhibit A2-2, pp. 31-32**

## Potential Energy Supply Variability

Page 3 of the Application states:

Within its operating time horizon, BC Hydro faces variability and uncertainty in both load and energy supply. Water inflows are the largest driver of potential energy supply variability, which, in a given year, is typically in the range of +/-7000 GWh, or about 12 per cent of BC Hydro's annual energy load requirements.

Pages 31 to 32 of Exhibit A2-2 states:

[W]hat the energy studies do is that they model really our load resource balance. And I know we use that term a lot, and I might just explain it because we do use it in different time settings. For example, when Mr. Austin referred us to Table D-1 in the long-term planning view, that's really a load resource balance at an annual level, and at an annual level it's both on energy and capacity. And then the energy studies in the end is creating that at a monthly value. The energy studies does [sic] do some month calculations that affect it, but essentially what we are doing is getting a monthly load resource balance.

16.1 Please provide: i) BC Hydro's average monthly load resource balance, excluding any imports to or exports from BC Hydro's system; ii) the time period over which BC Hydro last experienced an energy supply surplus greater than 5,000 GWh; and iii) the time period over which BC Hydro last experienced an energy supply deficit greater than 5,000 GWh, respectively.

16.1.1 Based on the information above, please comment on the variability of BC Hydro's system deficit/surplus over time.

**17.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED  
Exhibit B-1, Appendix A, pp. 8, 19  
Gas Fired Generation Plants**

Page 8 of Appendix A to the Application provides the following definitions:

1.1.37. "Thermal Generation Plants" means the gas-fired generation plants owned or under the control of B.C. Hydro from time to time including Fort Nelson, Island Generation and RPG;

1.1.42. "Variable Operating Costs" means all incremental costs incurred by B.C. Hydro in respect of generation at the Thermal Generation Plants at the request of and for purchase by Powerex pursuant to Sections 5.1 or 5.2, as determined in good faith from time to time by B.C. Hydro;

Page 19 of Appendix A states:

At any time when B.C. Hydro is operating any of the Thermal Generation Plants for its own purposes, Powerex will have the option, exercisable by notice in writing to B.C. Hydro, to purchase from B.C. Hydro the electricity generated by that operation on the terms set out in Section 5.1 for the purchase by Powerex of electricity from a Thermal Generation Plant, including with respect to the supply of Gas by Powerex and the payment by Powerex of the Variable Operating Costs and any Variable Transportation Costs.

17.1 For each of the Thermal Generation Plants (Fort Nelson, Island Generation and RPG), please identify the total volume of electricity generated at each facility in each of the last five years.

17.1.1 For each facility, please identify the total volume of electricity generated by each facility

for the purpose of serving Domestic Load, satisfying BC Hydro's obligations under Interutility Agreements or responding to System Constraints.

**18.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED  
Exhibit B-1, Appendix A, p. 24; Exhibit A2-6, pp. 4, 26, 27, 29  
Gas Transportation**

Page 4 of Exhibit A2-6 states:

Total forecast gas and external transmission costs for fiscal 2020 and fiscal 2021 are \$2.8 million and \$2.7 million respectively, compared to the fiscal 2019 Plan of \$6.1 million. This decrease largely reflects the assignment of BC Hydro's gas transportation contract to Powerex.

Page 26 of Exhibit A2-6 states:

[D]rilling activities in northern BC have resulted in strong demand for T-South pipeline capacity and currently all available firm capacity has been contracted for in the foreseeable future. Price spreads between Station 2 and Huntingdon are significant so there is trading value in securing T-South capacity.

Page 27 of Exhibit A2-6 states:

Comparing the cost of holding capacity on the Spectra gas transmission system to gain access to Station 2 to purchasing gas from Huntingdon for use at IG, it is apparent that BC Hydro should simply purchase the gas from Huntingdon. However, the concern with this option is the reliability of gas supply at Huntingdon.

Page 29 of Exhibit A2-6 states:

It is recommended that BCH renew the existing T-South TSA [transportation service agreement] for a period of no less than two years in order to retain future renewal rights. Once the TSA is renewed, the firm capacity is to be assigned to Powerex to capture the value of trading.

18.1 Please identify when rights to the existing T-South TSA expire.

18.2 Please confirm whether the existing T-South TSA is still assigned to Powerex.

18.2.1 Please estimate the current value of the T-South TSA and how much revenue BC Hydro could generate if such rights were sold on the secondary market.

18.3 Please explain how much BC Hydro charged Powerex for the rights to use the T-South TSA. In your response, please identify whether this charge reflects the historical cost that BC Hydro paid for the T-South TSA, the current value of the T-South TSA or some other valuation.

18.3.1 If the amount BC Hydro charged Powerex for the rights to use the T-South TSA is neither the historical cost nor the current value, please explain how the amount charged to Powerex was determined.

**19.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED  
Exhibit B-1, Appendix A, pp. 19-20  
Delivery, Title and Risk – IPP Purchases**

Pages 19 to 20 of Appendix A to the Application states the following:

Section 6.1.1 – subject to Sections 6.1.2 and 6.1.3, electricity sold and purchased under this Agreement shall be made available, and title and risk of loss shall pass from the seller to the buyer, at either the British Columbia-United States border or the British Columbia-Alberta border, as determined by Powerex;

Section 6.1.2 – electricity purchased by Powerex under Sections 5.1 or 5.2 and then sold to B.C. Hydro under this Agreement shall be made available and title and risk of loss shall pass from Powerex to B.C. Hydro at the point of interconnection between the applicable Thermal Generation Plant and the Transmission System; and

Section 6.1.3 – electricity purchased by Powerex from independent power producers or other entities in British Columbia and sold to B.C. Hydro under this Agreement shall be made available and title and risk of loss shall pass from Powerex to B.C. Hydro at the point of interconnection between the third party and the Transmission System.

- 19.1 Please explain whether the 2003 TPA contains a similar clause as per section 6.1.3 of the 2020 TPA as referenced in the preamble above.
- 19.1.1 If yes, please provide the specific reference in the 2003 TPA and explain any differences between the 2003 TPA and 2020 TPA in terms of the pricing and transfer mechanism of electricity purchased by Powerex from independent power producers to BC Hydro.
- 19.1.2 If no, please explain why this section has been added to the 2020 TPA.
- 19.2 Please explain how frequently the transactions described under section 6.1.3 of the 2020 TPA have occurred in the last 10 years. Please provide, in confidence if necessary, the volume and price of those transactions in the last 10 years.
- 19.3 Please explain under what circumstances BC Hydro would purchase IPP power through Powerex rather than through Electricity Purchase Agreements directly with IPPs.
- 19.3.1 In instances where BC Hydro purchases IPP power through Powerex, please confirm whether this qualifies as a system import under the 2020 TPA. In your response, state under what circumstances these purchases would qualify as a Flexible or Non-Flexible Import.
- 19.4 Please confirm, or otherwise explain, whether both BC Hydro and Powerex can simultaneously purchase electricity directly from the same IPP.
- 19.5 Please confirm, or otherwise explain, that purchases of IPP energy by BC Hydro are subsequently sold to Powerex at the appropriate transfer price as stated in the 2020 TPA.
- 19.5.1 Please confirm, or otherwise explain, that BC Hydro is required to use and reserve its own Open Access Transmission Tariff (OATT) transmission to deliver IPP energy to Powerex at either the British Columbia-United States border, or the British Columbia-Alberta border, as determined by Powerex.
- 19.6 Please explain how the prices of any purchases of IPP energy by Powerex are established.
- 19.6.1 In cases where Powerex purchases energy from an IPP, please explain whether Powerex reserves its own OATT transmission outside the transmission allocated by BC Hydro to Powerex under the terms of the 2020 TPA. In your response, please confirm that in these instances, Powerex pays BC Hydro for scheduling and ancillary service fees.

**C. FINANCIAL IMPACT AND PRICING MECHANISM**

**20.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-5, slide 21  
Payment for Surplus Energy**

Slide 21 in BC Hydro’s Workshop shows the following table:

	F14 to F18 Average	F2019	F2020	Beneficiary
Payment for BC Hydro Surplus Energy <sup>1</sup>	\$97	\$115	\$1	Ratepayers
Payment for Canadian Entitlement <sup>2</sup>	\$128	\$202	\$119	B.C.Government

- 20.1 Please explain why the payment for BC Hydro surplus energy is significantly lower at \$1 in F2020 compared to \$115 in F2019 and the average of \$97 over the F14 to F18 period.
  - 20.1.1 Please discuss whether, and to what extent, the reduced payment is due to the execution of the 2020 TPA.
- 20.2 Please explain how Powerex’s payment for BC Hydro surplus energy is determined under the terms of the 2020 TPA.
- 20.3 Please explain how any Powerex payments for BC Hydro surplus energy will be reported for all transactions since April 2020 (e.g. annual report, revenue requirements application, etc.).
- 20.4 Please explain any differences between the reporting of any Powerex payment for BC Hydro surplus energy before and after the execution of the 2020 TPA.

**21.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, p. 59  
Value of Forward Contracts**

On page 59 of the Application, BC Hydro states that “BC Hydro is no longer exposed to the one-day-at-a-time market prices associated with the specific timing of sales related to its actual Annual Flexible Surplus/Deficit because it is added to, or subtracted from, the balance in the Transfer Volume Account, at the Annual Price”

- 21.1 Please explain how forward contracts entered into by Powerex under the terms of the 2020 TPA are priced.
- 21.2 Please explain and compare how the costs of forward purchases and revenues from forward sales are recorded under the 2003 TPA and the 2020 TPA, respectively.
- 21.3 Please explain whether forward contracts are marked to market.
  - 21.3.1 If yes, please elaborate on the frequency and the benchmark index against which the contracts are marked to market.
  - 21.3.2 If no, please explain whether, and if so how, any gains or losses are determined during the term of the forward contract.
- 21.4 Using an illustrative example, please explain under which account(s) and how the value of a forward purchase contract, along with any gains or losses, is recorded over the time horizon of a forward purchase contract from the time of execution to after the settlement date from BC

Hydro's and Powerex's perspective, respectively, under the 2020 TPA.

21.4.1 Please replicate the analysis above under the terms of the 2003 TPA (in conjunction with the 2018 and 2019 Letter Agreements) and highlight and explain any difference between how forward contracts are recorded before and after the execution of the 2020 TPA.

21.5 Please explain whether BC Hydro has established price limits associated with forward purchase and sale transactions. If yes, please elaborate on the policy establishing price limits. If not, please explain why not.

21.6 Please discuss and provide details of all the costs to BC Hydro associated with entering into higher volumes of forward contracts, including all transactional costs, subscription costs, premiums, external management costs, etc.

21.6.1 Please explain whether BC Hydro and its ratepayers are exposed to higher costs after the execution of the 2020 TPA.

21.6.2 Please discuss how the costs of entering into forward contracts are recorded by BC Hydro under the 2003 TPA and the 2020 TPA, respectively.

**22.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, p. 13; Transcript Volume 1, p. 107; Exhibit A2-2, p. 2  
Transfer Price Risk**

BC Hydro states on page 13 of the Application that "the 2003 TPA created transfer price risk that discouraged Powerex from entering into transactions in the forward market for delivery to and from the BC Hydro system."

BC Hydro provides the following example of transfer price risk on page 13 of the Application:

...the price and allocation applicable to these future exports would not have been determined at the time Powerex committed to the forward third-party sale transaction. Rather, on the days that Powerex was delivering electricity to that third-party, electricity exports from the BC Hydro system would have been allocated between BC Hydro and Powerex on the basis of the Applicable Mid-C Price determined no earlier than the previous trading day, even though the commitment that resulted in those third-party sales had occurred much earlier.

Page 107 of Transcript Volume 1 states:

[I]n your example, those imports and exports aren't just happening at the end of the year, so there's going to be a transfer price risk kind of assumed by BC Hydro over the course of the year until it's like cleared up at the next time.

On page 2 of Exhibit A2-2, BC Hydro explains that:

All else being equal, lower inflows across the system (including reservoirs besides Williston and Kinbasket) will result in lower end of year energy content in System Storage (i.e., the Williston and Kinbasket reservoirs). Similarly, all else being equal, higher inflows would result in higher end of year energy content in System Storage. The energy in System Storage is directly related to the difference between inflow and generation at GM Shrum (GMS) and Mica (MCA) generating stations (assuming no spill). Generation at GMS and MCA depends, in turn, on load, exports (or imports), and remaining system resources (other BC Hydro assets, coordination agreements, and IPP energy).

- 22.1 Please confirm, or otherwise explain, that for forward imports and exports, BC Hydro will experience an inflow or outflow of electricity, respectively, to its system at the time of delivery rather than when the forward contract is executed.
- 22.2 With reference to System Storage in the preamble above, please explain whether the 2020 TPA introduces any difference to the factors, or relative impact of each factor, on BC Hydro's System Storage level.
- 22.3 Please discuss the variability of the level of BC Hydro's system deficit/surplus, including the risk and uncertainty around forecasting the level of system deficit/surplus in a future period.
- 22.3.1 Please comment on whether the level of uncertainty is higher in forecasting the level of system deficit/surplus further into the future.
- 22.4 Please confirm, or explain otherwise, that the value of any imports to BC Hydro's system, and the price at which BC Hydro is willing to export, are dependent on the level of BC Hydro's system deficit/surplus.
- 22.4.1 If yes, please comment on whether it is appropriate for the valuation of the inflow and outflow of electricity to BC Hydro's system to occur at the time the energy is delivered.
- 22.4.2 If no, please explain how the value of any imports and the price at which BC Hydro is willing to export are determined.
- 22.5 Please confirm, or otherwise explain, that system imports and exports relate only to transactions where electricity has been physically imported/exported (i.e. volumes associated with day-ahead and forward transactions that have yet to be delivered are not reflected here).
- 22.5.1 If yes, please explain where the volume and value of day-ahead and forward transactions are recorded in the revenue requirement.
- 22.5.2 If no, please explain why the volume and value of day-ahead and forward transactions are captured in system imports and exports.
- 22.6 Please explain whether the delivery of system imports and exports are settled using a daily price under the 2020 TPA.

**23.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, pp. 54-56  
Transfer Price Risk – Example**

Pages 54 to 56 summarize how transfer price risk under the 2003 TPA is mitigated under the 2020 TPA by removing a Threshold Sale price that would have allocated an export to BC Hydro rather than Powerex. Key phrases to describe these mechanics are provided below:

- If the Applicable Mid-C Price was less than the price Powerex had negotiated with the customer in California (e.g., \$30/MWh), Powerex would have paid BC Hydro \$30/MWh for the energy and would still have generated net income, albeit a lower amount of \$5 million (i.e., 500 GWh x [\$40/MWh - \$30/MWh]);
- If the Applicable Mid-C Price was greater than the price Powerex had negotiated with the customer in California (e.g., \$50/MWh), however, Powerex would have paid BC Hydro \$50/MWh for the energy and, would have incurred a net loss on the transaction of \$5 million (i.e., 500 GWh x [\$40/MWh - \$50/MWh]); and
- Under the 2020 TPA, the first part of the above scenario similarly results in a credit of \$20 million to the Transfer Volume Account. When 500 GWh of energy is exported, the balance in the Transfer Volume Account is reduced, by the Weighted Average Price of \$20/MWh, from 1,000 GWh to 500 GWh and from \$20 million to \$10 million. Powerex would then sell

that energy to the customer in California for \$40/MWh, generating net income, to the benefit of BC Hydro ratepayers, of \$10 million.

- 23.1 Please use an Excel worksheet to illustrate the example provided in pages 54 to 56 of the Application by comparing how Powerex's net income is generated to benefit ratepayers under the 2003 TPA and the 2020 TPA, respectively.
- 23.2 Please confirm, or otherwise explain, that the cost to ratepayers for an import to the system is equal to the wholesale market price that Powerex pays, plus any transmission costs required to deliver that electricity to BC Hydro's customer.
- 23.3 Please confirm, or otherwise explain, that the financial benefits that ratepayers receive for an export from BC Hydro's system is equal to the price at which Powerex sells that electricity, less any transmission or other costs (e.g. Powerex's operating costs) required to deliver electricity to Powerex's customer.
- 23.4 From the above example, please confirm, or otherwise explain, whether energy other than that supplied by BC Hydro's system could be used to satisfy Powerex's forward sales commitments.
  - 23.4.1 If yes, please explain whether Powerex could have purchased wholesale electricity from the market at a price lower than the price it would have paid to BC Hydro.
    - 23.4.1.1 If not, please explain why.
  - 23.4.2 Please explain the extent to which substituting wholesale market purchases to supply Powerex's sales commitments with electricity supplied by BC Hydro's system affects operational risks associated with managing BC Hydro's system.

**24.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, pp. 26-27; Appendix A, section 4.8  
Transfer Volume Account**

BC Hydro states on page 26 that 2020 TPA replaces "the Trade Account with a Transfer Volume Account that includes not only the volume and value of Powerex's trade activity using the Residual System Capability (similar to the Trade Account) but also BC Hydro's annual energy surpluses and deficits (not included in the Trade Account)"

BC Hydro elaborates under section 4.8 of the 2020 TPA on how "Net Delivered Quantity to BC Hydro" and "Net Delivered Quantity to Powerex" are determined in each hour.

BC Hydro further states on page 27 that:

Immediately before the end of each fiscal year, the Transfer Volume Account is also adjusted by adding or subtracting BC Hydro's actual Annual Flexible Surplus/Deficit. The Weighted Average Price is adjusted at the same time based on the simple average of on-peak and off-peak prices for all hours during the year times a pre-determined multiplier (Annual Price) and an adjustment for the net financial value, as determined by BC Hydro, of the impact resulting from Powerex's import and export decisions, on head gains and losses and on spill in the BC Hydro system (System Adjustment Value).

- 24.1 Using data from the transactions conducted between April 2019 to March 2020 as an illustrative example, please provide in a functional excel spreadsheet explaining: i) what is being recorded under the transfer volume account (e.g. the type of transaction – non-flexible/flexible/specified Quantity Request, etc.; unit price; gross volume); ii) what a journal entry looks like; and iii) how any adjustment is made at the end of each fiscal year (including adjustment based on BC Hydro's actual Annual Flexible Surplus/Deficit and adjustment to the Weighted Average Price).

- 24.1.1 Please replicate the analysis above to illustrate what is recorded under the Trade Account in accordance with the terms under the 2003 TPA.
  - 24.1.1.1 For information recorded under the Transfer Volume Account that is not recorded under the Trade Account, please explain where that information was recorded under the terms of the 2003 TPA.
  - 24.1.1.2 For information recorded under the Trade Account that is not recorded under the Transfer Volume Account, please explain where that information is recorded under the terms of the 2020 TPA.
- 24.2 Please explain what the balance in the Transfer Volume Account represents. Specifically, please explain from the perspective of: i) BC Hydro’s system operation; ii) BC Hydro’s ratepayers’ financial position; and iii) availability/constraint to Powerex’s ability to trade, respectively.
- 24.3 Please explain whether BC Hydro has a target balance in the transfer volume account i) at any given time and ii) at the end of the fiscal year.
  - 24.3.1 If yes, please explain: i) how the target is determined; ii) what the target signifies; and iii) under what circumstance would a different target be applied.
  - 24.3.2 If no, please explain why not.

**25.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, p. 53  
Transfer Volume Account – Market Value**

BC Hydro explains on page 53 that “the Transfer Volume Account will have a cumulative quantity that is either positive or negative, and changes in the fair market value of the Transfer Volume Account will result in a mark-to-market gain (or loss) for BC Hydro, with a corresponding offsetting loss (or gain) for Powerex.”

- 25.1 Please explain how the fair market value of the Transfer Volume Account is determined, including the process and methodology used to mark-to-market, any referenced benchmark and how often BC Hydro re-evaluates the fair market value of the Transfer Volume Account.
  - 25.1.1 If a benchmark is used to mark-to-market, please explain why this benchmark is appropriate relative to other alternatives.
- 25.2 Please explain what processes are in place to manage changes in the market value of the Transfer Volume Account.

**26.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, pp. 27, 51  
Transfer Volume Account - Annual adjustment**

BC Hydro states on page 27 that:

By adding or subtracting BC Hydro’s actual Annual Flexible Surplus/Deficit to the Transfer Volume Account and adjusting the Weighted Average Price based on the applicable Annual Price (which represents a sale price that reflects the fair market value) and the System Adjustment Value, the 2020 TPA, like the 2003 TPA, ensures that Powerex’s net income represents the value added from Powerex’s trading activity and is not conflated with the market value or surplus or deficit energy in the BC Hydro system.

On page 51 of the Application, BC Hydro states, “The Annual Price is calculated as the simple average annual Mid-C index price, multiplied by either the Deficit Multiplier or the Surplus Multiplier.”

BC Hydro elaborates under footnote 65 that:

The multipliers were determined based on a historical analysis of the average value actually received by BC Hydro for its surplus energy and the average cost actually paid by BC Hydro for energy deficits, under the 2003 TPA, relative to the annual average index price at Mid-C. The Surplus Multiplier is a mutually agreed value between 1.05 and 1.25 and is initially set at 1.15. The Deficit Multiplier is a mutually agreed value between 0.75 and 0.95 and is initially set at 0.85

BC Hydro states on page 51 of the Application that “The System Adjustment Value is the net financial value, as determined by BC Hydro of the impact resulting from Powerex’s import and export decisions, on head gains and losses and on spill in the BC Hydro system.”

- 26.1 Using an illustrative example, please explain in detail how the adjustments to the Trade Volume Account explained in the preamble above “ensures that Powerex’s net income represents the value added from Powerex’s trading activity and is not conflated with the market value or surplus or deficit energy in the BC Hydro system”.
- 26.2 Please explain the purpose of the Weighted Average Price. Specifically, what is the value supposed to represent to BC Hydro and Powerex, respectively?
- 26.3 Please explain the steps and methodology to adjust the Weighted Average Price, including how the Annual Price factors into the Weighted Average Price.
- 26.4 Please explain how the use of the Weighted Average Price rather than using the annual ICE Mid-C index impacts the balance in the Transfer Volume Account, including how it impacts the volumes and value of any import/export of energy recorded.
- 26.5 Please explain why the Weighted Average Price is adjusted annually, rather than by any other frequency.
- 26.6 Please explain the advantages and disadvantages between applying an Annual Price that is calculated by multiplying the simple average annual Mid-C index price by a Deficit Multiplier or the Surplus Multiplier, versus directly applying the average value actually received by BC Hydro for its surplus energy and the average cost actually paid by BC Hydro for energy deficits.
- 26.7 Please explain whether BC Hydro will continue to record the value actually received by BC Hydro for its surplus energy and the average cost actually paid by BC Hydro for energy deficits, as per under the 2003 TPA.
  - 26.7.1 If yes, please explain where and how those values will be recorded under the 2020 TPA.
  - 26.7.2 If no, please explain the basis for adjusting the Deficit Multiplier or the Surplus Multiplier in the future, absent the record of this historical data.
- 26.8 Please explain how frequently BC Hydro plans to recalculate the Surplus Multiplier and Deficit Multiplier.
  - 26.8.1 If a fixed frequency is not established, please discuss the circumstance(s) that would warrant BC Hydro’s review of the value of the multipliers.
- 26.9 Please describe the similarities and differences between the Weighted Average Price used in valuing the Transfer Value Account under the 2020 TPA versus the weighted average price used in valuing the Trade Account under the 2003 TPA.
- 26.10 Please discuss whether the annual application of a weighted average price is an after the fact allocation of the value of system imports and exports.

**27.0 Reference: OPERATIONAL IMPACT, QUANTITY AND NEED**

**Exhibit B-1, pp. 56-57**  
**Domestic Gas Requirements**

Pages 56 to 57 of the Application state:

The BC Hydro purchase of gas and resulting energy output would serve load and that energy would also then be added to the actual Annual Flexible Surplus/Deficit. To better align the gas generation decision as generally a reliability or capacity based decision, Powerex can purchase the gas at its cost and receive the electricity as an import into the Transfer Volume Account and not have it impact the actual Annual Flexible Surplus/Deficit. This provision allows the plants to be operated for capacity or reliability reasons without altering the overall system energy balance.

27.1 Please explain the mechanics of how natural gas purchases are converted to electricity and added as an import to the Transfer Value Account, based on an illustrative example where 1,000 GJ of natural gas at a cost of \$2/GJ is supplied to a thermal generation plant (for simplicity, assume that gas transportation costs are zero). In your response, please explain the methodology and inputs, including the following:

- i) The heat rate applied that converts GJ to electricity;
- ii) The estimated volume of electricity produced; and
- iii) The value of electricity produced.

27.1.1 Please explain why natural gas purchases converted to electricity in order to serve load is included in the Transfer Volume Account but is excluded from the Annual Flexible Surplus/Deficit. In your response, please address whether this energy is exported to support load outside of BC Hydro's system or for other purposes.

27.1.2 Please explain the difference between generating gas for reliability-based reasons versus generating gas for capacity-based reasons.

**28.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM**  
**Exhibit B-1, Appendix A, section 4**  
**Flexible Price**

BC Hydro explains Flexible Price under section 4 of Appendix A to the 2020 TPA. Section 4.2 explains that the Flexible Import Price will be:

4.2.1. if at the beginning of the hour the Transfer Volume Account is zero or a positive amount, the applicable Hourly Index Price specified in Section 6.1; and

4.2.2. if at the beginning of the relevant hour the Transfer Volume Account is a negative amount, the Weighted Average Price,...

28.1 Please explain why the value of the import/export is dependent on the balance of the Transfer Volume Account at the time the import/export was made.

**29.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM**  
**Exhibit B-1, Appendix F, p. 2**  
**Commodity Risk**

Page 2 of Appendix F to the Application states the following as it related to the 2003 TPA:

Commodity Risk – this referred to changes in gains/losses on intercompany transactions between BC Hydro and Powerex relating to the Trade Account.

Under the classification above, Surplus Sales and Market Electricity Purchases were previously characterized as domestic energy. Net Purchases (Sales) from Powerex were previously characterized as trade energy.

Page 2 of Appendix F also states the following as it relates to the 2020 TPA:

Under the 2020 TPA, import and export transactions between BC Hydro and Powerex are no longer be allocated between trade and domestic purposes, and all electricity and gas purchased from or sold to Powerex is classified in the following categories:

Commodity Risk – refers to changes in gains/losses on intercompany transactions between BC Hydro and Powerex relating to the Transfer Volume Account and the annual surplus volume for the upcoming fiscal year.

29.1 Please explain how each Powerex and BC Hydro manage commodity risks associated with transactions captured by the Transfer Volume Account. In your response, please discuss how this risk has changed from the 2003 TPA to the 2020 TPA, and whether the allocation of commodity risks between Powerex and BC Hydro has changed.

**30.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, p. 28  
Specified Quantity Request**

BC Hydro states on page 28 that with Specified Quantity Request, BC Hydro may stipulate a volume of required import and export needs over any specified time period, and update it as conditions evolve, allowing Powerex to then transact across a range of time horizons and markets to meet those requirements.

30.1 Please explain how the costs associated with Specified Quantity Request are determined and allocated to BC Hydro and Powerex, respectively.

**31.0 Reference: FINANCIAL IMPACT AND PRICING MECHANISM  
Exhibit B-1, pp. 37, 49; Appendix A, Appendix A, Section 2.1  
Electricity Transfer Price**

BC Hydro states on page 49 of the Application that “the 2020 TPA declares that the Electricity Transfer Price is intended to be established as a sale price that reflects the fair market value of electricity delivered at the British Columbia-United States border, at which parties acting on an arms-length basis would be willing to transact.”

Appendix A to the TPA lays out the calculation of the Electricity Transfer Price, and specifically, under Section 2.1, it states that:

For each hour during a Transfer Period, the Electricity Transfer Price will be the weighted average of:

2.1.1. the Flexible Price associated with the volume (if any) of the Net Scheduled Flexible Quantity for that hour; and

2.1.2. the Non-Flexible Price associated with the volume (if any) of the Scheduled Non-

Flexible Quantity for that hour.

BC Hydro further elaborates under section 11 of Appendix A to the TPA that:

For purposes of the calculations in this Appendix A, it is assumed that the ICE Mid-C On-Peak Index Price and the ICE Mid-C Off-Peak Index Price are determined in the manner specified in the “ICE Futures U.S. Rulebook Subchapter 18B – Power Futures Contracts” for those indices and published by ICE in the ICE Day Ahead Power Report for transactions reported at the Mid-C hub

On page 37 of the Application, BC Hydro states under the 2003 TPA, the “Threshold Purchase Price served as a ceiling price above which BC Hydro would not buy electricity from wholesale markets for domestic purposes and the Threshold Sale Price served as a floor price below which BC Hydro would not sell electricity into wholesale markets for domestic purposes.”

- 31.1 Please explain how the Electricity Transfer Price reflects “the fair market value of electricity delivered at the British Columbia-United States border, at which parties acting on an arms-length basis would be willing to transact”.
- 31.2 Please comment on whether the ICE Mid-C On-Peak Index Price and ICE Mid-C Off-Peak Index Price reflect the value of energy exported from BC Hydro, including consideration for any environmental attributes, firmness, and energy profile.
- 31.3 Please explain whether, and if so how, BC Hydro provides information to Powerex on the need for energy and the price it is willing to pay, in the absence of a threshold price as established under the 2003 TPA.
- 31.4 Please explain the purpose of the Electricity Transfer Price under the 2020 TPA, including the value it is designed to represent to BC Hydro and Powerex, respectively.

#### **D. IMPACT ARISING FROM THE 2020 TPA**

**32.0 Reference: IMPACT ARISING FROM THE 2020 TPA  
Exhibit B-1, p. 1  
Impact of the 2020 TPA on BC Hydro Daily Operations**

On Page 1 of the 2020 TPA Application, BC Hydro states that the 2020 TPA came into effect on April 1, 2020, replacing the prior Transfer Pricing Agreement for Electricity and Natural Gas (TPA), which came into effect 17 years ago (in 2003).

- 32.1 Please describe any changes to BC Hydro's daily operations that would result from replacement of the 2003 TPA with the 2020 TPA.

**33.0 Reference: IMPACT ARISING FROM THE 2020 TPA  
Exhibit B-1, p. 53; Appendix F, p. 1  
Financial Presentation of Electricity Transactions**

On page 53 of the Application, BC Hydro states:

Under the 2020 TPA, electricity transactions between BC Hydro and Powerex are no longer allocated between domestic and trade activities. As a result, all electricity transactions between BC Hydro and Powerex under the 2020 TPA are classified as either “System Exports” or “System Imports”.

On page 1 of Appendix F to the Application, BC Hydro states:

Under the 2003 TPA, electricity and gas purchased from or sold to Powerex resulted in associated amounts, which were classified in the following categories:

- **Surplus Sales** – often referred to as domestic sales, represented sales of electricity by BC Hydro to Powerex, when BC Hydro had generation in excess of its domestic load requirements. This did not include sales included in Net Purchases (Sales) from Powerex.
- **Market Electricity Purchases** – often referred to as domestic purchases, represented market purchases of electricity from Powerex by BC Hydro to meet domestic load requirements. This did not include purchases included in Net Purchases (Sales) from Powerex.
- **Net Purchases (Sales) from Powerex** – often referred to as trade purchases (sales), represented Powerex purchases/sales from/to BC Hydro for the purpose of trade related activities, provided that the BC Hydro system had the ability to accommodate those transactions. These were presented on a net basis. These were not purchases (sales) for domestic purposes.

- 33.1 Please explain in detail the rationale for the change in electricity transactions classified as Market Electricity Purchases, Surplus Sales and Net Purchases (Sales) from Powerex under the 2003 TPA to electricity transactions classified as System Exports or System Imports under the 2020 TPA.
- 33.2 Please explain under the 2020 TPA how BC Hydro would track and present the different volumes and values associated with Flexible and Non-Flexible Imports and Exports from requests made by BC Hydro versus those made by Powerex, respectively.
- 33.3 Please compare the advantages and disadvantages (e.g. transparency, representativeness, administrative cost, etc.) between the presentation of the transactions under the 2003 TPA with respect to domestic and trade activities versus the presentation of the transactions under the 2020 TPA.

**34.0 Reference: IMPACTS ARISING FROM THE 2020 TPA  
Exhibit B-1, pp. 42-43, 53; Appendix F, p. 4; Decision and Order G-246-20, p. 55  
Effect on Future Revenue Requirements**

Pages 42 to 43 of the Application state:

Trade Income is forecasted and included in BC Hydro’s revenue requirements, based on a rolling five-year average, with the difference between forecast and actual Trade Income captured by the Trade Income Deferral Account. Powerex generates Trade Income through:

- using its transmission rights and market access and knowledge to purchase or sell electricity at more attractive prices than the price it pays to, or receives from, BC Hydro;
- using the Residual System Capability to make offsetting purchases and sales in different time periods (e.g., buying during periods with relatively lower prices and selling during periods with relatively higher prices.); and
- trading activities that are entirely unrelated to the BC Hydro system.

Page 53 of the Application states the following:

- The ability to defer variances between forecast and actual System Exports and System Imports is covered by the scope of existing orders and such variances will be deferred to the Non-Heritage Deferral Account.
- Trade Income will continue to be forecast based on a rolling five-year average, with the difference between forecast and actual Trade Income captured by the Trade Income Deferral Account.

Page 4 of Appendix F states:

Deferral of variances to the Heritage Deferral Account, Non-Heritage Deferral Account, and Trade Income Deferral account will occur under the 2020 TPA under existing orders, which accept that deferral of these non-controllable variances is appropriate, so that ratepayers pay for, and receive, only the actual amounts, of the associated costs and revenues.

34.1 Please confirm, or otherwise explain, that the net consolidated value of all transactions under the 2020 TPA is captured through the summation of the following:

- i) Forecast System Imports;
- ii) Forecast System Exports;
- iii) Non-Heritage Deferral Account; and
- iv) Powerex Trade Income.

34.1.1 If confirmed, provide an illustrative example that demonstrates this allocation.

34.1.2 If not confirmed, please provide an illustrative example that reflects the correct allocation of how the net consolidated value of transactions under the 2020 TPA is captured in the revenue requirement.

Page 55 of the Decision and Order G-246-20 to the F2020-F2021 BC Hydro Revenue Requirements Application states:

For further clarity, the Panel allows the continuance of the Trade Income Deferral Account to capture variances between forecast and actual income from BC Hydro related transactions and the forecast and actual Other Powerex Transactions, subject to BCUC approval.

34.2 Please explain whether the use of a weighted average price to value the Annual Flexible Surplus/Deficit to the Transfer Volume Account is expected to provide greater certainty to forecast Powerex’s net income.

34.3 Please complete the below table that shows the effect on the Cost of Energy Deferral Accounts (Heritage Energy, Non-Heritage Energy, Trade Income Deferral Account) as a result of activities under the 2020 TPA. In your response, provide an illustrative example that calculates these effects:

Deferral Account	Effect on value included in Revenue Requirement (Increase / Decrease / Same)
Heritage Deferral Account	

Non-Heritage Deferral Account	
Trade Income Deferral Account	

**35.0 Reference: IMPACT ARISING FROM THE 2020 TPA  
Exhibit B-1, Appendix F, p. 5; Attachment 1, Schedule 4.0; Exhibit A2-2, p. 4  
Ratepayer Impact**

Page 5 of Appendix F to the Application states the following:

The changes to presentation will be on a prospective basis for Fiscal 2021 (actual amounts) and future years (plan and actual amounts), and therefore there will be no restatement of prior year amounts. The changes to Schedule 4.0 are as follows:

- Amounts related to Surplus Sales (Lines 9, 23, 39 and 65) and Market Electricity Purchases (Lines 8, 22, 38 and 64) will be classified as System Exports (Lines 11, 25, 41, and 79) and System Imports (Lines 10, 24, 40 and 78).
- Net Purchases (Sales) from Powerex (Lines 12, 42 and 77) will no longer be used and will be reallocated to the respective System Exports and System Imports lines.

Lines 22 to 25 of Schedule 4.0 in Attachment 1 to Appendix F reflect the average per unit cost of Market Electricity Purchases and Surplus Sales, which use transfer pricing mechanics under the 2003 TPA, and System Imports and System Exports, which reflect the reallocation of Market Electricity Purchases, Surplus Sales and Net Purchases (Sales) from Powerex:

Cost of Energy (\$ million)		Revised for 2020 TPA		
		F2019 Actual	F2020 RRA	F2021 RRA
<b>Unit Costs (\$/MWh)</b>				
18	Water Rentals	8.6	8.4	7.3
19	Natural Gas for Thermal Generation	40.0	41.8	43.7
20	IPPs and Long-Term Commitments	87.5	92.8	92.6
21	Non-Integrated Area	281.0	259.1	250.7
22	Market Electricity Purchases	61.4	41.5	32.9
23	Surplus Sales	(51.6)	(5.0)	(47.0)
24	<b>System Imports</b>			39.3
25	<b>System Exports</b>			40.8
26	Total Weighted Cost	29.0	36.2	32.6

Page 4 of Exhibit A2-2 states:

BC Hydro does not believe that minimizing costs from operations should be an objective of the Energy Study. The Energy Studies models are designed manage risks, revenues and certain costs in order to maximize overall net revenue to the benefit of our customers. Minimizing costs from operations would have a corresponding impact on BC Hydro's ability to maximize overall net revenue. Maximizing overall net revenue means that increases in costs may occur in order to achieve even greater increases in revenues. For example, by increasing market purchases during lower priced periods, BC Hydro can receive the benefit of increased sales revenue in higher priced periods, resulting in a net overall benefit to customers.

- 35.1 Please provide an illustrative example that compares how Market Electricity Purchases under the 2003 TPA and Market Electricity Purchases reallocated as System Imports under the 2020 TPA affect: i) BC Hydro's Consolidated net income; and ii) Powerex's net income, respectively.

- 35.2 Please provide an illustrative example that compares how Surplus Sales under the 2003 TPA and Surplus Sales reallocated as System Exports under the 2020 TPA affect: i) BC Hydro's consolidated net income; and ii) Powerex's net income, respectively.
- 35.3 Please discuss the extent to which costs to support trading activities are recovered from current and future ratepayers, regardless of what actual Powerex's net income is.

**36.0 Reference: IMPACT ARISING FROM THE 2020 TPA  
Exhibit B-1, Appendix A, p. 20  
Transmission Charges and Ancillary Services**

Page 20 of Appendix A to the Application states the following:

6.2 Transmission Charges and Ancillary Services

B.C. Hydro shall acquire and pay for all necessary wholesale transmission services, including losses and ancillary services, on the Transmission System for electricity transactions under this Agreement. For greater certainty, B.C. Hydro may self-supply losses and ancillary services. Section 6.2 of the 2020 Transfer Unless otherwise determined by B.C. Hydro, acting reasonably, Powerex will pay to B.C. Hydro an amount equal to the parties' reasonable estimate of:

6.2.1. the point-to-point transmission costs incurred by B.C. Hydro presently under the Open Access Transmission Tariff in respect of transactions under this Agreement, but excluding

6.2.2. the point-to-point transmission costs incurred by B.C. Hydro for the purposes of serving Domestic Load requirements, satisfying Interutility Agreement obligations (including under any operating procedures), responding to System Constraints, satisfying B.C. Hydro's obligation to manage the Annual Flexible Surplus/Deficit (as defined in Appendix A) and delivering electricity pursuant to Non-Flexible Export Schedules, and receiving and/or delivering the Canadian Entitlement, in accordance with Section 12. Such amount is the parties' reasonable allocation of the point-to-point transmission costs incurred by B.C. Hydro in respect of Powerex's trading activities.

- 36.1 Please confirm, or otherwise explain, whether OATT transmission costs paid by Powerex relate to import and export transactions that use Residual System Capability only.
- 36.2 Please confirm, or otherwise explain, that in a given hour, OATT transmission costs are determined on a net import or net export basis.
- 36.3 Please explain whether imports and exports, respectively, in a given hour could include a combination of transactions listed in section 6.2.2 referred to above, as well as transactions that use Residual System Capability.

**37.0 Reference: IMPACT ARISING FROM THE 2020 TPA  
Exhibit B-1, Appendix F, Attachment 1, Schedule 4.0; Exhibit A2-4, p. 17  
Transmission Charges and Ancillary Services**

Schedule 4.0 in Attachment 1 to Appendix F of the Application shows the allocation of Market Energy costs using System Imports and System Exports.

Market Energy					
38		Market Electricity Purchases	125.0	211.6	0.0
39		Surplus Sales	(115.0)	(0.4)	0.0
40		<b>System Imports</b>	0.0	0.0	153.9
41		<b>System Exports</b>	0.0	0.0	(201.2)
42		Net Purchases (Sales) from Powerex	25.0	33.1	0.0
43		Domestic Transmission - Export	18.5	1.1	17.0
44		Total	53.5	245.3	(30.3)

Line 66 of Schedule 4.0 in Attachment 1 to appendix F also shows that variances between actual and forecast costs related to Domestic Transmission – Export are captured in the Heritage Deferral Account.

Page 17 of Exhibit A2-4 states, “Domestic Transmission – Export: This represents transmission costs with B.C. related to Surplus Sales”.

37.1 Please explain how “Domestic Transmission – Export” is now determined, if exports are no longer allocated between BC Hydro and Powerex.

37.1.1 Please provide an example calculation that shows the impact of how transmission previously classified as “Domestic Transmission – Export” would be captured in Schedule 4.0, as well as the Heritage Deferral Account, or any other account. In your response, provide a calculation to demonstrate, if any, the impact to ratepayers.

**38.0 Reference: IMPACT ARISING FROM THE 2020 TPA  
Exhibit B-1, p. 28; Exhibit A2-5, p. 32; Network Economy Quarterly Report – Second Quarter (Q2) 2020 Response to BCUC Staff Information Request No. 1, p. 3  
Network Economy Service**

Table 5 on Page 28 of the Application states there is “no need to allocate imports and exports between BC Hydro and Powerex.”

Page 32 of Exhibit A2-5 states:

A non-designated resource is any resource of the Network Customer that has not been designated as being committed to serving Network Load per section 30 of BC Hydro’s Open Access Transmission Tariff (OATT). In BC Hydro’s case, any generation resource located outside of British Columbia (for example, in the U.S.) would be a non-designated generation resource. BC Hydro can use a non-designated resource to supply its Network Load using Secondary Service under section 28.4 of the OATT, as modified by the Network Economy Service provisions of Attachment Q-2 of the OATT and Tariff Supplement 80.

38.1 Please explain whether allocating imports between BC Hydro and Powerex is still necessary for the purpose of using non-designated resources to serve Network Load.

Page 2 of BC Hydro’s response to BCUC Staff IR1 to the Q2 2020 Network Economy Quarterly Report (Response to the Q2 2020 Report) states:

- As of April 1, 2020, a revised Transfer Pricing Agreement for Electricity and Gas between BC Hydro and Powerex Corp came into effect and the TPP [Threshold Purchase Price] concept no longer exists in that agreement. However, since TS [Tariff Supplement] 80 does not require the TPP to be reestablished at any particular time and only requires changes to be reported, and since BC Hydro no longer has an ability to revise this value under the new Transfer Pricing Agreement, it will continue to use the value established on June 27, 2019 in the “Economic Test”.

Page 3 of the Response to the Q2 2020 Report states:

- BC Hydro plans to consult with OATT Customers during the next Network Economy Annual meeting in 2021 on how to address this impact arising from the new Transfer Pricing Agreement.

38.2 Please explain why OATT customers were not consulted on the impact arising from the new Transfer Pricing Agreement prior to the execution of the 2020 TPA.

**39.0 Reference: IMPACT ARISING FROM THE 2020 TPA  
Transcript 1, pp. 42-43, 45-46; Exhibit A2-4, pp. 15, 38-39, 51  
Market Risks**

Pages 42 to 43 of Transcript 1 state:

And then in real-time it gets a little more interesting, where it's bilateral for one or one to four, or four to six, any number of hours that the purchaser and seller agree to through negotiations. This is also where the western energy imbalance market resides, which is a relatively new organized market where 15 minute and 5 minute transactions take place. It's important to note, however, the western energy imbalance market is a relatively small market, because you are just transacting 15 minute or 5 minute power as you move through the hour.

Pages 45 to 46 of Transcript 1 state:

Two final points I want to make is that the forward and day-ahead markets generally transact greater volumes. So the real-time market is a smaller market by volume, and that is of course understandable because the real-time market is transacting one or a few hours. The real-time market is also the last market and many entities are transacting to meet their needs, whether they have surplus power or they're looking to purchase to meet a deficit or to displace their own internal resources, they often transact those needs in the forward and day-ahead timeframes. And then the second point I wanted to make is that resource adequacy and environmental policy objectives are increasing opportunities in the forward timeframe, both from a volume perspective, but also a premium price perspective for sales opportunities.

Page 51 of Exhibit A2-4 states:

Each of the elements of Powerex's portfolio exhibits volatility, as does the portfolio as a whole. Including estimated financial implications of isolated elements of Powerex's overall activities, such as the benefits of Powerex participation in the EIM, when forecasting Trade Income, would not be any more accurate than the current five-year average methodology.

39.1 Please compare the level of price volatility inherent to the western energy imbalance market against each of the forward, day-ahead, and real-time bilateral markets.

39.1.1 Please explain what mechanisms, within the 2020 TPA and/or otherwise, protect BC Hydro ratepayers from the price volatility described above.

Page 15 of Exhibit A2-4 states:

BC Hydro does not make decisions on specific imports and exports to or from specific external markets, including the Energy Imbalance Market (EIM). BC Hydro specifies the system capability made available to Powerex to facilitate the import or export of energy. Powerex exclusively

makes decisions on its participation in external markets, of which the EIM is just one of multiple options. Powerex makes decisions to import or export energy consistent with the overall BC Hydro system capability and availability communicated to Powerex by BC Hydro.

Pages 38 to 39 of Exhibit A2-4 state the following:

Q: Would it be fair to say that if you rely on the Mid-C market for your core energy requirements, you rely on it at your peril as California found in 2000 in relation to relying on non-firm contracts to supply its core requirements?

A: Yeah, I would say that with the different geographical reasons, different areas and utilities might decide to rely on a certain part of their need from the market, and that is really up to them and their regulators. But you can't obviously make that too big. And the other problem is, if everybody is relying on the market, then that is really when you get into trouble, which might be a reflection of what had happened back then.

39.2 Please elaborate on the extent to which BC Hydro's system could be subject to increased exposure to each of the forward, day-ahead, real-time bilateral, and western energy imbalance markets. In your response, please provide the risks and benefits to ratepayers that could result from participating in these markets through the 2020 TPA.

## **E. OTHER TERMS AND CONDITIONS**

### **40.0 Reference: OTHER TERMS AND CONDITIONS Exhibit B-1, p. 48 Wear and Tear**

On page 48 of the Application, BC Hydro states:

Section 4.11 allows BC Hydro to develop and implement a procedure to determine payments between BC Hydro and Powerex related to wear and tear resulting from Powerex's import and export decisions under the 2020 TPA.<sup>61</sup> Import and export decisions by Powerex can either increase or decrease wear and tear on the BC Hydro system because those decisions can either reduce or increase starts and stops and cycling of generating units.

In footnote 61 on page 48 of the Application, BC Hydro states that at the time of filing it had yet to establish the procedure contemplated in Section 4.11.

40.1 Please provide an update on BC Hydro's efforts to establish a procedure to determine payments between BC Hydro and Powerex related to wear and tear resulting from Powerex's import and export decisions under the 2020 TPA (Wear and Tear Payments). If a procedure to determine Wear and Tear Payments has been established, please provide a copy of this procedure.

40.1.1 If BC Hydro has made efforts to establish the procedure contemplated in Section 4.11, but has yet to finalize the procedure, please describe the preliminary language BC Hydro is considering for the procedure and the process and timeline for finalizing it.

40.1.2 If BC Hydro has not made any efforts to establish the procedure contemplated in Section 4.11 to date, please provide a detailed explanation as to why BC Hydro has made no such efforts. In your response, please describe any plans BC Hydro has developed to establish the procedure contemplated in Section 4.11, including the timelines associated.

- 40.2 Absent establishment of the procedure contemplated in Section 4.11, please explain who bears the cost of, or benefits from, changes to wear and tear on BC Hydro’s system that result from Powerex’s import and export decisions under the 2020 TPA and how these costs are recovered.
- 40.3 Please confirm, or otherwise explain, that the procedure contemplated in Section 4.11 is expected to address the use of Thermal Generation Plants to generate electricity not required to serve Domestic Load.
- 40.4 Could wear and tear to BC Hydro’s transmission and/or distribution system assets result from import and export decisions made by Powerex under the 2020 TPA? Please explain.
- 40.4.1 If yes, please explain whether the procedure contemplated in Section 4.11 allows for payments related to transmission and/or distribution system wear and tear.
- 40.5 Please describe the magnitude of the annual increases and/or decreases to wear and tear on BC Hydro’s system that BC Hydro anticipates would result from implementation of the 2020 TPA.
- 40.5.1 Please discuss the factors that might affect the level of wear and tear on BC Hydro’s assets that would result from implementation of the 2020 TPA.
- 40.5.2 For each of the factors identified in response to the above, please explain whether BC Hydro anticipates a material change to the extent the factor impacts wear and tear over time.
- 40.6 Please explain whether BC Hydro anticipates that Wear and Tear Payments made over the life of the 2020 TPA would tend to be payments made by Powerex to BC Hydro, or payments made by BC Hydro to Powerex.

**41.0 Reference: OTHER TERMS AND CONDITIONS  
Exhibit B-1, Appendix A, pp. 16-17  
Wear and Tear**

Regarding the procedure to determine Wear and Tear Payments, Section 4.11.1 of the 2020 TPA states that BC Hydro “...may amend or replace such procedure from time to time, provided that any amended or replacement procedure will only take effect for the purposes of Section 4.11.2 on the first day of the next Transfer Period.”

Further, Section 4.11.2 of the 2020 TPA provides, in part, that if “...Powerex’s import and export decisions during a Transfer Period have resulted in increased or decreased wear and tear on the B.C. Hydro System for a Transfer Period, B.C. Hydro will notify Powerex of such determination (including the applicable cost) within 30 days after the end of the Transfer Period.” Section 4.11.2 further states that Powerex will pay to BC Hydro, or BC Hydro to Powerex, the amount determined by B.C. Hydro within a further 30 days.

- 41.1 Please describe the mechanism for BCUC review should the procedure to determine Wear and Tear Payments be (i) amended or (ii) replaced in the future.
- 41.2 Please identify the regulatory account or accounts where Wear and Tear Payments from Powerex to BC Hydro or from BC Hydro to Powerex would be recorded.
- 41.3 Please describe the opportunities for review that the BCUC would have for Wear and Tear Payments.

**42.0 Reference: OTHER TERMS AND CONDITIONS**

**Exhibit B-1, Appendix A, pp. 9-10, 35; Transcript Volume 1, p. 54  
Amendment or Termination of the 2020 TPA**

Section 2.1 of the 2020 TPA provides, in part, that “This Agreement shall continue in full force and effect until terminated by mutual agreement of the parties or as provided in Section 2.3.”

Section 2.4 of the 2020 TPA reads:

Following the delivery of a notice of termination by either party under Section 2.3, the parties will negotiate a new agreement to confirm the relationship under which the parties will purchase and sell electricity and natural gas to each other following termination of this Agreement, including provisions to address any existing commitments or liabilities of the parties that exist on and extend beyond the termination of this Agreement.

Section 18.3 of the 2020 TPA provides that “If at any time during this Agreement the parties consider it necessary or expedient to make an amendment, supplement, waiver, or other modification to this Agreement they may do so only by means of a written agreement between them.”

Finally, regarding the potential for establishing a fixed term for the 2020 TPA, in the September 22, 2020 workshop, BC Hydro stated that it does not “think the need for a term makes sense.”

- 42.1 Please describe the circumstances that would warrant: (i) a review or amendment of the 2020 TPA; and (ii) termination of the 2020 TPA and negotiation of a new agreement between BC Hydro and Powerex.
- 42.2 Please explain the basis for BC Hydro’s position that it does not “make sense” to establish a fixed term for the 2020 TPA.
- 42.3 Please discuss any advantages and/or disadvantages associated with establishing a fixed term for the 2020 TPA from the perspective of: (i) BC Hydro; (ii) Powerex; and (iii) BC Hydro ratepayers.

**43.0 Reference: OTHER TERMS AND CONDITIONS  
Exhibit B-1, Appendix A, pp. 5-6  
Interutility Agreements**

The 2020 TPA defines an Interutility Agreement as follows:

1.1.23. “Interutility Agreement” means:

- 1.1.23.1. an agreement between B.C. Hydro and one or more third parties related to the coordination of generation, transmission and/or reservoir operations;
- 1.1.23.2. an agreement between B.C. Hydro and one or more balancing authorities or reliability entities for the purpose of maintaining transmission and generation system reliability;
- 1.1.23.3. an agreement between B.C. Hydro and one or more third parties relating to international treaty obligations of Canada;
- 1.1.23.4. an agreement under which B.C. Hydro exports electricity pursuant to a border accommodation electricity export permit issued by the National Energy

Board or any successor permit; or

1.1.23.5.any other agreement with one or more third parties under which B.C. Hydro imports or exports electricity to or from the B.C. Hydro System,

but excludes agreements whose purpose is the purchase and sale of transmission or electricity products and services for B.C. Hydro's profit;

- 43.1 Please identify any existing agreements that meet the definition of an Interutility Agreement. For each existing agreement identified, include a brief description of the agreement and identify which part of definition 1.1.23 the agreement falls under.

**44.0 Reference: OTHER TERMS AND CONDITIONS  
Exhibit B-1, pp. 18-19  
Differentiated Electricity Products**

BC Hydro states on page 18 to 19 that "The increased demand for forward supply transactions and differentiated electricity products has been driven by the adoption of new environmental policies across the Western Interconnection, such as state renewable and clean energy standards."

- 44.1 Please elaborate on which products are considered "differentiated electricity products".
- 44.2 Please explain which market(s) Powerex transacts in for imports and exports of differentiated electricity products.
- 44.2.1 Please explain how the import and export of differentiated electricity products are priced in the market(s) explained above.
- 44.3 Please explain how the price/cost of differentiated electricity products is allocated between BC Hydro and Powerex, respectively. Please reference the terms of the 2020 TPA, as applicable.
- 44.4 Please explain whether BC Hydro exports (through Powerex) any differentiated electricity products from its system.
- 44.4.1 If yes, please explain whether these products are distinguishable (both in terms of volume and price) from other firm, non-firm, and forward export transactions as described in the Application.
- 44.5 Please explain whether, and if so where, BC Hydro records transactions of differentiated electricity products as an independent category. If not, why not?
- 44.6 With reference to the terms of the 2003 TPA and 2020 TPA, please explain whether the terms of the 2020 TPA better facilitate the export of differentiated electricity products compared to the 2003 TPA.

**45.0 Reference: OTHER TERMS AND CONDITIONS  
Exhibit B-1, pp. 4-5, 19  
Environmental Products – Generation, Transfer and Sale**

On pages 4-5 of the Application, BC Hydro states:

Powerex is a wholly-owned subsidiary of BC Hydro...It is an energy trading company that primarily in the western United States and Alberta. Its activities are focused in three different areas: wholesale electricity, wholesale natural gas, and related environmental products...

Powerex's net income directly reduces BC Hydro's revenue requirements, helping to keep BC Hydro customer rates low. While some of that net income is derived from

external transactions related to the import and export of electricity to and from the BC Hydro system, a substantial proportion arises from electricity marketing and trading activities that are unrelated to the BC Hydro system as well as from transacting natural gas and environmental products.

Footnote 29 on page 19 of the Application states:

A Renewable Portfolio Standard (RPS) requires utilities to source a certain amount of the energy they generate or sell, from renewable sources. There are many variants to a RPS policy, such as clean energy standards (which typically allow nuclear and low-polluting non-renewable energy sources like natural gas) as well as clean energy or renewable goals, which are non-binding.

- 45.1 Please discuss whether a utility can meet an RPS by only trading and redeeming/retiring environmental products against its RPS requirement without sourcing the equivalent clean/renewable power.
  - 45.1.1 Please provide an example of this transaction.
- 45.2 Please provide an overview of the environmental products and their purposes as discussed and in the preamble.
- 45.3 Please discuss whether environmental products are created/generated by facilities i) located within BC and ii) within BC Hydro's system.
- 45.4 Please describe: (i) how these environmental products are generated/created; (ii) how these products are traded; and (iii) the market(s) for environmental products within which BC Hydro and Powerex operates.
- 45.5 With specific reference to the 2020 TPA, as applicable, please explain whether the 2020 TPA includes the provision for the transfer and/or sale/purchase of environmental products between BC Hydro and Powerex.
  - 45.5.1 If yes, please explain if and how the 2020 TPA includes the provision for the transfer/sale of environmental products (including Renewal Energy Certificates (REC)), as a standalone commodity separate to the clean/renewable power from which it is associated with.
- 45.6 Please discuss how energy prices with and without the associated environmental attributes are determined.
- 45.7 Please explain how environmental products are registered and tracked and (i) within BC and (ii) for electricity exported from BC to other jurisdictions.
  - 45.7.1 Please confirm, or explain otherwise, that environmental products can only be 'consumed' once.

**46.0 Reference: OTHER TERMS AND CONDITIONS  
Exhibit A2-5, p. 2  
Environmental Products – BC Hydro Generation Facilities**

In Exhibit A2-5, in response to BCUC IR 3.304.7, BC Hydro states:

Eligible facilities (presently, limited to wind facilities in B.C.) are registered with the California Energy Commission (CEC) for approval in California's Renewable Portfolio Standard (RPS)... Powerex, as the California market participant, leads the application process and pays all associated registration costs. Only facilities approved and certified

by the CEC are eligible for the California RPS.

- 46.1 Please explain whether, and to what extent, BC Hydro's generation system generates environmental products and supports Powerex's activities related to environmental products.
- 46.2 Please confirm, or explain otherwise, that BC Hydro-owned generation facilities are not eligible to register with the CEC and generate/create environmental products.
- 46.3 Please explain if BC Hydro-owned generation facilities are eligible to register with other jurisdictions and generate RECs for the purposes of their state-level RPS.
  - 46.3.1 For each BC Hydro-owned generation facility, please identify the state-level RPS under which RECs associated with each certified facility would qualify.
- 46.4 Are all environmental products generated by a BC Hydro generation facility transferred from BC Hydro to Powerex? Please explain.
- 46.5 Please describe, using examples where applicable, how the 2020 TPA provides the mechanism to value, transfer and sell/purchase the environmental products between BC Hydro and Powerex.
- 46.6 Where applicable, for each of the BC Hydro facilities identified, please provide the: (i) quantity; (ii) weighted average price of energy; and (iii) weighted average price of the environmental product(s) transferred from BC Hydro to Powerex from on an annual basis between 2010 and 2020.
- 46.7 Please discuss whether energy transferred between BC Hydro and Powerex with an attached environmental attribute is priced differently than energy without an attached environmental attribute.
- 46.8 Please discuss how BC Hydro determines the transfer price for energy with and without the associated environmental attributes.
- 46.9 Please explain how BC Hydro calculates a fair market value for the environmental attribute upon transfer between BC Hydro and Powerex price.
  - 46.9.1 Please explain how any income or loss resulting from the transfer of an environmental attribute between BC Hydro and Powerex is recognized, and how the income or loss is recorded in financial statements.
  - 46.9.2 Do BC Hydro and/or Powerex mark-to-market this transaction? If yes, please provide an illustrative example that calculates how the market-to-market for any environmental attributes is determined. In your calculation, state any valuations and assumptions.