REQUESTOR NAME: **BC Sustainable Energy Association and Sierra Club BC**
INFORMATION REQUEST ROUND NO: **1**
TO: **Andy Shadrack**
DATE: **June 8, 2017**
PROJECT NO: **3698896**
APPLICATION NAME: **FortisBC Inc. 2016 Long Term Electric Resource Plan (LTERP) and Long Term Demand Side Management Plan (LT DSM Plan)**

1.0 Topic: Resource Options
Reference: Exhibit C10-6, Evidence of Andy Shadrack, Modified Table 8-1: FBC Demand-Side and Supply-Side Resource Options

1.1 For the four Kaslo NM Solar PV entries, the figure under the heading "Unit Capacity Costs ($KW-year)" is in brackets, whereas the figure for the "FortisBC Ellison Solar PV" entry is not in brackets. Do the brackets here mean negative numbers? If so, please explain.

1.2 What formula did Mr. Shadrack use for the "unit capacity costs ($KW-year)" of the resources that are not in Table 8-1? Was it the same formula as FBC used in Table 8-1?

The evidence is that Kaslo NM #1 is a self installed 12kW solar PV system with a Unit Energy Cost of $65/MWh based on amortization over 20 years.

1.3 Please explain how Mr. Shadrack arrived at a Unit Energy Cost of $65/MWh for Kaslo NM#1. In addition to the amortization period of 20 years, what numbers went into the calculation, such as the upfront costs, the operating costs (if any), the annual kWh, and the discount rate? If other numbers were used please provide them.

1.4 Is the unit energy cost of $65/MWh strictly the costs of the generation, or is it reduced to account for financial savings under the net metering program?

1.5 Would someone else be able to self-install a 12kW solar PV system with a Unit Energy Cost of $65/MWh based on amortization over 20 years, assuming they had a site with similar insolation characteristics and the ability to do the installation?

The Unit Energy Cost figures for self-installed "Kaslo NM#2 – 8.1 kW Solar PV" and contractor-installed "Kaslo NM#4 – 7 kW Solar PV" are $95/MWh and $175/MWh respectively, based on 20 year amortization.

1.6 Please provide the numbers that were used to calculate these unit energy cost figures.

1.7 The two self-installed systems are $65/MWh and $95/MWh levelized UEC, and the contractor installed system is $175/MWh LUEC. Is the implication that installation costs are a substantial component of the total cost of a solar PV system?

1.8 Is Mr. Shadrack saying that a levelized unit energy cost of $175/MWh for contractor-installed 7 kW solar PV system in the Kaslo area is a benchmark cost, i.e., that anyone in the area could acquire a similar system at similar price?

The evidence refers to FBC's explanation of why the unit energy cost estimates for solar power in FBC's resource options table are higher than unit energy cost estimates for solar power in the 2016 Seventh Northwest Power Plan document. FBC states:

> "Solar UEC [in FBC's resource options table] is different [than in the NWPP document] because smaller plants were evaluated in B.C., so they were not able to realize the same economies of scale. In addition, it is likely that the solar intensities of good sites were greater in the U.S. as they are closer to the equator." [Exhibit B-2, BCUC 1.25.1, pdf p.86]

(FBC goes on to state that "Renewables in the U.S. also are able to access a federal tax credit which does not have an equivalent in Canada.")

FBC's Table 1 indicates that NW PP used an estimate of levelized unit energy cost of PV solar of $91-$121/MWh in 2012 US Dollars. FBC's Table 2 indicates that it used an estimate of levelized unit energy cost of PV solar of $169-$184/MWh in 2015 Canadian Dollars.

1.9 What is Mr. Shadrack's point about the FBC UEC for solar PV being higher than the NW PP UEC for solar PV? Is he saying that FBC's estimated unit energy cost for solar PV as a supply side resource should be lower than it is? If so, how does Mr. Shadrack respond to points about the size of the assumed solar PV installation, geographic differences in insolation, and the US federal subsidy for solar PV?

The evidence provides a unit energy cost of $463/MWh for FBC's proposed Community Solar Pilot Project at the Ellison Substation, and a unit capacity cost of $670/KW-year. In the Community Solar Pilot Project application, FBC says the price would be based on the cost and that "The price of electricity supplied under the FortisBC Solar Offset rate would be $0.231/kWh." [p.13, pdf p.20]

1.10 Please provide the details of how Mr. Shadrack calculated these unit energy cost and unit capacity cost figures.

1.11 Why is Mr. Shadrack's estimate of a unit energy cost of $463/MWH (or $0.463/kWh) so different than FBC's estimate of $0.231/kWh?

Mr. Shadrack's evidence includes data such as the following:

> "April 19th FBC purchase 491/7.8 kWh
> April 19th Solar production 419.6/6.7 kWh 85.5%
> **April 19th Solar transfers 280/4.4 kWh 57%**
> April 19th Solar use 139.6/2.2 kWh
> April 19th Total use 350.6/5.6 kWh 63 Days -(28.6%)"

1.12 What is the "/7.8" figure? (and "/6.7", "/4.4" etc.)

1.13 Please confirm that the data illustrates a customer-owned solar PV system that is at times providing power to the grid and at times offsetting power that would otherwise have been drawn from grid, in accordance with the way the net metering program is supposed to work.

1.14 Please explain the purpose of the percentages. Is the point that the amount of power that the customer's solar PV system generates is substantial in relation to the amount of power the customer purchases, i.e., that the customer's solar PV system provides to the grid a substantial amount of power relative to the amount of the customer's purchases from the grid, and reduces substantially the amount of power the customer would otherwise purchase from the utility?

1.15 What is Kaslo #3, and why is the unit energy cost "N/A"?

1.16