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February 28, 2017

FORTISBC INC. LONG TERM ELECTRIC RESOURCE PLAN & LONG TERM DEMAND SIDE MANAGEMENT PLAN EXHIBIT A-3

Ms. Diane Roy
Vice President, Regulatory Affairs
FortisBC Inc.
16705 Fraser Highway
Surrey, BC V4N 0E8

Dear Ms. Roy:

Re: FortisBC Inc.
2016 Long Term Electric Resource Plan & Long Term Demand Side Management Plan

Further to FortisBC Inc.'s November 30, 2016 filing of the above-noted application, enclosed please find British Columbia Utilities Commission Information Request No.1. In accordance with the Regulatory Timetable, please file your responses no later than Thursday, April 06, 2017.

Yours truly,

Original signed by:

Erica Hamilton

/ad
Enclosure

cc: Registered Interveners

FortisBC Inc.
2016 Long Term Electric Resource Plan & Long Term Demand Side Management Plan

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A. CHAPTER 1 – INTRODUCTION

1.0 **Reference:** **PURPOSE OF THE RESOURCE PLAN**
FortisBC Energy Utilities (FEU) 2014 Long Term Resource Plan (LTRP) Decision dated December 3, 2014 p. 5 and Order G-189-14; *Utilities Commission Act* (UCA) sections 44.1, 44.2, 45, 71
Long Term Electric Resource Plan guidance for future applications

On page 5 of the British Columbia Utilities Commission (Commission) decision on the FEU 2014 LTRP Application, the Commission describes the purpose of FEU's resource plan as providing strategic direction and insight for future applications, direction on broader policy issues and considering areas where there may be public interest concerns.

1.1 In a format consistent with the three bullets provided on page 5 of the FEU 2014 LTRP Decision, please provide a summary list of the key guidance in this resource plan that FortisBC Inc. (FBC) considers it may rely on in applications to the Commission over the next five years.

2.0 **Reference:** **RESOURCE PLAN OBJECTIVES**
Exhibit B-1 (the Application), Volume 1 (2016 LTERP Application), pp. 5, 95; Commission Resource Planning Guidelines[1], p.3; FBC 2012-2013 Revenue Requirement & Review of 2012 Integrated System Plan (2012 RR & ISP), Exhibit B-1-1, p. 11; 2012 RR & ISP Decision dated August 15, 2012, pp. 143,144 and Order G-110-12; Seventh 2016 Northwest Conservation and Electric Power Plan (2016 NW PP)[2], pp. 15-26, 15-43; BC Hydro 2013 Integrated Resource Plan (BCH 2013 IRP)[3], pp. 1-12 – 1-17, 1-19
General

FBC describes its resource planning objectives on page 5 of the 2016 LTERP Application. The Commission describes resource planning objectives on page 3 of the Resource Planning Guidelines, which include "equal consideration of DSM and supply resources".

FBC states on page 95 of the 2016 LTERP Application: "Demand-side resource options are typically more cost-effective than new supply-side resource options….Accordingly, FBC looks to demand-side resources first to meet any future [load resource balance (LRB)] gaps." FBC 2012 resource planning objectives were described on pages 143 and 144 of the FBC 2012 RR & ISP Decision. FBC stated on page 11 of its 2012 RR & ISP application (Exhibit B-1-1): "Reduction of GHG volumes is a key input in evaluating capacity and energy alternatives in the Company's 2012 Resource Plan."

Figure 15-17 on page 15-43 of the 2016 NW PP compares residential bills and rates with and without lower conservation, and figure 15-11 on page 15-26 compares carbon emissions by scenario. BC Hydro described its planning criteria on pages 1-12 to 1-17 of the BCH 2013 IRP which include: achieving electricity self-sufficiency by 2016 and generation and transmission planning criterion. On page 1-19, BC Hydro defines cost-effectiveness.

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[1] http://www.bcuc.com/Documents/Guidelines/RPGuidelines_12-2003.pdf
[2] https://www.nwcouncil.org/media/7149924/7thplanfinal_chap15_resourcestratanalysis.pdf
[3] https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/integrated-resource-plans/current-plan/0001-nov-2013-irp-chap-1.pdf

2.1 In table form, please compare FBC's 2016 resource planning objectives to those included in the following documents: (i) the Resource Planning guidelines; (ii) FBC's 2012 RR & ISP; and (iii) BCH's 2013 IRP. Where objectives are included in the resource plans listed above, but not in FBC's 2016 LTERP Application, please explain if FBC supports these additional objectives (and if not, why).

2.1.1 Does FBC have, as a resource planning objective, giving "equal consideration to DSM and supply resources"? Please explain if this is a change from the 2012 RR &ISP.

2.2 Please identify the key metrics that could be used to measure how portfolios perform against each of FBC's objectives. Please specifically comment on whether the following metrics could be appropriate: residential bills, FBC rates, BC greenhouse gas (GHG) emission levels, percentage of load met through energy from BC generators, percentage of load met though clean energy supply, and loss of load expectation (related to network/generator capacity).

3.0 **Reference: REGULATORY FRAMEWORK**
Exhibit B-1, Volume 1, p. 9
Applicable Clean Energy Act (CEA) objectives relevant to the LTERP

On page 9 of the Application, Table 1-3, FBC states that: "GHG emissions for [the] preferred portfolio including clean or renewable resources and gas-fired generation are minimal".

3.1 Please explain the meaning of "minimal" GHG emissions for the preferred portfolio, measured as emissions per tonne, and provide a comparison of GHG emissions of the preferred portfolio and other considered portfolios in the 2016 LTERP Application.

B. CHAPTER 2 – PLANNING ENVIRONMENT

4.0 **Reference: PLANNING ENVIRONMENT**
Exhibit B-1, Volume 1, p. 18
Climate Leadership Plan (CLP)

On page 19 of the Application, FBC states that it "has addressed relevant items from the CLP in its load scenarios, market price forecasts and portfolio analysis."

4.1 Please discuss which items in the CLP FBC considers relevant and has addressed in the LTERP.

5.0 **Reference: CHANGING SUPPLY ENVIRONMENT**
Exhibit B-1, Volume 1, pp. 5, 37, p. 39
Alberta and regional markets

On page 37 of the Application, FBC states that B.C.'s role "in supplying Alberta's future needs is not yet known, but if a significant amount of electricity from B.C. is transported to Alberta, it could reduce the amount of potentially surplus generation available in B.C. to meet FBC requirements."

On page 39 of the Application, FBC states it believes that its strategy of making market purchases to close the gap between its supply and demand has generally been successful. On page 5 of the Application FBC lists its resource planning objectives (cost-effective, secure and reliable power, cost-effective Demand Side Management (DSM), consistency with provincial energy objectives).

5.1 Please discuss the magnitude of the potential impact of BC's role to supply Alberta's electricity needs to FBC.

5.2 Please explain which metrics FBC uses to establish achievement of its strategy of making market purchases to close the gap between its supply and demand.

5.3 Please explain how this strategy measures against the stated resource planning objectives.

6.0 **Reference: PLANNING ENVIRONMENT**
Exhibit B-1, Volume 1, p. 47
Power Purchase Agreement (PPA) rate scenarios for Tranche 1 energy and capacity

On page 47 of the Application, FBC states: "The percentage increases in the PPA Tranche 1 energy and capacity rates are the same as those applicable to BC Hydro's residential customers. … In the low case, rate increases keep up with inflation of about 2 percent per year …. In the base case, rate increases are 1 percent per year in real terms. In the high case, rate increases are 3 percent in real terms."

6.1 Please provide a table showing both the nominal and the real annual percentage increases in BC Hydro's residential rates and the PPA Tranche 1 energy and capacity rates for each year from 2007 through to 2016.

6.2 Please discuss the likelihood of the PPA Tranche 1 energy and capacity rates having an annual percentage increase of 1 percent in real terms, based on an annual inflation rate of 2 percent. In your discussion please consider the response to the previous question.

6.3 Please explain whether FBC has confirmed with BC Hydro the reasonableness of its low/base/high estimates of Rate Schedule (RS) 3808 T1 increases, and provide BC Hydro's response if available.

7.0 **Reference: DISRUPTIVE CHALLENGES**
Exhibit B-1, Volume 1, p. 69; Edison Electric Institute (EEI), Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business, Jan. 2013, p. 1; Ceres, Practicing Risk-Aware Electricity Regulation, 2014 update, p. 19[4]
General

FBC scenarios on page 69 of the 2016 LTERP Application show that 4 out of 5 of the scenarios modelled show growing peak demand, but only 2 out of the 5 scenarios modelled show growing energy levels. Page 1 of the EEI January 2013 paper states: "The financial risks created by disruptive challenges include declining utility revenues, increasing costs, and lower profitability potential, particularly over the long-term." Page 19 of the Ceres 2014 update paper states: "The U.S. electricity industry has entered what may be the most uncertain, complex and risky period in its history."

7.1 Please describe at a high level the key disruptive challenges faced by FBC and the adjustments made to the LTERP to meet those disruptive challenges.

7.2 Please explain to what extent FBC coordinates its long-term planning with BC Hydro and FortisBC Energy Inc. (FEI). Does FBC consider that its coordination in long-term planning should be expanded to also include transportation?

[4] https://www.ceres.org/resources/reports/practicing-risk-aware-electricity-regulation-2014-update/view

8.0 **Reference:** **ELECTRIFICATION**
Exhibit B-1, Volume 1, p. 24, Appendix B, p. 20, Appendix G, pp. 28, 45; CLP, p. 20; BC Hydro F2017-F2019 Revenue Requirements Application (F2017-F2019 RRA), Exhibit B-9, BCUC IR 7.2, Attachment 1, p. 2
Electric Vehicles (EV)

FBC states on page 24 of the 2016 LTERP Application that it supports electric vehicle adoption by funding charging stations. On page 45 of Appendix G to the FBC 2016 LTERP Application, Navigant states: "Navigant believes that of all eight load drivers, EVs could pose the greatest risk of disruption for FortisBC in the period of analysis." Page 28 of the Navigant report includes 5 Electric Vehicle (EV) scenarios.

The CLP states on page 20: "… policies that facilitate the adoption of zero emission vehicles like electric cars can make a significant impact in the fight against climate change. A major challenge for adoption of these vehicles is ensuring that owners can access charging stations." On page 2 of the November 3, 2016 letter from the Minister of Energy to BC Hydro regarding the CLP (Exhibit B-9), the Minister stated that reorienting DSM to promote low-carbon electrification is "expected to be revenue positive…."

8.1 Please describe FBC's strategy regarding EVs. Specifically, does FBC consider that its strategy is to promote, discourage or be neutral towards EVs?

8.1.1 Please explain: (i) how much, for each year, FBC has spent on EV charging stations for the last five years and is planned for the next five years; (ii) FBC strategy (if any) to encourage EV customers to charge during off-peak hours; (iii) FBC strategy (if any) regarding grid reinforcements that may be required.

8.2 Does FBC consider that increased adoption of EVs would provide a net benefit to ratepayers? Please explain.

8.3 Does FBC consider that EV batteries could be used as a source of grid storage over the term of the LTERP? Please explain.

9.0 **Reference:** **ELECTRIFICATION**
Exhibit B-1, Volume 1, p. 9, Appendix B, p. 28, Appendix G, p. 46, Volume 2 (2016 LT DSM Plan), Appendix C, p. 3; CLP, p. 28; CEA, Section 2, BC's Energy Objectives; Decision and Order G-186-14 on FBC's application for 2015- 2016 DSM Expenditures, Decision dated December 3, 2014 (FBC 2015-2016 DSM Decision), p. 14; 2016 NW PP, p. 17-5
Natural gas to electricity fuel switching

On page 3 of Appendix C to the 2016 LT DSM Application, Navigant states: "Since there are no economic benefits (only costs) to society resulting from the adoption of these measures, all have a TRC ratio of zero…." On page 46 of Appendix G to the FBC 2016 LTERP Application, Navigant states: "… fuel switching should be monitored simply due to the very substantial unit impacts, the highest of any of the load drivers examined in this study."

BC's energy objectives as stated in the CEA, include: "to encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia." The CLP states on page 28: "To advance efficient electrification we are taking action by working with BC Hydro to expand the mandate of its DSM programs to include investments that increase efficiency and reduce GHG emissions."

The Commission stated in the FBC 2015-2016 DSM Decision: "The Commission Panel is concerned that FBC excludes customers from eligibility for FBC DSM incentives where they are switching from gas to electricity. The Panel considers that this approach acts contrary to BC's energy objective …." The 2016 NW PP describes on page 17-5 the model conservation standards for conversion to electric space conditions and water heating and states: "… utilities should take actions through … programs or a combination thereof to achieve electric power savings from such buildings."

9.1 Please describe FBC's strategy regarding natural gas to electricity fuel switching for customer space and water heating needs. Specifically, does FBC consider that its strategy should be to promote, discourage or be neutral to a customer fuel switching from natural gas to electricity?

9.1.1 Does FBC consider that encouraging natural gas to electricity fuel switching increases risks to its shareholder (either directly, or indirectly via FEI), and if so, how could this disincentive to encourage fuel switching be addressed? Please explain.

9.2 Please explain how Navigant factored in (i) BC GHG reduction benefits and (ii) customers non-energy benefits into its determination that there are no economic benefits (only costs) to society resulting from the adoption of natural gas to electricity fuel switching measures.

9.3 Does FBC consider that its residential inclining block rate design could discourage customers from fuel switching from natural gas to electricity? Please explain.

9.4 Are customers who fuel switch from natural gas to an efficient electric appliance eligible for FBC DSM incentives? If not, does FBC consider that this could discourage customer fuel switching from natural gas to electricity? Please explain.

9.4.1 Does FEI offer DSM incentives to customers who switch from electricity to natural gas? If yes, please explain.

9.4.2 Does FBC consider that, if a fuel switching customer is not offered a DSM incentive, there is a risk that they could install a less efficient electricity appliance? Please explain.

10.0 **Reference:** **DISTRIBUTED GENERATION**
Exhibit B-1, Volume 1, pp. 8, 21, 26-28, Appendix G, p. 46; CEA, section 2, BC's energy objectives; 2007 BC Energy Plan: A Vision for Clean Energy Leadership (2007 BC Energy Plan), p. 39; FBC 2016 Net Metering Program Tariff Update (FBC 2016 NM), Order G-199-16, Appendix A, Reasons for Decision dated December 29, 2016 (FBC 2016 NM Reasons for Decision), p. 5; BCH 2013 IRP, pp. 8-4, 8-5; FBC 2012 RR & ISP, Exhibit B-1-1, p.9; Arthur D. Little, Distributed Generation [DG]: Policy Framework for Regulators, 1999, pp. iv, 10-12[5]
FBC Strategy

On page 21 of the FBC 2016 LTERP Application, FBC states that the City of Nelson is proposing to build a small solar photovoltaic (PV) array, and that such initiatives, if pursued on a large enough scale, could impact the traditional utility business in which FBC is engaged. On pages 26 to 28, FBC also discusses small-scale distributed generation (DG) and states that it presents some challenges for FBC. On page 46 of Appendix G to the FBC 2016 LTERP Application, Navigant states: "Although likely a lower disruption risk than EVs, rooftop solar PV has the potential to significantly affect the energy consumption of customers in FortisBC territory."

[5] http://www.encorp.com/ADLittleWhitePaperPolicyFrameworkForRegulators.pdf

The CEA includes as a BC energy objective: “use and foster…innovative technologies that support…the use of clean and renewable resources.” The 2007 BC Energy Plan includes as Policy Action #25: “Ensure the procurement of electricity appropriately recognizes the value of aggregated intermittent resources.”

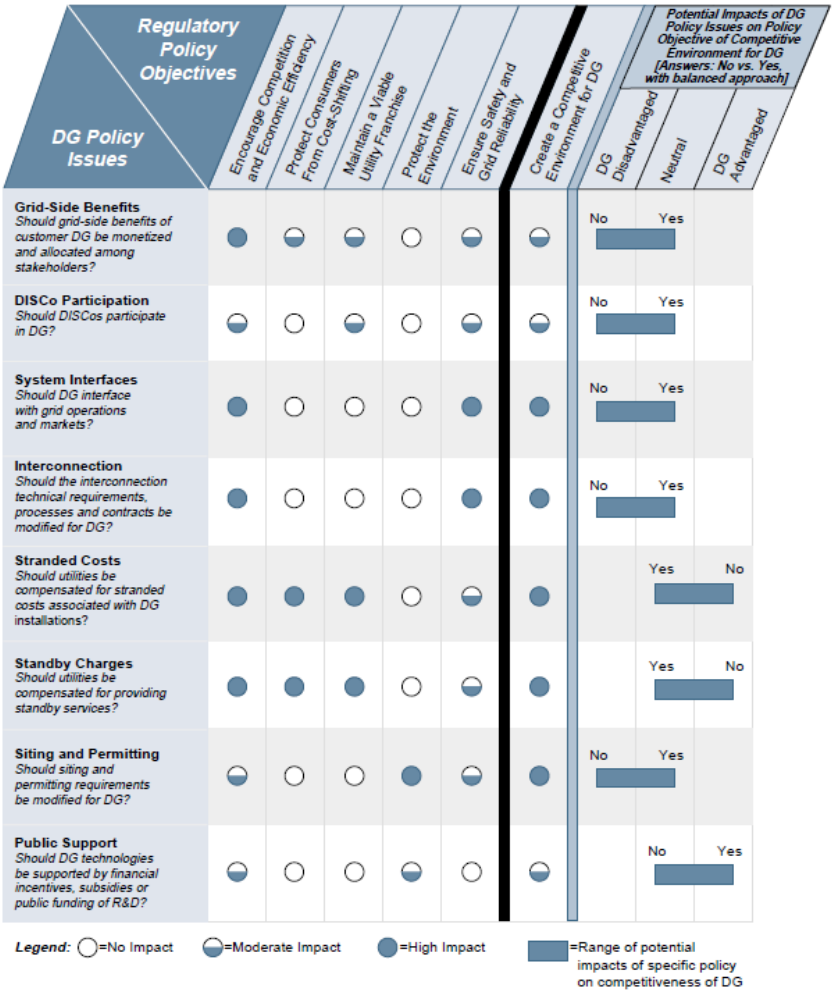
On Page 5 of the FBC 2016 NM Reasons for Decision, the Commission stated: “The Panel feels that these broader issues (for example, whether the Program should be expanded beyond its original intent) are more appropriately addressed following the LTERP and/or [self-generator policy (SGP)] proceedings as these proceedings may provide broader guidance regarding FBC’s self-generation strategy.”

BC Hydro described its objectives and principles of its Clean Energy Strategy on page 8-4 to 8-5 of the BCH 2013 IRP. These included: “A continual focus on finding the most cost-effective clean energy resources through competitive, or competitively benchmarked, processes” and “Effective participation by First Nations … on clean energy projects in their traditional territories.”

FBC stated on page 9 of its 2012 RR & ISP Application (Exhibit B-1-1): “As BC Hydro proceeds to implement programs such as Feed In Tariffs and continues to operate the various power acquisition activities (Standing Offer Program, Clean Call, Bioenergy Call), it creates some impetus for FortisBC to consider the implementation of similar programs in its service territory in order to maintain provincial consistency ….”

A 1999 Arthur D. Little White Paper titled “Distributed Generation: Policy Framework for Regulators”, provides the following overview of DG policy issues in Figure E-1, page iv and on page 12 states: “A public policy that prohibits DG interfaces has, at worst, the potential to significantly limit the competitive environment for DG.”

Figure E-1: Issue Mapping Process



10.1 Please define the terms ‘self-generation’, ‘distributed generation’, ‘small-scale distributed generation’, and ‘net metering’ as used in this Application.

10.2 Please describe FBC’s strategy regarding DG. Specifically, for each of the DG Policy Issues described in Figure E-1 of the 1999 Arthur D. Little White paper, does FBC consider that it should advantage, disadvantage or be neutral towards distributed generation compared to other generation? Please also explain whether FBC considers that its strategy should be different depending on the size, type, ownership (e.g. First Nation, community) and location of the generator.

10.3 Does FBC consider that it should have as an objective obtaining all cost-effective clean distributed generation (i.e., ‘behind-the-meter’ generation) to meet its load? Please explain why/why not.

10.4 Does FBC consider that its DG strategy should aim for provincial consistency with BC Hydro? If no, please explain in which areas FBC’s DG strategy should differ.

11.0 **Reference:** **DISTRIBUTED GENERATION**
Exhibit B-1, Volume 1, pp. 26, 27, 28, 90, 113; FBC 2016 Self Generation Policy (FBC 2016 SGP), Stage I, Decision dated March 4, 2016, p. 17 (FBC 2016 SGP Stage I Decision), and Order G-27-16; 2016 NW PP, p. 1-12; FBC 2016 NM, Exhibit B-12, BCUC IR 13.4
Costs and benefits

On pages 26 and 27 of the FBC 2016 LTERP Application, FBC states that small-scale DG presents some challenges to FBC, including safety, grid stability and cost. FBC also states on page 90: "Intermittent renewable generation creates many new challenges not experienced with conventional distributed generation…. Depending on its location, the integration of DG can reduce power losses on the transmission and distribution network, but as the penetration level increases, the power losses may begin to increase."

FBC states on p. 113 of the 2016 LTERP Application that self-generation supply from larger industrial customers can have the following benefits: self-sufficiency and less reliance on market supply; reduction of transmission losses depending on location on the FBC system; improved reliability depending on location; and complement traditional power generation. FBC also states on pages 27 and 28 of the 2016 LTERP Application that it is considering filing an application for a pilot community solar program.

The FBC 2016 SGP Stage I Decision includes on page 17 a list of potential benefits of self-generation as identified by FBC. The 2016 NW PP states on page 1-12: "… decreasing costs for utility-scale and distributed-scale photovoltaic systems have made them cost-competitive sources of energy supply." FBC stated in the FBC 2016 NM proceeding (Exhibit B-12, BCUC IR 13.4): "The Company does not currently have technical or safety concerns regarding customer investment in small hydro-electric installations that meet the interconnection guidelines."

11.1 Does FBC consider that (i) new small-scale clean self-generation and (ii) new large-scale self-generation provide an overall net benefit to BC? Please explain how FBC estimates the benefits and costs, and arrives at the net benefits.

11.2 Please expand on FBC's DG safety concern regarding small-scale DG. Specifically, is FBC able to mitigate this concern through its connection policy?

11.3 Please expand on FBC's DG grid stability concern. Specifically, can this concern be addressed through, for example, the planning reserve margin and the connection policy?

11.4 Please expand on FBC's DG cost related concern. Specifically: (i) if the concern relates to contribution towards sunk network costs, why is it a problem if an electric heating customer with roof-top solar makes the same or similar contribution, as a customer who is low-use because they have gas space and/or water heating; and (ii) if the concern relates to incremental network costs, can this be addressed in the connection policy?

11.5 For each of the benefits identified on page 17 of the FBC 2016 SGP Stage I Decision, please explain: (i) whether FBC considers that they could apply to both large and small distributed generation; and (ii) whether (and if so how) these benefits flow back to the self-generators that provide them.

11.6 Please expand on the community solar PV pilot being considered by FBC. Please include in your discussion: (i) how the cost of this investment would be accounted for (would it be in rate base); (ii) whether FBC investment in solar PV would be on a level playing field with self-generators wanting to make the same investment; and (iii) why this was not included in the Action Plan.

12.0 **Reference: DISTRIBUTED GENERATION**
Exhibit B-1, Volume 1, p. 113; FBC 2016 SGP Stage I Decision, p. 11; FBC 2016 NM Reasons for Decision, pp. 9, 12
DG market barriers and mitigation approaches

FBC states in its 2016 LTERP Application (p. 113) that it is not actively looking to purchase power from self-generators, but may do so if the cost is lower than FBC alternatives.

The Commission stated in the FBC 2016 SGP Stage I Decision on page 11, that FBC's SGP should identify and mitigate market barriers to cost-effective clean self-generation. The Commission stated in the FBC 2016 NM Reasons for Decision on pages 9 and 12:

> FBC states that the NM Program is not the correct program to set the rate to buy power … However, FBC states that it has no tariff or program in place to purchase IPP power…. The Panel also notes that BC Hydro's net metering program does have such a condition [50kW capacity limit] imposed on participants.

12.1 Please describe the market barriers to customer investment in DG. Please specifically comment on whether they could include: difficulty accessing the market, overly-complex interconnection policy, lack of standby service, and immature state of the industry.

12.2 Does FBC consider that a 'neutral' (as opposed to 'discourage') DG strategy requires that FBC identify and mitigate market barriers to distributed generation? Please explain.

12.3 To what extent does FBC consider that the customers cost of investment in DG is a relevant consideration for FBC in determining what the output is worth? Please explain.

12.4 BC Hydro has a Standing Offer Program (SOP), micro-SOP and net metering (100kW generator capacity cap, no volume cap). Comparatively, what does FBC have?

12.4.1 Are new FBC self-generators eligible for BC Hydro's micro-SOP or SOP program?

12.4.2 Does FBC anticipate filing any energy purchase agreements with industrial self-generators in the next four years? Please explain why/why not, and if yes, why it is not included in the four-year Action Plan.

12.5 Please provide an update on the standby product offerings that FBC has, or plans to develop, for self-generators who are on rates with a demand charge.

C. CHAPTER 3 – LONG-TERM LOAD FORECAST

13.0 **Reference: LONG-TERM LOAD FORECAST**
Exhibit B-1, Volume 1, Appendix E, pp. 6–7
Residential customer count data

13.1 Please use the template below to provide a table which shows historical actual (A) figures for FBC's direct residential customer count for each year from 2006 through to 2015. Please include FBC's 2016 residential customer count forecast (F).

		Column 1	Column 2	...	Column 9	Column 10	Column 11
Row 1		**Residential Customer Count for FBC**					
Row 2		**2006 (A)**	**2007 (A)**	**...**	**2014 (A)**	**2015 (A)**	**2016 (F)**
Row 3	**Residential Customer Count**						

13.1.1 Please explain any anomalies in the residential customer count data presented in response to the previous question.

14.0 **Reference:** **LONG-TERM LOAD FORECAST**
Exhibit B-1, Volume 1, Appendix E, pp. 6, 8; Figure E-7, p. 8
Residential UPC data and load forecast methodology

On page 6 of Appendix E of the Application, FBC states: "Residential load growth is driven by the increase in customer count, which itself is determined econometrically as a function of population in the FBC service area. This is then combined with the forecast use per customer (UPC) to determine the residential load forecast."

On page 8 of Appendix E of the Application, FBC states:

> The [residential] UPC is forecast by averaging the most recent three years' normalized historical UPCs (2013, 2014, 2015), and each year after this is assumed to remain constant at the 2016 level of 11.80 MWh. This value was assumed to remain constant since there is no significant long term trend in the UPC at this point in time.
>
> The graph below [Figure E-7: Residential UPC (MWh)] shows the UPC, which was calculated by taking the forecast residential loads and then dividing it by the average customer count. After adjusting for savings, UPC increases slightly over the planning horizon.

14.1 Please use the template below to provide a table which shows historical actual (A) figures for FBC's normalized residential UPC for each year from 2006 through to 2015. Please include FBC's 2016 UPC forecast (F) as shown in the template.

		Column 1	Column 2	...	Column 9	Column 10	Column 11
Row 1		**Normalized Residential UPC for FBC**					
Row 2		**2006 (A)**	**2007 (A)**	**...**	**2014 (A)**	**2015 (A)**	**2016 (F)**
Row 3	**Residential UPC (MWh)**						11.80

14.1.1 Please explain if any trends (increasing/decreasing/constant) are present in FBC's historical normalized residential UPC data from 2006 through to 2015 and include a discussion of any years with an anomalous residential UPC.

14.1.1.1 If an increasing or decreasing trend is present for FBC's historical normalized residential UPC data from 2006 through to 2015, please explain the impact to the reference case load forecast if the trend is used to forecast FBC's residential UPC for the planning period in the Application. Please use calculations to support your response.

14.2 Please discuss the feasibility of accurately determining the trend for FBC's normalized residential UPC over a twenty year time frame using only the most recent three years of normalized historical UPCs, considering: (i) FBC's actual residential UPC data in response to the previous question; and (ii) recent energy and environmental policy included in B.C.'s CLP released in August 2016.

14.3 Please confirm, or otherwise explain, that the residential UPC figure for each year in Figure E-7, comprises of a normalized constant residential UPC of 11.80 MWh plus an additional amount attributable to savings.

14.3.1 If confirmed, please provide the forecasted savings figure in MWh for each year in Figure E-7.

15.0 **Reference: LONG-TERM LOAD FORECAST**
Exhibit B-1, Volume 1, p. 54; Appendix E, p. 2, p. 11 and p. 16
System losses and Advanced Metering Infrastructure (AMI) impact

On page 54 of the Application, FBC states that: "[l]osses are assumed to be 8 percent of gross load as discussed in Section 4.7 of Appendix E."

On page 16 of Appendix E in the Application, FBC states:

> System losses consist of the following: Losses in the transmission and distribution system; Losses due to wheeling through the BC Hydro system; Company use, and Unaccounted-for energy (meter inaccuracies and theft). Consistent with past practice FBC assumed a loss rate of eight percent of gross load, before the AMI impact. AMI loss reduction is expected to further reduce the losses in the future by reducing theft from the system from illegal marijuana grow operations.

On page 2 of Appendix E in the Application, FBC states: "

> Load savings include the impacts of the RCR, AMI, and rate-driven reductions in load due to price elasticity … AMI savings are the incremental sales that occur due to deterrence of theft, mainly from marijuana grow operations (as opposed to the closure of illegal unmetered marijuana grow sites, which are reflected in lower system losses)…."

15.1 Please explain, with calculations if necessary, whether the AMI impact is fully accounted for in the system losses forecast or through the load savings forecast described in section 2 of Appendix E of the Application.

15.2 Please complete the table below by populating all the empty cells with corresponding data.

	Column 1	Column 2	Column 3	Column 4
Row 1	**FBC System Losses**			
Row 2 Row 3 Row 4	**Year**	**Normalized Actual System Losses (GWh)**	**Normalized Before-Savings Gross Load (GWh)**	**System Loss* (%)**
Row 5	**2011 Actual**			
Row 6	**2012 Actual**			
Row 7	**2013 Actual**			
Row 8	**2014 Actual**			
Row 9	**2015 Actual**			
Row 10	**2016 Actual**			
	Most recent 5-year average using actual historical data =			
	* - Column 4 = (Column 2 / Column 3) expressed as a %			

15.2.1 Please explain if any trends (increasing/decreasing/constant) exist in the percentage figures for system loss presented in response to the previous question.

15.2.2 Please discuss (i) the feasibility, (ii) the impact to the reference case load forecast, and (iii) the impact to FBC's preferred portfolio and Action Plan of using the average of the percentage system loss for the five most recent years of historical data to forecast system losses for the 20-year planning period.

15.3 Please explain if FBC considers that there will be no improvement in FBC's ability to reduce system losses to a percentage smaller than 8% for the 20-year time period of the Application.

15.4 Please provide, to the best of your ability, a labeled pie chart titled "FBC's 2015 System Losses by Category" that shows the percentage energy losses broken down into each category listed in section 4.7 of Appendix E of the Application. Please include the corresponding energy loss in GWh for each percentage shown.

On page 11 of Appendix E, FBC States:

> FBC has six wholesale customers that make up 16.8 percent of the total gross load…. Consistent with past practice the wholesale class is forecast using survey information from each of the individual wholesale customers…. All of the wholesale customers responded to the surveys with their forecast growth projections."

15.5 Please explain if system losses that occur within the wholesale customer's service territory are accounted for exclusively by the wholesale customers through the survey forecasts or exclusively by FBC through FBC's system losses forecast.

15.6 Please provide an update of FBC's reduction in theft from the system from illegal marijuana grow operations resulting from the AMI program. Please include in this update a discussion of the strategy used by FBC to detect theft, and the results achieved.

16.0 **Reference:** **LONG-TERM LOAD FORECAST**
Exhibit B-1, Volume 1, Appendix E, p. 4 and p. 11
Wholesale customer forecast accuracy

On page 4 of Appendix E of the Application, FBC presents a pie chart showing that wholesale customers accounted for 16.8 percent of 2015 gross load consumption. On page 11 of Appendix E in the Application, FBC explains that the wholesale class is forecast using survey information from each of the individual wholesale customers.

16.1 Please provide a table which shows, for each of the wholesale customers, the three most recent years of data for the (i) forecasted load, (ii) the actual load, (iii) the variance between forecast and actual in units, and (iv) the percentage variance between the forecast load and actual load.

16.1.1 Please discuss the accuracy of the forecasts provided in response to the previous question.

D. CHAPTER 5 – EXISTING SUPPLY-SIDE RESOURCE

17.0 **Reference:** **MARKET PURCHASES**
Exhibit B-1, Volume 1, pp. 32, 36, 108; 2016 NW PP, pp. 1-5, B-15
Attributes - environmental

On page 32 of the FBC 2016 LTERP Application, FBC states: "Regional market electricity prices continue to be highly correlated with regional natural gas prices. This is largely because natural-gas fired power plants are often the marginal generating unit for generating electricity." FBC further states on page 36: "…gas-fired power plants have become a low-cost alternative for power generation … This will further strengthen the interdependency between natural gas and electricity prices in the Pacific Northwest region."

The 2016 NW PP states on page 1-5: "Although the dominant generating resource in the region is hydropower, natural gas-fired plants are often the marginal generating unit for any given hour." Page B-15 includes a graph which shows a linear relationship between the Mid-C electricity price and the natural gas price. On page 108 of the FBC 2016 LTERP Application, FBC describes market energy as 'mixed' under the clean/renewable category.

17.1 Please describe FBC assumptions regarding the environmental attributes of market energy purchases, and explain if assumptions are consistent with those used to forecast market prices.

17.1.1 Does FBC have the option of purchasing market energy from clean sources? If yes, please estimate the incremental cost.

18.0 **Reference:** **MARKET PURCHASES**
Exhibit B-1, Volume 1, pp. 45, 111, Appendix J, p. 42; FBC 2012 RR & ISP, Exhibit B-1-2, p. 31
Attributes – price and price risk

FBC provides a graph showing forecast future mid-C prices on page 45 of FBC 2016 LTERP Application, and discusses the range of unit energy costs for market purchases on page 111.

FBC states on page 42 of Appendix J to the 2016 FBC LTERP Application:

> … the base case long term market price for electricity at Mid-C, the levelized unit energy cost for market purchases is about $51 per MWh including transmission costs and losses from Mid-C. … Relying on market purchases for energy or capacity in the long term can be risky for FBC. … regional market power supply, and capacity in particular, may be declining in the future. There may also be new transmission congestion issues as systems are operated differently to integrate renewable resources.

FBC stated on page 31 of the FBC 2012 LTRP that in July 2006 it was required to purchase 1,680 MWh of energy from the market at an average price of $225/MWh during a region-wide hot spell.

18.1 Please describe the attributes of market energy in terms of: term, delivery location and shape.

18.2 Please explain how FBC has included the risk of market price spikes into its price forecast.

18.2.1 Have there been occasions of market price spikes in the last five years, and to what extent does FBC consider this could be a concern in the future?

18.2.2 Please update the graph on page 45 of the Application to also show historical Mid-C prices from the year 2000.

18.3 Please compare the methodology used by FBC in developing its market price forecast and the attributes assumed (i.e., firmness, environmental) with that assumed by BC Hydro in its 2013 IRP. Please explain any significant differences.

19.0 **Reference: MARKET PURCHASES**
Exhibit B-1, Volume 1, pp. 39, 40, 79; Appendix L, pp. 9, 10; BCH 2013 IRP, p. 9-54; FBC 2012 RR & ISP, Exhibit B-1-2, p. 31
Attributes – firmness

FBC states on pages 39 and 40 of the FBC 2016 LTERP: "… under critical water conditions the region faces the probability of a peak capacity shortfall … transmission interconnections often operate at their maximum available transfer limits …" FBC also states on page 79: "Additional firm transmission cannot be reliably obtained on the U.S. side of the border and as such … it cannot be considered a long-term resource to meet capacity requirements." FBC provides on pages 9 and 10 of Appendix L to the FBC 2016 LTERP (2016 Planning Reserve Margin (PRM) report) the forced outage rate assumed for market availability.

BC Hydro states on page 9-54 of its 2013 IRP "The spot market provides non-firm energy and no capacity, and generally has a term of one hour." On page 31 of the FBC 2012 LTRP FBC stated that during a regional cold spell in 2010, FBC attempted to purchase an additional 10MW in the real time market and there was no supply available at any price and that a similar situation occurred the following week.

19.1 Please provide the forced outage rate assumed related to (1) transmission forced outages and (2) market availability in both the 2014 Planning Reserve Margin Studies report and the 2016 Planning Reserve Margin Report. Please explain how these estimates were derived, and any changes in assumptions between the 2014 and 2016 estimates.

19.1.1 Does FBC consider that these reliability estimates reflect future (rather than historic) risks of market reliability? Please explain.

19.1.2 To what extent, if any, does FBC consider market energy to be 'firm' energy.

19.2 Please explain why FBC considers market purchases to be a reliable and secure source of energy supply in the short to medium term.

20.0 **Reference:** **FBC-OWNED GENERATION ENTITLEMENTS**
Exhibit B-1, Volume 1, pp. 76, 78
Generation Capital Expenditures/contract extension

On page 76 of the FBC 2016 LTERP Application, FBC states that, subject to Commission approval, it intends to refurbish four generating units at the Upper Bonnington Plant in the 2017-2020 timeframe. FBC also states on page 78 that it is in discussions to extend the purchase of unused CPA entitlements from the Brilliant and Brilliant Expansion Plants.

20.1 Please explain why FBC has not included a potential filing of an extension of the Brilliant power purchase agreement or the Upper Bonnington Plant refurbishment in the four-year Action Plan.

20.2 Please discuss if there are other generation capital expenditures expected in the next four years that FBC intends to construct or extend to serve the estimated demand.

E. CHAPTER 6 – TRANSMISSION AND DISTRIBUTION SYSTEM

21.0 **Reference:** **RECENT SYSTEM UPGRADES AND EXPENDITURES**
Exhibit B-1, Volume 1, Section 6.1.3, pp. 83–84; FBC 2012 RR & ISP, Exhibit B-1, Tab 6 2012-2013 Capital Expenditure Plan, Index of Tables and Figures, pp. vi–vii-
Capital Expenditures

On page 83 of the Application, FBC states that "To ensure ongoing safe and reliable operation of the electric system, FBC undertakes both growth and sustainment capital investments in the transmission and distribution system on an annual basis." Under Table 6-2 on page 84 of the Application, FBC provides the following actual expenditures from 2011 – 2015 and planned expenditure for 2016:

Table 6-2: Transmission and Distribution Capital Expenditures 2011 – 2016 ($000s)

Expenditure Categories	2011A	2012A	2013A	2014A	2015A	2016P
Transmission, Stations, Protection & Control, Telecommunications	27,101	19,412	16,681	23,659	12,024	8,691
Distribution	26,434	25,994	60,866	34,121	28,409	24,052

21.1 Please expand the above table to provide the total transmission and distribution capital expenditures planned for the next four years.

21.1.1 Please provide:

- A breakdown of the transmission and distribution facilities that FBC intends to construct or extend in order to serve the estimated demand in the next four years,
- A brief description of the facilities that FBC intends to construct or extend in order to serve the estimated demand,
- An explanation of why the demand for the energy to be served by the facilities FBC intends to construct or extend are not planned to be replaced by demand-side measures.

In FBC's 2012-2013 RR & ISP Application (Exhibit B-1), under the 2012-2013 Capital Expenditure Plan, FBC requested Commission approval of projects and associated expenditures under: 'Generation', 'Transmission', 'Distribution', 'Telecommunications, SCADA and Protection and Control', 'General Plant' and 'Demand Side Management', all listed from Table 2 to Table 7.

21.2 From all projects listed in Table 2 to Table 7, please identify any significant changes to the facilities planned to be built or extended from the 2012-2013 Capital Expenditure Plan.

22.0 **Reference: ANTICIPATED SYSTEM REINFORCEMENTS**
Exhibit B-1, Volume 1, pp. 87, 164–166
Transmission Project CPCNs/Long Term Capital Plan

On page 87 of the Application, FBC indicated that it "filed a [LT CP] Plan in June 2011, which identified short term (2012-2013), medium term (2014-2016) and long term (2017 onward) transmission projects."

FBC further states: "At the present time, only two transmission reinforcement projects have been identified within the 20-year planning horizon; in both cases these projects were intended to be the subject of future CPCN applications." Table 6-3 in the Application shows these projects:

Table 6-3: Transmission Reinforcement Projects

Time Frame	Project	Purpose	Primary Driver	
			Capacity	Reliability
2018-2020	Grand Forks Terminal Transformer Addition	Add a second terminal transformer to maintain adequate single-contingency reliability for load in the Grand Forks area.		X
2019-2020	Kelowna Bulk Transformer Capacity Addition	Add additional 230/138 kV transformation capacity in Kelowna to adequately supply area load	X	X

FBC includes its Action Plan on pages 164 to 166 of the Application.

22.1 Please confirm that FBC will not be filing a new Long Term Capital Plan (LT CP) under this proceeding. If not confirmed, please discuss and specifically indicate when FBC anticipates filing a LT CP.

22.2 If the two transmission reinforcement projects are Certificates of Public Convenience and Necessity (CPCNs) expected within the next four years, please discuss why these have not been included in the action plan.

22.3 Please provide more details on why the two transmission reinforcement projects are needed to serve the estimated demand.

23.0 **Reference:** **NETWORK INVESTMENTS**
Exhibit B-1, Volume 1, pp. 87, 89; FBC 2012 RR & ISP, Exhibit B-1-1, FBC 2012 Long-Term Capital Plan (FBC 2012 LT CP), p. 8; 2016 NW PP, pp. 12-41, G-52; Puget Sound Energy 2015 Integrated Resource Plan (PSE 2015 IRP)[6], p. 6-27; Idaho Power 2015 Integrated Resources Plan[7], p. 48
DSM and DG alternatives

FBC states on page 87 of the 2016 LTERP Application: that the lack of dynamic reactive support in the Okanagan (due to absence of generation resources which can respond to load changes in real-time) can lead to low voltages or voltage collapse during contingency conditions.

FBC states on page 89 of the 2016 LTERP Application that the integration of a new large-scale generation resource, such as a gas-fired generation plant, could defer the requirement for the proposed third bulk transformer.

FBC stated on page 8 of its 2012 LT CP that it was evaluating Voltage and Var Optimization. The 2016 NW Power Plan describes on page 12-41 its program to regulate voltage on distribution lines to minimize system and end-use losses, and on page G-52 describes its distribution system efficiency measure bundles. The PSE 2015 IRP includes on page 6-27 voltage reduction and phase balancing as a demand-side resource. Idaho Power 2015 IRP includes on page 48 conservation voltage reduction.

23.1 Please provide an update of FBC's evaluation of voltage and Var optimization discussed in FBC's 2012 LT CP. Does FBC have Voltage and Var optimization programs similar to those described in the 2016 NW PP, PSE 2015 IRP and Idaho Power 2015 IRP? Please explain why/why not.

23.2 Please explain whether small-scale or larger clean DG could (i) defer the requirement for the anticipated network system reinforcements, and (ii) provide dynamic reactive support.

23.2.1 Please explain whether targeted regional DSM programs could defer the requirement for the anticipated network system reinforcements.

F. CHAPTER 7 – LOAD RESOURCE BALANCE

24.0 **Reference:** **LOAD RESOURCE BALANCE**
Exhibit B-1, Volume 1, pp. 92-93, p. 49; BC Hydro 2014 Application for Approval of Rates between BC Hydro and FBC with regards to Rate Schedule 3808 (2014 BC Hydro RS 3808), Decision dated May 6, 2014, p. 54, and Order G-6-14
BC Hydro PPA Tranche 2 Energy and FBC's Load-Resource Balance

Figure 7-1 on page 92 of the Application shows FBC's annual energy load-resource balance (in GWh) from 2016 through to 2035. On page 93 of the Application, FBC states that:

> PPA Tranche 2 Energy is also available to FBC but at a much higher cost…FBC expects that it would be able to build or contract for new energy resources at a lower cost than the PPA Tranche 2 Energy cost. For this reason, the energy LRB is presented here with only the PPA Tranche 1 Energy amount.

[6] https://pse.com/aboutpse/EnergySupply/Documents/IRP_2015_Chap6.pdf
[7] https://www.idahopower.com/pdfs/AboutUs/PlanningForFuture/irp/2015/2015IRP.pdf

FBC state on page 49 of the Application that PPA Tranche 2 energy rate ($129.70/MWh) is tied to BC Hydro's long run marginal cost (LRMC), and BC Hydro's LRMC was recently updated to $85/MWh. The Commission stated on page 54 of the 2014 BC Hydro RS 3808 Decision: "… both FortisBC and BC Hydro have stated that there is no forecast intention to use any Tranche 2 energy …."

24.1 Please provide an updated version of Figure 7-1: "Annual Energy Load-Resource Balance (GWh)", which includes PPA (Tranche 2) energy in a new colour. Please assume that the PPA Tranche 2 energy price is $85/MWh, as described in the preamble, from the beginning of 2019.

24.2 Please describe the attributes (in terms of shape) of BC Hydro RS 3808 Tranche 2 energy. Does FBC intend to use any Tranche 2 energy over the proposed term of the New PPA?

24.3 Please confirm that energy purchases under RS 3808 are 'BC clean' and that FBC retains the environmental attributes of this energy.

G. CHAPTER 8 – RESOURCE OPTIONS

25.0 **Reference:** **SUPPLY SIDE GENERATION**
Exhibit B-1, Volume 1, pp. 96, 109, 128, Appendix J, p.8; BCH 2013 IRP, pp. 4-56, 4-68; GE Energy Consulting, Pan-Canadian Wind Integration Study, 2016, pp. 36, 37[8]; 2016 NW PP pp. 13-9, 13-11
Unit cost and wind integration

FBC summarizes the cost of its supply-side resource options on page 109 of the 2016 LTERP Application. The 2016 NW PP includes at page 13-9 and 13-11 an estimate of the cost of natural gas generating resources and renewable resources.

FBC estimates on page 96 of the 2016 LTERP Application the onshore wind cost at $111 - $145/MWh, and stated on page 128 that portfolio C4 included: "the addition of biomass to the portfolio to provide some back-up base load supply that is not intermittent like wind or solar." In Appendix J, page 8 of the FBC 2016 LTERP Application, FBC states that it has assumed $10/MWh for solar/wind integration costs.

BC Hydro includes in its 2013 IRP) a $10/MWh wind integration cost. The GE Energy Consulting 2016 Wind Integration report states on page 36 that hydro generation provides a valuable complement to wind generation, and estimated the wind-levelized cost of energy as about $40.5/MWh - $43.4/MWh. On page 37 the report states that regulation reserve requirements to mitigate wind variability appear to be a small fraction of the additional installed wind capacity.

25.1 Please compare the FBC estimated cost of its supply-side resource options with the estimated cost included in the 2016 NW PP and explain any significant differences.

25.2 Please explain the difference between the estimated onshore wind cost used by FBC and the 2016 GE Energy Consulting report.

25.3 Please explain the assumptions made by FBC regarding the approach and cost of integrating wind energy into its portfolio options.

25.3.1 Please provide a comparison in $/MWh of the cost of integrating wind into the portfolio using (i) clean energy or demand-side alternatives, and (ii) non-clean energy.

[8] http://canwea.ca/wp-content/uploads/2016/07/pcwis-fullreport.pdf

25.4 For the preferred portfolio (A4), please explain which resources (market, biogas, single cycle gas turbine [SCGT]) are primarily being relied on to provide wind integration, and why.

26.0 **Reference: RESOURCE OPTIONS**
Exhibit B-1, Volume 1, p. 112; BC Hydro 2017-2019 RRA, Exhibit B-1-1, p. 4-18
Expiring Energy Purchase Agreements

BC Hydro states on page 4-18 of its 2017-2019 RRA that "Over the last three years, 14 Electricity Purchase Agreements have been terminated."

On page 112 of the Application, FBC states:

> Fourteen of BC Hydro's existing EPAs with IPPs are expiring by the end of fiscal 2019. Consistent with the approved 2013 Integrated Resource Plan (IRP), BC Hydro continues to assume renewal of 50 percent of the energy and capacity contributions from biomass EPAs and 75 percent from the run-of-river hydroelectric EPAs that are due to expire within the remaining years of the 10-Year Rates Plan the BC government announced in 2013. BC Hydro is targeting renewal of contracts for those facilities that have the lowest cost, greatest certainty of continued operation and best system support characteristics. However, there may be opportunities for FBC to acquire power from the other facilities on a cost-effective basis.

26.1 Please estimate the total quantities of energy and capacity that will become available for a potential energy supply contract with parties other than BC Hydro if BC Hydro executes its plan as described in the preamble. Please provide supporting explanations and/or calculations.

26.2 Please quantify and explain what would be a cost-effective price for FBC to acquire the additional power from the expired BC Hydro Electricity Purchase Agreements (EPAs).

26.3 Please provide an analysis of the energy and capacity resource options that will become available if BC Hydro executes its plan described in the preamble by analyzing the (i) technical, (ii) financial, (iii) environmental, and (iv) socio-economic attributes.

26.4 Please explain the feasibility of FBC securing energy and/or capacity from the expired energy purchase agreements if BC Hydro executes its plan described in the preamble.

26.4.1 If FBC was satisfied with the price for BC Hydro non-renewed Independent Power Producer (IPP) energy and FBC required the energy, please describe some options on how FBC may acquire it from BC Hydro or the IPP. Could FBC purchase it directly from the IPP and wheel it through BC Hydro? Could FBC negotiate a special contract or tariff with BC Hydro where BC Hydro purchases the power from the IPP and BC Hydro delivers it to FBC transmission system? Please elaborate.

27.0 **Reference: RESOURCE OPTIONS**
Exhibit B-1, Volume 1, p. 113; FBC SGP Stage II, Exhibit B-1 (FBC SGP Stage II Application), p. 13, Appendix A; FBC 2014 Stepped and Stand-By Rates for Transmission Voltage Customers (FBC 2014 Stepped and Stand-By), Decision dated May 26, 2014, p. 48
Purchases from eligible self-generation customers

On page 13 of the FBC SGP Stage II Application, FBC explains that it currently has three customers with self-generation above the thresholds eligible for the policy. On page 113 of the Application, FBC states:

"… if a self-generator could provide power at a cost lower than FBC's alternatives, there may be an opportunity for FBC to purchase the output of the self-generation."

The Commission stated on page 48 of the FBC 2014 Stepped and Stand-Bby Decision:

> The Panel is concerned that FortisBC conducts transmission planning based on the expected [Celgar] 45 MW firm customer load … if the costs are the same based on either load then there seems to be little harm in using 45 MW. However, in the event that there are cost savings to FortisBC of using an amount less than that the Commission would fully expect FortisBC to only use that amount required for its customer's firm needs.

27.1 Please quantify the cost, or range of costs, that would be lower than FBC's alternatives for power. Please state the assumptions.

27.2 Considering the three customers and their potential generation quantities, please explain the potential impact on FBC's (i) annual energy load-resource balance presented in section 7.1 of the Application, (ii) the capacity-resource balance presented in section 7.2 of the Application, and (iii) FBC's preferred portfolio (93% clean with SCGT) presented in section 9.3.6 of the Application, if:

i. The Commission approves the FBC SGP Stage II Application as submitted by FBC; or

ii. The Commission denies the FBC SGP Stage II Application as submitted by FBC.

27.3 Please explain if FBC would purchase a portion or all of the output of the self-generation from its eligible customers if power could be provided to FBC at a cost below $96 per MWh, which is the LRMC for FBC's preferred portfolio. In your response, please consider the technical, environmental and socio-economic attributes of the self-generation customers.

27.4 Please explain how Celgar's energy and demand consumption levels have been reflected in FBC's energy and demand forecast.

H. CHAPTER 9 – PORTFOLIO ANALYSIS AND LONG RUN MARGINAL COST

28.0 **Reference: PLANNING OBJECTIVES**
Exhibit B-1, Volume 1, p. 5; FBC 2012 RR & ISP, Exhibit B-1-1, p. 11, Exhibit B-1-2, pp. 73, 74; FBC 2016/2017 Annual Electric Contracting Plan (AECP), Letter L-8-16 dated April 21, 2016
Energy supply options

FBC describes its resource planning objectives on page 5 of the 2016 FBC LTERP as: ensure cost-effective, secure and reliable power for customers; provide cost-effective DSM; and ensure consistency with provincial energy objectives.

FBC described its resource options ranking and evaluation criteria on page 73 and 74 of its 2012 LTRP as: appropriate size; environmental impact and adherence to the Directives of the CEA; appropriate energy shape; and comparative resource economics test (targeting the least cost solution conditional upon fidelity with the other criteria). FBC stated on page 11 of its 2012 ISP:" Reduction of GHG volumes is a key input in evaluating capacity and energy alternatives in the Company's 2012 Resource Plan."

FBC described its objectives in the 2016/2017 AECP: To ensure a firm supply of resources to meet expected annual energy and peak capacity requirements and to maintain an appropriate balance of:

a. cost minimization for FBC customers through optimization of FBC resources and market purchases;
b. reliability and security, to ensure that cost effective power is available when needed to meet load;
c. flexibility, to minimize the risk of changes to load forecast, generation and transmission availability, wholesale power market and BC Hydro rates; and
d. operational efficiency, in order to be able to supply load requirements while maintaining contractual compliance.

28.1 Does FBC consider that, when evaluating alternative supply side options: (i) the objectives articulated in the 2016/2017 AECP define FBC's LTERP objective to ensure cost-effective, secure and reliable power for customers; and (ii) preference should be given to options that support BC energy objectives? Please explain why/why not.

28.2 Does FBC consider that resource options ranking and evaluation criteria described on pages 73 and 74 of the FBC 2012 LTRP, and the GHG related statement on page 1 of the FBC 2012 ISP, also apply to the FBC 2016 LTERP Application resource option evaluation criteria? If no, please explain.

29.0 **Reference: PLANNING RESERVE MARGIN**
Exhibit B-1, Volume 1, p. 128, Appendix L, p. 7; PSE 2015 IRP, p. 1-3; BCH 2013 IRP, pp. 1-16, 4-9
General

FBC states on page 128 of its 2016 LTERP Application that it has adopted Loss-Of-Load-Expectation (LOLE) as the reliability metric for Planning Reserve Margin (PRM), and targeted '1 day in 10 years'. FBC states on page 7 of Appendix L to the 2016 LTERP Application: "[Western Electricity Coordinating Council (WECC)] remains the only [North American Electric Reliability Corporation (NERC)] entity that has not endorsed this criterion."

The PSE 2015 IRP states on page 1-3:

> Translating the MWh lost into the Customer Value of Lost Load allows us to quantify the value associated with different levels of reliability … moving to the 2015 Optimal Planning Standard reduces the expected value of lost load to customer by $130 million per year. The cost to achieve that expected savings is $63 million per year ….

BC Hydro states on page 1-16 of the BCH 2013 IRP: "An `adequate` generation system is defined as one that has an annual expectation of being unable to serve the daily peak demand of less than one day in 10 years. The one day in 10 years LOLE methodology has widespread use in the industry" and on page 4-9 "… once the planning criteria are met, reliability can be traded off against other objectives."

29.1 Please provide FBC's actual generation capacity related loss of load over the past 10 years.

29.2 Did FBC quantify the cost/value to customers associated with different levels of reliability? If yes, please provide. If no, please explain why not.

29.3 Please explain why WECC has not endorsed the probabilistic approach, and whether there would be any effect on FBC's costs over the next five years of using a WECC endorsed approach.

29.4 Please explain the assumptions FBC has made regarding the dependability of market power purchases over the planning period in developing its Planning Reserve Margin estimate, and whether this is consistent with the assumptions made by BC Hydro in its 2013 IRP.

30.0 **Reference: SUPPORT FOR BC SELF-SUFFICIENCY OBJECTIVE**
Exhibit B-1, Volume 1, pp. 36, 111, 116, 117, Appendix L, p. 9; PSE 2015 IRP p. 1-2
FBC proposal

FBC states on page 111 of its 2016 LTERP Application: "… FBC believes that market purchases, at current price levels, are more cost effective than other supply-side resource options and so should not be ruled out in favour of self-sufficiency, at least in the short to medium term." FBC states on page 116, that the base portfolio characteristics included self-sufficiency by 2025. FBC states on page 117 that, its base case assumption is that it will be able to access low-cost and reliable market supply for the next ten years, out to 2025.

FBC states on page 9 of Appendix L of its 2016 LTERP Application: "FBC's view is that dependence on market capacity to meet expected demand over the long term is not a prudent policy due to the uncertainly associated with both resource availability and market prices. This view is common among utilities." FBC states on page 36 of the 2016 LTERP Application: "In the next decade, the Pacific Northwest is forced to face a capacity deficit due to load growth, coal plant retirements, and increasing growth of intermittent resources such as solar and wind generation."

The PSE 2015 IRP states on page 1-2:

> The surplus conditions the Pacific Northwest electric markets have experienced for a decade are forecast to change significantly with the scheduled retirement of two coal plants in 2020 … During the decade of surplus capacity, relying on short-term wholesale market purchases to meet a significant portion of peak customer need has been a low cost/low risk strategy, but now that supplies are tightening, continuing this level of market purchases would expose PSE and its customers to unreasonable levels of physical and financial risk.

30.1 Please calculate, for each year over the past 10 years, and for each year to 2025 under FBC's proposed portfolio (A4), the percentage of total energy (in terms of energy volume) that FBC has or expects to acquire from (i) the market, (ii) Canadian Entitlement energy generated from generators not located in BC, and (iii) energy that FBC considers meets the CEA definition of electricity self-sufficiency.

30.1.1 If FBC has assumed market price energy will displace RS 3808 T1 energy over the next 10 years, please provide an updated analysis assuming no displacement of T1 energy.

30.2 Please describe the options that could be used by FBC to increase energy purchases from BC generators. Please specifically address the following: additional T1 purchases under RS 3808; EPAs with BC Hydro; IPPs; self-generators; standing offer programs (similar to BC Hydro's SOP and micro-SOP); expansion of the net metering program; expansion of DSM programs.

30.2.1 To what extent does FBC estimate it would be able to replace (a) 100% and (b) 50% of its market energy purchases with energy purchased from generators located in BC if the market price offered to the BC generators was: (i) the levelized Mid-C market price, (ii) $85/kWh, or (iii) $100/kWh? Please explain.

30.2.2 Please estimate the (i) annual cost to FBC and (ii) rate impact if FBC replaced 100% of market price purchases with energy purchased for (a) $85/kWh or (b) $100/kWh.

30.3 Does FBC agree with the statement on page 1-2 of the PSE 2015 IRP that relying on the market is no longer a low cost/low risk strategy? Please explain.

30.3.1 Please explain how FBC has incorporated the physical and financial risk of reliance on the Mid-C market into its portfolio analysis.

30.4 Please explain to what extent FBC's proposed strategy is to rely on market purchase to meet (i) energy needs under the expected load forecast, (ii) energy needs where the load forecast is higher than expected, and (ii) generation capacity needs.

31.0 **Reference: SUPPORT FOR BC ENERGY OBJECTIVES**
Exhibit B-1, Volume 1, pp. 8-10, Appendix B, p. 28; CLP, p. 28
FBC proposal

FBC describes BC's Energy objectives on pages 8 to10 of its 2016 LTERP Application. The CLP states on page 28: "Going forward, 100 per cent of the supply of electricity acquired by BC Hydro in British Columbia for the integrated grid must be from clean or renewable sources, except where concerns regarding reliability or costs must be addressed."

31.1 Please calculate, for each year over the past 10 years, the percentage of energy volume used to serve load that meets the CEA definition of clean/renewable. Please also calculate this percentage for each year to 2025 under FBC's proposed portfolio (A4). Please describe all key assumptions.

31.1.1 Please estimate the (i) annual cost to FBC and (ii) rate impact if FBC was to ensure that a minimum of (A) 93% of its energy (by volume) or (B) 100% of its energy (by volume) was sourced using clean or renewable sources. Please include all assumptions.

31.2 Please estimate the (i) annual cost to FBC and (ii) rate impact if FBC replaced its market energy purchases with market purchases from clean sources. Please state all assumptions.

31.3 Please explain whether (and if so how) FBC's proposed supply side energy acquisition strategy specifically supports each of the following BC energy objectives: innovative technologies, waste heat/biogas/biomass, and the development of clean or renewable resources by First Nation and rural communities. If FBC does not have specific strategies, please explain why.

32.0 **Reference: MARKET PURCHASES**
Exhibit B-1, Volume 1, p. 79
Displacement of RS 3808 -short vs. long term

FBC states on page 79 of its 2016 LTERP Application: "FBC purchases energy and capacity from the wholesale market when it is more competitively priced than purchases under the PPA, or when FBC does not have sufficient resources to meet peak demand requirements. In 2015, market and contracted purchases accounted for 10 percent of FBC's annual energy requirements."

32.1 Please explain how FBC takes into account (i) BC self-sufficiency objectives; (ii) environmental objectives; and (ii) reduced level of reliability/increased planning reserve margin, in determining whether BC Hydro PPA (RS 3808) power should be displaced with market purchases.

32.1.1 Does FBC consider that the increased flexibility of the new BC Hydro PPA RS 3808 has resulted in an increase in FBC's reliance on market purchases compared to that accepted in the FBC 2012 RR & ISP? Please explain.

32.2 Please describe FBC's strategy regarding the proportion of its energy needs that should be met through hourly market purchases compared to (i) 1 – 3 year market contracts and (ii) long-term contracts. Please also comment on whether the disruption risks identified in this LTERP have resulted in an increase or decrease in the proposed level of reliance on short-term vs. long-term energy purchase contracts compared to the FBC 2012 IRP.

33.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, pp. 14, 15; 2016 NW PP, p. O-18
Attributes of DSM energy

FBC includes DSM scenario data on page 14 of the FBC 2016 LT DSM Plan Application (Table 3-1). FBC states on page 15 of the 2016 LT DSM Plan Application: "The Max scenario was not chosen for a number of reasons including the voluntary nature of DSM participation and the inherently non-dispatchable nature of DSM savings compared to supply-side resources." The 2016 NW PP states on page O-18: "Conservation also lacks the economic risk with volatile fuel prices and carbon dioxide emission reduction policies. Its short lead time and availability in small increments also reduce its economic risk."

33.1 For each portfolio option included in Table 3-1 of the FBC LT DSM Plan Application, please provide the following information for each year from 2017-2021, with a five year total: utility annual cost ($'million); annual energy savings (GWh); energy cost (c/kWh), the total resource cost (TRC), Rate Impact Measure (RIM).

33.1.1 Please provide an estimate of the above metrics for a DSM portfolio option that achieves energy savings that offsets 100% of load growth.

33.2 For the proposed DSM portfolio, please describe the following attributes of the 'DSM energy' saved as a result (i.e. the energy that displaces supply side alternatives). Please also indicate if the responses would be significantly different for any of the alternative DSM portfolios:

- The level of confidence FBC has on the annual volume of energy generated/conserved
- The level of confidence FBC has on what the cost of the energy will be
- Energy shape (i.e., what is the seasonal/within-day shape of energy saved through DSM)
- Environmental attributes (i.e., is DSM energy clean)
- Firmness (generation capacity) – to what extent is the energy saved through DSM coincident with the generation system peak
- Firmness (network capacity) - to what extent is the energy saved through DSM coincident with the (i) transmission, and (ii) distribution system peak
- Other benefits related to the DSM portfolio, such as economic development, social etc.

33.3 Please compare in table form the attributes (as listed above) of the conserved energy through DSM to (i) market energy purchases, (ii) onshore wind generation, and (iii) FBC's preferred energy supply portfolio (portfolio A4). For each attribute, please comment on whether the DSM portfolio performs better or worse than the supply side option

33.4 Please discuss the level of confidence FBC has in its energy savings estimate from the alternative DSM portfolios. Specifically, does FBC consider that its DSM programs have been effective in achieving forecast energy/capacity savings in the past?

33.5 Please identify DSM programs that meet the following criteria and identify the level of funding for these programs over the next five years under FBC's preferred DSM portfolio:

- Have a utility cost lower than the LRMC of market purchases;
- Address 'lost opportunities' (energy savings that would be more expensive to obtain later); and
- Required to meet the adequacy requirements of the DSM Regulations.

34.0 **Reference:** **LONG-RUN MARGINAL COST**
Exhibit B-1, Volume 1, pp. 94, 126, Appendix K, Appendix J, p. 8; BC Hydro F2017-F2019 RRA, Exhibit B-1-1, Appendix X; ACEEE, Everyone Benefits: Practices and Recommendations for Utility System Benefits for Energy Efficiency, June 2015, p. 21[9]; 2016 NW PP, p. G-15
General

FBC describes its proposed portfolio (A4) on page 126 of its 2016 LTERP Application, and its Long-Run Marginal Cost (LRMC) methodology in Appendix K. In Appendix J, page 8, FBC states that it has assumed $10/MWh for solar/wind integration costs. FBC states on page 94 of the FBC 2016 LTERP Application that based on the reference case forecast, minimal capacity gaps start in 2028. BC Hydro provides its avoided capacity costs and generation system reserve margin in Appendix X to its F2017-F2018 RRA.

The ACEEE 2015 "Everyone Benefits" states on page 21: "We collected 45 data points for estimates of avoided [transmission and distribution (T&D)] used in efficiency program screening. … The majority of values were between [US] $25 and $50 per kW-year." The 2016 NW PP states on page G-15 that it used data for 8 transmission and distribution utilities to estimate the T&D capacity cost.

34.1 Please provide FBC's LRMC of acquiring electricity generated from clean or renewable resources in BC at the transmission voltage level for: (i) energy - non-firm ($/MWh), (ii) energy – firm ($/MWh) and (iii) generation capacity ($/kW-year).

34.1.1 Does FBC consider that the $10/MWh wind/solar integration cost is a reasonable proxy for the cost of generation capacity, which would result in an LRMC of non-firm clean generation of being $10/MWh less than the cost of firm generation? Please explain.

34.1.2 For the energy LRMC estimates above, please provide the adjustments to the LRMC for network losses and ancillary services that would be required to for delivery at the (i) distribution – primary, and (ii) distribution – secondary voltage level.

[9] http://aceee.org/sites/default/files/publications/researchreports/u1505.pdf

34.2 Please calculate the same LRMC estimates, but this time for FBC's proposed portfolio (A4) rather than clean BC energy. Please state all key assumptions made.

34.3 Please compare FBC's estimate of transmission and distribution capacity LRMC with the ACEEE and NW PP benchmarking findings and explain any significant differences.

35.0 **Reference: LONG-RUN MARGINAL COST**
Exhibit B-1, Volume 2, p. 3; DSM Regulations, s. 4(1.1)(b)(ii); BC Hydro F2017-F2019 RRA, Exhibit B-1-1, p. 3-46, Appendix X, p. 2; FBC SGP Stage II, Exhibit B-1, p. 34
LRMC for DSM

FBC states on page 3 of the LT DSM Plan Application that its LRMC of firm energy (inclusive of generation capacity) is $100.45/MWh (abbreviated as $100/MWh) and the avoided capacity cost of deferred infrastructure is $79.85/kW-year.

Section 4 (1.1)(b)(ii) of the DSM Regulations requires that, in applying the TRC, the avoided electricity cost, in addition to the avoided capacity cost, is "an amount that the commission is satisfied represents the authority's long-run marginal cost of acquiring electricity generated from clean or renewable resources in British Columbia."

BC Hydro states on page 3-46 of the F2017-F2019 RRA that the avoided cost of greenfield clean or renewable IPPs is $100/MWh.

35.1 Please describe the energy resources used to arrive at the estimate of $100 per MWh for clean or renewable firm energy in BC. Please explain whether adjustments to these LRMC estimates would be required to reflect the delivery location and shape of DSM.

35.2 Please compare the average (as opposed to incremental) TRC (in $/MWh) of each DSM portfolio option with the $100 per MWh estimate for BC clean/renewable energy.

35.2.1 Please explain the difference between comparing each DSM portfolio options against the average TRC as opposed to incremental changes on FBC's preferred DSM portfolio option.

BC Hydro provides its avoided energy cost (electricity and natural gas) assumptions in Appendix X to the F2017-F2019 RRA , and estimates avoided electric energy costs at $85 per MWh (F2013 $) for F2015-F2033.

FBC states on page 34 of its SGP Stage II Application: "… any rates to be based on a LRMC value must value DSM measures based on the Utility Cost (UC) for DSM rather than on the TRC as the UC only considers costs the utility incurs to achieve the DSM results."

35.3 Does FBC consider that the LRMC of Portfolio Option A4 ($96/MWh on page 125 of the Application) is the appropriate utility cost to estimate the effect of alternative DSM portfolios on residential bills and rates? Please explain why/why not.

35.3.1 Please explain whether adjustments to this LRMC estimate would be required to reflect the delivery location, firmness, shape and environmental attributes of DSM.

36.0 **Reference:** **LONG-RUN MARGINAL COST**
Exhibit B-1, Volume 1, p. 96; FBC 2016 NM Reasons for Decision, pp. 17-19
Energy purchases/DG

FBC states on page 96 of its 2016 LTERP: "The Company does not consider small-scale customer-owned renewable power to be a secure or reliable firm resource".

The Commission stated on pages 17–19 of the FBC 2016 NM Reasons for Decision:

> BCSEA-SCBC submits that FBC's long-run marginal cost (LRMC) of clean or renewable resources in BC is the appropriate referent price (11.2 c/kWh). FBC submits that energy generated from a distribution connected customer is short-term in nature as there is no long term-commitment from the customer. However:
>
> - FBC submits the lifetime of distributed generation sources as ranges from 14 years to 38 years.
> - FBC states that NM customers do not have the option of selling generation to a third party other than FBC, and that FBC has no tariff or program in place to purchase IPP power other than the NM rate.
> - A letter of comment states: "…A system like this can't be just dismantled and moved to an area where its more financially feasible to install."
> - Scarlett argues: "The primary reason NM customers don't make a long term commitment is that FBC has not to date given them the opportunity to do so."
> - Scarlett also submits that FBC's proposal does not acknowledge the value of aggregated small energy sources, contrary to Policy Action #25 in the BC Energy Plan …"

The Panel reiterates its comments made earlier in this decision that broader issues, such as whether the scope of the Net-Metering (NM) programs should be expanded to include customers who generate Annual (net excess generation [NEG]), and if so what the appropriate price should be, are more appropriately addressed as part of or following the LTERP and/or SGP proceedings

36.1 Does FBC consider generation from small-scale customer-owned generation to be long-term in nature? If no, please explain why and specifically address each of the five bullets included in the FBC 2016 NM Reasons for Decision extract above.

36.2 Please provide a break-down of FBC's long-term avoided cost of energy between (i) generation – energy; (ii) generation – capacity; and (iii) network – capacity.

36.2.1 Please describe the attributes of the generation assumed for FBC's long-term avoided cost (for example, is it a flat or shaped block of power, location, clean, delivery voltage (distribution/transmission)).

36.3 Please approximate the long-term value of (i) solar PV energy, and (ii) micro-hydro energy using FBC's LRMC of energy estimate as the starting point and adjusting the value for avoided distribution losses, location and shape (if required). Please provide all key assumptions used.

36.3.1 Please estimate the additional value (in terms of avoided generation and network capacity costs) that could accrue to firm long-term distributed generation.

36.4 When does FBC next plan to review/update the NM rate (RS 95)? Please explain.

I. CHAPTER 10 – STAKEHOLDER AND FIRST NATIONS ENGAGEMENT

37.0 **Reference: STAKEHOLDERS AND FIRST NATIONS ENGAGEMENT**
Exhibit B-1, Volume 1, pp. 135, 136
Community consultation workshops

On page 135 of the Application, FBC states that seven community workshops were held between 2014 and 2016 in communities within the FBC service area. FBC notes that the workshops included interactive sessions with stakeholders to promote discussion about potential electricity demand and scenarios and resource options. FBC further states on page 136 that workshop discussions were robust and customer-focused and they demonstrated that FBC's long-term planning considerations align well with stakeholders expectations.

37.1 Please discuss the content and amount of information provided to stakeholders with respect to tradeoffs of considered demand scenarios and resource options, for example: cost/emissions trade off; cost/energy security trade off; cost/reliability trade off; short-term costs vs. long-term benefit; rate impacts; bill impacts.

37.2 Please discuss results of the feedback you received from the stakeholders, including customer preferences regarding alternative scenarios considered.

37.2.1 Please discuss were the results of customer feedback considered? If yes, in which areas?

J. VOLUME 2 – LONG-TERM DEMAND-SIDE MANAGEMENT PLAN

38.0 **Reference: LONG-TERM DSM PLAN**
Exhibit B-1, Volume 2, pp. 14; FBC's 2012 RR & ISP, Exhibit B-1-2 (FBC 2012 LT DSM Plan), p. 11; FBC 2012 RR&ISP, Decision, p. 129 and Order G-110-12; FBC Application for Acceptance of DSM Expenditures for 2017 (FBC 2017 DSM), Order G-9-17, Appendix A, Reasons for Decision dated January 25, 2017 (FBC 2017 DSM Reasons for Decision), p. 5
Funding envelope history

FBC provides in table 3-1, p. 14 of the FBC 2016 LLT DSM Plan Application, key DSM scenario data. On p. 11 (table 2.5) of the FBC 2012 LT DSM plan, FBC provided for the three DSM portfolio options considered: incentive levels as a percentage of TRC and TRC benefit/cost ratio.

On page 129 of the Commission's Decision on the FBC's 2012 RR & ISP (G-110-12), the Commission stated: "The first issue is whether the Plan is in fact a long-term plan or, more accurately, a five-year plan because a placeholder for energy savings has been used for 2017-2030. FortisBC's position is that detailed planning data is only valid for 5 years due to rapidly changing DSM technology and costs."

On page 5 of the FBC 2017 DSM Reasons for Decision, the Commission stated: "In the 2012 LTRP, FBC considered three DSM options (low, medium and high) which resulted in annual funding levels of $5 million, $9 million and $20 million, respectively."

38.1 Please confirm, or otherwise explain, that the FBC 2012 LT DSM plan was a five-year plan only, ending in 2016.

38.2 Please provide in table form the following key DSM scenario data (average per annum for the 5 years following the 2012 ISP and 2016 LTERP, respectively) for: (i) the low/medium/high DSM scenarios considered in 2012 and (ii) the low/base/high/max scenarios considered in 2016:

- Annual savings (in GWh, % of load growth, and % of total load)
- Annual DSM funding levels, $ million
- Utility incentive levels as a percentage of the total resource cost
- TRC benefit/cost ratio
- Utility cost of energy savings ($/MWh)

38.2.1 Please also provide the key DSM data (see bullets above) for the past 10 years of historical actual and historical forecasted (as approved under s. 44.1) DSM, and 5 years of projected DSM based on the proposed DSM portfolio in the 2017 LT DSM Plan.

39.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
FBC's 2012 RR & ISP Decision, p. 133; FBC 2014-2018 Multi-Year Performance Based Ratemaking Plan, Decision dated September 15, 2014 (2014-2018 PBR Decision), p. 242; FBC 2015-2016 DSM Decision, pp. 4, 32 and Order G-186-14; FBC Application for Acceptance of Demand Side Management Expenditures for 2017 (FBC 2017 DSM), Reasons for Decision and Order G-9-17, pp. 4, 10,
Guidance from prior Commission Decisions

On page 133 of the Commission's Decision on the FBC's 2012 RR & ISP, the Commission stated:

> The Commission Panel recognizes that this acceptance means that FortisBC may simply maintain current levels of DSM spending over the next five years, subject to future DSM expenditure schedules filed for approval with the Commission. However, … FortisBC received approval to spend approximately twice the amount on DSM in 2011 over 2010 and was unable to spend to the higher approved level. As well, the Commission Panel acknowledges that the Company is implementing new programs that will take time to gain participants.

In the FBC 2014-2018 PBR Decision, the Commission stated on page 242: "The Commission Panel accepts the 2014 DSM schedule filed by FBC … As it is now near the end of 2014, the Panel does not consider that FBC would be able to meaningfully impact its 2014 DSM spend should a higher budget be approved."

In the Commission Decision on FBC 2015-2016 DSM expenditures, the Commission stated on pages 4 and 32:

> Despite the acceptance of the proposed expenditures, the Panel is concerned about the adequacy of expenditures … especially given that FBC's proposed DSM expenditures are less than those accepted in 2013 and those proposed in the 2012 LTRP (in particular for industrial customers). … While the Panel acknowledges FBC's explanation for the 2013 underspend, the issue of utility incentives to undertaken DSM is not new to the Commission.

In the Commission Reasons for Decision on FBC 2017 DSM expenditures, the Commission stated on pages 4, 10:

> Despite the acceptance of the proposed expenditure schedule, the Panel is concerned that it falls short of addressing a range of DSM possibilities that could be pursued in the coming year. …The Panel is further concerned that the extension of existing programming sits on a foundation of recent activity which in itself can be characterized as having fallen short. In other words, "more of the same" is inherently plagued by underperformance.

39.1 Please provide in table form a comparison, for each year from 2010 to 2016: (i) DSM expenditure levels accepted in the appropriate LTRP; (ii) accepted DSM funding levels under s.44.2 of the UCA; (iii) actual FBC DSM expenditures.

39.2 For each of the four examples of FBC's explanation for DSM underspend that the Commission considered unpersuasive on page 10 of the FBC 2017 DSM Reasons for Decision, please explain whether (and if so how) they were also an FBC consideration in the selection of the proposed 2016 LT DSM Plan.

39.3 Please identify any key concerns FBC would have with spending that achieves savings that offsets 100% load growth. Please specifically identify whether concerns include: lack of cost-effective DSM opportunities, difficulty in scaling-up DSM programs, timing of Commission approval received, rate impact.

39.4 Does FBC consider that it is conflicted in any way in its motivation to identify and achieve cost-effective DSM savings? Please explain why/why not.

40.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 1, p. 95; UCA, s. 44.1; 2007 BC Energy Plan, p. 5; BCH 2013 IRP, p. 9-12; Guide to the DSM Regulation (DSM Guide), p. 8
Definition of cost-effective DSM

FBC states on page 95 of its 2016 LTERP Application: "Demand-side resource options are typically more cost-effective than new supply-side resource options… Accordingly, FBC looks to demand-side resources first to meet any future LRB gaps."

Section 44.1(2)(f) of the UCA states, that a long-term resource plan must include: "(f) an explanation of why the demand for energy … [is] not planned to be replaced by demand-side measures."

The 2007 BC Energy Plan states on page 5: "… the plan supports utilities in [BC] and the [Commission] pursuing all cost-effective and competitive demand side management programs".

BC Hydro states on page 9-12 of its 2013 IRP:

> Cost-Effectiveness: Activities should be cost-effective to ensure BC Hydro's investments in DSM will generally be lower than the LRMC and reduce overall revenue requirements while providing broad opportunities for participation across customer sectors. Cost-effectiveness is measured by the TRC and UC.

Page 8 of the DSM Guide includes illustrative examples of how the 15% non-energy benefit adder can be applied.

40.1 Does FBC consider that, in order to meet the requirement of s. 44.1(2)(f) of the UCA, it should include in its list of DSM portfolios an option that attempts to capture all cost-effective DSM? If no, please explain why not.

40.2 Is FBC's definition of 'cost-effective' DSM is the same as that used by BC Hydro in its 2013 IRP? Please explain.

40.2.1 Please explain how environmental and non-energy benefits are incorporated into the 'cost effective' DSM definition.

41.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, pp. 6, 10, 14; FBC 2017 DSM Reasons for Decision, p. 10; FBC 2012 RR & ISP, Exhibit B-1-2, LT DSM Plan, p. 14; 2016 NW PP, pp. 12-10, 12-16
Conservation Potential Review (CPR): linkage to DSM portfolio options

Table 3-1 on page 14 of FBC's 2016 LT DSM Plan, shows the four DSM portfolio options, including their respective resource cost.

FBC describes on page 6 of the 2016 LT DSM Plan the steps used to develop the plan. FBC further states on page 10 "roughly 500 GWh of savings are available at a cost less than $50 per MWh … The economic results of the FBC CPR are a key input for the LT DSM plan …."

FBC states on page 10 of the 2016 LT DSM Plan: "

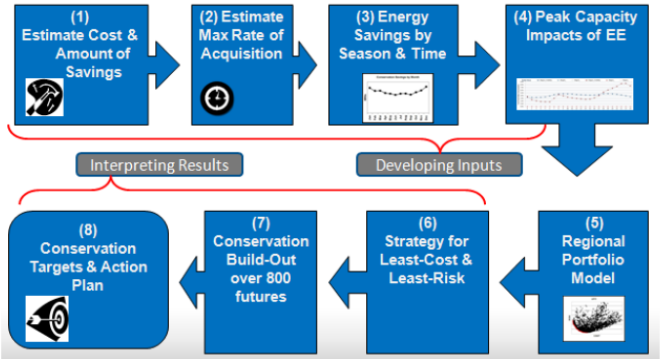
> The next phase of the BC CPR project, expected in 2017, includes assessing the market potential that is a subset of economic potential and carving out non programmatic potential (e.g. Codes & Standards …). The market potential identified in the next phase of the BC CPR is expected to inform FBC's next DSM expenditure schedule.

The FBC 2017 DSM Reasons for Decision stated on page 10: "FBC submits that any attempt to increase 2017 DSM spending on the basis of the draft BC CPR would have been imprecise guess work."

FBC stated on page 14 of the 2012 LT DSM Plan: "In this plan, FortisBC has included all programs identified in the [CPR] reports in which the program TRC ratio is above unity, which supports the objective of pursuing all cost-effective DSM."

The 2016 NW PP includes the following chart on p. 12-10, and conservation ramp rates on p. 12-16.

Figure 12 - 5: Approach to Setting Conservation Targets



41.1 Please explain FBC's action plan item to complete the final phase of the BC CPR (identifying the market potential and non-program potential). Would regulatory efficiency be enhanced if the 2016 LT DSM plan was filed after the CPR had been finished?

41.1.1 Does FBC consider that the development of the DSM portfolio's prior to the completion of the CPR is 'imprecise guess work'? Please explain.

41.2 Please explain how the 2016 CPR results have informed the development of the DSM scenarios.

41.2.1 Please explain the key differences between the approach used in the FBC's 2016 LT DSM Plan to develop alternative DSM portfolios and the approach used in (i) FBC's 2012 LT DSM Plan, and (ii) the 2016 NW PP.

41.3 Please show in table form the annual DSM savings under each of FBC's DSM portfolio options and the Navigant CPR findings of 500 GWh/year savings available at a cost less than 5c/kWh. Please calculate the DSM portfolio savings as a percentage of the 500 GWh/year savings.

41.4 Please explain how FBC calculates the resource cost of each DSM portfolio in the absence of a complete CPR. Please state all assumptions and data sources.

41.5 Please explain when FBC considers it should file the next LTERP.

42.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, Appendix A, 3.2.5, sub-appendix A
CPR: Model results and input assumptions

Appendix A of the 2016 LT DSM Plan Application references three attachments containing additional model results and input assumptions, which are "A.1 Detailed Modeled Results", "A.2 Measure List and characterization Assumptions", and "A.3 Other Key Input Assumptions." Navigant states in the executive summary of the CPR: "The team supplemented the measure list using the Pennsylvania, Illinois, Mid-Atlantic, and Massachusetts technical resource manuals (TRMs), and partnered with CLEAResult to inform the list of industrial measures." In section 3.2.5 of Appendix A, Navigant states that it "relied primarily on BC Utility provided program data and TRM data for incremental cost data."

42.1 Please provide the referenced excel attachments in Appendix A of the CPR.

42.2 Please identify the LRMC of energy used in the CPR and discount rate assumption. Please discuss the advantages/disadvantages of using a societal discount rate to calculate the TRC.

42.3 Please provide a summary of which area of the CPR relied on the TRMs as an input, and explain whether the TRMs is an appropriate proxy that is applicable in FBC's geographical and operating environment.

42.3.1 Please explain whether Navigant adjusted the TRM values due to geographic differences. If yes, please explain how FBC determines when an adjustment is necessary and the appropriate magnitude and methodology of the adjustment(s). If not, why not?

43.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, Appendix A, sections 1.3.4, 2.4.3, sub-Appendix D
CPR: modeling measures independently

Navigant states in section 1.3.4 of Appendix A that:

> This study models energy efficiency measures independently. As a result, the total aggregated energy efficiency potential estimates may be different from the actual potential available if a customer installs multiple measures in their home or business. Multiple measure installations at a single site generate two types of interactions: within-end-use interactions, and cross-end-use interactions.

Navigant states in sub-appendix D of Appendix A that: "there is the real-world approach where some measures are implemented in isolation and others are stacked. Unfortunately, the data is simply not available to accurately estimate the savings from the real-world approach" Navigant states in section 2.4.3 of Appendix A that it "used measure specific program evaluation data from the BC Utilities to inform energy savings."

43.1 Please explain whether the use of evaluation data offsets the potential overstatement of the estimated energy savings from modeling measures independently.

44.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, p. 7; 2016 NW PP, pp. G-33, G-39, G-47; FBC 2012 RR & ISP,
Exhibit B-1-2, LT DSM Plan, pp. 18, 29;
CRP: Other

Page G-33, G-39, and G-47 of the 2016 NW PP include residential, commercial and industrial measures bundles by end use respectively. Page 18 to 29 of the FBC 2012 LT DSM Plan includes a list of DSM programs. FBC states on page 7 of the 2016 LT DSM Plan Application that, primary inputs in the base year were the 2012 Residential and 2015 Commercial End-Use Surveys.

44.1 Are there any residential, commercial or industrial measures that were listed on pages G-33, G-39, and G-47 of the 2016 NW PP which were not included in the 2016 FBC CPR? If yes, please identify and explain why.

44.2 Please identify any DSM programs that FBC described on page 18 to 29 of the FBC 2012 LT DSM Plan that were either not included in the 2016 LT DSM Plan Application, or were proposed 2017 funding levels are more than 25% lower than those proposed for 2016 in the 2016 LT DSM Plan Application.

44.2.1 For these identified programs, please provide the estimated TRC ratio and utility cost (in $/MWh) explain why they have been eliminated/funding reduced.

44.3 Please explain why the residential end-use survey was not updated for the CPR.

44.4 Please explain how behaviour based DSM opportunities have been captured in the 2016 CPR.

45.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, Section 3, pp. 14, 16; FBC 2015-2016 DSM Decision, p. 16; BCH 2013 IRP, p. 9-17
Developing alternative DSM portfolios

In the FBC 2015-2016 DSM Decision the Commission stated that, in reviewing the DSM portfolio from the perspective of interests of persons in BC, it would focus on effectiveness (consideration of Utility Cost Test (UCT) results, addressing 'lost opportunities' and maintaining an engagement) and balance (providing broad opportunities for customers to participate, in particular for 'hard to reach' customers).

BC Hydro describes on page 9-17 of its 2013 IRP its principles for developing the DSM portfolio, including consideration of the persistence of savings/short-term energy surplus, lost opportunities, maintaining customer and trade engagement, cost-effectiveness of DSM from a Utility Cost (UC) and TRC perspective, and providing broad opportunities for customers to participate.

On page 14 of the 2016 LT DSM Plan Application, FBC presents four DSM portfolios: low, base, high, max which offsets 50%, 66%, 77%, and 89% of load growth on average from 2018 to 2035, respectively.

FBC presents its DSM portfolio scenarios in section 3 of the 2016 LT DSM Plan Application. Table 3-2 on page 16 shows the High DSM scenario rollout of target savings and pro-forma costs over the LTERP planning horizon

45.1 Please replicate Table 3-2 for all of the DSM portfolio scenarios, and for a hypothetical scenario if DSM spending offsets 100% of load growth.

45.2 Please articulate the key principles FBC used when grouping together different DSM programs/incentive levels to develop alternative DSM portfolios.

45.3 For each portfolio options included in Table 3-1 of the FBC 2016 LT DSM Plan Application, please provide the following information for each year from 2017-2021, with a five year total: utility annual cost ($'million); annual energy savings (GWh); energy cost (c/kWh), TRC, Rate Impact Measure (RIM).

45.3.1 Please provide an estimate of the above metrics for a DSM portfolio option that is 50% higher than the annual DSM budget compared to the 'High DSM' scenario.

45.4 Please identity the key differences in programs offered between each portfolio option. Specifically, do differences primarily relate to the level of incentives provided or are there differences in the measures targeted (and if so, which ones)?

45.4.1 Please identify the differences between FBC's presented DSM portfolio options in terms of: (i) the range of measures targeted; (ii) the incentive levels offered; (iii) the extent to which 'lost-opportunities' are addressed; and (iv) the extent to which broad opportunities are provided for customers to participate.

45.5 Please explain to what extent the different DSM portfolios focus on targeting customer behaviour as opposed to promoting investments in efficient appliances.

45.6 Please describe the key assumptions used to determine the utility cost (in $/MWh) of alternative DSM portfolios, including assumptions regarding the discount rate, free-rider/spillover rates and persistence of savings.

45.7 Please identify any measures identified in the 2016 CPR that pass the TRC which FBC is not targeting in its DSM portfolio options.

45.8 Please identify DSM programs that meet the following criteria and identify the level of funding for these programs over the next five years under FBC's preferred DSM portfolio:

- have a utility cost lower than the LRMC of market purchases;
- address 'lost opportunities' (energy savings that would be more expensive to obtain later);
- required to meet the adequacy requirements of the DSM Regulations

46.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, p. 11; BC Hydro F2017-F2019 RRA, Exhibit B-1-1, p. 10-23, Exhibit C1-8, p. 8; FBC 2015-2016 DSM Decision, p. 11
DSM portfolios - load growth target

FBC states on page 11 of the 2016 LT DSM Plan Application: "The DSM scenarios FBC considered are based on offsetting FBC's forecast growth, which is included in section 3 of the LTERP." The Commission stated on page 11 of the FBC 2015-2016 DSM Decision: "… the Panel considers that this load reduction target should act as a floor rather than a cap on the level of cost effective DSM funding."

BCSEA state in their intervener evidence on the BC Hydro F2017-F2019 RRA (Exhibit C1-8): "The uneven nature of load growth can lead to rising and falling energy efficiency and conservation investments as growth fluctuates due to external forces." BC Hydro states on page 10-23 of their F2017-F2019 revenue requirements application: "However, this metric [66 percent target] can be highly variable given changes in the load forecast …"

46.1 Please explain why FBC has based its portfolio options on a percentage of load growth. Please include in your response whether this could result in FBC purchasing energy for a higher cost than could be obtained through DSM.

46.1.1 Does FBC consider that it should only offer DSM programs when it is experiencing load growth? Please explain why/why not.

46.1.2 Does FBC consider that the 77 percent load reduction target in the proposed DSM portfolio should act as a floor rather than a cap on the level of cost-effective DSM? Please explain why/why not.

46.1.3 Please provide FBC's (i) plan and (ii) actual DSM energy savings as a percentage of load growth for each year from 2010 to 2016.

46.2 Does FBC consider that its proposed 'percentage of load growth' approach to the development of DSM portfolios is consistent with general industry practice? Please explain and provide references.

47.0 **Reference:** **LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
BC Hydro F2017-F2019 RRA, Exhibit B-9, BCUC IR 176.2; FBC PBR 2014-2018, Exhibit B-43, Appendix C, p. 35, Exhibit C10-7, Appendix A, pp. 2, 10-18, 30-33
Benchmarking

In the BC Hydro F2017-F2019 RRA (Exhibit B-9, BCUC IR 176.2), BC Hydro provides a comparison of its DSM energy savings as a percentage of energy sales to other jurisdictions.

FBC includes a January 2013 Public Utilities Fortnight article titled "DSM in the Rate Case: a regulatory model for resource parity between supply and demand," as Appendix C to its 2014-2018 PBR Application Rebuttal Evidence to the Industrial Customer's Group (ICG). The article states on page 35: "Recently the U.S. Energy Information Administration (EIA) indicated that $5.5 billion was spent on electric DSM programs in 2011, representing 1.5 percent of total electric retail revenues."

ICG submitted a 2006 report prepared for the Canadian Association of Members of Public Utility Tribunals (CAMPUT) titled "Demand-Side Management: Determining Appropriate Spending Levels and Cost-Effectiveness Testing" in the FBC PBR 2014-2018 Application (Exhibit C10-7). This report discusses on pages 2, 10-18, 30-33 setting appropriate targets for the amount of DSM activity. The executive summary of this report provides recommendations which include: "A minimum expenditure of 1.5% of annual electric revenues might be appropriate with a ramping up to a level near 3%."

47.1 Please calculate, for each DSM portfolio considered, (i) DSM spend as a percentage of FBC revenues and (ii) DSM energy savings as a percentage of energy sold.

47.1.1 Please compare the above DSM metrics to those of BC Hydro and other utilities and explain any significant differences.

48.0 **Reference:** **LONG TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 1, p. 5, Volume 2, p. 11; 2016 NW PP, p. 17-3; FBC 2015-2016 DSM Decision, p. 17; BCH2013 IRP, pp. 4-21, 4-22, 6-153
Evaluation of DSM vs. supply side: objectives

FBC describes its resource planning objectives on page 5 of the 2016 LTERP Application. The Commission describes resource planning objectives on page 3 of the Resource Planning Guidelines, which include 'equal consideration of DSM and supply resources'. FBC states on page 11 of the 2016 LT DSM Plan Application that the High DSM scenario was designed to optimize use of RS 3808 Tranche 1 energy and minimize the rate impact.

Page 17-3 of the 2016 NW PP describes conservation program standards. The Commission stated in the FBC 2015-2016 DSM Decision, p. 17: "The Panel also considers that concerns regarding the overall rate impacts from the DSM portfolio are best addressed in a LTRP …."

Figure 6-21 (p. 6-153) in BC Hydro's 2013 IRP show the differential rate impact related to alternative DSM portfolios over time. BC Hydro includes the following comparators on page 4-21 of the BCH 2013 IRP: rate impact, cost-effectiveness (TRC and UC), bill reductions and risk/flexibility. BC Hydro also states on page 4-22: "Over the long-term, a negligible difference between the average rate impacts of the different alternative means is expected."

48.1 Please describe the key factors FBC considered in comparing DSM portfolios against supply side portfolios. Please specifically address the four criteria used by BC Hydro in its 2013 IRP.

48.1.1 Does FBC consider that the principles used to evaluate DSM with supply side options are consistent with that used to compare alternative supply side options? Please explain.

48.1.2 Please explain why FBC used RS 3808 Tranche 1 energy as an input into the development of the High DSM scenario, rather than FBC's long-term avoided cost.

48.2 Does FBC consider that the size of the DSM portfolio should be constrained to address rate impact concerns? If yes, please describe and justify any rate limit proposed.

48.2.1 Please discuss the advantages/disadvantages of alternative options to mitigate the effect of DSM related rate impacts. Please include: DSM programs to target hard-to-reach vulnerable customers (such as low-income); ensuring a reasonable balance of DSM programs between customer classes; reducing the level of cost-effective DSM.

48.2.2 Does FBC consider that DSM related rate impact considerations are short-term in nature only? Please explain.

48.3 Does FBC consider that DSM can be preferable to new generation build as a result of the flexibility to ramp up/down DSM spending levels? Please explain, and discuss how any such benefit is recognized in the evaluation of all presented DSM portfolio options.

49.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 1, pp. 29, 127, Volume 2, p, 14; 2016 NW PP, pp. 15-42, 15-26, O-17; 2016 PSE IRP, p. 1-18
Evaluation of DSM vs. supply side: results

FBC states on page 29 of its 2016 LTERP Application: "With increasing federal, provincial and local government interest and development of new regulatory frameworks to reduce GHG emissions, FBC anticipated that there will be a greater requirement for DSM programming." FBC includes DSM scenario data on page 14 of the FBC 2016 LT DSM Plan Application (Table 3-1). FBC states on page 127 of the 2016 LTERP Application that the LRMC of its preferred portfolio is $96/MWh.

Figure 15-17 (p. 15-42) of the 2016 NW PP compares the effect over time on rates and average regional residential bills of different levels of energy efficiency spending, and figure 15-11 (p. 15-26) compares CO2 emissions. The plan states on page O-17 that the highest priority new resource is conservation, and that the Lower Conservation scenario (which still offsets regional load growth through 2030) had significantly higher ($14 billion) average system cost and exposed the region to much larger ($19 billion) economic risk that the Existing Policy scenario.

Page 1-18 of the 2016 PSE IRP states: "This plan - like prior plans – includes acquiring conservation to levels such that much of what is available will be acquired. … PSE's analysis indicates that although current market power prices are low, accelerating acquisition of [demand side resources] continues to be a least-cost strategy."

49.1 Please estimate for each of FBC's DSM portfolio options the effect (in year 5, 10 and 20) on (i) residential customer bills and (ii) FBC rates. Please assume that the avoided cost of energy is equal to the long-run marginal cost of FBC's preferred portfolio.

49.1.1 Please provide the same metrics for a DSM portfolio option that is 50% higher than the utility DSM funding compared to the 'High DSM' portfolio. Please state all assumptions used.

49.1.2 Please estimate how much of the effect on rates in the first five years is due to (i) the cost of DSM spend; and (ii) the effect on consumption levels.

49.2 Please explain the level of weight FBC considers should be placed on the following metrics in evaluating the DSM portfolios: residential bills, FBC rates, GHG emissions. If the level of weight placed on any one of these metrics has changed since the 2012 IRP, please explain why.

50.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
FBC's 2012 RR & ISP, Exhibit B-1-2, LT DSM Plan, pp. 14, 15; BC Hydro F2017-F2019 RRA, Exhibit B-9, BCUC IR 176.1; 2016 NW PP, p. 17-4
Adequacy and balance

On page 14 and 15 of FBC's 2012 LT DSM Plan Application, FBC provides energy savings targets by sector and cost benefit ratios by sector. In Exhibit B-9 (BCUC IR 176.1) of the F2017-F2019 RRA proceeding, BCH provides DSM expenditures as a percentage of retail revenue by sector.

The 2016 NW PP states on page 17-4:

> Although low-income customers are often an underserved segment, other hard-to-reach (HTR) segments may include: mid-income customers, customers in rural regions, small business owners, commercial tenants, multifamily tenants, manufactured home dwellers, and industrial customers if they are unable or unwilling to participate in conservation programs.

50.1 Please provide an estimate of the annual break down by customer class over the next five years of DSM spend as a percentage of revenues. Please (i) explain any significant variation in these percentages between customer classes and (ii) comment on any significant differences between DSM spend as a percentage of customer class revenue and that is proposed by BC Hydro.

50.2 Please identify the 2012-2016 (actual) and 2017-2021 (proposed) DSM funding to meet each of the four adequacy requirements in Section 3(a) of the DSM Regulations, and describe the programs offered. Please explain any significant difference in the programs offered or funding allocated between these two periods.

50.3 Please identify any low-income DSM programs offered by BC Hydro that are not offered by FBC, and explain why FBC does not offer similar programs to its customers.

50.4 Please explain whether (and if so how) FBC has given specific consideration to other potentially 'hard to reach' customers. Please specifically address: First Nation communities, rural communities without access to natural gas, low-income/high use residential customers, and high use customers in rental accommodation who are direct customers of FBC.

50.5 Please explain the approach used by FBC to identify energy savings from industrial customers.

51.0 **Reference:** **LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
2007 BC Energy Plan p. 5; City of New Westminster report, Partnership with BC Hydro-Power Smart, April 12, 2007[10]
Co-ordination

The 2007 BC Energy Plan states on page 5: "Ensure a coordinated approach to conservation and efficiency is actively pursed in British Columbia." A City of New Westminster report dated April 12, 2007, states that the City has signed a Memorandum of Agreement with BC Hydro PowerSmart, allowing City of New Westminster electrical customers to participate in all BC Hydro PowerSmart programs.

51.1 Please explain how FBC, in the development and implementation of its DSM programs, ensures that it actively coordinates with Livesmart, FEI and BC Hydro.

51.1.1 Does FBC consider that it should increase the standardization of its DSM programs with BC Hydro? Please explain why/why not.

51.1.2 Does FBC consider that there could be a net benefit from BC Hydro extending some or all of its DSM programs into FBC's service areas in a similar manner that the City of New Westminster has done with BC Hydro? Please explain.

51.2 Please identify FBC's DSM budget for 2012-2016 and 2017-2021 for (i) rate design and (ii) codes and standards.

51.2.1 Does FBC consider that it can obtain cost effective energy/capacity savings through rate design? Please explain why/why not. In your response, please compare the incremental energy charges of FBC's main rate classes with FBC's LRMC of portfolio A4.

51.2.2 Please explain the approach undertaken by FBC to identify cost effective codes & standards energy savings.

51.3 Please discuss the make-up and role of FBC's DSM advisory committee. If FBC no longer has an active DSM advisory committee, please explain why not.

52.0 **Reference:** **LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, p. 24
Self-generator eligibility

FBC states on page 24 of the 2016 LT DSM Plan Application: "Customers that normally supply a portion of their load through self-generation may be eligible for DSM programs and financial incentives in proportion to the share of potential energy savings to the Company."

52.1 Please explain which customer classes FBC considers could be subject to prorating of DSM incentives, and identify existing FBC industrial or wholesale customers that could be affected.

52.2 Please explain to what extent the (i) TRC and (ii) UCT is affected depending on whether the customer purchases their energy from the utility, a third party, or self-supplies generation.

52.2.1 Please explain whether (i) FEI reduces the DSM incentives available to its customers depending on whether they purchase gas from FEI or an alternative supplier and (ii) BC Hydro reduces a self-generators eligibility to participate in DSM programs.

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[10] http://www.newwestcity.ca/council_minutes/0416_07/CW/Reports/CW13.pdf

52.3 Did FBC consider an alternative option of determining eligibility to DSM programs based on the contribution the self-generator makes towards the sunk cost of the network (for example, if a self-generator pays 50% of network charge compared to a full service customers, they would be eligible for 50% of the DSM funding)? Please explain why/why not and the results.

52.4 Please explain why FBC considers that the DSM incentive levels for self-generators would be adjusted downwards, rather than the total DSM funding level (i.e. no reduction in the incentive level provided, but fewer DSM programs funded). Specifically, to the extent the incentive level is set at the minimum level required to incent the customer to undertake the efficiency measure, would a reduction in the incentive mean the customer would not participate in the program?

53.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
FBC 2012 RR & ISP Decision, p. 134; National Action Plan for Energy Efficiency (2007). Model Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc.,[11] p. 7-2
Evaluation, Measurement and Verification (EM&V)

On page 134 of the Commission's Decision on FBC's 2012 RR & ISP, the Commission rejected FBC's proposed monitoring and evaluation plan as it failed to ensure that all programs are evaluated. Figure 1 on page 7-2 of The Model Energy Efficiency Program Impact Evaluation Guide (2007) outlines the Program Implementation Cycle with High-Level Evaluation Activities. The report states on page 7-2 that "When a program is first envisioned, often as part of a portfolio of programs, is when both program goals and evaluation goals should be considered."

53.1 Please explain whether FBC has an EM&V plan that includes proposed evaluation methods and timing that will be used to conduct both process and impact evaluations on its DSM programs. If yes, please provide. If not, why not?

54.0 **Reference: LONG-TERM DEMAND-SIDE MANAGEMENT PLAN**
Exhibit B-1, Volume 2, pp. 25, 26; FBC 2017 DSM proceeding, Exhibit B-2, BCUC IR 9.1
RS 90 / RS 91

On page 25 of the FBC 2016 LT DSM Plan Application, FBC states "FBC is proposing to rescind RS 90 from its Electric Tariff…." On page 26, FBC requests approval to remove RS 90 from FBC's tariff sheet. FBC stated in Exhibit B-2 of the FBC 2017 DSM Expenditures proceeding (BCUC IR 9.1) that it intends to apply to formally close RS 91 to new entrants, as part of its 2016 LT DSM Plan Application.

54.1 Please explain why FBC has not applied to close RS 91 to new entrants.

54.2 Please explain the difference between to cancel, rescind, and close a rate schedule.

54.3 Please confirm, or otherwise explain, that FBC is requesting in this proceeding to cancel RS 90 from FBC's tariff sheet under section 58 to 61 of the UCA.

54.3.1 Would FBC customers be affected by FBC's request to rescind RS 90, and if so, how?

54.4 Please explain whether (and if so how) RS 90 has been used in the past five years, for example to determine the level of incentives offered under a DSM program or as part of a dispute resolution.

[11] https://www.epa.gov/sites/production/files/2015-08/documents/evaluation_guide.pdf