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British Columbia Utilities Commission
Sixth Floor, 900 Howe Street, Box 250
Vancouver, B.C., V6Z 2N3

Attention: Patrick Wruck, Commission Secretary
By Electronic Filing

Dear Sir:

Re: FortisBC Inc. 2016 Long Term Electric Resource Plan and Long Term Demand Side Management Plan Application,
Andy Shadrack - Information Request No. 2

1.i. In my previous Shadrack IR No. 1, my initial questions requested information related to residential service sizes under 200 amps, to which FortisBC replied (Exh. B-9), in part, that it did not have service size data for all its customers. FortisBC's answer thus suggests that it has begun collecting such data and has it for some of its customers. Is FortisBC now collecting service size information on residential services under 200 amps, and if so, why?

ii. Please provide the pro-rata amount by which each FortisBC non-net metering residential customer's annual bill would be increased as a result of having 'incremental' costs related to the net metering program service costs passed on to the other customers.

iii. It is my understanding, confirmed by BC Hydro, that the reading of bi-directional meters is automated. Why isn't FBC using an automated system to read its bi-directional meters?

2. Low consumption customers obviously pay a larger percentage of their electricity costs as service charges, whereas, on the other hand, high consumption customers pay a smaller percentage as service charges. Although I understand the rationale, simplistic as it may be, of customers kicking in equally to cover fixed costs, it also seems unreasonable, especially for low and fixed income seniors, that the existing rate schedule has the net effect of subsidizing high consumption customers at the expense of low consumption customers - an effect which seems, on the face of it, quite contrary to the intent of provincial energy objectives. What are FortisBC's thoughts on this, and does FortisBC have any suggestions towards rectifying a situation where those who are most frugal in using electricity, sometimes because they cannot afford to use more, end up paying the highest percentage cost to access that electricity?

3. In response to Shadrack IR #1.4.i, FBC stated:

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

i. Are FBC's concerns about the negative impacts of Distributed Generation (DG), and NM in particular, to both the Company and its customers, equally hypothetical and only relevant to a high level of DG proliferation?

ii. Please comment on the likelihood that, during the life span of this LTERP, advances in renewable energy storage technology (ie batteries) for DG and NM will likely resolve many of the outstanding concerns of FBC.

iii. A number of North American utility regulators are allowing utilities to set interim caps on the amount of DG and NM electrical power that they have to accept as an overall part of their energy supply. Has FBC considered applying to the BCUC for a cap on the amount of DG and NM energy it has to accept as part of its overall energy supply plan? If not why not?

iv. On Saturday, April 22nd the CBC news program The National reported that solar PV and wind sources now account for 5.2% of energy production across Canada. What percent of FBC's electricity sales is represented by solar PV and wind production?

4. In response to BCUC IR#1.36.1, FBC stated:

"The Company has an established net metering program in support of small-scale customer-owned generation, which at the current compensation rates values the DG output delivered to FBC in excess of its value".

i. Since the NM program is a kWh exchange program, does this mean that, for this to occur with residential customers, the credited dollar (\$) value of the DG output, on an annualized basis, would have to exceed the overall purchase dollar (\$) value of kWh from the company of \$134.80 per MWh? (B-10 FortisBC Inc Net Metering (NM) Program Tariff Update Application: *"For the residential class, this value is \$184,326,000/1,367,000,000 kWh = 13.48 cents/kWh"*)

ii. In response (Exh. B-4) to BCUC IR#1.21 in FBC's Net Metering Program Tariff Update Application, FBC stated:

"With respect to the NEG [Net Excess Generation] sold to FBC, since the Company accumulates NEG for customers as a dollar amount on the account, the exact kWh's are not available. Instead, the annual total of payments to the three customers are listed:

2013 \$4,345

2014 \$8,830

2015 \$16,926

2016 \$34,402" (Net Metering Program Tariff Update Application Exhibit B-4, BCUC

IR 2.1)

In response (Exh. B-6) to BCSEA IR#1.2.2 in FBC's Net Metering Program Tariff Update Application, FBC stated:

"In the analysis completed for Order G-59-16, there were 9 customers who, over the 36 months, had NEG that would have been purchased by the Company. These customers had a total of approximately 518,000 kWh of NEG over that period...Over the 36 months, these net kWh would have a value of approximately \$68,000 for an average value of \$0.13/kWh".

Is it three or nine NM customers who produced NEG? Please explain the apparent discrepancy.

iii. Why did FBC state that *"the exact kWh's are not available"* when, as shown on the bill which I have attached as an appendix to my Final Argument in FBC's Net Metering Program Tariff Update Application, the delivered and received kWh under the net metering program are stated specifically?

iv. Of the 86 NM customers in 2016 (at time of filing of FBC's Net Metering Program Tariff Application), how many of these customers, on an annualized balance basis, were being compensated for NEG at a rate higher than the retail rate that they were being charged?

v. Without providing any customer identification, please list, in order of amount of compensation for NEG, each customer whose annual gross compensation for NEG exceeded the gross amount payable for electricity purchased from FBC, both net and with the addition of the Basic Charge and GST. Please also include the respective MWh price for both electricity received by FBC from the customer, and delivered from FBC to the customer.

vi. With reference to FBC's response (Exh. B-10) to Shadrack IR #1.20.a in FBC's Net Metering Tariff Update Application, what percentage of the MWh dollar (\$) values, on an annualized basis, transferred from DG customers in the NM program exceed in dollar (\$) value the residential retail rate of \$134.80 per MWh?

5. In FBC's response to Scarlett IR# 1.1.d in Exh. B-8 and to Shadrack IR#1.5.1 in Exh. B-9, FBC stated:

"...it is only the net metering customers that, under the current rate structure, have the ability to reduce their contribution to fixed costs to zero, or negative, despite remaining connected to, and using the FBC system."

In the case of a residential NM customer subject to a blended rate of \$134.80 per MWh (Shadrack IR #1.20.a, Exh. B-9) in 2016, would it be correct to say that, in order to completely offset the annual cost of that customer's basic charge, that customer would have to transfer an additional 1.421 MWh of electricity above their annualized kWh consumption level?

6. BC Hydro recently undertook a survey of customers and received 230 responses which are being included as part of their Net Metering Evaluation Report to be submitted to the BCUC on April 30. BC Hydro also now provides monthly net metering stories and photographs on their website, such as the one about the [Village of Alert Bay's bold move towards net metering](#).

i. Why isn't FBC similarly engaged in active consultation with its NM customers, and taking similar steps to promote and publicize its NM program?

ii. Why is FBC's approach to NM so radically different from that of BC Hydro?

7. In FBC's response (Exh. B-2) to BCUC IR#1.10.4, FBC stated:
"FBC has a net metering program that is generally consistent with that of BC Hydro"

On its website, BC Hydro currently describes its NM program as follows:

"Generation options for homes, businesses

Our net metering program is designed for those who generate electricity for their own use. When you generate more than you need, you sell it to us. When you don't generate enough to meet your needs, you buy it from us.

When you sell to us, you get a bill credit towards your future electricity use. If you still have an excess credit at your anniversary date of joining the program, we'll pay you for the electricity at the rate of 9.99 cents per kilowatt hour (kWh). It's that simple.

By the numbers

- *Since 2004, over 900 customers have been participating in our net metering program.*
- *Over 95% of customers chose to install a [solar photovoltaic system](#).*
- *A typical home generally consumes 11,000 kWh/year. A typical solar installation on a residential roof is 4 kilowatt (kW) in size with 16 solar panels, which in B.C., generates 4,400 kWh of electricity over a year.*
- *On average, solar systems of this size can cost about \$14,500. Based on BC Hydro's step 2 of its [Residential Conservation Rate](#), payback on your investment is about 23 years (including savings from the Rate Rider and GST - (https://www.bchydro.com/energy-in-bc/acquiring_power/current_offerings/net_metering.html)*

Please explain how FBC's application and reconsideration application to lower its NM NEG RS 95 tariff price from retail rates to PPA Tranche 1 BC Hydro RS 3808 wholesale rate of between \$47 to \$56 per MWh, when BC Hydro has a NEG RS1289 tariff rate of \$99.90 per MWh above its Tier 1 retail rate of 85.80 per MWh, is consistent with that of BC Hydro, who have raised their NEG price twice since inception of their NM program in 2004?

8. BCIT recently installed solar PV EV chargers - <https://www.bchydro.com/news/conservation/2016/solar-powered-ev-charging.html> .

i. With reference to FBC's response (Exh. B-2) to BCUC IR#1.7, has FBC considered promoting household NM with a combination of battery storage to offset the intermittent need for EV charging?

ii. With reference to FBC's response (Exh. B-2) to BCUC IR#1.9.1, 1.9.2, 1.9.3 and 1.9.4, and in accordance with section 2(h) of the *Clean Energy Act*, why is FBC not promoting the NM program "*to encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia*", as a means to assist natural gas customers lower their carbon footprint and switch to electric heat?

iii. By offsetting part of their annual consumption level, would it be possible for a NM customer to altogether eliminate Tier 2 costs for electric heating, becoming load neutral instead of load building?

iv. Could a natural gas customer who lowers or eliminates their current electrical consumption through NM enrollment potentially switch from natural gas to electric heating at Tier 1 rates, becoming load neutral instead of load building?

9. In its response to BCUC IR# 1.10.2 in Exh. B-2, FBC stated:

"...the Company can offer some comment based on its role as a public utility, but not from the perspective of furthering public policy objectives that may be unrelated to how the Company evaluates its options for meeting load.

Should siting and permitting requirements be modified for DG? Not a consideration for the utility

Should DG technologies be supported by financial incentives, subsidies, or public funding of R&D? Not a consideration for the utility"

i. Would it be fair to sum up FBC's attitude towards DG, including programs such as NM, that as long as DG does not interfere with the Company's ability to provide the maximum return for its shareholders, FBC will continue to tolerate the existence of a NM program?

ii. Would it also be fair to say that FBC, a private corporation, differs from BC Hydro, a Crown corporation, in that FBC places the interests of its shareholders above those of the public?

10. In its response to BCUC IR# 1.11.1 in Exh. B-2, on the issue of diversifying the Company's LTERP portfolio to include small and large scale self-generation, FBC stated:

"In the view of FBC, while some net benefits may exist for a DG installation of any size they are situational, difficult to determine and limited by the fact that an

increase in customer owned, clean self generation of any scale primarily serves to offset the clean and renewable generation that currently makes up the vast majority of the Company's resource portfolio".

In contrast, B.C. Hydro completed a study in 2012, which projected a 12% to 31% decrease below the 1961-1990 average in summer inflows to Kootenay Lake by the 2050s, and in which it stated:

"Summer stream-flow and hence water availability during summer will very likely decline across the province. Snow-melt will start earlier and flows will peak earlier. This has already been observed over the past few decades. Snow-melt-dominated watersheds in southeastern B.C., for example Arrow and Kootenay Lakes, will experience higher flows during winter and lower flows during late summer, but will very likely remain snow-melt-dominated.

"...Glaciers are projected to continue retreating under all future climate scenarios. Under a warming climate, the contribution of glacier melt to stream-flow initially increases but eventually declines as glaciers shrink. Evidence shows that B.C. glaciers are already shrinking and studies suggest that the glacier melt contribution to stream-flow is already declining. In the Mica basin, approximately 60 per cent of glacier cover is projected to disappear by 2050 and 85 per cent by 2100. Some scenarios show a complete loss of glaciers in the region by 2100." (Jost, G. & Weber, F., 2012. "Impacts of Climate Change on B.C. Hydro's Water Resources" at pp. 24-25)

In light of the projections made in this study for BC Hydro, is it prudent for FBC to rely so heavily on both self-generated and contracted electrical power, from the Kootenay and Columbia River systems?

11. A 2009 study by Lausanne's EPFL technical university forecasted a decline in Swiss hydro generation from 46 to 60 per cent by the year 2035 as precipitation declines and total energy use increases. And that's based on a forecast runoff decrease of just 7 per cent by the year 2049, and includes forecasted precipitation changes ("Glacier BC Hydro's Melting Batteries", Tye, February 6th 2012 <http://thetye.ca/News/2012/02/06/Glacier-Hydro/>).

With reference to FBC's response to Resolution IR# 1.8 in Exh. B-8, FBC stated that 77% of total electrical resources came from FBC self-generation and Brilliant plant generation, and a further 15% from BC Hydro and other IPP's.

i. How would a 7% decline in spring freshet runoff, and overall annual river flow, impact electrical generation from 92% of FBC's hydro-electric generation of resources?

ii. What contingencies has FBC made if BC Hydro cannot supply PPA Tranche 1 resources due to an inability to meet its own direct customers' electrical needs?

iii. What percentage of the FBC's remaining market source portfolio, of 8%, also comes from hydro-electric sources?

12. With reference to FBC's response to BCUC IR# 1.11.2 in Exh. B-2, with respect to FBC's statement that risk is only mitigated by FBC interconnection requirements when a customer advises FBC of the interconnection, please explain the circumstances under which a customer supplying electricity might connect into the grid without FBC's knowledge.

13. With reference to FBC's response to BCUC IR# 1.11.3 in Exh. B-2, is it correct that this issue only becomes a problem when DG displaces more power than is being consumed in a local area network, and therefore at the point where electrical power has to be exported further along the transmission grid to be consumed?

14.i. With reference to FBC's response to BCUC IR# 1.11.4 in Exh. B-2, BC Hydro currently has a residential customer daily fixed charge, or "Rate Rider", of 18.99 cents per day, while the current FBC equivalent is approximately 52.5 cents per day. Can you please provide a breakdown of the fixed plant and equipment costs as well as any other explanation of why FBC's daily fixed cost charges to residential customers appear to be nearly five times greater than BC Hydro's?

ii. With further reference to FBC's response to BCUC IR# 1.11.4 in Exh. B-2, is it correct that power transferred from a NM customer's system has the potential to displace electricity which would otherwise have been produced/purchased and transmitted from a greater distance away and therefore, as suggested by BC Hydro, the potential exists, at sufficient volume, for DG to offset certain fixed costs?

15.i With reference to FBC's responses to Shadrack IR#1.6ii and IR#1.14i in Exh. B-9, please explain how FBC's responses meet the objectives of the 2007 BC Energy Plan which, at p. 28 state:

"Work with BC Hydro and parties involved to continue to improve the procurement process for electricity.

"Ensure BC Hydro considers alternative electricity sources and energy efficiency measures in its energy planning for remote communities"

(http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/bc_energy_plan_2007.pdf).

ii. With further reference to FBC's responses to Shadrack IR#1.6ii and IR#1.14i in Exh B-9, explain how FBC's responses allow it to meet the objectives of the *Clean Energy Act* at 2(l) and (k) which state:

"foster the development of first nation and rural communities through the use and development of clean or renewable resources"

"encourage economic development and the creation and retention of jobs"?

16. The *Clean Energy Act* also states at 2(i) that one of BC's energy objectives is to:

"encourage communities to reduce greenhouse gas emissions and use energy efficiently."

With reference to FBC's evidence in Shadrack IR#1.8.i, the Company states that its:

"...GHG emissions represent only about 0.078 percent of total provincial GHG emissions".

i. Does this 0.078% emission figure refer solely to FortisBC (electricity) or does it include FortisBC Energy Inc. (natural gas), FortisBC Alternative Energy BC Services, FortisBC Energy (Vancouver Island) Inc., FortisBC Energy (Whistler) Inc., Fortis Energy Utilities, FortisBC Midstream Inc. and Fortis BC Utilities combined?

ii. If not, what would be the combined GHG percent total of provincial GHG emissions for all FortisBC companies and subsidiaries operating in BC in 2016?

17. With reference to FBC's responses to Shadrack IR#1.8.iv in Exh. B-9 and to BCUC IR#1.14.1 in Exh. B-2, at Table 1 the UPC (Use per Customer) residential electricity consumption rate is stated as averaging 12.1 MWh per year between 2012 and 2014, and 11.8 in 2016. Our household had an average UPC rate of 3.2 MWh between 2012 and 2014 before we joined the NM program, and a UPC rate of 1.3 MWh after one full year of belonging to the program.

i. Using data from residential NM customers, what would be the average UPC rate before and after joining the NM program?

ii. What would be the change in the residential UPC rate if 5% of residential customers joined the NM program?

iii. In 2016 our household produced approximately 2 MWh of electrical power with a 2.4 KW solar PV system. Please confirm that if 5% of FBC's current residential customers enrolled in the NM program and produced an average of 2 MWh of electrical power, that would be 11.5 GWh annually, or 0.0115 Terawatt hours (TWh).

iv. Please confirm, with reference to evidence in Net Metering Program Tariff Update Application Exhibit B-4 (BCSEA IR#1.2.2), that over a 36 month period as few as nine NM customers transferred to FBC 518 MWh of NEG electrical power, .518 GWh.

18.i. With reference to FBC's response to BCUC IR#1.16.1 in Exh. B-2, please explain the difference between "actual" GWh and "normalized" GWh.

ii. Please provide a table indicating the BCH Lardeau "actual", "normal" and "percent variance" annually back to 2009.

19. With reference to BCUC IR#1.18 in Exh. B-2, the BCUC recounts a statement on p. 31 of FBC's 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".

Can you please explain why solar PV, especially if the NM program is developed and expanded, would not help offset an energy shortfall during any future region-wide "hot spell"?

20. With reference to FBC's response to BCUC IR#1.23.2 in Exh. B-2, FBC stated:

"It is possible that small scale or larger clean DG resources could (i) defer the requirement for the anticipated network system reinforcements, and (ii) provide dynamic reactive support. In order to have this impact, the clean DG resources would collectively need to have availability factor, capacity factor, and dynamic reactive capability characteristics similar to a gas-fired generation plant. They will also need to be located in areas where the anticipated network system reinforcements are planned to occur".

Would this primarily be in the Okanagan and not the West Kootenay?

21. With reference to FBC's response to BCUC IR#1.23.2.1 in Exh. B-2, FBC stated:

"FBC considers DSM savings to be reliable but non-firm resources, and thus cannot be counted on to defer network system reinforcements that are predicated on peak-load requirements"

i. Given that FBC currently meets only 28% of peak load through self generation, have any of FBC's DSM offerings been designed to reduce peak load, and if not why not?

ii. What, if any, DSM programs or other strategies has FBC considered to encourage reduction of peak load? Have any such programs or strategies been implemented?

22. With reference to FBC's response to Shadrack IR#1.9.i in Exh. B-9, what level of penetration of NM as a percentage of electrical power sources would have to occur for the kind of disruption contemplated to actually happen?

23. With reference to FBC's response to Shadrack IR#1.9.ii in Exh. B-9, is not the reverse also true, that is, that FBC can utilize:

"[T]hese CPA resources [which] are hydro facilities that can ramp up or down as required to support the integration of intermittent renewable energy resource"?

24.i. With reference to FBC's response to Shadrack IR#1.10.iii. in Exh. B-9, to clarify my previous question, given that electricity transferred from NM customers to the Company is given a dollar (\$) value, please create a table indicating the average MWh dollar (\$) value for electrical power transferred during the past five years from NM customers, both overall and for NEG specifically.

ii. With reference to FBC's response to Shadrack IR#1.10.iii. in Exh. B-9, FBC stated:

"These amounts are both in excess of the current lowest alternative source of power and the LRMC of the Company's preferred resource portfolio".

Does this answer reflect an underlying assumption on the part of FBC that the cost of accepting transfers of electricity from NM customers is the same as the costs to the Company of producing electricity itself or purchasing electricity?

iii. Is there a difference in the kinds of variable and fixed costs incurred by FBC's own production of electricity versus the kinds of costs incurred when the Company purchases electrical power?

iv. Please create a table that compares the fixed and variable costs to FBC of (a) producing electricity, (b) purchasing electricity from other sources, and (c) accepting the transfer of NM electricity.

25. With reference to FBC's response to Shadrack IR#1.10.v. in Exh. B-9, FBC stated three different UEC values for DSM: Incremental, Average, and Actual Average.

i. With reference to FBC's response to Shadrack IR#1.11.iv. in Exh. B-9, is the difference between the Actual DSM cost in 2016 of \$47, the Base Incremental value of \$88, and the UEC Average value of \$54, due to uptake of the program by customers?

ii. If not, please explain how the different values are obtained and why they occur?

26. With reference to FBC's response to Shadrack IR#1.10.vi. in Exh. B-9, FBC stated:

"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".

Between 2005 and 2007 our household implemented a series of DSM measures and our overall annual consumption of FBC grid electricity dropped

from 6.42 MWh to 4.485 MWh. Then, between 2008 and 2014, our consumption averaged annually 3.365 MWh. While there was a variance of between 3.6 MWh in 2009 and 3.111 MWh in 2012, consumption did not exceed 3.3 MWh after 2011.

i. While acknowledging that there is a seasonal consumption variation of a high of .7 MWh for the three October to April billing periods and a lower consumption level of between .6 and .5 MWh between April and October, is there not, after a customer has applied DSM to their household, a constant capacity reduction in that household's consumption both annually and on a per billing period basis compared to consumption levels prior to adopting DSM measures?

ii. Likewise, while acknowledging that solar PV and wind are intermittent resources, is there not also a certain capacity requirement reduction from DG and NM customers similar to the consumption reduction levels achieved by DSM participants?

iii. In the past, BC Hydro has given its customers a cash rebate when they achieved a ten percent reduction in annual consumption. Has FBC considered offering DSM and DG, including NM, customers a rate rebate for achieving a certain level of consumption reduction as a means to incentivize a constant capacity reduction among participating customers?