Diane Roy
Vice President, Regulatory Affairs

Gas Regulatory Affairs Correspondence
Email: gas.regulatory.affairs@fortisbc.com

Electric Regulatory Affairs Correspondence
Email: electricity.regulatory.affairs@fortisbc.com

FortisBC
16705 Fraser Highway
Surrey, B.C. V4N 0E8
Tel: (604) 576-7349
Cell: (604) 908-2790
Fax: (604) 576-7074
Email: diane.roy@fortisbc.com
www.fortisbc.com

August 23, 2017

Resolution Electric Ltd.
600 Wlke Rd
Kelowna, B.C.
V1W 1A7

Attention: Mr. John Cawley, AScT

Dear Mr. Cawley:

Re: FortisBC Inc. (FBC)

Project No. 1598911

Application for Community Solar Pilot Project

Response to Resolution Electric Ltd. (Resolution) Information Request (IR) No. 2

On April 26, 2017, FBC filed the Application referenced above. In accordance with the British Columbia Utilities Commission Order G-114-17 setting out the Amended Regulatory Timetable for the review of the Application, FBC respectfully submits the attached response to Resolution IR No. 2.

If further information is required, please contact Corey Sinclair at 250-469-8038.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

IR# 2.1.1 With reference to FBC response to Resolution IR 1.1 and ICG IR1.4.2 regarding choice of location for the pilot program, are FBC imply the CSPP would have more chance of being successful if the public have a visual connection with the proposed Solar Array?

Response:

FBC believes that visibility of the CSPP may be a factor in creating interest in a solar offering and attracting subscribers.

IR# 2.1.2 Please confirm the purpose of the CSPP is to determine if there is sufficient interest (appetite) from the commercial and residential customer base for solar electric to form part of their supply which would be charged at the proposed solar rate of $0.23+ / kWh or whatever the final cost is determined.

Response:

Although the Program is open to more than just Commercial and Residential customers, the Company can confirm that the primary purpose of the pilot is to gauge customer interest in community solar, as well as to gain knowledge on the siting, construction and operation of such a facility.

IR# 2.1.3 Please confirm that if the CSPP was to prove successful and result in a 100 percent subscription (with possible weight list), then the intent would be to make the Schedule 85a & 85b rate permanent and possibly lead to expanding the existing array at the Ellison substation or develop other locations.

Response:

FBC confirms that if the CSPP were 100 per cent subscribed the intent would be to make the Schedule 85a rate permanent. The Solar Offset rate (85b) would not be considered unless the current or future project could not be fully subscribed utilizing the Virtual Solar rate and offering the additional rate option would be expected to result in additional subscriptions.

The success of the Program will inform any future community solar expansion or development.

IR# 2.1.4 As previously stated the land costing was not included in the calculations for the project given that there was sufficient existing land at the Ellison substation. Having already identified other locations as less satisfactory based on customers being able to visibly see the array (optics) would FBC op to lease land or purchase land to build additional solar arrays which would be more publicly visible?

Response:

FBC cannot speculate on how it may choose any future community solar sites. The answer would depend in part on the location, demographics and feedback from CSPP participants.

IR# 2.1.5 The "Google" result for the dictionary definition of "pilot" for which FBC are using is described follows; *adjective **1**. done as an experiment or test before introducing something more widely. "a two-year pilot study"*

synonyms: experimental, exploratory, trial, test, sample, speculative; preliminary "a pilot project"

Given the emphasis on customer visibility and given other locations proved less favorable in terms of visibility, would the Ellison location be a true representation in terms of marketability of the solar electric offer? How much emphasis (weight) do FBC place on "optics" to the customer for the success of the Ellison array and how would FBC market the less desirable (less visible) locations to the customer if the solar option where to be rolled out and developed to more locations? How can the pilot be expanded to something more widely if the Ellison location is the best shot at success? The results of the survey indicated participants would be willing to pay a small additional sum for going solar, the proposed rate is approximately 250% of the existing tier one rate, this is not a small sum.

Response:

The visibility of the Ellison site is considered a benefit that may have a positive impact on awareness and increased interest in the solar offering, but was not a significant factor in site selection. Only a small proportion of FBC customers will see any solar site, including the proposed site.

IR# 2.1.7 How much engineering scoping has been developed for subsequent locations? Is FBC intending using a "cookie cutter" approach to reduce engineering costs? Have FBC developed an executable plan to efficiently construct in a timely fashion more solar gardens in the event the CSPP is successful? If so please provide details.

Response:

FBC has completed minimal analysis on additional locations for community solar projects.

FBC intends to leverage its experience with the CSPP for potential solar installations in order to reduce the costs of future installations. However, each location will have its own site-specific challenges which may result in modified designs.

FBC has not developed project execution plans for additional community solar installation sites.

IR# 2.1.8 FBC has indicated that the CSPP will be evaluated after two years and if deemed successful would make permanent schedule 85A and possibly 85B if applicable. Hypothetically would it not make sense to make permanent the 85A even if the CSPP was only 50 percent subscribed? Surely it would be better (economically) for the rest of the rate base for the program to continue due to the subscribed participants of the CSPP paying a premium for 50 percent of the CSPP facility, the rest of the generation being absorbed into the resource plan. This would also allow for future participants to subscribe or re-subscribe as they see fit based on availability. If the program were to be cancelled is it FBC's intent to offer the power generation to the FBC staff at a discounted rate?

Response:

Please refer to the response to BCOAPO IR 2.20.1. Regardless of the final disposition of the output of the energy from the Ellison array, it will not be sold to FBC staff at a discounted rate. FBC staff do not receive discounted rates on any power.

IR# 2.2.1 With reference to FBC response to Resolution IR 1.3 FBC replied *"The customer consideration driving the Application is the desire on the part of some customers*

to meet a portion of their electricity needs with energy derived from a solar resource."

The term "solar resource" is a generic term and could infer a number of renewable technologies; for example, wind generation, hydro generation and solar thermal and solar electric. However Wind and Hydro are indirect solar resources which are harnessing the effect of the Sun's energy, whereas solar thermal and solar electric are direct solar resources which harness the actual photons. Pease confirm the term "solar resource" is used in the context to describe solar electric.

Response:

Confirmed, in the context of the response "solar resource" refers to electricity generated by solar photovoltaic panels.

IR# 2.2.2 Presently three categories of energy exist, Fossil Fuel, Nuclear and Renewable. Alberta will be phasing out coal fired power stations by 2030 and have established support and grants to customers to install solar electric (PV) systems. Ontario is phasing out its nuclear power plants and has established similar support for PV systems. British Columbia has no established support for solar electric (PV) systems and British Columbia is majority supplied with energy from hydroelectric power plants. My experience as a landed immigrant back in 2003 when I asked people about their power supply and cost, nearly everyone who I talked with referred to the electricity bill as a "Hydro bill", even though their supply was from West Kootenay Power / Aquila. Would FBC view the customer consideration which drive the application to be any of the following

A. Misinformed on their present energy not been supplied from a clean renewable resource.
B. Assumption of subscribing to a solar garden will develop the solar industry.
C. Supporting the ideology of energy independence.

To continue from an ethical standpoint, would it not be prudent for FBC to accurately determine the knowledge of the participants in the survey with respect to clean energy or to garner whether the potential subscribers would actually commit to such a program based on replacing part or all of their existing hydro supply with solar electric, both clean energies. FBC has previously stated that it will not be holding face to face open house style events.

Please comment on the above and whether FBC feels confident with the results of the survey. Would FBC be willing to reconsider holding an open house to ascertain whether the general public is fully understanding of the solar garden offer, which is to offset renewable generation with solar generation.

Response:

FBC believes that customers that would make an investment in a CSPP subscription would do so in an informed manner. The Company does not believe that customers are misinformed about current resources, but does assume that customers may choose to enroll in the CSPP while holding the view that doing so may help develop further solar resources and support energy independence. The Company has no reason to doubt the accuracy of the survey results.

While FBC is not opposed to holding open houses to help customers understand the CSPP better, it would only do so if there was a broad and common misunderstanding from customers inquiring about the Program. FBC will develop a standard information package for interested parties setting out how the Program works and what the benefits are. FBC believes this is a better and more targeted approach to inform those that are interested in the Program.

IR# 2.2.3 FBC make reference to a subset of customers that are unable to install rooftop installations and could be served by a solar garden. This subset has previously been identified as dwellings which are rented, have poor roof conditions, apartment/town home, people who cannot afford the initial upfront costs, or areas where installation of solar is prohibited.
Please explain why the residential survey would not have targeted say 30% of the sample population living in apartment / condo style residences? And please confirm if FBC has this residential MURB intelligence attached to its metering database.

Response:

Please refer to the response to Resolution IR 2.2.4.

No, FBC does not have MURB data in its metering or customer databases.

IR# 2.2.4 With reference to the residential sample statistics attached below it can be seen firstly that the sample percentage number not living in single detached homes is

12% or 13% (please note percentage figures add up to 101%) hence the ambiguity. Given the relative small sample percentage of the main type of customer/residence to which the CSPP is targeting and potentially seeking to meet a portion of this type of customers electricity needs with energy derived from a solar resource, how confident is FBC with the result and conclusions of the survey?

Response:

The survey at the outset was not formulated to determine what type of customer (single family dwelling or non single family dwelling owner/renter) would prefer rooftop solar vs. community solar, but rather what customers would prefer in general.

The target population for the survey were those who were responsible for paying their electricity bill and were FBC electricity customers. No quotas were set on dwelling type or any other demographic by FBC customer as that information is unavailable to FBC.

FBC is not "targeting" the CSPP at any particular group, but expects that it may be appealing to a variety of customers, including renters, residents of multi-unit buildings, customers that move frequently and residents of homes with roof orientations not well-suited for solar panels. It is not practical to try to filter respondents for these attributes.

Please also refer to the response to BCUC IR 2.19.1.

IR# 2.2.5 The same residential customer profile also indicated a seven percent sample population who rent, again this is a relatively small sample for representation of the main group this application is directed for. Given this rent/own information is also available to FBC, would it not be more appropriate for FBC to target a significant proportion of this renter population in another survey / open house?

Response:

Please refer to the response to BCUC IR 2.2.4.

IR# 2.2.6 Given that both surveys were conducted in the solar winter months (February & December), did FBC not consider holding a survey in summer or even consider

how this seasonal survey would affect the outcome of the solar survey results. Please comment.

Screenshot from the online service application form captured from the FBC website.

Residential Customer Profile

	Residential Customers				
	Total	Interest in Rooftop Solar		Interest in Community Solar	
		Likely to participate	Unlikely to participate	Likely to participate	Unlikely to participate
Base	305	119	155	144	115
	%	%	%	%	%
Home ownership					
Own	93	95	92	95	95
Rent	7	5	8	5	5
Type of Residence					
Apartment/Condo	6	3	7	6	4
Townhouse/duplex/triplex	7	3	8	6	10
Single detached home	88	95	85	88	86
Primary Heat Source					
Natural gas	58	53	64	60	59
Electricity (baseboard heaters)	17	16	15	16	13
Electricity (heatpump)	14	15	14	15	14
Wood	7	11	4	5	9
Oil	1	2	0	1	1
Other	3	4	2	2	4

Response:

The surveys were undertaken to gauge customer perceptions of solar generation in general and to collect information on FBC's behalf without consideration for the seasonal factors.

IR# 2.2.7 In the same IR FBC also state *"FBC notes that it has experienced an annual increase in participation in its Net Metering Program despite the relatively high cost of this source of supply relative to retail energy rates so comparative power prices do not always seem to be a deterrent to participation in the solar arena."*

It is Resolution Electric Ltd experience that the customer's main driver for installing a solar electric system to their residence is a financial one, and many also add the fact that they dislike FortisBC and want to reduce their reliance on purchasing power. The "solar arena" is a place where electrical energy consumers opt to invest and direct their electrical utility billing costs to a system that they own (via loan or savings / investments) or the alternative option is of

course the status- quo of continue paying money for power on a bi-monthly basis to the utility, a bit like leasing a car, you never get to own it!

Would FBC consider performing another market research survey (perhaps in the summer) that aims to identify more of the financial drivers / aspect now these figures are available, rather than an ecological intent which is really clean energy for clean energy? Does FBC consider the results to be an accurate reflection of their customer's basic intent for subscription to the solar garden?

Response:

FBC believes that the objectives targeted by both surveys have successfully demonstrated an interest in a community solar offering and therefore does not intend to perform more market research prior to the proposed pilot project.

Based on the results from both surveys, the top three motivators to subscribe to the CSPP would be the prospect of saving money on electricity, being part of a green community project and GHG emissions reduction. The only way to know with certainty whether these results are an accurate reflection of customers' basic intent for subscription is to offer the Program. Customer preferences related to community solar will not be well understood without a pilot.

IR# 2.3.1 In reply to the BCUC IR# 1.3.1 regarding the overall project cost of the survey, FBC stated "*The total cost incurred was approximately $60 thousand. External costs amounted to $56 thousand and internal costs are estimated at $4 thousand."*

Please confirm the internal costs were the cost attributed to the FBC staff to direct and manage the Sentis marketing company, to develop the brief and review the survey questions.

Response:

Confirmed.

IR# 2.3.2 In light of the results and the lower target population for rented and / or condo/townhome are FBC happy with the level of supervision / guidance or direction given to the marketing company?

Response:

Yes. Please refer to the response to Resolution IR 2.2.4.

IR# 2.3.3 The internal cost of $4,000 dollars seems very small please provide the type of resource allocated to the managing the marketing project and how many hours assigned and to how many employees.

Response:

The research management was performed by one senior research analyst at 50 hours.

IR# 2.3.4 With reference to the initial procedural conference (on page 10) held on June 1st 2017 FBC draw parallels with the bio methane customer purchase offer which allows natural gas customer to select a percentage of bio methane to offset natural gas from nonrenewable ground sources. Did FBC ever consider

conducting a survey on the present bio methane customers who reside in the FBC electricity service area as to whether they would include solar electric as an option? This would provide accurate feedback from customers presently adopting clean energy on the basis of environmental reason rather than financial.

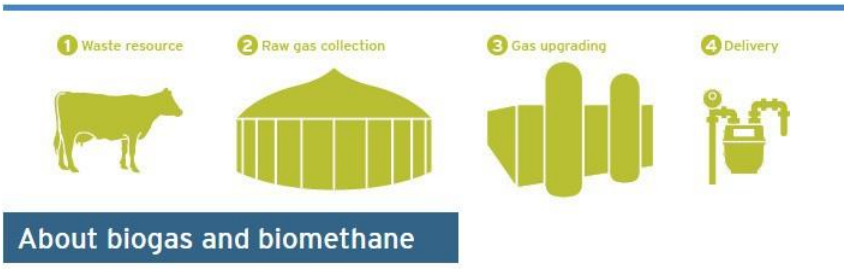
Response:

FBC does not see value in conducting research specifically with present Renewable Natural Gas customers, although it is reasonable to expect that the interest level in the CSPP may be higher in that group.

The Solar research that was conducted does indicate that those residential customers who are likely to consider Community Solar are strongly motivated by environmental reasons with one-in-five (21 percent) indicating that "to be part of a green project in my community" is the primary motivation. This is on par with the financial drivers; "pay less on electric bill" (21 percent) and "To save money overall". For commercial customers, saving money is the primary driver (41 percent), but being part of a green community is a clear second motivation (20 percent).

Overall, both residential and commercial customers indicate that environmental reasons are a consideration in their decision.

IR# 2.3.5 Reference to the procedural conference caption notes below, FBC claim this application is "somewhat akin" to the bio methane program that the previous Terasen gas company offered. It is my understanding the bio methane program managed an environmental hazardous waste i.e. methane gas, which is a potent greenhouse gas, captured and processed this methane into a usable fuel for combustion, effectively greenhouse gas mitigation. The FBC website offers a great explanation on the process, here is a caption below.



Please clarify how the bio methane program and the CSPP are related, i.e. describe what qualities are similar.

Excerpt from the procedural conference call below (page 10)

> And in some respects, going back into the history of FortisBC and its -- and Fortis Energy Inc., when it was still Terasen, this application is somewhat akin to that that Terasen, as it then was, made when it was starting to engage in biomethane services. And so, like community solar, it's another means for Terasen, as it then was, to put forward a product that was in the category it's engaged in, for gas, for us electricity, but in a new way.
>
> And in 2010, looking to embark on two pilot projects to deal with biomethane, Terasen brought
>
> Allwest Reporting Ltd., Vancouver, B.C.

Response:

Generally speaking, both the Renewable Natural Gas (RNG or biomethane) program and the CSPP involve delivering energy into the distribution systems from a defined resource and notionally delivering that commodity to specific customers at a price that carries a premium over standard rates. Other similarities are discussed in response to BCOAPO IR 2.12.1.

The biomethane program and CSPP are different in various respects. For example:

- Solar technology is relatively more established.
- In the context of FBC the use of solar power does not result in significant greenhouse gas mitigation.
- The biomethane application was filed by Terasen Gas (now FortisBC Energy Inc.), an energy utility that is not involved in generation (commodity supply). This is unlike FBC, which does generate electricity. Correspondingly:
  - Terasen Gas was not going to generate the biomethane that was the subject of its application. It was going to purchase it from other suppliers, and indeed those initial suppliers were identified in its application.
  - By contrast, power generation is a core activity at FBC.
- Terasen Gas was venturing into a new arena of activity via the biomethane application in another sense: it proposed to become involved in an aspect of commodity supply via the ownership and operation of upgrading facilities. This was an involvement outside its traditional business model. No new activity is being

undertaken by FBC, which as noted above is traditionally involved not simply in distribution but also in generation.

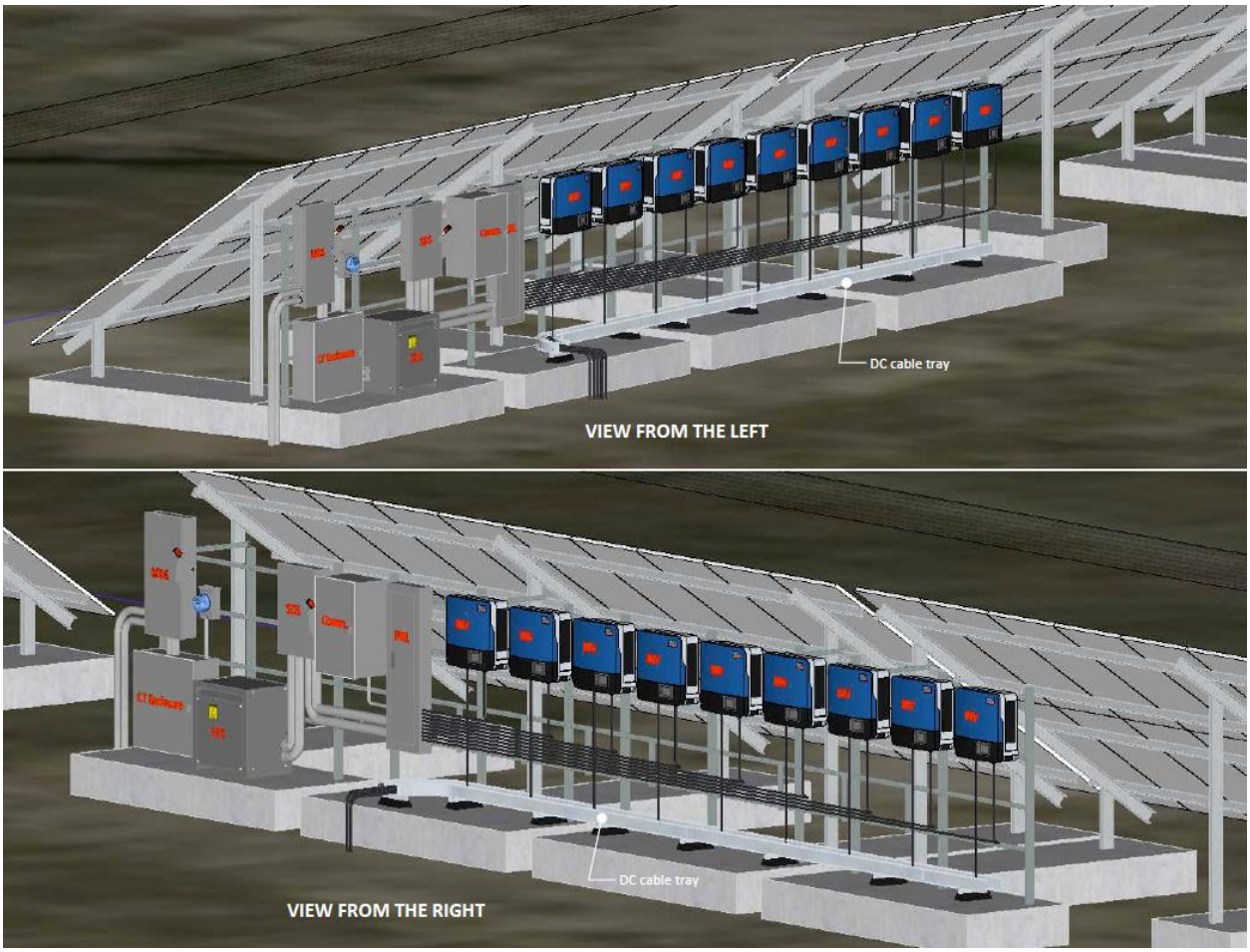
- Solar power is simply another means for FBC as an electricity utility to generate and distribute the product – electricity – with which it is already associated and that it already generates and distributes. Biomethane is an alternative to the product (natural gas) that was traditionally distributed by Terasen. Correspondingly, solar is less of a distinct concept than biomethane; rather, it is another means of various potential means (whether hydroelectric, wind, solar, turbine or other) to carry out FBC's traditional functions.

IR# 2.4.1 With reference to FBC response to Resolution IR 1.6 FBC indicated *"the lifespan of an inverter typically ranges from 10 to 20 years; however, the lifespan is highly dependent on the surrounding environment."*

Please indicate whether the inverters will be located outside under shelter, outside exposed to the elements sun/moisture, inside a non-conditioned air space, inside a conditioned air space.

Response:

The inverters will be located outdoors, but will be shaded from direct sunlight. The following is a three dimensional drawing of the proposed system showing the layout of the panels and inverters.



The proposed inverters (SMA Sunny Tripower inverters) are suitable for outdoor use.

IR# 2.5.1 With reference to FBC response to Resolution IR 1.7 FBC indicated "*FBC last reviewed solar PV technology for DSM-related cost-effectiveness in 2010, and at that time residential PV installations did not meet the Total Resource Cost test and FBC therefore did not offer incentive or financing programs. The measure has not been evaluated since.*

Would it not be prudent for FBC to conduct a re-evaluation for the loan option for DSM, the last evaluation was conducted in 2010 and product and installation techniques have become more affordable and efficient. Now a residential install for >10kWp can be as low as $2.65 / Watt*. This provides excellent value compared to the $4.00 / Watt that FBC is planning on spending on the CSPP. This would also satisfy one of the identified groups that FBC is aiming the CSPP at – people who cannot afford the upfront costs.

*Based on Resolution Electric Ltd installation cost for single family residential applications.

Response:

FBC has updated the 2010 analysis using $2.65 per Watt installed cost and the 2016 LTERP avoided costs, and found the benefit/cost ratio of 0.5 still falls far short of passing the governing TRC test.

The Company also notes that its DSM loan option is capped at $6,500, whereas a 10 kWp installation would cost at least $26,500 using the unit cost provided. Particularly when considering the poor TRC ratio, higher loan levels represent higher risk for customers of FBC.

IR# 2.6.1 With reference FBC reply to ICG 1.4.5, FBC indicate the interconnection cost of $60k was included in the CSPP costing, FBC also provided a SLD indicating the point of connection was the low side of the 300kVA distribution transformer.

Does the $60k connection cost include the 13.8kV circuit breaker and / or pole and switch-cutout (hot-line crew) and associated cabling costs? Please provide a Single Line Diagram of the high voltage connection to the FBC system, together with details of connection of components w.r.t. manufacturer and model of components.

Response:

The connection costs include all costs to install the distribution transformer and associated underground equipment, such as conduit and cable, in order to connect the CSPP to the existing underground electrical distribution system. The connection will be made to an existing junction box across Lochrem Road.

With respect to the high voltage connection, the SLD provided as part of ICG 1.4.5 shows the high voltage connection to the FBC system. The pad mount distribution transformer (the connection point) is a CAM TRAN 300 kVA, 600/347 volt to 12470 volt transformer designed specifically to meet FBC's requirements and is commonly used throughout the FBC system. The part number for the transformer is specific to FBC and is for internal use only so has not been provided. The main disconnect switch in the proposed SkyFire design, which is to be supplied by SkyFire, is manufactured by Siemens (part# HFC365NRA). The final selected product may be subject to change prior to construction.

IR# 2.6.2 The Single Line Diagram indicates the inverter will be running the DC connections at 1000V rating. Will the solar array be accessible to the general public?

Response:

The solar array facility will be fenced to deter public access.

IR# 2.6.3 If the array is accessible to the public will the array be fenced to prohibit unauthorized access, if so what are the cost associated.

Response:

Please refer to the response to Resolution IR 2.6.2. Material and labour for the fencing installation is included in the project cost and is estimated at $22 thousand.

IR# 2.6.4 What insurance policy will be in effect to cover against damages and losses to the solar installation for natural causes or man-made cause i.e. vandalism / theft?

Response:

The facility will be covered by the FBC general insurance policy that applies to all assets.

IR# 2.6.5 Please supply the model number for the Canadian Solar modules.

Response:

The proposed design includes Canadian Solar MAXPOWER CS6U-335 modules. This may be subject to change prior to construction as module manufacturers are often updating their product offerings.

IR# 2.7.1 With reference to FBC response to Resolution IR 1.14 FBC indicated *"Monthly billing was chosen to provide more timely information and so that 1 the March 31 date to zero the accumulation of unused output could be easily managed."*

With the proposed monthly billing cycle having potential financial / cash flow advantages to FBC, is there any future provision to move schedule 95 or other rates schedules to a monthly billing cycle, like the one presently used by Fortis Gas?

Response:

Monthly billing for Rate Schedules 1, 3, 3A, and 20 was approved by Order G-169-14. While most residential customers are currently billed on a bimonthly basis, the billing cycles are staggered such that revenue collection is relatively smooth over an annual period.

One advantage of monthly billing (outside of the rationale specific to the CSPP) is that it provides more timely feedback to customers on their particular usage habits which can be beneficial in managing energy use and expenditures. As such, FBC would prefer to move more customers to monthly billing when the opportunity arises.

IR# 2.8.1 With reference to FBC response to BCUC IR 1.13.2 FBC indicated "*FBC does not have data available to describe an "average year", however, residential mean annual consumption has been approximately 11,000 kWh for several years."*

With regard to the type of dwelling the residential meter is supplying, please provide a breakdown of the percentage of apartment / town homes / single family dwellings etc.

Reason for request

It is critical to understand that occupants in apartment residences typically have a hot water source supplied by the "house" or strata as a common hot water system supplying multiple apartments. The residents in these apartments / condos complexes that rely on hot water from a communal heated water system are not experiencing these electrical energy cost to heat hot water on their residential meters/bill.

The strata is billed at a commercial rate for heating hot water together with "house" heating loads which is typically recovered in the strata cost. Occupants (with a residential meter) of an apartment or condo are not seeing these potential kWh accumulated to their meter, therefore the 11,000 kWh is a skewed figure because it does not include costs for hot water to the condo residential occupant which is typically assumed to be between 18 ~24 percent of annual bill.

Response:

FBC does not identify accounts on the basis of dwelling type within its information systems and cannot provide the requested information. Also, the question seems to imply that the CSPP may only be of interest to customers in multi-unit buildings, which is not accurate.

IR# 2.8.2 Please provide the amount of energy in kWh an average residential customer in FBC's service area consumes in an average year for residents in apartment / condo style dwellings.

Response:

Please refer to the response to Resolution IR 2.8.1.

IR# 2.9.1 Please provide simulations for the kWh performance from the solar array, the value of 282,939 kWh seems a little lower than expected. I have attached and accompanying Solar Edge simulation and used the Canadian Solar CS6U-335 (assumption made). The simulation is for the output for one inverter, multiply by nine to get the annual output for 720 modules, 38.264MWh x 9 = 344.376MWh.

Response:

The estimated output (as measured at the meter) of the proposed system was provided by SkyFire.

FBC and SkyFire discussed the results provided by Resolution and offer the following observations, which are limited by not having the input files used in the Resolution analysis:

- The SolarEdge software is not designed for providing an accurate estimated energy output of systems. Rather, it is meant to help size SolarEdge inverters and optimizers to the modules for the particular system. Conversely, PVsyst, which is used by SkyFire, is an energy modeling software designed specifically for energy modeling of solar array systems.
- The print report does not show the derating factors that the SolarEdge program used for the CSPP equipment and therefore FBC is unable to compare the derating factors used by Resolution in the SolarEdge program to the derating factors used by SkyFire in the PVsyst program. SkyFire uses information based on systems they have designed, built and monitored over the past 16 years. These derating factors include, but are not limited to, the following:
  - Soiling
  - Inter-row shading
  - Snow
  - Mismatch
  - DC voltage drop
  - AC voltage drop
  - Connection
  - LID losses
  - Module nameplate
  - System age
  - System availability
- The print report does not show the weather source used for weather data and the time period of the historical data.

SkyFire uses the derating factors to determine a P50 energy output for the system, which means that the average annual output of the proposed system is 290.2 MWh. FBC has been informed that, in SkyFire's professional opinion, it is not possible to achieve a P50 energy output of 344.3 MWh for this system in Kelowna, BC.

IR# 2.9.2 Please comment on why a staged approach to implementation was not considered? It would be a sensible approach for FBC to commit to providing an authentic solution for customers who are unable to install systems to their own residence to provide a sustainable longer term plan for the pilot.

Response:

It is unclear to FBC what a staged approach to implementation would entail with respect to the CSPP. In the view of the Company, one such interpretation would consider that implementing the CSPP as a pilot prior to making a decision about the longer term viability of providing community solar to customers is, in effect, a staged approach.

IR# 2.9.3 Have FBC considered a five year period which could implement a 100kWp per year and develop the site as the program becomes more adopted.

Response:

FBC considered building the Project in stages (though not exactly as described). However, the proposed size of the CSPP is already very small relative to the customer base and the proposed site has limited expansion capability.

IR# 2.9.4 The total installed module kWp for each 24kWp inverter (9 off) is 26.8 kWp (assuming a 335W module). This provides a 111% over capacity for module to inverter. Have FBC considered a higher capacity greater than 111%? This could possibly result in clipping of power during peak irradiance exposure periods in high summer but could offer a higher optimized return on the inverter capacity for the majority of the year.

Response:

The FBC RFP specified a solar array with approximately 240kW DC capacity. Based on site conditions, the proposed Project layout and string lengths, SkyFire determined that nine 24kW inverters were required for an optimized design. The potential cost savings associated with smaller inverters are insufficient to justify additional clipping during peak generation periods.

IR# 2.9.5 With respect to module replacement in future years for possible failure, how do FBC plan to mitigate against installed modules (manufacturer/model) becoming obsolete in the future for failed panel replacement. Given that the system they have opted for does not allow for module level optimization how will FBC manage potential mismatch of electrical characteristics for future replacement modules that have increased efficiency?

Response:

FBC acknowledges that a potential mismatch of PV modules in the future will result in a situation where the output of new PV modules is limited by the PV module with the lowest output within an array. This will certainly be a missed opportunity since the output of PV modules is increasing as manufacturers improve efficiency, although the efficiency gains reported by PV module manufacturers appear to be slowing at this time.

In the absence of further significant efficiency achievements, FBC does not believe the PV module mismatch issue to be a major concern. In the event PV module manufacturers achieve considerable efficiency achievements in the future, FBC expects that industry will create an engineering solution to module mismatch which would allow solar array owners to maximize output of PV modules.

IR# 2.9.6 The inverter output voltage is 480VAC, please comment on why the 300kVA distribution transformer could not be specified to take supply at the low voltage winding of 480V instead of 600V? This would eliminate the need for the solar transformer and improve reliability.

Response:

FBC‘s nominal standard secondary voltage from pad-mounted transformers is 347/600 volts.

Nevertheless, FBC is considering using a distribution pad-mount transformer for 480V, which would eliminate the need for a solar transformer.

FBC does not see a significant reliability impact between the two alternatives as either option contains non-inventory material and would therefore be impacted by lead times. In the case of the proposed CSPP design, in the event the 600V/12,470V transformer fails, FBC has inventory which can be utilized to minimize disruption. In the event the solar transformer fails, FBC will be forced to procure a replacement. In the case of the design proposed by Resolution in this IR, in the event of a failure in the 480V transformer, FBC will be forced to procure a replacement.

Prior to ordering equipment, FBC will make a final decision on transformer specification from the perspective of providing reliable service at the lowest reasonable Project cost.

IR# 2.9.7 The inverter can be set to output a lead/lag power factor of 0.8, please confirm the inverter output will only be selected for true power unity (Watts) and not be set to provide VAR support to the FBC system.

Further information for IR 2.6.1 Google image below show no local powerlines for easy connection, therefore I assume it is a breaker connection point.

Response:

FBC does not plan on using the CSPP to provide VAR support to the FBC system.

With respect to the interconnection with the FBC distribution system, there is an existing junction box across Lochrem Road which will be used to tie the CSPP into the FBC distribution system.