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April 6, 2017

Andy Shadrack
Box 484
Kaslo, BC V0G 1M0

Attention: Mr. Andy Shadrack

Dear Mr. Shadrack:

**Re: FortisBC Inc. (FBC)
Project No. 3698896
2016 Long Term Electric Resource Plan (LTERP) and Long Term Demand Side
Management Plan (LT DSM Plan)
Response to Mr. Andy Shadrack (Shadrack) Information Request (IR) No. 1**

On November 30, 2016, FBC filed the Application referenced above. In accordance with the British Columbia Utilities Commission Order G-197-16 setting out the Regulatory Timetable for the review of the Application, FBC respectfully submits the attached response to Shadrack IR No. 1.

If further information is required, please contact Joyce Martin at 250-368-0319.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties



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1 1. FortisBC (FBC) stated in its application at 2.3.3 "Small Scale Distributed Generation"
2 that:

3 *"...the fixed charges in current rate structures do not adequately recover the cost of*
4 *connection to the distribution system".*

5 i. Please compare the average cost to FBC, by rate class if available, of connecting
6 Net Metering (NM) customers with the average cost to FBC for connecting
7 regular customers.

8
9 **Response:**

10 The majority of NM customers are already connected when they enroll in the net metering
11 program. The physical requirements for interconnection are comparable to customers in
12 general (although the ability of the utility to recover these common costs from the NM customer
13 may be lessened as discussed in the response to BCUC IR 1.11.4).

14 There are, however, incremental costs associated with connecting a NM customer and with the
15 ongoing administration of the program. FBC does not recover these costs from program
16 participants and does not therefore separate them in a manner that can provide reporting.
17 Costs prior to interconnection include any required site visit, review of the NM design and
18 documentation by FBC staff, administering the Net Metering Application and Agreement and
19 billing review to ensure eligibility. Post-connection, NM metering customers require manual
20 billing and account reconciliation each billing period. Currently all of these costs are recovered
21 from customers in general.

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25 ii. Does the expression *"fixed charges in current rate structures"* refer, for
26 residential services under 200 amps, to the \$533 Schedule 82, Sheet 40
27 installation charge, or does it refer to something else? If it does refer to
28 something else, please elaborate on what costs or charge FBC is referring to.

29
30 **Response:**

31 *"The fixed charges in current rate structures"* refers to the Customer Charge that is part of each
32 rate schedule. The phrase, *"...cost of connection to the distribution system"*, is not intended to
33 refer to the discrete task of the initial connection to the FBC system. Rather, it is intended to
34 mean the cost of being connected to the distribution system, including all of the fixed costs that
35 are partially recovered through the Customer Charge.



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iii. Are there any pro-rata or other connection or installation charges based on service size which are applied to residential services at 100 amps, 125 amps, 150 amps and 200 amps? If so, please list these charges and elaborate as to why these different charges are levied

Response:

The standard charges for the installation of a new or upgraded service are detailed in Schedule 82 of the FBC Electric Tariff. Standard overhead installation charges for residential service apply to service sizes of 200 amps or less.

There is an additional charge for either an underground service or a 400 amp service that reflects the additional cost of performing these connections.

iv. Are there any other charges, excluding line extension ones, related to connection of a new or upgraded residential service under or over 200 amps? If so, please list these charges and elaborate as to why they are levied.

Response:

Please refer to the response to Shadrack IR 1.1iii.

v. Please provide a table showing the average per annum kWh household residential consumption rates by 100 AMP, 125 AMP, 150 AMP and 200 AMP service.

Response:

FBC is unable to provide the requested data as it does not have service size data in its customer service systems for all customers.

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1 2. In section 2.3.3, FBC mentions a "*perception that distributed generation is 'greener'* "
2 amongst the reasons that small scale generation is gaining customer traction. Is
3 photovoltaic generation, in FBC's opinion, actually "*greener*" overall? Please elaborate.

4

5 **Response:**

6 Based on customer interactions and public discourse, it appears that customers may believe
7 that the decision to install a solar PV system will result in the displacement of energy sourced
8 from environmentally unfriendly technologies and therefore carries a significant environmental
9 benefit.

10 FBC has characterized resource options as either clean or renewable, or not, according to what
11 the CEA defines as clean or renewable resources generated in BC, but has not ranked
12 resources within that designation in terms of which one is "greener" than the other.

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1 3. FBC stated in its application at 2.3.4 "Rate Design Considerations" that:

2 *"...the growth in interest and participation in small scale customer - owned generation,*
3 *such as the installations that qualify for the Company's Net Metering Program, may*
4 *begin to pose rate stability challenges for all customers. While the current participation*
5 *rates and installed capacity are not a cause for concern, FBC recognizes that a*
6 *proliferation of grid -connected customers with greatly reduced, zero, or periodic load is*
7 *problematic for the current regulatory model where the costs of providing all aspects of*
8 *service are recovered primarily through volumetric rates. FBC, like many other utilities, is*
9 *concerned that the result of the widespread installation of customer - owned generation*
10 *will be the transfer of costs to customers who either cannot participate, or choose not to*
11 *participate".*

12 i. Can FBC project a level or degree of small scale generation at which the
13 Company would expect rate structures to become unstable, and please describe
14 how it would expect such instability to manifest itself?
15

16 **Response:**

17 FBC did not state that the "rate structures" themselves would no longer work and would become
18 unstable, rather that there may be rate stability challenges. These challenges increase as the
19 level of DG on the system rises, but FBC does not have a projection of the point where the
20 issues described below would become unacceptable.

21 A tenet of rate design is that to the extent possible, the fixed costs of the utility, those that do not
22 vary with the level of customer consumption, should be collected through a fixed charge, and
23 similarly that variable costs are collected through a variable charge. There is seldom a full
24 recovery of fixed costs through the fixed charges and most utilities collect at least some of the
25 fixed cost in a variable energy rate. The issue of rate stability for customers is manifested in
26 higher rates driven by an increasing disparity in the fixed cost/fixed charge relationship. While
27 FBC is supportive of a customer's ability to offset his or her own consumption, it is a cause for
28 concern that all customers, including those that do not have the ability or desire to own and
29 operate generation, will ultimately see an impact through higher rates.

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33 ii. FBC states that all aspects of service are "*recovered primarily through volumetric*
34 *rates*". If this is correct, please explain in detail the existence and purpose of the
35 Basic Charge.
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1 **Response:**

2 The basic charge (or Customer Charge as it is described in some rate schedules) is applied to
3 each customer bill to recover a portion of FBC's fixed costs. Fixed costs do not vary with how
4 much or how little energy customers use and include costs such as reading meters and
5 maintaining poles and wires. Currently, FBC's basic charge does not recover all of FBC's fixed
6 costs, such that a portion of those fixed costs are instead being recovered through volumetric
7 rates.

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1 4. BC Hydro Net metering Evaluation Report No 3 states:

2 *“Generally speaking, the economic value of customer self-generation to BC Hydro and*
3 *non- participating customers is measured in terms of avoided costs because customers*
4 *supply part or all of their own electricity. For example, customer self-generation may*
5 *reduce forecast load that BC Hydro is expected to serve or it may appear as a supply*
6 *resource, reducing the amount of electricity BC Hydro must generate or acquire.*
7 *Customer generation may also allow BC Hydro to avoid or defer system costs, such as*
8 *upgrades to enhance the reliability of the system in a particular area” (A-21/BC Hydro*
9 *Netmetering Evaluation Report No 3, April 30th , 2013, Value of RS 1289: Avoided Cost*
10 *and Load Resource Balance, p 15, line 11-18).*

11 i. BC Hydro suggests that self-generation provides value to the utility and non-
12 participating customers measured in avoided costs, and postulates that self-
13 generation may reduce the amount of electricity the utility must generate or
14 acquire, and may allow the utility to avoid or defer upgrade costs in particular
15 areas. Does FBC share BC Hydro's views on customer self- generation? Please
16 elaborate.

17
18 **Response:**

19 FBC believes the view expressed by BC Hydro with respect to the potential benefit of self-
20 generation to be largely hypothetical and relevant to a high level of DG proliferation.

21 In the cited report, BC Hydro concludes the following (with FBC emphasis added):

22 However, the impact of RS 1289 customer generation on the load forecast is
23 inconsequential, given the size of BC Hydro’s system and the very small amount
24 of installed RS 1289 generation (1.1 MW). On the supply side, BC Hydro does
25 not include surplus RS 1289 electricity in its LRB portfolio of existing or planned
26 resources given the nature of RS 1289 and the associated small volume of
27 energy.

28 Under RS 1289, customers are not obligated to generate any electricity. In
29 F2012, the total energy purchases from RS 1289 customers was about 0.5 GWh.
30 To BC Hydro’s knowledge, there are no material system costs that have been
31 avoided or deferred due to RS 1289 generation. At this time, the installed
32 capacity of RS 1289 generators and the volume of energy generated by those
33 customers is simply too small to result in any appreciable avoided cost benefits to
34 BC Hydro and other ratepayers, both in terms of the impact on BC Hydro’s LRB
35 and avoided system costs.

36 The situation with respect to small-scale DG on the FBC system and resource requirements is
37 similar with the exception that FBC is severely limited in its ability to store energy for use in a



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1 later season as compared to the BC Hydro system. Therefore, any benefits on the FBC system
2 may be smaller than they would be on the BC Hydro system. Please also refer to the response
3 to BCUC IR 1.36.3.1.

4
5

6

7 ii. Please list the documents and reference the sections where FBC has previously
8 provided to the BC Utilities Commission cost-benefit analyses of the overall
9 positive and negative financial and system stability attributes of Distributed
10 Generation (DG) and Net Metering (NM) in particular.

11

12 **Response:**

13 FBC is not aware of any such submissions to the BCUC.

14

15

16

17 5 FBC expresses specific concern about NM customers "*with greatly reduced, zero, or*
18 *periodic load*" as "*problematic for the current regulatory model where the costs of*
19 *providing all aspects of service are recovered primarily through volumetric rates*".

20 i. What percentage of FBC's seasonal, occasional and conservation minded
21 residential customers have a volumetric consumption level that would give rise to
22 a similar concern as that of NM customers, or is FBC's focus just on NM
23 customers?

24

25 **Response:**

26 FBC does not categorize its customers on the basis requested. However, it is only the net
27 metering customers that, under the current rate structure, have the ability to reduce their
28 contribution to fixed costs to zero, or negative, despite remaining connected to, and using the
29 FBC system.

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1 6. In accordance with 2 (l) of the Clean Energy Act FBC is encouraged to "*foster the*
2 *development of first nation and rural communities through the use and development of*
3 *clean or renewable resources*"?

4 i. What percentage of FBC's customers are first nation and/or live in remote/rural
5 locations where the cost of delivering electricity is considerably more expensive
6 than to highly concentrated urban areas?
7

8 **Response:**

9 While FBC works closely with First Nations communities and governments, the Company does
10 not ask First Nations customers to self-identify. As such, FBC cannot provide a percentage of
11 customers that are First Nations. In addition, FBC cannot comment on the assertion regarding
12 the relative cost of delivery to remote/rural locations versus highly concentrated urban areas
13 because FBC does not examine costs in this way.
14
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16
17 ii. Please elaborate on how the concern about "*greatly reduced, zero, or periodic*
18 *load*" fits in with the *Clean Energy Act's* overarching goal of energy self-
19 sufficiency and promotion of economic development for First Nations and rural
20 regions within the FBC service area
21

22 **Response:**

23 FBC notes that the *CEA* includes 16 energy objectives and does not agree with the assertion in
24 the question that energy self-sufficiency and promotion of economic development for First
25 Nations and rural communities are 'overarching' goals of the *CEA*.

26 To answer this question, some discussion of FBC's LTERP objectives is required. These
27 objectives, as stated in Section 1.3 of the LTERP include the following:

- 28
- Ensure cost-effective, secure and reliable power for customers;
 - 29 • Provide cost-effective demand side management; and
 - 30 • Ensure consistency with provincial energy objectives (for example, the applicable *CEA*
31 objectives).

32 These objectives can, in some cases, compete with each other. For example, the self-
33 sufficiency objective of the *CEA*, if implemented by FBC in the short term, would require
34 potentially more expensive generation to be acquired or built by FBC to replace lower cost

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1 market purchases. This would reduce the cost effectiveness of FBC's resource portfolio, as
2 discussed in Section 9.3.2 of the LTERP and in Figure 9-2.

3 FBC balances its LTERP objectives but places emphasis on the first objective of ensuring cost-
4 effective, secure and reliable power for customers. Ensuring consistency with provincial energy
5 objectives is still important to FBC but does not take priority over the first objective.

6 FBC's concern with greatly reduced, zero, or periodic load that potentially results in costs being
7 shifted from one group of customers to another lies in the impact this could have on its primary
8 objective of providing cost-effective, secure and reliable power for customers. This concern is
9 not tied specifically to the CEA objectives. As discussed in Section 8.2.9 of the LTERP, if new
10 supply-side resources are needed in the future, FBC would consider generation projects that
11 promote First Nations and community development if they are competitive with the cost of
12 alternative resources and meet FBC's LTERP objectives.

13

14

15

16 iii. Please provide cost comparisons of transmitting and service delivery of power to
17 remote and rural service populations versus delivery of power to densely
18 populated urban and city populations.

19

20 **Response:**

21 FBC believes that any analysis of the costs of serving customers should be done using sound
22 cost causation principles in a Cost of Service Analysis (COSA). FBC does not conduct a COSA
23 in consideration of regional differences and is therefore not able to provide the cost
24 comparisons as requested. FBC supports the concept of postage stamp rates throughout its
25 service territory, in accordance with prior direction from the Commission.

26

27

28

29 iv. Are there remote and rural portions of FBC's service delivery area where take up
30 of FBC's NM program, using micro-hydro, wind or solar PV etc, would allow FBC
31 to defer upgrades of transmission lines, etc?

32

33 **Response:**

34 No. Assuming a level of program uptake such that localized, aggregated Net Metering (NM)
35 systems could have an impact on actual system peak loads and thereby influence FBC's load
36 forecast, NM systems could in theory result in the deferral of future capital growth projects.

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1 However, given the uncertainties associated with non-firm power produced by customer DG, it
2 is not considered a practical alternative to the firm capacity and the more certain construction
3 timelines associated with conventional infrastructure upgrades. The primary issues are that net
4 generation produced by NM customers is often intermittent and is unlikely to peak concurrently
5 with system peak load.

6
7

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9 v. Has FBC considered a pilot program offering incentives to customers in remote
10 and rural areas to install their own self-generation, such that the cost of electricity
11 is offset, thus reducing overall cost to FBC and non-participating NM customers?
12

13 **Response:**

14 FBC has not considered such a pilot program. The question is focused only on costs, without
15 considering the revenue that would be lost as a result of the load reduction. At the level of rates
16 and cost for energy as they currently exist, and will exist for the foreseeable future, the loss of
17 load as described would lead to an increase in rates to all customers.

18

19

20

21 7i. In accordance with s.2(k) of the *Clean Energy Act*, please provide examples of how FBC
22 is encouraging "*economic development and the creation and retention of jobs*" within its
23 electrical service area.

24

25 **Response:**

26 FBC encourages economic development and the creation and retention of jobs within its service
27 territory through its operations, generation requirements, DSM programs and other initiatives.
28 FBC currently directly employs about 500 FTE employees within its various offices and plants
29 located in its service area. These employees operate the FBC system, provide transmission
30 and distribution system planning, provide customer service and implement DSM and other
31 initiatives such as the AML project.

32 As discussed in Sections 8.2 and 9.3.6 of the LTERP, FBC has considered the contribution to
33 economic development and the creation of jobs of future resource options by including full-time
34 equivalents per year in the resource attributes (for example, see Table 9-2 of the LTERP).

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1 As discussed in the response to Shadrack IR 1.6ii, FBC places emphasis on the objective of
2 ensuring cost-effective, secure and reliable power for customers. Ensuring consistency with
3 provincial energy objectives is still important to FBC but does not take priority over the first
4 objective.

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6

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8 ii. How many Full Time Equivalent (FTE) employees were directly employed by
9 West Kootenay Power/Utilicorp in the FBC electrical service area in 1997?

10

11 **Response:**

12 FBC does not have an FTE figure for 1997 but can confirm it employed 369 persons in 1997.

13

14

15

16 iii. How many FTE employees were directly employed in the electrical service area
17 by FBC in 2007?

18

19 **Response:**

20 FBC employed 561 FTEs in 2007.

21

22

23

24 iv. How many FTE employees does FBC directly employ in the FBC electrical
25 service area in 2017?

26

27 **Response:**

28 As of February 28, 2017, FBC directly employs 489 FTEs in its service area.

29

30

31

32 v. How many FTEs has FBC both directly and indirectly helped create and retain
33 within the FBC service area through corporate economic activity, for each of the
34 last five years?

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1

2 **Response:**

3 The following table shows the FTEs FBC has directly employed within the FBC service area for
4 the last five years. FBC does not have any data regarding indirect FTEs.

| | 2016 | 2015 | 2014 | 2013 | 2012 |
|---------|--------|--------|--------|--------|--------|
| FBC FTE | 487.29 | 507.08 | 503.29 | 477.68 | 551.30 |

5

6

7

8 8. BC.'s energy objectives as outlined in the Clean Energy Act included reducing, by 2016,
9 B.C. greenhouse gas emissions by 18% (s.2 (g)(ii), and at s.2(i) "*encourage*
10 *communities to reduce greenhouse gas emissions and use energy efficiently*".

11 i. Have FBC's existing Plan and Demand Side Management programs, by any
12 calculation, succeeded in reducing, by 2016, greenhouse gas emissions by 18%
13 in any area or category? Please elaborate.

14

15 **Response:**

16 B.C.'s energy objectives as outlined in the *CEA* are provincial objectives and, unless otherwise,
17 stated, are not specific to individual utilities. In Table 1-3 of Section 1.4.2 of the LTERP, for the
18 *CEA* objective relating to reducing B.C. GHG emissions (s. 2(g)), FBC notes that its GHG
19 emissions represent only about 0.078 percent of total provincial GHG emissions. As discussed
20 in Section 5 of the LTERP and the response to CEC IR 1.1.5, FBC's portfolio of generation
21 resources are largely clean and renewable, comprised mostly of hydro generation. Therefore,
22 FBC expects that its DSM programs have not significantly contributed to reducing B.C.'s overall
23 GHG emissions by 18 percent by 2016.

24

25

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27 ii. Have FBC's existing Plan and Demand Side Management programs, by any
28 calculation, succeeded in encouraging "*communities to reduce greenhouse gas*
29 *emissions and use energy efficiently*". Please elaborate.

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1 **Response:**

2 FBC DSM activities include supporting initiatives such as community energy planning (see
3 Section 4.4.2 of the LT DSM Plan). Under this category, and with measure funding from
4 specific DSM programs, the Company has successfully initiated the following:

- 5 • Provided utility data for foundational CEEI¹ reports
- 6 • Rossland Energy Diet pilot (2011-12)
- 7 • Regional West Kootenay/Okanagan Energy Diets (2012-13)
- 8 • Strategic Community Energy Planning workshops in nine Boundary and Kootenay
9 communities (2015-16), City of Kelowna (2017), Selkirk College (2015-16) and UBC
10 Okanagan(2015-16)
- 11 • Support for energy policy development for City of Nelson (2016)
- 12 • Co-sponsor a Senior Energy Advisor for Central Kootenays (2016-17)
- 13 • Co-sponsor a Community Energy Ambassador for Okanagan Nation Alliance (2016-17)

14
15 Although FBC funding is focused on enabling electricity savings, by partnering with FEI for all of
16 the above initiatives, FBC ensures the scope of community energy planning includes natural
17 gas savings and hence reductions in greenhouse gas emissions.

18
19

- 20
21 iii. Have FBC's existing Plan and Demand Side Management programs, by any
22 measure, succeeded in reducing consumption of electricity in any rate class?
23

24 **Response:**

25 Yes. Please refer to the response to Shadrack IR 1.8iv.
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¹ Community Energy & Emissions Inventory (<http://www2.gov.bc.ca/gov/content/environment/climate-change/reports-data/community-energy-emissions-inventory>).

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1 iv. Can FBC's existing Plan and Demand Side Management programs be said to
2 have demonstrably influenced lowering average per household consumption of
3 residential electricity during the past five years? Please elaborate
4

5 **Response:**

6 Please refer to the response to BCUC IR 1.14.1 that indicates a UPC drop from 12.77 (2011A)
7 to 11.80 (2016F) in average household usage (MWh per year).

8 In addition to DSM program effects, there are a number of other factors that likely contributed to
9 the overall drop in average consumption:

- 10 • The RIB/RCR rate became effective July 2012;
- 11 • Incorporating the former Kelowna electrical utility customer base in 2012;
- 12 • General price elasticity effects, including fuel switching; and
- 13 • Natural stock turnover.
- 14
- 15
- 16

17 9. FBC stated in its application at 2.3.3 "Small Scale Distributed Generation" that:

18 *"...Grid stability the distribution grid must be able to handle unpredictable distributed*
19 *generation output without causing power quality problems for other customers"*

20 i. Please explain in detail, using examples, what exactly is being referred to in this
21 statement.
22

23 **Response:**

24 This statement primarily refers to the intermittent nature of wind and photovoltaic (PV)
25 generation. In the case of PV, fluctuations in generation output can occur when there is a
26 varying amount of cloud cover. Depending on PV size and distribution circuit characteristics,
27 this can lead to transient voltage issues experienced by adjacent customers.

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31 ii. How does FBC currently adjust load production from its facilities on the Kootenay
32 River, in accord with overall customer power needs?

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1

2 **Response:**

3 As a result of the Canal Plant Agreement (CPA), the overall physical balancing of generation
4 and load in BC is done by BC Hydro. Typically, BC Hydro does not use FBC's Kootenay River
5 facilities as a balancing resource for the province. On an hourly basis, FBC must ensure it has
6 resources in place to meet overall customer needs, which includes using the maximum amount
7 of generating capability from the Kootenay River facilities derived from entitlement under the
8 CPA, even though those units may not be generating at their maximum capability. If FBC does
9 not have sufficient resources in place to meet overall customer power needs, unauthorized
10 inadvertent power will flow from BC Hydro to FBC, and FBC must pay financial penalties to BC
11 Hydro.

12

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1 10. Recently it was reported that:

2 *"The U.S. Energy Department's National Renewable Energy Lab expects [solar] costs of*
3 *about \$1.20 a watt now declining to \$1 by 2020"*

4 ([https://www.bloomberg.com/news/articles/2017-01-03/for-cheapest-power-on-earth-](https://www.bloomberg.com/news/articles/2017-01-03/for-cheapest-power-on-earth-look-skyward-as-coal-falls-to-solar)
5 [look-skyward-as-coal-falls-to-solar](https://www.bloomberg.com/news/articles/2017-01-03/for-cheapest-power-on-earth-look-skyward-as-coal-falls-to-solar))

6 i. Can FBC please supply the source for its solar and other power cost estimates
7 stated in Table 8-1 of its application?

8
9 **Response:**

10 As described in Section 1 of the Supply-Side Resource Options Report (Appendix J of the
11 LTERP), the supply-side resource options costs were developed in collaboration with BC Hydro
12 as it updated its Resource Options Inventory. As part of this engagement process, consultants
13 and industry experts helped update the potential energy and capacity available from various
14 resource options in B.C.². Compass Renewable Energy Consulting Inc. was hired to prepare a
15 report on the solar market potential for B.C.³ Other consultants, including Hatch, Amec Foster
16 Wheeler and Kerr Wood Leidal contributed to the development of the resource potential and
17 costs for the other resources options.

18 The FBC-BC Hydro collaboration developed cost estimates for 13 hypothetical 5-MW single
19 access tracker solar PV projects located in various high potential areas of B.C, five of which
20 were in the southern B.C. Capital costs included estimates of machinery and equipment, civil,
21 and interconnection costs. In its portfolio modelling, FBC narrowed this down to three of the
22 lower cost projects near its service territory.

23 Section 3.3.3 of the Resource Options Report notes that FBC's estimated unit costs for solar
24 generation are higher than unit costs in many U.S. jurisdictions, despite solar costs coming
25 down generally over the past few years. This is largely due to the relatively small size of the
26 solar projects considered, the lower solar PV yield in Canada compared to the more southerly
27 U.S. states and U.S. government subsidies provided to utilities for solar power.

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² <https://www.bchydro.com/energy-in-bc/planning-for-our-future/electricity-supply-options/updates.html>.

³ British Columbia Solar Market Update 2015. Compass Renewable Energy Consulting
<https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/integrated-resource-plans/current-plan/rou-characterization-solar-report-20150624-compass.pdf>.

1 ii. Given the range of reported PPA Tranche 1 Energy costs of between \$47 and
 2 \$56 per MWh in Table 8-1, can FBC please provide the average cost of Tranche
 3 1 Energy, Tranche 2 Energy (where applicable) and Market purchases per MWh
 4 for the last five years.

5
 6 **Response:**

7 The table below shows the average unit cost for FBC's energy purchases from PPA Tranche 1
 8 and the market from 2012 to 2016. FBC did not purchase any PPA Tranche 2 energy during
 9 the last five years.

| Year | PPA Tranche 1 (\$/MWh) | PPA Tranche 2 (\$/MWh) | Market (\$/MWh) |
|------|---------------------------|---------------------------|--------------------|
| 2012 | \$37.60 | N/A | \$21.10 |
| 2013 | \$39.27 | N/A | \$29.44 |
| 2014 | \$41.35 | N/A | \$31.43 |
| 2015 | \$44.41 | N/A | \$38.65 |
| 2016 | \$46.40 | N/A | \$38.46 |

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14 iii Please provide the average cost to the company of NM customer electrical
 15 power transfers per MWh for each of the last five years.

17 **Response:**

18 The information provided in the reference is related to the installation costs for a solar system
 19 on a per watt basis. FBC has no visibility of customer installation costs and cannot comment on
 20 the total customer cost for power inclusive of that produced by the customer-owned resource.

21 The Company does not understand what costs the question may assume to be included in
 22 electrical power transfers, however, if the request is for the average amount at which the
 23 Company compensates customers for excess generation that flows into the FBC system, the
 24 rate would be somewhere between the Tier 1 and Tier 2 rate of the Residential Conservation
 25 Rate, currently \$0.10117/kWh and \$0.15617/kWh respectively. These amounts are both in
 26 excess of the current lowest alternative source of power and the LRMC of the Company's
 27 preferred resource portfolio.

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1 iv. Please provide the cost to the company of NM Net Excess Generation (NEG) per
2 MWh for each of the last five years.

3
4 **Response:**

5 The response to a similar question was provided in the 2016 Net Metering Update Application,
6 Response to BCSEA IR 1.2.2 (Exhibit B-6), an excerpt of which is as follows:

7 2.2 What is the estimated amount of positive NEG (i.e., in kWh) for the 6-8
8 program participants who will have a positive NEG balance after a 12 month
9 period? What is the dollar amount? What is the effective average price?

10 Response:

11 In the analysis completed for Order G-59-16, there were 9 customers who, over
12 the 36 months, had NEG that would have been purchased by the Company.
13 These customers had a total of approximately 518,000 kWh of NEG over that
14 period. Under the current billing methodology, the value of NEG is derived from
15 the net kWh that would have been credited at either the Tier 1 or Tier 2 rate.
16 Over the 36 months, these net kWh would have a value of approximately
17 \$68,000 FortisBC Inc. for an average value of \$0.13/kWh. Under the proposed
18 billing methodology, the value of NEG is derived from the net kWh that would
19 have been used to offset consumption at either the Tier 1 or Tier 2 rate plus the
20 value of any kWh purchased at the end of the billing year. In this case, the value
21 of the annual excess NEG purchased at the end of the billing year is
22 approximately \$24,400 for an average value of approximately \$0.047 / kWh.

23 The Company had not undertaken the significant work required to update these figures for each
24 of the last five years, but expects that the annual totals will be fairly consistent.

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28 v. FBC provides three different Unit Energy Cost estimates in Table 8-1 for DSM.
29 For comparison purposes, please provide the average DSM UEC MWh
30 expenditures for each of the last five years.

31

32 **Response:**

33 The Unit Energy Cost (UEC) estimates in Table 8-1 (LTERP, page 96) for DSM represent the
34 unit costs of the incremental cost for the Base, High and Maximum scenarios, including program
35 administration. The derivation of the numbers is shown in Table 3-1 in the LT DSM Plan and
36 values are presented in \$2016.

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1 The comparable average UECs for the three scenarios of the LT DSM Plan, along with the UEC
 2 for Actual DSM expenditures over the last five years are as follows:

| | UEC Incremental | UEC Average | UEC Average |
|-------------------------|--------------------|-------------|----------------|
| Year/Scenario | 2016 \$/MWh | 2016 \$/MWh | \$/MWh |
| 2017 LT DSM Plan - Base | 88 | 54 | |
| 2017 LT DSM Plan - High | 104 | 61 | |
| 2017 LT DSM Plan - Max | 114 | 67 | |
| DSM Actual 2016 | | | 47 |
| DSM Actual 2015 | | | 60 |
| DSM Actual 2014 | | | 59 |
| DSM Actual 2013 | | | 67 |
| DSM Actual 2012 | | | 51 |

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vi. FBC provides no Unit Capacity Costs for DSM and PPA Tranche 1 and Tranche 2 energy, but does for PPA Capacity and Market Purchases. Please explain why a different approach is taken for each of these different options.

Response:

This response refers to Table 8-1 in the LTERP. The PPA Tranche 1, Tranche 2 and Capacity costs are energy rates as per the BC Hydro tariff, which breaks out the costs into energy and capacity. As such, they are included in the table as UEC and UCC for illustrative purposes since to arrive at the total PPA cost, both the energy and capacity costs must be added together. This is not the case for true UEC and UCC costs, which cannot be added as they will both include many of the same costs but just expressed in terms of costs per unit of either energy or capacity.

DSM provides both capacity and energy in the LTERP and the total costs are expressed in terms of energy as DSM is primarily an energy resource. The market can be used to supply both energy and capacity depending on the situation so both a UEC and a UCC cost is presented.

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1 11. In Part 8, Resource Options, FBC states:

2 *"FBC does not treat DG supply in the same manner as other generation resource*
3 *options. This is because the availability of DG in the future is not predictable or within*
4 *FBC's control to operate or call upon on demand when needed. As discussed in the FBC*
5 *Net Metering Program Update Application dated April 15, 2016: The Company does not*
6 *consider small - scale customer - owned renewable power to be a secure or reliable firm*
7 *resource...*

8 *"FBC has also not included power supply from self-generators within FBC's service area*
9 *in the table above. This is because FBC does not have any information regarding*
10 *available energy or capacity, timing or cost related to any self - generation supply at this*
11 *time".*

12 i. Has FBC ever had discussions with any of its NM customers prior to enrollment
13 about designing their systems so that they could provide power to FBC's system
14 in a "secure or reliable" manner, including matters related to "available energy or
15 capacity, timing or cost"?

16
17 **Response:**

18 The two references quoted above are related to two separate potential DG resources. Small-
19 scale DG, including NM, is distinct from self-generators as defined in the LTERP. The latter are
20 large commercial enterprises with self-generation facilities.

21 Discussions with NM customers are focused on eligibility and safe interconnection. As stated,
22 FBC does not consider small-scale customer-owned renewable power, including NM, to be a
23 secure or reliable firm resource. NM as designed and approved is not intended to be a supply
24 resource.

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28 ii. Has FBC ever had discussions with any of its NM customers, especially those
29 who consistently provide Net Excess Generation (NEG), about ways to make that
30 supply source "secure or reliable", in matters related to "available energy or
31 capacity, timing or cost"?

32
33 **Response:**

34 Please refer to the response to Shadrack IR 1.11i.

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1
2 iii. Please elaborate on why FBC believes that its current DSM programs are more
3 reliable than its NM program?
4

5 **Response:**

6 FBC is not suggesting that its current DSM programs are more or less reliable than its NM
7 program; but regardless, the two are not directly comparable. DSM programs reduce
8 consumption and drive efficiency while the NM program helps facilitate distributed generation
9 within the FBC system.

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13 iv. Please provide, data, or provide estimates, in MWh, of the amount per annum by
14 which each DSM program is reducing consumption of power in a table so that the
15 figures can be compared with the amount of power being transferred from NM
16 program customers to FBC for each of the last five years.

17
18 **Response:**

19 Please refer to the following table:

| | MWh savings | | | | |
|--------------------------------------|--------------------|---------------|---------------|--------------|--------------|
| | 2011 | 2012 | 2013 | 2014 | 2015 |
| Residential | | | | | |
| Home Improvements | 3,692 | 4,656 | 5,222 | 1,299 | 231 |
| Heat Pumps | 2,257 | 2,161 | 2,100 | 865 | 569 |
| Residential Lighting | 3,308 | 2,599 | 3,300 | 3,411 | 4,144 |
| New Home Program | 689 | 1,040 | 3,000 | 733 | 356 |
| Appliances ¹ | | 1,248 | 578 | - | 52 |
| Water Heating ¹ | | | | 92 | 5 |
| Low Income | 1,447 | 1,054 | 2,000 | 2,286 | 282 |
| <i>Residential Total</i> | 11,393 | 12,758 | 16,200 | 8,686 | 5,639 |
| Commercial | | | | | |
| Lighting | 20,577 | 14,256 | 7,600 | 3,353 | 4,089 |
| Building and Process Improvements | 1,386 | 1,959 | 2,600 | 1,926 | 1,606 |
| Municipal (Water Handling) | 2,199 | 1,677 | 700 | - | 187 |
| Irrigation ² | | | | - | - |
| <i>Commercial Total</i> | 24,162 | 17,892 | 10,900 | 5,279 | 5,882 |
| Industrial | | | | | |
| Compressed Air | | | | | |
| Industrial Efficiencies (incl. EMIS) | 794 | 937 | 2,500 | 614 | 1,087 |
| <i>Industrial Total</i> | 794 | 937 | 2,500 | 614 | 1,087 |

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¹ These programs were included in Home improvements program

² Irrigation was included in Municipal (Water Handling)

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1 12. In 8.2 Supply-Side Resource Options FBC states:

2 *"...all of the generation plants FBC owns are located in the Kootenay region whereas*
3 *most of the load and expected load growth is in the Okanagan region".*

4 Has FBC ever considered contracting out load supply for the Okanagan Region to BC
5 Hydro, in the same manner that BC Hydro contracts with FBC to supply electrical power
6 to its Lardeau and Yahk service areas?

7

8 **Response:**

9 As noted in Section 6.1.2 of the LTERP, the Okanagan region has no generation resources and
10 thus all demand is met by external generation delivered either directly through FBC's system or
11 wheeled via the BC Hydro network. Thus, while FBC is not "contracting out load supply to the
12 Okanagan Region to BC Hydro", FBC is already heavily reliant on the transmission
13 interconnections between FBC and the surrounding BC Hydro bulk transmission system to meet
14 load requirements in the Okanagan area.

15

16

17

18 13. Have FBC and BC Hydro ever had discussions about swapping hard-to-reach service
19 areas, like Lardeau and Yahk, for similar areas that are harder for FBC to service?

20

21 **Response:**

22 FBC is not able to comment on any discussions with BC Hydro on this subject. Further, this
23 question is out of scope for this proceeding.

24

25

26

27 14i. What is the MWh cost differential between producing and delivering power to the
28 Kootenays versus producing and delivering power to the Boundary and Okanagan?

29

30 **Response:**

31 Please refer to the response to Shadrack IR 1.6iii.

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- ii. Has FBC ever done a cost benefit analysis of solely purchasing power from BC Hydro for the Boundary and Okanagan region, and discontinuing use of the transmission lines from the West Kootenay?

Response:

FBC is not aware that relying solely on BC Hydro supply through either purchases or additional wheeling has ever been formally studied. However, FBC believes this is not a practical operating configuration due to reliability requirements for the loads in the Boundary and Grand Forks region. If the existing FBC transmission interconnection between the Okanagan and West Kootenay region was discontinued, customers in the Boundary and Grand Forks regions would experience significantly reduced levels of reliability.

- 15. The Drake Landing Solar Community (DLSC) is a planned community in Okotoks, Alberta, Canada, equipped with a central community solar heating system, the first of its kind in North America, and which achieved 100% space heating from solar PV collectors and seasonal thermal energy storage in 2015/16, as well as other energy efficient technology (<http://www.dlsc.ca> and https://en.wikipedia.org/wiki/Drake_Landing_Solar_Community)

- i. Has FBC conducted any solar hours studies in the north, mid and south Okanagan and/or talked to any of their NM customers in the Okanagan region about solar PV production capacity with a view toward developing a similar seasonal thermal energy storage project?

Response:

FBC has not conducted or discussed a project of this type.

- ii. What have been the ten highest peak consumption days for FBC in 2017?

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1 **Response:**

2 Please refer to Table 1 below, which shows the ten highest peak consumption days for FBC
3 thus far in 2017.

4 **Table 1: Top Ten Peak Consumption Days in 2017**

| Date | Peak Demand (MW) |
|-------------------|---------------------|
| January 04, 2017 | 731 |
| January 03, 2017 | 715 |
| January 12, 2017 | 711 |
| January 11, 2017 | 703 |
| January 05, 2017 | 695 |
| January 13, 2017 | 692 |
| January 06, 2017 | 682 |
| January 10, 2017 | 677 |
| February 02, 2017 | 665 |
| January 02, 2017 | 659 |

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1 16. Please reconstitute Figure 9.1 to include an NM LRMC.

2

3 **Response:**

4 Figure 9-1 of the LTERP shows the LRMC values for portfolios with varying levels of DSM. As
5 discussed in Section 1.2 of Appendix K of the LTERP, FBC's LRMC values are based on a
6 portfolio approach, which includes a combination of existing resources, DSM resources and
7 incremental supply-side resources to meet forecast load requirements. As FBC does not have
8 a forecast of the required attributes for potential future generation from NM customers for its
9 portfolio analysis, such as monthly energy and capacity profiles and costs, it is not able to
10 provide a LRMC for a portfolio with NM generation at this time.

11 Please also refer to the response to BCUC IR 1.36.3.

12

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1 17. With reference to A3 BCUC IR #1.19 has FBC experienced any time, since 2010, an
2 inability to purchase power on the spot market at any price?

3

4 **Response:**

5 Yes, on April 22, 2013 FBC attempted to secure market power for one hour in the morning, and
6 could not at any cost.

7

8

9

10 i. On what dates and for what length of hours did this occur?

11

12 **Response:**

13 Please refer to the response to Shadrak IR1.17i.

14

15

16

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18 ii. Did this situation result in power outages or forced shut down of certain
19 customers' electricity supply? Please elaborate.

20

21 **Response:**

22 In this situation, FBC was attempting to purchase a relatively small volume of 10 MW in order to
23 meet forecast demand plus a reasonable buffer, which is typically 15 to 30 MW, depending on
24 the hour. Actual load for the hour was such that the 10 MW was not required to meet load, and
25 therefore it did not cause an imbalance on the FBC system. Had it caused an imbalance, it
26 would not have resulted in a forced shut down of any customer's electricity supply, as FBC has
27 contractual methods of dealing with any imbalance transfer with BC Hydro.

28