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August 2, 2019

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

Dear Mr. Wruck:

**RE: British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro) and Powerex Corp
(Powerex) 2019 Letter Agreement Application**

BC Hydro writes to file with the Commission a letter agreement between Powerex and BC Hydro that provides for the forward sale and delivery of wholesale electricity by Powerex to BC Hydro (**2019 Letter Agreement**). The 2019 Letter Agreement is an "energy supply contract" (**ESC**) within the meaning of that expression in the *Utilities Commission Act (UCA)*. The agreement was executed on June 6, 2019, and is filed within 60 days of that date pursuant to the Commission's Rules for Energy Supply Contracts for Electricity. The 2019 Letter Agreement is attached as Appendix 1 (a redacted copy in the public filing; an un-redacted copy in the confidential filing).

BC Hydro seeks a determination from the Commission that the 2019 Letter Agreement is in the public interest, and an order accepting it as filed under section 71 of the UCA. A draft order to that effect is attached at Appendix 2.

Recent amendments to the UCA have the effect that the UCA is no longer applicable to Powerex.¹ Nevertheless, the statutory obligation remains on BC Hydro to file ESCs, regardless of the statutory exemption applicable to Powerex. Accordingly, this application should be understood as one made solely by BC Hydro, despite the wording of section 71(1) of the UCA which requires both parties to an ESC to file it with the Commission.

¹ New section 1(2) of the UCA came into force on May 16, 2019, by virtue of section 10 of the *Energy Statutes Amendment Act, 2019*, chapter 24, SBC 2019.

Relationship with 2018 Letter Agreement

On December 6, 2018, BC Hydro filed with the Commission an agreement between it and Powerex that provided for the forward sale and delivery of wholesale electricity by Powerex to BC Hydro (**2018 Letter Agreement**). The record of the proceeding regarding the 2018 Letter Agreement was made public on May 23, 2019,² and the 2018 Letter Agreement has been the subject, in part, of Information Requests in BC Hydro's Fiscal 2020 to Fiscal 2021 Revenue Requirements Application (**F20-F21 RRA**).³ The 2018 Letter Agreement was accepted for filing pursuant to section 71 of the UCA by Order E-15-19.⁴

The 2019 Letter Agreement is quite similar in form and substance to the 2018 Letter Agreement. Both are enabling agreements that allow BC Hydro to acquire forward physical wholesale electricity to manage potential electricity shortages in the operational time horizon.⁵ However, there are some important differences between the two agreements. In light of intervenor and Commission awareness of the 2018 Letter Agreement, and to avoid misunderstanding, BC Hydro notes the differences between the two at the outset of this application as follows:

- The 2018 Letter Agreement was a short term arrangement in effect for only seven months (December 1, 2018, to June 30, 2019); the 2019 Letter Agreement is a longer term arrangement in effect until terminated by either party. That is, the 2019 Letter Agreement does not have a fixed term or expiry date;
- The 2018 Letter Agreement was entered into to respond to an impending electricity supply issue that arose; the 2019 Letter Agreement was entered into proactively to ensure appropriate measures are in place should similar supply issues arise from time to time and generally to allow BC Hydro to manage the type of risks that led to the 2018 Letter Agreement in a timely way (any purchases that BC Hydro has made under the 2019 Letter Agreement will be disclosed as discussed below in the section titled "Reporting". BC Hydro will also be providing an updated forecast cost of energy confidentially to the BCUC in the F20-F21 RRA Evidentiary Update to be filed on August 22, 2019 and provided publicly on October 18, 2019). A more fulsome discussion of the rationale for the 2019 Letter Agreement is provided below; and

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

³ See for example BC Hydro responses to BCUC IRs 1.21.xxx - 1.24.xxx, part of Exhibit B-5 in the F20-F21 RRA proceeding.

⁴ At <https://www.ordersdecisions.bcuc.com/bcuc/orders/en/item/418174/index.do?q=e-15-19>.

⁵ In response to BCUC IR 1.15.3 of the F20-F21 RRA (Exhibit B-5) BC Hydro explained the difference between the planning view and the operational view of BC Hydro's resource needs: "*In summary, the planning view reflects the capability of resources based on BC Hydro's planning criteria while the operational view shows the forecasted operation of these same resources given market and system conditions.*" The difference between the two views is the reason BC Hydro can be in surplus from a planning perspective and concurrently in deficit from an operating perspective.

- The narrow purpose and short-term nature of the 2018 Letter Agreement meant that it needed to be kept confidential to avoid prejudicing BC Hydro's ability to obtain the required additional supply in as cost-effective a manner as possible; the broader purpose and longer-term nature of the 2019 Letter Agreement means that the over-arching confidentiality issue that was present in the proceeding regarding the 2018 Letter Agreement is not present in regard to the 2019 Letter Agreement, and this application is made publicly and consistent with the Commission's transparency objectives.⁶

Description of 2019 Letter Agreement

Like the 2018 Letter Agreement, the 2019 Letter Agreement provides BC Hydro with the ability to make a "Purchase Interest Request" (as defined in the agreement) to Powerex. A Purchase Interest Request is a binding written offer to purchase wholesale electricity from Powerex on its terms, including the maximum price that BC Hydro is willing to pay, maximum volumes of electricity, and delivery period(s). In response to a Purchase Interest Request, Powerex is obliged to use commercially reasonable efforts to sell and deliver wholesale electricity on a forward basis to BC Hydro, as confirmed in writing in an instrument referred to as a "Confirmation". When the deliveries of electricity contemplated by the Confirmation are made, BC Hydro pays for the electricity at the price as detailed in the Confirmation in accord with the pricing mechanism in the 2019 Letter Agreement. Generally, that price is a wholesale market price.

Forward wholesale electricity acquired by Powerex for sale to BC Hydro under the 2019 Letter Agreement is delivered, and title transfers, to BC Hydro at the border interconnection points of its transmission system. Powerex's obligation is to deliver electricity on a firm basis. Transmission service outside of BC is the responsibility of Powerex, and within BC is the responsibility of BC Hydro. Payments for electricity deliveries are made monthly.

In summary, the 2019 Letter Agreement is an additional tool for BC Hydro to employ to address short-term operational requirements. It does so by allowing BC Hydro to secure physical wholesale electricity from Powerex on a forward basis (ie outside of the pre-schedule day-ahead wholesale markets) but still within the operating time horizon. There is no other mechanism currently in place that allows BC Hydro to purchase wholesale electricity in that manner.

Roles of BC Hydro and Powerex

The decisions from time to time to acquire forward wholesale electricity from Powerex through the issuance of a Purchase Interest Request are solely those of BC Hydro.

⁶ Some information remains commercially sensitive and cannot be publicly released for the reasons described below and in more detail in the public (redacted) copy of the agreement.

BC Hydro makes such purchase decisions within the usual operational management framework it employs to make all dispatch and other system operation decisions. BC Hydro's operational management framework is described in the F20-F21 RRA. To avoid duplicating evidence already before the Commission on the same topic, BC Hydro has attached as Appendix 3 to this application section 4.4 of the F20-F21 RRA ("Maximizing the Value of Our Energy Supply") and the IR responses in regard to that section. That evidence provides a fulsome account of how BC Hydro manages its generation system in the operational time horizon to cost-effectively meet its load-serving obligations.

Powerex is also a wholly-owned subsidiary of BC Hydro. It is an energy marketing company trading in wholesale electricity and natural gas across Canada and the United States. To facilitate such trading it is also an active purchaser of electricity and natural gas transmission and transportation services; has a myriad of enabling permits, including a market-based rate authority from the Federal Energy Regulatory Agency and a U.S. Department of Energy export permit, among others; and is a member of a number of regional trading organizations. Since its inception Powerex has been the exclusive supplier of wholesale market electricity to BC Hydro, and the exclusive purchaser of BC Hydro's surplus electricity. Powerex's energy trading activities have resulted in net profits to the benefit of BC Hydro's ratepayers. Powerex manages its obligations to procure wholesale electricity in response to Purchase Interest Requests using its existing operational capabilities and in the normal course of its business.

Need for 2019 Letter Agreement and the 2003 Transfer Pricing Agreement

As noted above, and in contrast to the 2018 Letter Agreement, BC Hydro's intention in entering into the 2019 Letter Agreement was to proactively ensure appropriate measures are in place to respond to future physical supply issues. The structural changes in the market, particularly the declining liquidity in the Mid-Columbia day-ahead market (described below), continue to exist, therefore the ability to acquire wholesale electricity from Powerex on a forward basis remains a valuable tool for BC Hydro to have available to address short-term operational requirements. Forward purchases under the 2018 Letter Agreement helped provide BC Hydro with additional supply to allow it to meet its load-serving obligations during the 2018/2019 winter season.⁷ As already noted, no other arrangement is available to BC Hydro to procure physical wholesale electricity on a forward basis to meet load-serving obligations in the operating time horizon as needs evolve.

⁷ And which also turned out to be financially beneficial for BC Hydro, although that aspect of the arrangement was not a driving factor and could well have turned out to be non-beneficial had circumstances at the time turned out differently. The primary purpose of these agreements is for risk management in supply acquisition, not to out-perform the day-ahead market price.

Since 2003 BC Hydro and Powerex have purchased and sold wholesale electricity exclusively through the Transfer Pricing Agreement (**2003 TPA**).⁸ The 2003 TPA has proved to be a reasonably robust and relatively flexible mechanism to facilitate BC Hydro purchases of imported wholesale electricity from Powerex, and sales to Powerex for export. However, purchases and sales under the 2003 TPA are effected on a day-ahead, pre-schedule basis, and are mechanically allocated to the account of Powerex (via the Trade Account) or BC Hydro. The 2003 TPA has worked well in the context of a consistently liquid wholesale day-ahead market for electricity in the Pacific Northwest. As such, the 2003 TPA did not provide, and did not need to provide, any mechanism for forward physical sales or purchases between BC Hydro and Powerex.⁹

Over the past decade there has been a steady decline in the volume of wholesale electricity traded on a day-ahead basis in the Pacific Northwest; that was one of the factors that prompted the 2018 Letter Agreement as a solution to the impending electricity supply issue BC Hydro faced in winter of 2018/2019, rather than attempting to rely on day-ahead purchases under the 2003 TPA. In response to BCUC IR 1.8.1.1 in the proceeding regarding that agreement, BC Hydro filed graphs showing declines in liquidity for both on-peak and off-peak hours at the Mid-Columbia wholesale electricity trading hub. Those graphs are reproduced here:¹⁰

10. Market Liquidity

Figure 10.1: Mid-C Liquidity (Day-Ahead Peak)

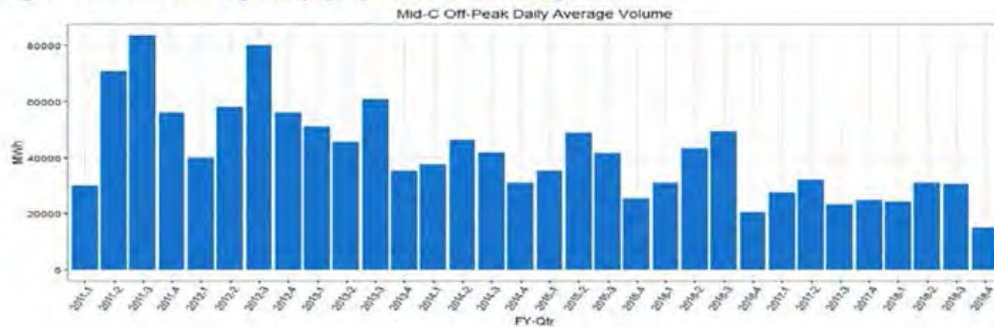


⁸ Subject to the 2018 Letter Agreement and now the 2019 Letter Agreement.

⁹ The 2003 TPA does provide for forward financial hedges, but not forward physical deliveries.

¹⁰ Source: Bonneville Power Administration, Southern Intertie Data Report, January 28, 2019, p. 27, at https://www.bpa.gov/Finance/RateCases/BP-20/Models/Southern%20Intertie%20Data%20Report_FY2018.pdf.

Figure 10.2: Mid-C Liquidity (Day-Ahead Off-Peak)



In summary, the impending physical supply issue in 2018/2019 was largely caused by low system inflows and the Enbridge pipeline explosion in October 2018.¹¹ The 2018 Letter Agreement was a response to those conditions and also accounted for the declining liquidity in Pacific Northwest wholesale day-ahead markets by providing for more certainty of supply through the forward physical purchases.

On a go-forward basis BC Hydro observes that, since the beginning of the current fiscal year, it has continued to have low system inflows, and has no basis to believe that the long-term decline in day-ahead market liquidity will quickly reverse itself. There are numerous other events that could result in similar supply shortfalls that threatened BC Hydro last winter, which may not reliably be addressed through purchases from Powerex on a day-ahead basis under the 2003 TPA. In these circumstances, BC Hydro believes it is prudent and in the interests of its ratepayers to have in place an additional mechanism that will allow it to respond to system conditions and reliably manage potential electricity shortages in a timely and cost-effective way. The 2019 Letter Agreement serves this objective.

Finally, it is apparent that an alternative solution to the on-going operational supply issues arising from the liquidity decline in day-ahead markets would be a revised Transfer Pricing Agreement. BC Hydro and Powerex are considering updating the 2003 TPA, including considering how the 2003 TPA might usefully be revised to accommodate forward transactions. That consideration is underway, but is not a trivial exercise because of the central role that the 2003 TPA plays in the BC Hydro-Powerex relationship. Nevertheless, and to the extent that Powerex and BC Hydro do update the 2003 TPA for that purpose, the 2019 Letter Agreement can be considered a bridging mechanism.

¹¹ Later a particularly cold winter and resulting increased heating loads exacerbated the situation.

Confidentiality Issues

BC Hydro requested that the 2018 Letter Agreement be treated confidentially by the Commission because knowledge of BC Hydro's short-term need for electricity could or would prejudice BC Hydro's ability to obtain cost-effective and reliable supply. The purpose of the 2019 Letter Agreement is to enable the parties to more quickly respond to supply challenges if and as they arise and evolve. As such, BC Hydro is not requesting that the Commission treat this application confidentially. However, certain terms and provisions of the 2019 Letter Agreement are commercially sensitive; any public disclosure of such terms and provisions could undermine Powerex's commercial position in the market and, in consequence, adversely affect the interests of BC Hydro ratepayers through lower Powerex net income and/or higher BC Hydro cost of energy. Accordingly, and consistent with the requirements of Part IV of the Commission's Rules of Practice and Procedure, BC Hydro seeks the Commission's confirmation that the redacted terms of the 2019 Letter Agreement are properly kept confidential. For convenience, BC Hydro has provided further explanation about the individual redactions into the copy of the agreement attached to the public filing.

Reporting

Pursuant to paragraph No. 3 of Order E-15-19 BC Hydro is required to report to the Commission information regarding transactions made under the 2018 Letter Agreement (paragraph No. 3). BC Hydro proposes to file the same information in regard to any transactions entered into under the 2019 Letter Agreement, at the end of a 90-day period following the calendar quarter in which any deliveries of electricity are made pursuant to the 2019 Letter Agreement. Such disclosure is accommodated by the 2019 Letter Agreement and appropriately balances transparency objectives and the interests of BC Hydro ratepayers.

BC Hydro will also file a confidential monthly report with the BCUC, commencing at the end of August 2019, disclosing any purchases that have been made under the 2019 Letter Agreement, similar to the information the BCUC has requested under Directive 3(a) of Order No. E-15-19 related to the 2018 Letter Agreement.

Energy Supply Contract Considerations: Section 71(2.21) of the UCA

Section 71(2.21) of the UCA describes the factors the Commission must consider when assessing whether an ESC filed by BC Hydro is in the public interest.

Interests of BC Hydro Ratepayers

The first enumerated factor is whether the ESC is in "the interests of persons in British Columbia who receive or may receive service from the authority" (i.e., is the ESC in the

interest of BC Hydro's customers). BC Hydro submits that the 2019 Letter Agreement is in the interests of BC Hydro's customers for the reasons set out above.

2013 IRP

The Commission must also consider BC Hydro's 2013 Integrated Resource Plan (**2013 IRP**).¹² Like the 2018 Letter Agreement, the purpose of the 2019 Letter Agreement is to enable BC Hydro to address electricity supply issues in the operational time horizon. The 2013 IRP is a long-term planning document that, among other things, assumes average inflows and no reliance on imports to serve domestic load, regardless of BC Hydro's needs in the operational time horizon. In BC Hydro's submission the 2013 IRP is not relevant to the Commission's assessment of the 2019 Letter Agreement.

Section 19 of the *Clean Energy Act*

The Commission must also consider the extent to which the ESC is consistent with the requirements of section 19 of the *Clean Energy Act*. That provision imposes obligations on BC Hydro with regard to prescribed targets in relation to clean or renewable resources, and prescribed guidelines in planning for the construction of generation facilities or the purchase of energy. There are neither prescribed targets nor prescribed guidelines and so this factor is not applicable.

Price, Quantity and Availability

The Commission must also consider the price, quantity and availability of the energy to be supplied under the ESC, as well as alternatives to the energy that is being acquired under the ESC. BC Hydro considers that it has addressed these issues above, bearing in mind that the 2019 Letter Agreement is an enabling agreement used by BC Hydro to manage water supply risks in the operational time horizon within the same operational management framework it employs to make all dispatch and other system operation decisions.

British Columbia's Energy Objectives

Finally, the Commission must also consider "British Columbia's energy objectives" as defined in section 2 of the *Clean Energy Act*.¹³ BC Hydro provides its submissions in

¹² Section 15 of the *Energy Statutes Amendment Act, 2019* amended section 71(2.21)(b). In consequence the Commission is obliged to consider the most recent of i) a Commission-approved BC Hydro Integrated Resource Plan or ii) the 2013 IRP. No BC Hydro Integrated Resource Plan has been approved by the Commission, and so the 2013 IRP remains the resource plan the Commission is obliged to consider. The 2013 IRP is available at <https://www.bchydro.com/toolbar/about/planning-for-our-future/irp/current-plan/document-centre/reports/november-2013-irp.html>.

¹³ Until the *Energy Statutes Amendment Act, 2019* effected an amendment to section 2 of the *Clean Energy Act* on May 16, 2019, one of the "British Columbia energy objectives" was to

regard to those objectives in the context of this application in the table below. Note that where the 2019 Letter Agreement either advances an objective, or is neutral with regard to an objective, BC Hydro refers to the objective as being "aligned" with the 2019 Letter Agreement.

Section/Objective	Explanation
2(a) – Self Sufficiency	Self-sufficiency is a criteria BC Hydro uses in its long term planning efforts and is not relevant to supply issues in the operational time horizon. The 2019 Letter Agreement neither advances nor conflicts with this objective, and is therefore in alignment with it.
2(b) – Conservation and demand side management	The 2019 Letter Agreement allows for the management of short-term operational needs which may be required even after considering planned conservation efforts. Moreover, the 2019 Letter Agreement does not impact the ability of BC Hydro to achieve the objective of reducing its expected increase in demand for electricity by the year 2020 by at least 66 per cent. The 2019 Letter Agreement neither advances nor conflicts with this objective, and is therefore in alignment with it.
2(c) – BC generation to be at least 93 per cent clean and renewable	The 2019 Letter Agreement relates to the import of wholesale electricity (not to generation within BC) in the operational time horizon. The 2019 Letter Agreement neither advances nor conflicts with this objective, and is therefore in alignment with it.
2(d) – Use of innovative technologies to support conservation and use of clean and renewable resources	The 2019 Letter Agreement allows for the management of short-term operational needs, while the use of innovative technologies or clean/renewable resources are longer-term planning issues. The Agreement neither advances nor conflicts with this objective, and therefore is in alignment with it.
2(e) – Ensure the heritage assets accrue to the benefit of ratepayers	The 2019 Letter Agreement allows for the management of short-term operational needs which are incremental to the supply capacity of the heritage assets and which in any event do not impact the value of the heritage assets to ratepayers. The Agreement neither advances nor conflicts with this objective, and therefore is in alignment with it.
2(f) – Ensure BC Hydro's rates remain competitive	The 2019 Letter Agreement is a cost-effective means by which BC Hydro plans to manage short-term operational needs, and therefore it advances this energy objective and is in alignment with it.

ensure that the Commission did not regulate BC Hydro with regard to "expenditures for export". That objective has been removed as a result of that amendment.

Section/Objective	Explanation
2(g), (h) & (i) – Reduction of greenhouse gas emissions	The 2019 Letter Agreement allows for the management of short-term operational needs and has no bearing on the carbon footprint of generation resources in B.C., fuel-switching by domestic load, or community-level energy use. The 2019 Letter Agreement neither advances nor conflicts with these objectives and therefore is in alignment with them.
2(j) – Reduce waste by encouraging use of waste heat, biogas and biomass	The 2019 Letter Agreement allows for the management of short-term operational needs and has no bearing on initiatives to encourage use of waste heat, biogas or biomass. Therefore, the 2019 Letter Agreement neither advances nor conflicts with this objective.
2(k) – Encourage economic development	The 2019 Letter Agreement allows for the management of short-term operational needs and has no bearing on economic development in B.C. The 2019 Letter Agreement neither advances nor conflicts with this objective and therefore is in alignment with it.
2(l) – Foster development of first nation and rural communities	The 2019 Letter Agreement allows for the management of short-term operational needs and has no bearing on development of First Nation and rural communities. The 2019 Letter Agreement neither advances nor conflicts with this objective and therefore is in alignment with it.
2(m) – Maximize value of BC’s assets	The 2019 Letter Agreement allows for the management of short-term operational needs. BC Hydro uses all available capability in its system for the benefit of ratepayers and may periodically request incremental short-term supply from Powerex. The 2019 Letter Agreement neither advances nor conflicts with this objective and therefore is in alignment with it.
2(n) – Be a net exporter of electricity	BC Hydro has a significant planning surplus that will not be affected by the 2019 Letter Agreement. The 2019 Letter Agreement neither advances nor conflicts with this objective and therefore is in alignment with it.
2(o) – No use of nuclear	The 2019 Letter Agreement relates to the import of wholesale electricity and not to the use of nuclear power in the Province. The 2019 Letter Agreement neither advances nor conflicts with this objective and therefore is in alignment with it.

Requested Order

BC Hydro seeks a declaration that that the 2019 Letter Agreement is in the public interest, and an order accepting it for filing under section 71 of the UCA. A draft order is attached as Appendix 2.

Requested Order - Process

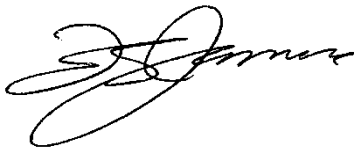
The *Rules for Energy Supply Contracts for Electricity* expressly state that the Commission intends to review ESCs expeditiously and without a hearing. Further, the scheme of the relevant provisions of the UCA is that ESCs are presumptively in the public interest unless the Commission declares otherwise, after a hearing. The Commission does allow Information Requests from BCUC staff and interveners, and submissions from interveners, before making a determination as to whether an ESC is in the public interest or, alternatively, whether a hearing is required.

In the case of this filing, BC Hydro considers that it would be appropriate for Commission staff and potential interveners copied with this application to have an opportunity to issue Information Requests; for interveners to have an opportunity to make submissions; and for BC Hydro to have an opportunity to make reply submissions. The proposed process would not be the "hearing" contemplated by the UCA, but a preliminary enquiry into the question whether i) the 2019 Letter Agreement can be declared to be in the public interest and accepted for filing, or whether ii) a hearing is required.

BC Hydro has not proposed a regulatory timetable for the review of the 2019 Letter Agreement, as it is aware of the BCUC's full regulatory calendar during the fall and its need to balance resources. BC Hydro leaves it to the BCUC to determine the timing of the proposed process.

For further information, please contact Geoff Higgins at 604-623-4121 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,



Fred James
Chief Regulatory Officer

st/rh

Enclosure

Copy to: BCUC Project No. 1598990 (Fiscal 2020 to Fiscal 2021 Revenue Requirements Application) Registered Intervener Distribution List.

**BC Hydro and Powerex Corp 2019
Letter Agreement Application**

**Appendix 1
2019 Letter Agreement**

PUBLIC



Powerex Corp.
1300 - 666 Burrard Street
Vancouver, BC, Canada
V6C 2X8

P 604 891 5000
TF1 800 220 4907

June 6, 2019

BC Hydro and Power Authority
333 Dunsmuir Street
Vancouver, BC V6B 5R3

Attention: Chris O'Riley, President & Chief Operating Officer

Dear Sirs and Mesdames:

Letter Agreement – Forward Electricity Purchases

This letter agreement (“**Agreement**”) sets forth the agreed framework between Powerex Corp. (“**Powerex**”) and British Columbia Hydro and Power Authority (“**BC Hydro**”) by which Powerex agrees to sell and deliver, and BC Hydro agrees to purchase and receive, electricity at the specified Delivery Points on a forward basis.

1. Definitions; Schedules. Capitalized terms not otherwise defined herein shall have the meanings ascribed thereto in Schedule “A”. The Schedules hereto are incorporated into and form an integral part of this Agreement.
2. Transaction Obligations. With respect to each Transaction (as defined in Section 5), Powerex shall sell and deliver, or cause to be delivered, and BC Hydro shall purchase and receive, or cause to be received, the Contract Quantity (as defined in Section 6) of electricity at the Delivery Point (as defined in Section 8), and BC Hydro shall pay Powerex the Contract Price (as defined in Section 7). Unless otherwise expressly provided herein, Powerex shall be responsible for any costs or charges imposed on or associated with the electricity or its delivery up to the Delivery Point. BC Hydro shall be responsible for any costs or charges imposed on or associated with the electricity or its receipt at and from the Delivery Point.
3. Purchase Interest Request. During the term, BC Hydro may deliver to Powerex a binding written offer to purchase electricity on a forward basis (“**Purchase Interest Request**”). A Purchase Interest Request shall be substantially in the form set forth in Schedule “B” and, at a minimum, shall specify the [REDACTED] the maximum hourly quantity (in MW) flat across all Peak Hours or Off-Peak Hours (or both) for each Delivery Period (as defined in Section 6), the Delivery Term and the Maximum Quantity. BC Hydro may issue multiple Purchase Interest Requests for unique and non-overlapping Delivery Terms.

EXPLANATION OF REDACTION: Specific pricing mechanisms have been redacted. The pricing mechanisms used in the Agreement may be used by BC Hydro in future agreements and, as such, cannot be known by the market. If the pricing mechanisms were known, Powerex’s ability to negotiate competitive energy prices may be impacted.



4. Revised Purchase Interest Request. A Purchase Interest Request for a Delivery Term may be revised from time to time in writing by BC Hydro by delivering a new (updated) Purchase Interest Request for the same Delivery Term and otherwise conforming to the requirements of Section 3, which shall replace the then current Purchase Interest Request for that Delivery Term effective five (5) business days' after receipt thereof by Powerex (as such period may be adjusted by agreement of the parties in writing (including by electronic mail)). A revised Purchase Interest Request shall not affect the validity of any Transactions for which BC Hydro has received a Confirmation in accordance with Section 5 prior to the effective date of the amended Purchase Interest Request (even if such confirmed Transactions exceed the limitations set forth in the revised Purchase Interest Request).
5. Purchase and Sale Confirmation. At any time and from time to time following receipt of a Purchase Interest Request, Powerex (I) will, subject to prevailing market and operating conditions (including transmission availability and third party commitments), use commercially reasonable efforts to sell and deliver electricity on a forward basis to BC Hydro within the limitations set forth in the then current Purchase Interest Request(s) and (II) to give effect to any such sale of electricity, may deliver to BC Hydro one or more written confirmations (each a "**Confirmation**") of its agreement to sell electricity which, upon receipt by BC Hydro and without any further action by BC Hydro, shall become a binding transaction for the purchase and sale of electricity ("**Transaction**") effective as of the Reference Date *provided that* [REDACTED] the quantities (in aggregate with all other confirmed Transactions) fall within the quantity limitations and Delivery Periods set forth in the then current applicable Purchase Interest Request(s).
- EXPLANATION OF REDACTION: Specific pricing mechanisms have been redacted. The pricing mechanisms used in the Agreement may be used by BC Hydro in future agreements and, as such, cannot be known by the market. If the pricing mechanisms were known, Powerex's ability to negotiate competitive energy prices may be impacted.**
6. Form of Confirmation. A Confirmation shall be substantially in the form set forth in Schedule "C" and, at a minimum, shall reflect the following (the heading of each paragraph is a defined term for the purposes of this Agreement):
- (a) Delivery Period: full calendar month(s) for delivery of electricity.
 - (b) Delivery Profile: Peak Hours or Off-Peak Hours, as applicable.
 - (c) Contract Quantity: quantity (in MW) to be delivered flat each hour across all Peak Hours or Off-Peak Hours, as applicable, for each Delivery Period.
 - (d) The Contract Price on the Reference Date for the Transaction, specified for Peak Hours and Off-Peak Hours.



A Confirmation will be sent to BC Hydro no later than one Business Day after the Reference Date specified therein.

7. Contract Price. The “**Contract Price**” for each MWh of electricity (in Dollars) delivered to BC Hydro shall be the sum of:

- (a) [REDACTED]
- (b) [REDACTED] multiplied by [REDACTED]; and
- (c) [REDACTED]

EXPLANATION OF REDACTION: Specific pricing mechanisms have been redacted. The pricing mechanisms used in the Agreement may be used by BC Hydro in future agreements and, as such, cannot be known by the market. If the pricing mechanisms were known, Powerex’s ability to negotiate competitive energy prices may be impacted.

representing the energy cost as well as a reasonable estimate of the fixed and variable transmission costs that will be incurred by Powerex for delivery of one MWh of electricity to the Delivery Point(s) (as the Contract Price may be adjusted by agreement of the parties in writing (including by electronic mail)).

8. Delivery Point: any one or more of the following delivery point(s) (each a “**Delivery Point**”): BC/US Border, BC/Alberta Border or any point of interconnection between a third party and the BC Hydro transmission system. Powerex may deliver electricity to any one or multiple Delivery Points on any day or in any hour.

9. Firm Energy. Electricity to be delivered by Powerex pursuant to a Transaction will be firm energy and, subject to Section 13, either Party will be relieved of its obligations to schedule, sell and deliver or receive and pay for, as applicable, such electricity without liability in the event that, and for the period during which, such performance is prevented by Force Majeure, as provided in this Agreement.

10. Passage of Title: Title to and risk of loss related to the electricity shall transfer from Powerex to BC Hydro at the Delivery Point(s). Powerex warrants that it will deliver to BC Hydro electricity free and clear of all liens, security interests, claims and encumbrances or any interest therein or thereto by any person (other than BC Hydro) arising prior to the Delivery Point. As between the parties, Powerex will be the importer of record into Canada for all electricity imported from the United States pursuant to this Agreement.

11. Transmission, Scheduling and Tagging:

- (a) Powerex shall arrange and be responsible for transmission service to the Delivery Point. BC Hydro shall arrange and be responsible for transmission service at and from the Delivery Point.



- (b) All electricity purchased and sold hereunder shall be scheduled by Powerex in accordance with Generally Accepted Utility Practice. Powerex will generate all e-Tags required to schedule electricity to the Delivery Point and such e-Tags will be in accordance with generally accepted e-tagging practices and standards in the Western Electricity Coordinating Council (“WECC”) region.
12. Invoicing; Netting:
- (a) Powerex will render to BC Hydro an invoice for the payment obligations, if any, incurred hereunder during the preceding month within 10 days of the end of the month. All invoices will be due and payable in accordance with Powerex’s invoice instructions on or before the 25th day of the month or, if such day is not a Business Day, then on the next Business Day. Unless otherwise agreed between the parties, overdue payments shall accrue interest from, and including, the due date to, but excluding, the date of payment at the annual rate of interest published by B.C. Hydro's principal banker from time to time as its prime rate plus 2%.
 - (b) In the event the parties are transacting under additional agreements, the parties hereby agree that they shall discharge mutual debts and payment obligations due and owing to each other on the same date pursuant to this Agreement and all such other agreements through netting, in which case all amounts owed by each party to the other party, including any interest, payments or credits, shall be netted so that only the excess amount remaining due shall be paid by the party who owes such amount.
13. Force Majeure. If either party is or was wholly or partly unable because of a Force Majeure to perform an obligation arising from this Agreement and claims that a Force Majeure is occurring or has occurred and reasonably establishes that fact, then the performance of the obligation shall be deemed to be suspended provided always that:
- (a) the suspension shall be of no greater scope and no longer duration than the Force Majeure,
 - (b) the non-performing party shall use commercially reasonable efforts to overcome the Force Majeure or to otherwise remedy its inability to perform the obligation,
 - (c) a performance required at a time other than when the Force Majeure is occurring shall not be excused by the Force Majeure, and
 - (d) an obligation to pay any fees when due shall not be excused by the Force Majeure except to the extent the claiming party’s payment systems are affected by Force Majeure.
14. Notices and Communication: Any notices, Purchase Interest Request (initial or revised) or Confirmation either party may give or deliver to the other under or in connection with this Agreement will be required to be in writing, will be delivered by electronic mail and will be



deemed received (i) on the Business Day sent if sent prior to 17:00 PPT on a Business Day, or (ii) otherwise on the next Business Day. A party may change its address by providing notice of same in accordance with this Section 14. Each party’s electronic mail address is set forth below:

Party	Address for Purchase Interest Requests or Confirmations	Address for all other Notices
BC Hydro	Heather.Matthews@bchydro.com	Heather.Matthews@bchydro.com
Powerex	[REDACTED]	[REDACTED]

EXPLANATION OF REDACTION: Identified contacts for notices has been redacted. For privacy reasons Powerex does not make the names of its non-executive personnel public, or their contact information.

15. Term; Survival. This Agreement shall be effective as of the date first written above and shall remain in effect until terminated by either party upon thirty (30) days’ prior written notice; provided, however, that such termination shall not affect or excuse the performance of either party under any provision of this Agreement that by its terms survives any such termination and, provided further, that this Agreement and any other documents delivered pursuant hereto shall remain in effect with respect to the Transaction(s) entered into prior to the effective date of such termination until both parties have fulfilled all of their obligations with respect to such Transaction(s).
16. No Agency, Etc. This agreement does not create an association, joint venture or partnership between Powerex and BC Hydro or impose any partnership obligation or liability upon either of them. Neither Powerex nor BC Hydro will have any right, power or authority under this Agreement to enter into any agreement or undertaking for, or act on behalf of, or to act as an agent or representative of, the other.
17. Confidentiality:
 - (a) Except as set forth herein, the parties agree that they will not disclose the terms of this Agreement, or information received by them under it (including any Purchase Interest Request or Confirmation), to any third party without the prior written consent of the other party.
 - (b) The Parties confirm that this Agreement and each Purchase Interest Request and Confirmation includes commercial and financial information which has been supplied in confidence and the disclosure of which could reasonably be expected to harm



significantly the competitive position and/or interfere significantly with the negotiating position of Powerex or BC Hydro (or both). Accordingly, BC Hydro and Powerex confirm their intention that this Agreement shall be deemed to be confidential in nature and exempt from disclosure to third persons in accordance with Section 21 of the *Freedom of Information and Protection of Privacy Act* (British Columbia).

- (c) Notwithstanding paragraphs (a) and (b), above, either party may disclose this Agreement with the British Columbia Utilities Commission (“BCUC”) or other judicial or regulatory body having jurisdiction if required by applicable law or if required to be filed by a party for the purpose of seeking approval of this Agreement.
 - (d) If this Agreement is disclosed to the BCUC or other judicial or regulatory body having jurisdiction as provided in paragraph (c), above, and such party is also required to disclose one or more Purchase Interest Requests or Confirmations, unless prohibited by applicable law any such Purchase Interest Requests and Confirmations shall be disclosed no earlier than ninety (90) days after the calendar quarter in which deliveries are made pursuant thereto.
 - (e) If a party is required to disclose this Agreement, or information received by them under it (including any Purchase Interest Request or Confirmation), as provided in this Section 17, the disclosing party shall consult with the other party and redact, to the extent permitted, commercially sensitive information prior to disclosure. If and solely to the extent this Agreement (or portions thereof) is made generally available to the public in connection with a required disclosure to the BCUC or other applicable judicial or regulatory body, the foregoing restrictions on disclosure in this Section 17 shall not apply.
18. Miscellaneous. This Agreement and all Transactions (including any Confirmations) shall form a single integrated agreement between the parties and are not separate contracts. Amendments to this Agreement will be made only in writing. This Agreement is entered into to enable forward purchases and sales of electricity, and nothing herein requires BC Hydro to provide a Purchase Interest Request to Powerex nor Powerex to provide any Confirmation to BC Hydro. This Agreement, and the rights and obligations of the parties, will be governed by and construed in accordance with the laws of the Province of British Columbia. Neither party may assign this Agreement, in whole or in part, without the prior written consent of the other party. Nothing in this Agreement or in its performance may be relied upon by third parties or create any rights or obligations to third parties. Nothing in this Agreement is intended to limit Powerex or BC Hydro from conducting transactions outside of this Agreement. References to “Dollars” or to “\$” are to United States Dollars.
19. TPA. Nothing in this Agreement is intended to amend or modify the rights and obligations of BC Hydro or Powerex under the Transfer Pricing Agreement between them dated as of April 1, 2003 (as amended) (“TPA”), and Transactions shall not be considered transactions or transfers under the TPA. All deliveries to BC Hydro of electricity will first be deemed to be deliveries on account of Transactions confirmed under this Agreement and any remaining



volumes will be deemed to be deliveries under the TPA, and any damages or remedies for undelivered electricity under this Agreement are hereby waived.

20. Counterparts; Electronic Delivery. This Agreement may be executed electronically and delivered by email (in Portable Document Format (.pdf)) and in counterparts, and such counterparts, when executed and delivered, will constitute an original and all such counterparts together will constitute one and the same agreement.

If the foregoing accurately reflects the understandings and agreements between BC Hydro and Powerex with respect to forward purchase of electricity, please sign this agreement and return it to us at your convenience.

[Remainder of this page intentionally left blank]

**BRITISH COLUMBIA HYDRO AND
POWER AUTHORITY**

POWEREX CORP.

By: _____
(Signature)

By: _____
(Signature)

Name: Chris O'Riley

Name: Thomas Bechard

Title: President & Chief Operating Officer

Title: President & CEO



SCHEDULE “A”

ADDITIONAL DEFINITIONS

In this Agreement, the following terms will have the respective meanings set forth below.

“Business Day” means any day other than a Saturday, a Sunday, a statutory holiday in the Province of British Columbia, Easter Monday, Boxing Day and any NERC Holiday.

“Delivery Term” means the period comprising one or more continuous Delivery Periods as set forth in a Purchase Interest Request.

“Force Majeure” means an event or circumstance which prevents one party from performing its obligations under one or more Transactions, which event or circumstance was not anticipated as of the date the Transaction was confirmed, which is not within the reasonable control of, or the result of the negligence of, the claiming party, and which, by the exercise of due diligence, the claiming party is unable to overcome or avoid or cause to be avoided. Force Majeure shall not be based on (i) lack of finances; (ii) BC Hydro’s inability to use or resell electricity purchased hereunder; (iii) the loss or failure of Powerex’s supply; (iv) Powerex’s ability to sell the electricity at a price greater than the Contract Price; or (v) the unavailability, interruption or curtailment of transmission service at a Delivery Point unless such unavailability, interruption or curtailment is material in nature.

“Generally Accepted Utility Practice” means a practice established by the Western Electricity Coordinating Council (“WECC”), as such practice may be revised from time to time, or if no practice is so established, means a practice otherwise generally accepted in the WECC region. Generally Accepted Utility Practice is not intended to be the optimum practice, method or act, to the exclusion of all others, but rather to be a spectrum of commonly or generally used practices, methods or acts in the WECC region.

[REDACTED]

[REDACTED]

EXPLANATION OF REDACTION: Specific pricing mechanisms have been redacted. The pricing mechanisms used in the Agreement may be used by BC Hydro in future agreements and, as such, cannot be known by the market. If the pricing mechanisms were known, Powerex’s ability to negotiate competitive energy prices may be impacted.



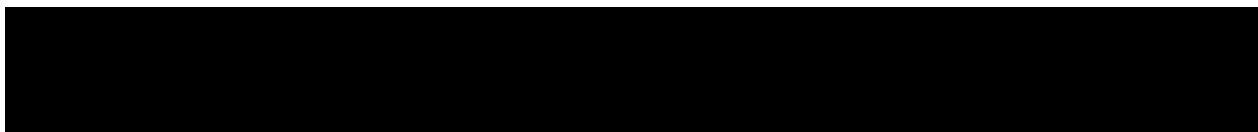
“Maximum Quantity”, as specified in the initial and any revised Purchase Interest Request, means the total maximum quantity (in MWh) for all Transactions (in aggregate) for the applicable Delivery Term.

“Off-Peak Hours” means hour ending (“HE”) 01:00 through HE 06:00 and HE 23:00 through HE 24:00 PPT and all hours on (i) Sundays or (ii) any day designated as a holiday by NERC (“NERC Holiday”)

“Peak Hours” means HE 07:00 through HE 22:00 (16 hours per day) PPT, Monday through Saturday (6 days per week), excluding NERC Holidays.

“PPT” means Pacific Prevailing Time, that is, prevailing Standard Time or Daylight Savings Time in the Pacific Time Zone.

“Reference Date” means the reference date on which the [REDACTED] Price is fixed for the purposes of the Transaction.



EXPLANATION OF REDACTION: Specific pricing mechanisms have been redacted. The pricing mechanisms used in the Agreement may be used by BC Hydro in future agreements and, as such, cannot be known by the market. If the pricing mechanisms were known, Powerex’s ability to negotiate competitive energy prices may be impacted.




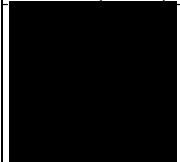
**SCHEDULE “B”
PURCHASE INTEREST REQUEST**

Date: _____

Pursuant to the letter agreement (“Agreement”) dated [●], 2019, between BC Hydro and Powerex, BC Hydro hereby submits this binding offer to purchase electricity on a forward basis subject to the following limitations:

Delivery Term:

Maximum Quantity for Delivery Term: [●] MWh

	[Month] [Year]	[Month] [Year]	[Month] [Year]	[Month] [Year]	[Month] [Year]	[Month] [Year]	[Month] [Year]
Hourly Maximum - Peak Hours (MW)							
							
Hourly Maximum - Off-Peak Hours (MW)							
							

EXPLANATION OF REDACTION: Specific pricing mechanisms have been redacted. The pricing mechanisms used in the Agreement may be used by BC Hydro in future agreements and, as such, cannot be known by the market. If the pricing mechanisms were known, Powerex’s ability to negotiate competitive energy prices may be impacted.

This Purchase Interest Request is provided pursuant to and is subject to the terms and conditions of the Agreement. Capitalized terms that are not otherwise defined herein shall have the meaning given to them in the Agreement.



**SCHEDULE “C”
CONFIRMATION**

This Confirmation confirms the Transaction effective the Reference Date regarding the sale and purchase of electricity in accordance with the letter agreement (“Agreement”) dated [●], 2019, between BC Hydro and Powerex with the following terms and conditions:

Reference Date:

Seller: Powerex

Buyer: BC Hydro

Delivery Period, Delivery Profile, Contract Price and Contract Quantity

<u>Delivery Period</u>	<u>Delivery Profile</u>	<u>Contract Quantity (MW)</u>	<u>Contract Price</u>	<u>Total Quantity (MWh)</u>

This Confirmation is provided pursuant to and is subject to the terms and conditions of the Agreement. Capitalized terms that are not otherwise defined herein shall have the meaning given to them in the Agreement.

**BC Hydro and Powerex Corp 2019
Letter Agreement Application**

Appendix 2

Draft Order

Suite 410, 900 Howe Street
Vancouver, BC Canada V6Z 2N3
P: 604.660.4700
TF: 1.800.663.1385
F: 604.660.1102



ORDER NUMBER
G-xx-xx

IN THE MATTER OF
the *Utilities Commission Act*, RSBC 1996, Chapter 473

and

British Columbia Hydro and Power Authority (BC Hydro)
Letter Agreement with Powerex Corp. – Forward Electricity Purchases

BEFORE:

Commissioner
Commissioner
Commissioner

on Date

ORDER

WHEREAS:

- A. On August 2, 2019, pursuant to section 71 of the *Utilities Commission Act* (UCA), British Columbia Hydro and Power Authority (BC Hydro) filed with the British Columbia Utilities Commission (BCUC) a letter agreement dated June 6, 2019, (2019 Letter Agreement) between BC Hydro and Powerex Corp. (Powerex) that provides for the forward delivery and sale of electricity from Powerex to BC Hydro (altogether the Application);
- B. By Order G-61-12 dated May 17, 2012, the BCUC established the Rules for Energy Supply Contracts (ESC) for Electricity (Rules). The Rules are intended to facilitate the BCUC's review of ESCs and proposed ESCs for electricity;
- C. BC Hydro requested that certain information contained in the 2019 Letter Agreement be kept in confidence pursuant to Part IV of the Commission's Rules of Practice and Procedure;
- D. In its Application BC Hydro sought a determination that the 2019 Letter Agreement is in the public interest and an order accepting it for filing;
- E. [DESCRIPTION OF PROCESS].

NOW THEREFORE pursuant to section 71 of the *Utilities Commission Act*, the Commission orders as follows:

- 1. The 2019 Letter Agreement between BC Hydro and Powerex, is accepted for filing.
- 2. BC Hydro is directed to file the following with the BCUC, at the end of a 90-day period following the calendar quarter in which any deliveries of electricity are made under the 2019 Letter Agreement:

.../2

- a) All transactions made under the 2019 Letter Agreement and executed in the applicable calendar quarter;
 - b) The total volume of purchases made under the 2019 Letter Agreement that were re-exported through the Transfer Pricing Agreement (TPA) between BC Hydro and Powerex, and surplus to domestic load requirements;
 - c) The dates on which forward purchases made under the 2019 Letter Agreement were re-exported through the TPA; and
 - d) The total revenues generated by re-exporting volumes purchased under the 2019 Letter Agreement through the TPA.
3. BC Hydro is directed to file confidentially with the BCUC, commencing at the end of August 2019, monthly reports of transactions made under the 2019 Letter Agreement.

BY ORDER

(X. X. last name)
Commissioner

Attachment Options

**BC Hydro and Powerex Corp 2019
Letter Agreement Application**

Appendix 3

**Section 4.4 of the F20-F21 RRA
("Maximizing the Value of Our Energy Supply")
and Related IR Responses**

1 these communities and the lack of connection to the integrated system, there are
2 limited opportunities to reduce supply costs.

3 There are currently five non-integrated IPPs in operation.¹¹⁹ BC Hydro has been
4 pursuing the renewal of its EPA with the Ocean Falls IPP which serves the
5 Non-Integrated Area of Bella Bella. BC Hydro and the IPP have not been able to
6 reach agreement and have been operating under short-term extensions of the
7 original EPA because BC Hydro has no other options to serve the region besides
8 operating our diesel generation facility. In August 2017, BC Hydro filed an
9 application for a service rate from the IPP with the BCUC. This application is
10 currently before the BCUC.

11 **4.4 Maximizing the Value of Our Energy Supply**

12 This section explains the role of our monthly Energy Studies in optimizing our
13 operational management of all sources of energy supply on BC Hydro's integrated
14 system, including the heritage assets.

15 **4.4.1 Energy Studies Inform Dispatch Decisions and Forecast Cost of** 16 **Energy**

17 The primary objectives of the Energy Study are to forecast:

- 18 • The marginal value of water in BC Hydro's two largest reservoirs (Williston and
19 Kinbasket) that is used to inform operational dispatch decisions; and
- 20 • The Cost of Energy for financial reporting.

21 The forecast monthly marginal value of water provides BC Hydro with a relative
22 measure that guides the operation of these reservoirs in the context of market and
23 system conditions (i.e., when domestic energy resources should be dispatched
24 versus purchases made from Powerex or when additional domestic resources

¹¹⁹ Non-integrated Area IPPs: Hluey Lake (Dease Lake), Moresby Lake (Haida Gwaii), Ocean Falls (Bella Bella), Pine Creek (Atlin) and Kwadacha Bioenergy Project (Fort Ware) are operational facilities and Gabion River EPA (Hartley Bay) has not reached commercial operation.

1 should be dispatched to facilitate sales to Powerex). This output of the monthly
2 Energy Study allows us to manage our integrated system to maximize the value for
3 ratepayers.

4 The forecast Cost of Energy is used for financial reporting purposes. This forecast
5 cost is based on outputs from the Energy Study, which develops an optimal set of
6 reservoir and generation station operations and market transactions, given the
7 current forecasts of water inflow, market prices, and weather adjusted load.

8 **4.4.2 Independent Experts Endorsed BC Hydro's Energy Study** 9 **Methodology**

10 In fiscal 2019, BC Hydro undertook an internal audit of our monthly Energy Studies
11 process. The internal audit relied on two subject matter experts from SINTEF¹²⁰, an
12 independent energy research organization that conducts contract research and
13 development projects. These experts are specialized in load forecasting, risk
14 management, hydrothermal market modelling and hydropower scheduling models.

15 The internal audit concluded that BC Hydro has a well-established Energy Studies
16 process in place, that key models are appropriate and that the methodologies
17 applied are in line with leading industry practices. The Energy Studies Process
18 Internal Audit Report is provided as Appendix DD.

19 **4.4.2.1 Energy Study Inputs**

20 The following list outlines the various inputs used by the Energy Study:

- 21 • **The Load Forecast:** The Load Forecast, net of demand-side management
22 savings, including a potential range based on historic weather variability. The
23 Load Forecast is set out in Chapter 3.
- 24 • **Forecast of IPP supply:** The forecast of supply from IPPs and Long-Term
25 Commitments including a potential range based on historic supply and

¹²⁰ The Foundation for Scientific and Industrial Research at the Norwegian Institute of Technology

1 seasonal variability. IPPs and Long-Term Commitments are discussed in
2 section [4.7.1](#).

- 3 • **The range of water inflow conditions:** Inflows to BC Hydro reservoirs are
4 inputs to the Energy Study and are the largest drivers of energy production and
5 reservoir operation. Inflows are driven by a combination of rainfall, snow pack
6 and glacier meltwater. Once the snowpack has melted, usually towards the end
7 of summer, rainfall becomes the primary driver of reservoir inflows.

8 Seasonal inflow forecasts are made at the beginning of every month for each of
9 25 basins which contribute to BC Hydro's energy supply. Each inflow forecast
10 incorporates the historical variability observed in meteorological conditions
11 since 1973. The Energy Study accounts for this range of potential inflow
12 scenarios in its forecast of generation and reservoir operations.

- 13 • **Electricity and gas market prices:** Surplus sales, market electricity purchases
14 and the cost to run thermal generation all depend on forecasts of electricity and
15 gas market prices. Electricity and gas prices tend to follow a seasonal cycle
16 with higher prices during the colder winter months and hotter summer months,
17 and lowest prices during the spring freshet.

18 At the beginning of each Energy Study, Powerex provides BC Hydro with
19 forward market price curves for electricity at Mid-C and gas prices at Sumas.
20 The Energy Study uses these forward curves as a starting point and then adds
21 variability to these prices to capture an expected range of price uncertainty.

22 During fiscal 2020 and fiscal 2021, Sumas gas forward prices are expected to
23 range from \$1.50 to \$3.07 USD/MMBtu with an average price of \$2.10. Mid-C
24 forward monthly electricity prices are expected to range from \$7.85 USD/MWh
25 in light load hours during the freshet to \$49.95 USD/MWh in heavy load hours.

26 System, market and weather conditions can significantly affect market prices.
27 Large snowpack, windy and wet conditions act to depress the Mid-C electricity
28 price, while hot, dry summer or cold winter conditions act to raise Mid-C prices.

1 For example, the October 2018 rupture of the Enbridge T-South pipeline and
2 subsequent gas curtailment resulted in Sumas spot gas prices reaching
3 \$66 USD/MMBtu in November 2018.

- 4 • **Generation unit availability:** Energy production and plant capacity is affected
5 when generation units are taken offline for maintenance, de-rated or forced out
6 of service. The Energy Study accounts for unit and plant maintenance
7 schedules as well as outages required for BC Hydro’s capital plan. In addition,
8 historic reliability data is used to account for the risk of forced outages.

9 **4.4.3 BC Hydro’s Objective is to Maximize Consolidated Net Revenue to** 10 **Benefit Customers**

11 As part of minimizing costs to ratepayers, BC Hydro’s objective is to maximize
12 “expected consolidated net revenue from operations”. “Consolidated” refers to the
13 combined activity of both BC Hydro (domestic) and forecast Powerex (trade). “Net
14 revenue from operations”¹²¹ includes both revenues and costs that are variable and
15 forecast through the Energy Studies. By managing the system as a whole to
16 maximize forecast consolidated net revenue, BC Hydro is able to optimize our
17 portfolio of resources to achieve the best value for ratepayers.

18 The following list outlines the components of consolidated net revenue.

- 19 • **Domestic revenue from accrued sales:** These sales depend on consumption
20 by BC Hydro’s customers. They are not impacted by system dispatch decisions.
- 21 • **Cost of IPPs and Long-Term Commitments:** These costs arise from
22 payments made to IPPs in accordance with their agreements. Other than Island
23 Generation and certain biomass facilities, most IPPs are not directly impacted
24 by system dispatch decisions.

¹²¹ Net Revenues from Operations = domestic revenue from accrued sales plus revenue from surplus (domestic) sales plus revenue from Columbia River Treaty related agreements less cost of IPPs and long-term commitments less cost of market electricity (domestic) purchases less cost of water rentals less cost of natural gas for thermal generation less cost of net purchases (sales) from Powerex.

- 1 • **Revenue from surplus sales (domestic sales):** These sales depend on
2 system storage, generating unit availability, energy availability as well as
3 market conditions. They are impacted by system dispatch decisions.
- 4 • **Cost of market electricity purchases (domestic purchases):** These
5 purchases depend on system storage, generating unit availability, energy
6 availability as well as market conditions. They are impacted by system dispatch
7 decisions.
- 8 • **Revenue from Columbia River Treaty related agreements:** These revenues
9 depend on non-Treaty water release decisions, Columbia system dispatch
10 decisions, hydrological conditions in the Columbia basin, and market
11 conditions. They are impacted by system dispatch decisions.
- 12 • **Cost of water rentals:** These costs depend on the generation output of the
13 heritage assets. They are impacted by system dispatch decisions.
- 14 • **Cost of natural gas for thermal generation:** These costs depend on the
15 generation output at BC Hydro's Prince Rupert and Fort Nelson generation
16 facilities. They are impacted by system dispatch decisions.
- 17 • **Cost of Net Purchases (Sales) from Powerex:** These purchases (sales)
18 represent modeled market energy transactions based on a forecast of trade
19 opportunities, which are allocated to Powerex.

20 **4.4.4 The Energy Study Optimizes the Use of System Storage**

21 The Energy Study optimizes the use of System Storage with imports and exports to
22 meet load requirements.

23 BC Hydro's primary sources of seasonal and multi-year operational flexibility are
24 Kinbasket reservoir on the Columbia River and Williston reservoir on the Peace
25 River. The total storage capacity in these two reservoirs represents approximately
26 90 per cent of the total storage in BC Hydro's system, and together are referred to
27 as System Storage.

1 These large reservoirs typically reach their minimum storage levels near the end of
 2 April, after the annual drawdown to serve winter load and prior to spring freshet. In
 3 some years water is withdrawn from System Storage and in other years water is
 4 stored. As a result the System Storage, expressed as an energy equivalent, can
 5 vary at the end of each fiscal year as shown in [Table 4-1](#) below.

6 The Energy Study optimization accounts for the efficiency gains made by operating
 7 our generating stations at higher reservoir levels. It also models dispatch decisions
 8 in response to a range of inflows, market prices, and loads.

9 **Table 4-1 End of Fiscal Year System Storage**

GWh	F2017 RRA	F2017 Actual	F2018 RRA	F2018 Actual	F2019 RRA	F2019 Forecast	F2020 Plan	F2021 Plan
End of Period System Storage ¹²²	11,918	13,208	10,746	9,736	10,576	7,293	9,354	10,649

10 **4.5 Overall Cost of Energy Forecast**

11 This section provides BC Hydro's forecast Cost of Energy, presented in the Gross
 12 View, for the test period. Sections [4.6](#), [4.7](#) and [4.8](#) below provide a more detailed
 13 breakdown of energy costs by category (Heritage, Non-Heritage and Market) to help
 14 clarify the drivers and facilitate comparisons to the previous test period.

15 BC Hydro's Cost of Energy forecast is shown in [Table 4-2](#) below.

¹²² System storage is the energy equivalent storage available at the end of each fiscal year at Williston and Kinbasket reservoirs. The system storage forecast is calculated by taking the fiscal 2018 ending storage and adding the forecast net changes in storage year over year.

<p>Association of Major Power Customers of BC Information Request No. 1.8.4 Dated: May 2, 2019 British Columbia Hydro & Power Authority Response issued June 6, 2019</p>	<p>Page 1 of 1</p>
<p>British Columbia Hydro & Power Authority Fiscal 2020 to Fiscal 2021 Revenue Requirements Application</p>	<p>Exhibit: B-6</p>

8.0 Thermal Generation/Costs

Reference: Chapter 4 – Cost of Energy, Sections 4.6 & 4.7

Table 4-6 provides the forecast costs of natural gas, gas transportation, carbon tax, motor fuel tax and other costs associated with BC Hydro’s Prince Rupert and Fort Nelson thermal generation facilities. Island Generation is a thermal IPP.

1.8.4 How did the Enbridge pipeline explosion, experienced in the F2019 year, impact ratepayers on a cost and revenue perspective with respect to power generation and potential Powerex market opportunities (through either Powerex Net Income, Surplus Sales and/or market purchases)? Please include the effects of the explosion on Sumas gas prices in your response.

RESPONSE:

The Enbridge Pipeline explosion reduced the availability of Island Generation, and contributed to increased market prices and market price volatility in wholesale electricity and gas markets over the winter season.

There is insufficient information available to establish a counterfactual forecast of gas and electricity supply, demand and market conditions and therefore BC Hydro cannot calculate the impact on cost and revenue specifically from the Enbridge pipeline explosion.

Please refer to BC Hydro’s response to BCUC IR 1.21.2 in this proceeding, and the Letter Agreement between BC Hydro and Powerex – Forward Electricity Purchases (the Agreement)¹ for how BC Hydro managed the system and system storage in response to the Enbridge T-South rupture and the forecasted low inflows over the winter of fiscal 2019.

Please also refer to BC Hydro’s response to BCUC IR 1.10.4 and 1.10.4.1 in the Agreement proceeding, which provides a graph of the Sumas gas prices and a discussion of potential drivers for price volatility.

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

<p>Association of Major Power Customers of BC Information Request No. 1.17.9 Dated: May 2, 2019 British Columbia Hydro & Power Authority Response issued June 6, 2019</p>	<p>Page 1 of 2</p>
<p>British Columbia Hydro & Power Authority Fiscal 2020 to Fiscal 2021 Revenue Requirements Application</p>	<p>Exhibit: B-6</p>

17.0 Powerex Exports/Imports – Market Purchases & Surplus Sales

Reference: BC Hydro RRA pages 1-46, 2-6 and 4-6

BC Hydro states on footnote 48 of page 1-46 of the Application:

“The costs of Market Electricity Purchases, Surplus Sales, Net Purchases (Sales) from Powerex and Domestic Transmission - Export were previously distributed into Heritage and Non Heritage Energy costs, based on the Heritage Contract threshold of 49,000 GWh. As discussed in Chapter 2, section 2.2.1, as part of the Comprehensive Review, the Government of B.C. repealed Direction No. 7 to the BCUC, which included the Heritage Contract. The repeal of the Heritage Contract has no impact on BC Hydro or ratepayers; however, it provides BC Hydro with the flexibility to re-categorize its Cost of Energy for this application by creating a third category, Market Energy, which includes the four components – Market Electricity Purchases, Surplus Sales, Net Purchases (Sales) from Powerex and Domestic Transmission - Export.”

On page 2-6 BC Hydro states:

“As explained in Chapter 8, section 8.9, BC Hydro believes that it continues to be appropriate for Powerex’s forecast net income to be included in BC Hydro’s revenue requirements and that if Powerex incurs a loss, it should be borne by the shareholder. Powerex’s net income continues to be forecast based on the historical five year average, and variances between actual net income and forecast net income are captured by the Trade Income Deferral Account. If Powerex’s actual net income in a given year were to be less than \$0, BC Hydro would only transfer the variance between forecast net income and \$0 to the Trade Income Deferral Account.”

Pages 4-6 to 4-7 state:

“Market Energy is electricity purchased from or sold to Powerex through transfer pricing arrangements between Powerex and BC Hydro. The costs or revenues associated with these transactions are allocated to the following categories:

- **Market Electricity Purchases:** This is often referred to as domestic purchases and represents market purchases of electricity from Powerex by BC Hydro to meet domestic load requirements. This does not include purchases included in Net Purchases (Sales) from Powerex.
- **Surplus Sales:** This is often referred to as domestic sales and represents sales of electricity to Powerex, when BC Hydro has generation in excess of its domestic load requirements. This does not include sales included in Net Purchases (Sales) from Powerex.
- **Net Purchases (Sales) from Powerex:** This is often referred to as trade purchases (sales) and represents Powerex purchases/sales from/to BC Hydro for the purpose of trade related activities, provided that the

<p>Association of Major Power Customers of BC Information Request No. 1.17.9 Dated: May 2, 2019 British Columbia Hydro & Power Authority Response issued June 6, 2019</p>	<p>Page 2 of 2</p>
<p>British Columbia Hydro & Power Authority Fiscal 2020 to Fiscal 2021 Revenue Requirements Application</p>	<p>Exhibit: B-6</p>

BC Hydro system has the ability to accommodate those transactions. These are not purchases (sales) for domestic purposes.

- **Domestic Transmission – Export:** This represents transmission costs within B.C. related to Surplus Sales.”

Page 8-17 discusses Powerex Net Income:

“In the test period, Trade Income is forecast at \$120.6 million per year in fiscal 2020 and fiscal 2021 (net of BC Hydro’s allocation of business support costs as described in section 8.10), and is reflective of Powerex’s average net income over the last five years (i.e., fiscal years 2014 through 2018). Using a five-year average as the basis of forecasting Trade Income is consistent with prior revenue requirement applications and is reasonable given the year-to-year volatility in market conditions.”

- 1.17.9 Please comment, as available, on the financial impacts on Surplus Sales and Market Purchases related to the Enbridge pipeline explosion from October 2018 through March 2019?

RESPONSE:

Please refer to BC Hydro’s response to BCUC IR 1.21.2 in this proceeding, and the Letter Agreement between BC Hydro and Powerex – Forward Electricity Purchases¹ for how BC Hydro managed the system and system storage in response to the Enbridge T-South rupture and the forecasted low inflows over the winter of fiscal 2019.

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

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21.0 D. CHAPTER 4 – COST OF ENERGY

**Reference: COST OF ENERGY
Exhibit B-1, pp. 4-14, 4-16
Energy Study – Enbridge T-South rupture**

BC Hydro states on page 4-14 of the Application:

The forecast Cost of Energy is used for financial reporting purposes. This forecast cost is based on outputs from the Energy Study, which develops an optimal set of reservoir and generation station operations and market transactions, given the current forecasts for water inflow, market prices and weather adjusted load.

BC Hydro states on page 4-16 of the Application that “the October 2018 rupture of the Enbridge T-South pipeline and subsequent gas curtailment resulted in Sumas spot gas prices reaching \$66/USD/MMBtu in November 2018.”

- 1.21.1 Please discuss both immediate and longer term impacts of the Enbridge T-South rupture on the gas and electricity market prices, availability of supply and domestic load requirements.
 - 1.21.1.1 Please discuss how BC Hydro's system and System Storage have been managed in response to this event.

RESPONSE:

Please refer the Letter Agreement between BC Hydro and Powerex Corp. (Powerex) – Forward Electricity Purchases at the following link for how BC Hydro managed the system and system storage in response to the Enbridge T-South rupture and the forecasted low inflows across the winter of fiscal 2019.

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

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7.0 Reference: Exhibit B-1, Application, Appendix A, Schedule 4.0, and BC Hydro News release, April 23, 2019

On April 23, 2019 BC Hydro issued the following news release:

News release Apr 23, 2019

Report: BC Hydro acts to address record low reservoir levels

VANCOUVER: Despite extreme weather leaving reservoirs at record low levels over the winter and challenges related to the Enbridge gas pipeline explosion, BC Hydro managed to meet the electricity demand while keeping rates low over the past several months.

A new BC Hydro report titled "[Generational challenge: How B.C.'s generation system is adapting to extreme weather and unforeseen events](#)" found the past 12 months demonstrate how extreme weather in B.C. can impact BC Hydro's reservoir levels. While BC Hydro has a lot of experience managing reservoir levels in low water years, October brought an unexpected challenge – the catastrophic Enbridge pipeline explosion – which impacted wholesale market prices by creating an increased demand for electricity to replace gas-generating units that would have otherwise been able to run, and required BC Hydro's planners to secure a sufficient supply of electricity to meet the needs of British Columbians over the winter.

Following a dry summer, BC Hydro's reservoirs were below normal, and by October, its two biggest reservoirs – Williston on the Peace River and Kinbasket on the Columbia River – reached record seasonal lows. In fact, dry conditions in the Williston basin resulted in four consecutive months of low inflows, with September, October and November being the third, second and fourth lowest in 60 years.

Then the unexpected happened – the Enbridge pipeline explosion caused a high-level of gas supply uncertainty in B.C. and the Pacific Northwest with only 80 per cent of normal capacity expected throughout the winter, impacting wholesale market prices for both natural gas and electricity. To ensure a consistent supply of affordable electricity for its customers, BC Hydro planners took steps to secure a sufficient supply of imports to meet evolving system needs over the winter season – particularly in the event of a cold, dry winter and continued gas supply challenges.

As it turned out, B.C. experienced a record-breaking cold February followed by the driest March on record in parts of B.C. This resulted in more electricity being used than forecasted, and less water remaining in BC Hydro's reservoirs as

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demand for power remained high. In addition, independent power producers were down below projections due to the weather and unable to meet the increased demand. Steps taken by BC Hydro’s planners secured the power required to meet the demand without impacting rates.

Cold and dry weather delayed the onset of the spring freshet; however, inflows into the reservoirs have started to increase in April with warmer weather and will soon start filling the reservoirs.

While BC Hydro is predicting higher water flows resulting from climate change over the long term, unpredictable weather patterns are expected to continue in the years ahead. BC Hydro is working to ensure its system performs safely across a wide range of conditions and extreme events by:

- Continuously working to improve the weather and inflow forecasting. For example, all coastal watersheds can now be forecasted down to the hour, which improves the forecast accuracy for extreme rainfall events.
- Expanding its hydroclimate monitoring technology. This includes custom-made solutions that have been designed in-house, as well as upgrading snow survey stations to automated, real-time snow and climate stations.
- Investing in capital projects – like spillway gate replacements – that will increase resiliency of the system to climate change.

In Appendix A, Schedule 4.0, the F2019 figures of “(4,517)” and “(2,230)” indicate that BC Hydro was forecasting surplus sales of energy.

1.7.4 What jurisdictions did these imports come from? What percentage was from coal fired generating plants? Gas fired plants? Nuclear plants? Wind generating facilities? Solar generating facilities? Other? What percentage of the electricity was imported in low load hours? High load hours? Other? How much electricity was imported in each month from November, 2018 to March, 2019, and what average price did BC Hydro pay in each of these months?

RESPONSE:

The importing activities noted above are conducted by Powerex. BC Hydro does not know the specific source of the imports. However, emissions associated with electricity imports are reported to the BC Government pursuant to the

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Greenhouse Gas Emission Reporting Regulation. The last update¹ was published on November 15, 2018 for the 2017 calendar year and thus does not overlap the period in question.

With regard to the volumes imported, please refer to BC Hydro’s response to BCUC IR 1.3.2 with respect to the Letter Agreement between BC Hydro and Powerex – Forward Electricity Purchases (the Agreement)² for electricity imported in each month from December 2018 through March 2019. In November 2018, 555 GWh of electricity was imported, consisting of 363 GWh of Domestic Electricity Purchases, 286 GWh of Trade Electricity Purchases, and 94 GWh of Trade Electricity Sales.

Appendix 2 of the Agreement² contains the set of contract electricity delivery volumes by delivery profile (off-peak vs. peak hours), quantity (MWh) and price (USD/MWh). A summary table is provided below:

Delivery period	Delivery profile	Contract price (USD)	Total
Feb. 1- Feb. 28	Heavy load hours	\$55.83/ MWh	96,000 MWh
Mar. 1 – Mar. 31	Heavy load hours	\$47.73/ MWh	520,000 MWh
Apr. 1 – Apr. 30	Heavy load hours	\$30.96/ MWh	624,000 MWh
Jan. 1 – Jan. 31	Light load hours	\$51.77 MWh	164,000 MWh
Feb. 1 – Feb. 28	Light load hours	\$40.87/ MWh	158,400 MWh
Mar. 1 – Mar. 31	Light load hours	\$36.36/ MWh	408,750 MWh
Apr. 1 – Apr. 30	Light load hours	\$26.14/ MWh	456,000 MWh
Total:		\$37.59/MWh (Average)	2,427,150 MWh

¹ <https://www2.gov.bc.ca/gov/content/environment/climate-change/data/industrial-facility-ghg>

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

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13.0 MISCELLANIOUS

Reference: Section 4.4.2.1: Energy Study Inputs

1.13.2 Please provide a history of electricity market prices at Mid-Columbia and Alberta (last 5 years) and BC Hydro’s forecast for these markets to F2024, with monthly resolution and segmented according by: all hours, and by heavy and light load hours.

RESPONSE:

BC Hydro has not provided the requested forecast data as this data is confidential. BC Hydro receives certain proprietary and confidential commercial information from Powerex which it incorporates into its forecasts.

BC Hydro has provided three years of average Mid-C prices in BC Hydro’s response to CEC IR 1.16.1.

Please refer to BC Hydro’s response to BCUC IR 1.10.3 with respect to the Letter Agreement between BC Hydro and Powerex - Forward Electricity Purchases (the Agreement)¹ for the last five years of Mid-Columbia prices, and BC Hydro’s response to BCUC IR 1.10.5 with respect to the Agreement for the last five years of Alberta prices.

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

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13.0 MISCELLANIOUS

Reference: **Section 4.4.2.1: Energy Study Inputs**

1.13.3 Please comment on market liquidity for the electricity (Mid-C and Alberta), and natural gas (Sumas) markets at 12 and 24 months in the future.

RESPONSE:

BC Hydro does not have the information to comment on forward market liquidity for electricity or natural gas 12 and 24 months in the future. For the Energy Study, Powerex provides BC Hydro with confidential forward market price curves for electricity at Mid-C and gas prices at Sumas.

Please refer to BC Hydro's response to BCUC IR 1.8.1.1 with respect to the Letter Agreement between BC Hydro and Powerex – Forward Electricity Purchases¹ for charts and commentary relevant to Mid-C spot market liquidity.

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