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INFORMATION REQUEST ROUND NO: 1  
TO: BRITISH COLUMBIA HYDRO & POWER AUTHORITY  
DATE: **May 2, 2019**  
PROJECT NO: 1598990  
APPLICATION NAME: **British Columbia Hydro and Power Authority - F2020-F2021 Revenue Requirements Application**

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**1.0 Reference: LOAD AND REVENUE FORECAST**

**Exhibit B-1, Sections 3.2.5, 3.2.6.1, 3.2.7.1, p. 3-10, p. 3-18**

In section 3.2.5, on page 3-10, BC Hydro states that “BC Hydro’s Load Forecast is divided into the following four sectors as shown in Figure 3-3: Residential, Commercial and Light Industrial, Large Industrial and Other (which includes inter-utility sales, firm exports, street lighting and irrigation demand).”

In section 3.2.6.1, on page 3-10, BC Hydro states that “As in the past, BC Hydro develops residential sector forecasts for four regions: the Lower Mainland, Vancouver Island, South Interior and the North Region. These regional forecasts capture geographic differences in population growth, disposable income and temperature. Further in Section 3.2.6.1, on page 3-11, BC Hydro states that “As with the forecast used in the Previous Application, to calculate the growth in the number of accounts the four regions are further divided into 15 sub-regions.”

In section 3.2.7.1, on page 3-18, BC Hydro states “The Commercial Load Forecast is an aggregation of forecasts developed for each of four service regions: the Lower Mainland, Vancouver Island, South, Interior, and the North Region. As with the residential sector, and consistent with the forecast prepared for the Previous Application, an SAE modelling approach is used. Within each region, separate SAE forecast models are used for small commercial customers (below 35 kW) and large commercial customers (above 35 kW). Figure 3-7 illustrates the process of developing the Commercial Sector Load Forecast.”

- 1.1 Please provide a base GIS map of the BC Hydro system including heritage generation, transmission, the non-integrated Ft. Nelson area, generating stations serving the Non Integrated Areas (NIA’s); systemically important distribution lines (i.e. distribution lines to those remote areas served at distribution voltage such as Bella Coola), boundary delineations to the Fortis BC (Electric) service area, and interconnections to neighboring jurisdictions.
- 1.2 Please provide a GIS map of the four service regions (Lower Mainland, Vancouver Island, South Interior and the North Region) used in the SAE modelling, overlaying the boundaries of the four service regions to the base BC Hydro system map.
- 1.3 Please explain how the delineation into the four service regions helps the load forecast process and/or the accuracy of the load forecast modelling for the residential and commercial load forecast.

- 1.4 Please provide a GIS map of the 15 sub-regions used in the SAE modelling, overlaying the boundaries of the 15 sub-regions to the base BC Hydro system map.
- 1.5 Please provide a discussion of the logic, factors or criteria used in delineating the 15 sub-regions for SAE modelling.
- 1.6 Please explain how further delineation into the 15 sub-regions helps the load forecast process and/or the accuracy of the load forecast modelling for the residential sector.
- 1.7 Please provide historical average annual growth rate for the BC population for the period F2002-F2021, using forecasts for fiscal years F2019-F2021.
- 1.8 In recent years, circumstantial evidence including fortunes of various large-scale retailers, suggest that one of the characteristics of the economic recovery post the 2005-2009 recession has been a 'hollowing out' of the North American retail sector. In developing the commercial load forecast, has BC Hydro come across any evidence of such a trend in the BC retail sector? How have retail sector considerations informed the commercial load forecast?

## **2.0 Reference: LOAD AND REVENUE FORECAST**

### **Exhibit B-1, Section 3.3, p. 3-36, Section 3.2.5, p. 3-10**

In section 3.3, on page 3-36, BC Hydro states that "The results of the Load Forecast are described in aggregate and then by customer sector in sections 3.3.1 through 3.3.5, with the risks and uncertainties that accompany the results outlined in section 3.3.6."

In section 3.2.5, on page 3-10, BC Hydro states that "BC Hydro's Load Forecast is divided into the following four sectors as shown in Figure 3-3: Residential, Commercial and Light Industrial, Large Industrial and Other (which includes inter-utility sales, firm exports, street lighting and irrigation demand)."

- 2.1 Please confirm that 'sector' definitions as stated in Section 3.3, on page 3-36, are the same as 'customer sector' definitions that are captured in Section 3.2.5, on page 3-10 and shown in Figure 3-3. If not, please explain.
- 2.2 Please provide in a table format, actual load (in GWh) for fiscal years F2002-F2018, indicating annual consumption and breakdowns by sector. Please include forecasted annual load (in GWh) for fiscal years F2019-2021 and breakdowns by sector.
- 2.3 Please provide in a table format, actual load (in GWh) for the non-integrated area of Ft. Nelson, for fiscal years F2002-F2018, indicating annual consumption and breakdowns by sector. Please include forecasted annual load (in GWh) for fiscal years F2019-F2021 and breakdowns by sector.

**3.0 Reference: LOAD AND REVENUE FORECAST**

**Exhibit B-1, Sections 3.5, 3.3, 3.2.5, p. 3-56, p. 3-36, p. 3-10**

In section 3.5, on page 3-56, BC Hydro states that “Table 3-9 below summarizes the domestic Revenue Forecast as shown on Appendix A, Schedule 14.0.”

In section 3.3, on page 3-36, BC Hydro states that “The results of the Load Forecast are described in aggregate and then by customer sector in sections 3.3.1 through 3.3.5, with the risks and uncertainties that accompany the results outlined in section 3.3.6.”

In section 3.2.5, on page 3-10, BC Hydro states that “BC Hydro’s Load Forecast is divided into the following four sectors as shown in Figure 3-3: Residential, Commercial and Light Industrial, Large Industrial and Other (which includes inter-utility sales, firm exports, street lighting and irrigation demand).”

- 3.1 Please confirm that ‘sector’ definitions as captured in section 3.5, on page 3-56, in lines 1-4 of Table 3-9, are the same as ‘customer sector’ definitions as stated in section 3.3, on page 3-36, and ‘sector’ definitions as stated in Section 3.2.5, on page 3-10 and shown in Figure 3-3. If not, please explain.
- 3.2 Please provide in a table format the capture, by sector and aggregates, of the following indicators for the period F2002-F2021, using forecasts for fiscal years F2019-F2021:
  - i) Load (consumption during the fiscal year) in GWh
  - ii) Number of Accounts as at Fiscal Year End (#)
  - iii) Average Annual Consumption per Account (GWh)
  - iv) Revenue from Billing (\$)
  - v) Average Annual Revenue per Account (\$)
- 3.3 Please provide a graph of the F2002-F2021 ‘Load’ and ‘Revenue from Billing’.
- 3.4 Please provide a graph of the F2002-F2021 ‘Number of Accounts as at Fiscal Year End’ by sector.
- 3.5 Please provide graphs of the F2002-F2021 ‘Average Annual Consumption per Account’ and ‘Average Annual Revenue per Account’ for each sector.

**4.0 Reference: COST OF ENERGY**

**Exhibit B-1, Section 4.7, p. 4-26**

In section 4.7, on page 4-26, BC Hydro states that “The cost of Non-Heritage Energy includes cost associated with EPAs for the integrated system and the non-integrated area. As of October 2018, BC Hydro has 133 active EPAs with

IPPs. This includes 124 projects that are in commercial operation and delivering energy as well as nine projects that are in various phases of development and have not yet reached commercial operation.”

- 4.1 Please provide a map of the 133 IPP projects, overlaying illustrative IPP project information over the base BC Hydro system map, as per the following: i) Please indicate each IPP project by a circle or dot whereby the size of the dot is representative of the size of the project as measured by its Installed Capacity (in MW); ii) Use color to denominate the IPP resource type.
- 4.2 Along with the map, for each IPP, please provide (either in a separate table or as part of the map) the project start date (fiscal year), its installed capacity (in MW), and historical average annual energy (AAE) delivery (in GWh per fiscal year) beginning with F2002 or the project start date, whichever is the latter. For those IPP projects that have not yet reached commercial operations, where available please provide the planned installed capacity of the project.

## 5.0 Reference: OPERATING COSTS

### Exhibit B-1, Section 5.3.2, Figure 5-3, Table 5-2, pp. 5-10–5-11

In section 5.3.2, on page 5-10 of the Application, BC Hydro states that “Our Business Groups are now organized under our four major work functions – Plan, Build, Operate, and Support. This is shown in Figure 5-3 below.

Figure 5-3 Plan-Build-Operate-Support Model



Further in section 5.3.2, on page 5-10, BC Hydro states that “The change brings together groups with similar functions that were previously separated by our different lines of business - Generation, Transmission, and Distribution. In addition, KBUs within these Business Groups have aligned their work to our main asset types – station assets (generation plants and substations) and line assets (transmission and distribution lines). Our Business Groups and their respective KBUs are summarized in Table 5-2.”

- 5.1 As per Table 5-2, on page 5-11, the Conservation and Energy Management KBU is included as a support function in the ‘Support’ business group. As part of developing the new organizational nomenclature, did BC Hydro consider including the Conservation and Energy Management KBU in the Integrated Planning business group? If so, what pros and cons were discussed?

- 5.2 In BC Hydro's view, could the efforts of Conservation and Energy Management KBU benefit from it being included in the 'Planning' work function of the organization? Please discuss.
- 5.3 In BC Hydro's view, could the efforts of the Integrated Planning business group, benefit from the inclusion in it, of the planning functions inherent in Conservation and Energy Management? Please discuss.

**6.0 Reference: CAPITAL EXPENDITURES**

**Exhibit B-1, Section 6.1.2, p. 6-5**

In section 6.1.2, on page 6-5, BC Hydro states that "BC Hydro's actual and planned capital expenditures and additions for fiscal 2017 to fiscal 2021 are provided in Table 6-1 and Table 6-2.."

- 6.1 Please provide in a table format, a list of BC Hydro generation growth projects or asset acquisitions, undertaken over the F2002-F2021 period with an in-service project cost in excess of \$75M. For those projects that have been placed into service, please provide the actual total cost for each project and its in-service date (fiscal year). Please include forecasts for projects that will be placed into service during fiscal years F2019-2021.
- 6.2 Please provide in a table format, a list of BC Hydro transmission and distribution growth projects, undertaken over the F2002-F2021 period with an in-service project cost in excess of \$75M. For those projects that have been placed into service, please provide the actual total cost for each project and its in-service date (fiscal year). Please include forecasts for projects that will be placed into service during fiscal years F2019-2021. Please identify projects as either 'transmission' or 'distribution'.
- 6.3 Please advise whether BC Hydro reports, as part of its annual financial reporting cycle, the book value of its assets as at fiscal year end.

**7.0 Reference: CAPITAL EXPENDITURES**

**Exhibit B-1, Section 6.3.4, p. 6-29**

In section 6.3.4, on page 6-29, BC Hydro highlights that "Step 3 - Enterprise Portfolio Management Process Validates and Prioritizes Capital Work Based on Risk and Drivers"

- 7.1 Is the Enterprise Portfolio Management process concerned with power system diversity and the ability of growth capital projects to contribute to increased power system diversity? Please discuss.
- 7.2 Is contribution to power system diversity an objective of and/or a criterion used in the capital project prioritization process or consideration of project alternatives? Is yes, how is contribution to power system diversity measured and/or considered? Please discuss.

**8.0 Reference: CAPITAL EXPENDITURES**

**Exhibit B-1, Section 6.4, Figure 6-11, p. 6-31\_6-32**

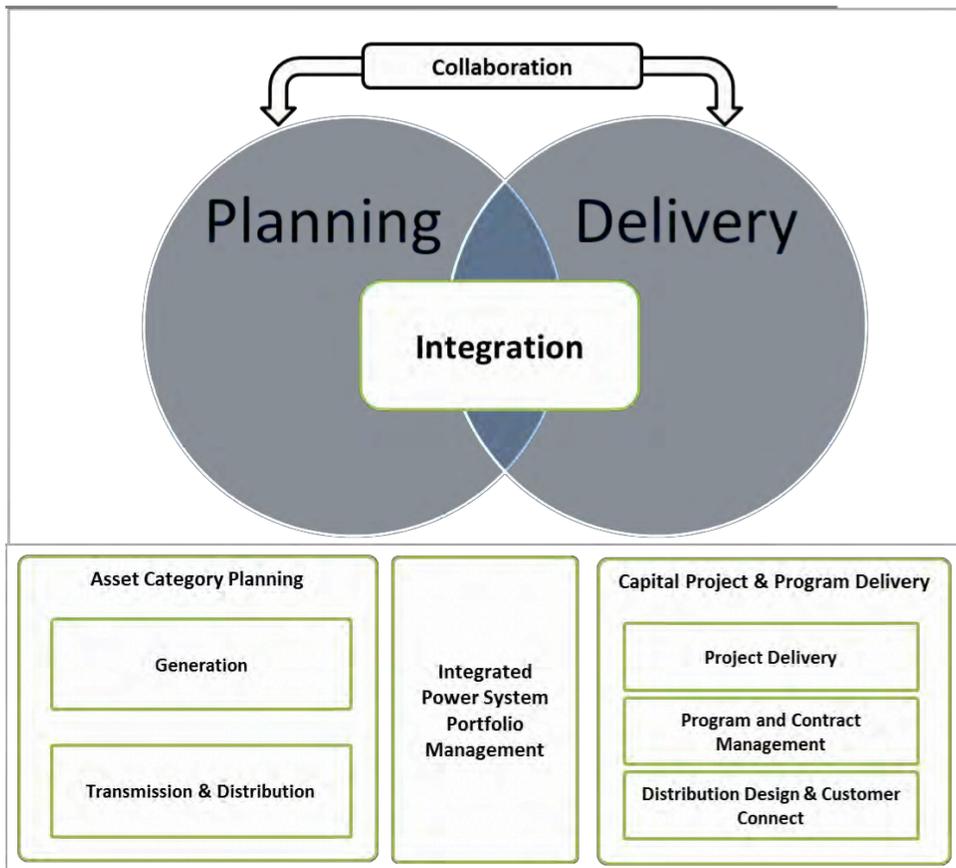
In section 6.4, on page 6-31, BC Hydro states:

“The Power System includes BC Hydro’s Generation, Transmission and Distribution assets. Over time, the condition and performance of existing assets degrade, regulatory and safety requirements change and new assets are required to address load growth and connect new customers. Together, these factors create issues, risks and opportunities to be addressed through capital investment.”

“The planning and delivery processes for the Power System are integrated, requiring a high degree of collaboration across the organization.”

“Figure 6-11 below represents a high level depiction of the interaction between functional groups responsible for asset management and planning, and portfolio delivery when planning and delivering capital investments for the Power System.”

Figure 6-11 Integrated Power System Planning and Delivery



- 8.1 Does BC Hydro consider Demand Side Management spending an investment in the system? Please discuss.
- 8.2 In BC Hydro's view, could the Integrated Planning process described in Figure 6-1, including the Peer Review process of the Capital Planning Working Group benefit from inclusion of Conservation and Energy Management functions in the Integrated Planning activities? Why or why not? If yes, please explain, in what ways?

**9.0 Reference: CAPITAL EXPENDITURES**

**Exhibit B-1, Section 6.4.1.2, Table 6-6, pp. 6-35–6-36**

Table 6-6 on page 6-36 of the Application, provides information on "BC Hydro's Generating Facilities by Category".

- 9.1 Please confirm the age of the Ft. Nelson Generating (FNG) Station.

**10.0 Reference: CAPITAL EXPENDITURES**

**Exhibit B-1, Section 6.4.4.1, p. 6-52, p.6-53**

In section 6.4.4.1, on page 6-52 of the Application, BC Hydro describes the first step of the transmission and distribution bottom-up capital planning process:

"Step 1 – Identify the System and Asset Needs"

"First, BC Hydro identifies system and asset needs to be considered for remediation. This assessment includes reviews of system performance data to identify assets with degrading conditions, representing safety or environmental risks, not performing adequately or not meeting regulatory requirements. System and substation load forecasts are also developed to identify areas in the system that may require reinforcement. Based on these reviews, BC Hydro develops a preliminary approach and timeline for remediation."

Further on page 6-53, BC Hydro states (on line 6) in the "Load and Energy Forecasts" that "BC Hydro assesses the capability of the transmission and distribution system to meet expected peak demand and accommodate forecast load and generation additions;"

- 10.1 Please provide a discussion of load forecast(s) and/or load forecast products that are used to inform "System and Asset Needs" assessment.
- 10.2 If BC Hydro uses more than one load forecast product to inform "System and Asset Needs" assessment, please explain how and when in the load forecasting cycle the forecasts are derived, and how they inform the assessment.

**11.0 Reference: CAPITAL EXPENDITURES**

**Exhibit B-1, Section 6.4.4.2, p. 6-53**

In section 6.4.4.2, on page 6-53 of the Application, BC Hydro describes the second step of the transmission and distribution bottom-up capital planning process:

“Step 2 – Determine the Scope of the Studies”

“Second, BC Hydro determines the scope of studies to assess identified needs. These studies integrate multiple needs, impacting the same parts of the system, within a similar timeframe, so that they proceed through the planning process together.”

“In this step, identified needs are reviewed by regionally-focused cross-functional teams to determine integration opportunities. These teams consider how needs relate to each other as well as the required timelines for remediation and the risks of delay. These reviews may result in certain needs being addressed through province-wide work programs or deferred due to low risk.”

- 11.1 Please advise if the cross-functional teams include the perspective of Conservation and Energy Management.
- 11.2 If not, and in BC Hydro’s view, could this cross-functional planning process benefit from inclusion of regionally-focused DSM expertise to determine integration opportunities?

**12.0 Reference: CAPITAL EXPENDITURES**

**Exhibit B-1, Sec. 6.4.7.5, 6.4.7.6, 6.4.7.7, 6.4.7.8, pp. 6-64–6-67**

In section 6.4.7.5, on page 6-64 of the application, BC Hydro states that “The delivery lifecycle of PPM projects is divided into four phases: Initiation, Identification, Definition and Implementation. Each phase is further divided into various stages. The lifecycle represents a staged approach to project definition and gate approvals.”

In section 6.4.7.6, on pages 6-65 and 6-66, BC Hydro provides more detail on Phase 1 (Initiation) and Phase 2 (Identification) in PPM Project Lifecycle. In section 6.4.7.8, on page 6-67, BC Hydro provides more detail on Phase 3 (Definition) in PPM Project Lifecycle.

- 12.1 Please advise, if the Initiation, Identification, and Definition phases of a project’s lifecycle, enable consideration of the ability of a project to contribute to system diversity.
- 12.2 If yes, please discuss as to, the degree and process by which this is achieved as a project moves along the development continuum from Phase 1 to Phase 2 to Phase 3 in PPM Project Lifecycle.

**13.0 Reference: REGULATORY ACCOUNTS**

**Exhibit B-1, Section 7.3, Table 7-1, pp. 7.8–7.9**

In section 7.3, on page 7-9 of the Application, BC Hydro states that “BC Hydro’s actual and forecast regulatory account balances for the fiscal 2017 to fiscal 2021 period are presented in Table 7-1..“

- 13.1 Please provide in a table format, the total of BC Hydro Regulatory Account Balances (\$M) as at fiscal year end for the period F2002-F2021. Please include forecasts for fiscal years F2019-F2021.

**14.0 Reference: DEMAND-SIDE MANAGEMENT**

**Exhibit B-1, Section 10.2.2, Table 10-4, p. 10-8**

In section 10.2.2, on page 10-8, BC Hydro includes “Table 10-4: DSM Program Spend by Sector”.

- 14.1 Please confirm that the definition of ‘sector’ for DSM Program Spend (as in Table 10-4) is the same as definition of ‘sector’ used in the Load Forecast (Exhibit B-1, Chapter 3).
- 14.2 Please provide in a table format BC Hydro’s annual DSM Program Spend (in \$M per fiscal year) in aggregate and broken down by sector, for the period F2002-2021, using forecasts for fiscal years F2019-F2021.
- 14.3 Please provide in a table format electricity savings from BC Hydro’s annual DSM Program Spend (in GWh per fiscal year), for the period F2002-F2021, in aggregate and by sector, using forecasts for fiscal years F2019-2021.
- 14.4 Please provide a commentary on the methodology for estimating or confirming DSM program savings over the F2002-F2021 fiscal years, and whether the methodology has undergone notable changes during this period.

**15.0 Reference: DEMAND-SIDE MANAGEMENT**

**Exhibit B-1, Section 10.3.1.1, p. 10-14, Appendix X, p. 4, p. 13**

In section 10.3.1.1, on page 10-14 of the Application, BC Hydro states that:

“Traditional DSM Is in the Interest of Persons who Receive or May Receive Service”

“This Application demonstrates that our proposed traditional DSM expenditures are in the interests of persons in B.C. who receive or may receive service from BC Hydro. For instance, BC Hydro’s proposed expenditures reflect a broad and cost effective range of demand-side management initiatives that provide significant energy savings and capacity benefits and provide customers with the

opportunity to save electricity and lower their bills, while reducing BC Hydro's revenue requirements."

In Appendix X, on page 4, BC states that "In developing the F2020-F2022 Demand-Side Management Plan, Conservation and Energy Management has continued with the moderation strategy and its funding envelope, given the continued period of surplus electricity and need to address rate increase pressure."

- 15.1 Please provide a discussion of system benefits arising from continued DSM program spend in an environment of an anticipated extended period of surplus electricity, specifically for those areas of the system (localized or broader) that have benefited or are benefiting from simultaneous (with the DSM program spend) generation and/or transmission build.

In Appendix X, on page 13, in discussing the development framework for the DSM plan, BC Hydro includes "flexibility to ramp activities and expenditures up or down as required" as one of the customer and strategic objectives that the DSM plan was assessed against.

- 15.2 Is this flexibility being used during the Test Period to inform BC Hydro integrated planning activities and/or DSM program spend for regions or localized areas, in light of other broader planning and capital investment activities for such areas?

**16.0 Reference: APPENDIX E**

**Exhibit B-1, Appendix E, p. 19 of 36**

In Appendix E, on page 19 of 36 of the appendix, BC Hydro provides a "Performance Measures" table. Line 3.a of the "Performance Measures" table captures "Affordable Bills" metric.

- 16.1 Please provide the average annual growth rate of BC Hydro electricity rate increases in aggregate (if measurable) and by sector, for the period F2002-F2021, using forecasts for fiscal years F2019-F2021.
- 16.2 How does the average annual growth rate of BC Hydro electricity rate increases over the F2002-F2021, compares with those of the other utilities surveyed? Has BC gained or relinquished any competitive advantage in this regard, as compared to other jurisdictions?

**17.0 Reference: APPENDIX E**

**Exhibit B-1, Appendix E, page 23 of 36**

In Appendix E, on page 23 of 36, BC Hydro provides a "Summary Financial Outlook" Table.

- 17.1 Please provide in a table format, a list of 'corporate health' or 'financial performance' indices that BC Hydro traces and reports annually, and a brief description of each.

17.2 Also, please indicate whether BC Hydro measures the year-over-year progression of these indices, or whether it conducts benchmarking with 'corporate health' or 'financial performance indices of other utilities.