BARRETT LIGHTBOURN, P Eng, BEAP
Coach House, 28 Middle Road
Paget PG 03

August 2nd, 2017

The Regulatory Authority
1st Floor Craig Appin House
8 Wesley Street
Hamilton HM 11

Ref: Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Monitoring

To whom it may concern,

Thank you for the opportunity to comment on the Preliminary Report, Preliminary Decision and Order, issued on the 14th of July, 2017.

After review of the consultation document and, specifically, an analysis of the data presented in Table 1, I hope that this document is tabled, as I feel that the recommendations are based on inconsistent and/or incorrect technical information. My attached response summarizes, in two pages, my comments and questions with regards to the document and also presents two spreadsheets that, I believe, more accurately reflect the scenarios modeled in the consultation document.

I would be more than happy to discuss my response in detail with the RA, should there be an opportunity. I also believe that the RA should meet with representatives of the solar PV industry (and BELCO, which I would imagine has already been done) in an effort to come up with a solution that will be to the benefit of all.

Thank you for your time and I look forward to hearing back.

Sincerely yours,

Barrett Lightbourn, P Eng, BEAP
ASHRAE-Certified Building Energy Assessment Professional
bmlight@mail.ashrae.org

Regulatory Authority - Renewable Energy Consultation Document 14Jul17

- *Preliminary Report, Preliminary Decision and Order, Table 1, Page 18 (n.b. same table is inserted at the end of Appendix C*)
  - Analysis of the table provided by the RA indicates that there are inconsistencies in the variables used to determine the cost-effectiveness of solar PV installations. The two variables are the annual PV production rate per installed capacity (i.e. annual kWh/kW) and the installed cost per Watt (i.e. $/Watt). The kWh/kW rate should be the same for all scenarios - it isn't. For the $/Watt installation rate, the numbers used are not logical. They should either be the same for all scenarios or scaled such that smaller systems cost more per Watt than larger systems.
  - Attached are two spreadsheets titled RA Table 1:Summary of Results and RA Table 1:Summary of Results Modified
    - The first attempts to recreate the RA table, using the variables specified by the RA (including the % of PV consumed, which is equal to 1-% PV exported). The second spreadsheet attempts to create a level playing field in that the PV production rates, kWh/kW, are the same for all scenarios and the installation rate, $/Watt, is scaled such that a smaller system has a higher cost per Watt. The modified variables are circled in red on both sheets. The %s of PV exported, as specified by the RA, have not been changed (though this variable will have a wide range depending on the daily load profiles of the customer)
    - The other thing the spreadsheets do is calculate the BELCO annual costs using a rate sheet template that models the BELCO Residential tariff for the 12-month period from August 2016 to July 2017 (n.b. the tariff changed on 01Jan2017). The annual energy cost savings realized by the PV system installation are calculated by: 1) modeling each scenario's initial monthly consumption and cost (e.g. 400 kWh/month) over a 12 month period; 2) modeling the original monthly consumption less the PV kWh consumed over a 12 month period; and 3) adding the annual PV exported revenue (@ $0.1736/kWh). The PV system realized first year energy cost savings are 1) minus 2) plus 3). This exercise was performed for all twenty scenarios.
  - As a result of the analysis of the RA's analysis, a number of comments and questions for the RA arise. These, which are related to either the RA's table or the "modified" table, are listed below:
    - why are the kWh produced/kW different for all four system sizes?
    - why are the installed costs/Watt inconsistently different?
    - how is the total value of production calculated?
    - the daily load profile of the residence, and the daily solar production profile, will significantly effect the daily amount of exported kWh. How does the RA account for these variables in their analysis of the feed-in tariff? (n.b. predictions using monthly net-metering are going to be more accurate as the residence's daily load profile is no longer a factor)
    - the simple payback is best for the largest consumer (1500 kWh/month) because all the saved kWh come off the "tail" block (@ $0.34/kWh). The smallest consumer (400 kWh/month) only gets the benefit of tier 2 reductions (@ $0.24/kWh). This fact, and the fact that smaller PV systems have a higher installed cost per Watt, cause the simple payback of a small consumer PV system to be 38% to 42% longer than that for the large consumer. Is this fair? And does it "encourage electricity conservation and the efficient use of electricity" as stated in Clause 4 (2) (b) of Appendix B?
    - if it is believed that the simple payback for any installed system should be approximately equivalent no matter whether a small or large consumer, then another tariff should be developed for customers that adopt solar PV. This rate should ensure that energy cost savings/kWh not purchased (i.e. PV production consumed, not exported) should be equivalent across all customers

Some comments and questions with regards to the remainder of the consultation document follow:

- *Appendix B*
  - Clause 4 (2) (b) indicates the RA's desire to "encourage electricity conservation and the efficient use of electricity". Under the current residential BELCO tariff, the small consumers have less incentive to conserve because the rate of energy cost savings/kWh is considerably lower than for large consumers. If the intent is to have all ranges of consumers conserve electricity then the residential rate tariff needs to be revised so that even the small consumer who adopts solar PV, or other energy conservation measures, is equally rewarded for their efforts.
  - Clause 4 (2) (c) indicates the RA's desire to "promote the use of cleaner energy solutions and technologies". The RA's proposed feed-in tariff will not to this for the smaller consumers because the simple payback is not attractive, based on analysis of Table 1: Summary of Results. Is this fair?

- *Schedule to GD*
  - what and where is Clause 5 (1) (b)?
  - Clause 5 (1) - under the present scheme, if a PV customer exports a kWh to the grid that customer receives $0.1736 and BELCO resells that kWh for either $0.1575, $0.2400 or $0.3362, depending on the appropriate tier. The Fuel Adjustment charge will also be applied to that kWh despite there being no fuel used to produce that kWh. BELCO should not be able to recognize this as revenue. Should not BELCO be required to create an escrow account to accumulate the FA revenue realized for each PV kWh resold?

- *Appendix C*
  - Summary of Analysis
    - Paragraph 2 - how are the first year energy cost savings, which are required to determine the Simple Payback, calculated? (it does not appear that the "before PV" and "after PV" annual BELCO electricity costs were calculated using the residential rate tariff and fuel adjustment rates)
    - many of the calculations posted in Table 1, and discussed in the text of the Summary of Analysis section, are suspect because the PV kWh/kW rates vary. Also, the costs/Watt installed are not consistent.
  - Conclusion
    - the final paragraph states "It should be noted that there is also additional value of solar PV production that is not quantified within the report. The fuel costs and taxes contribute no value to the scheme participants when they export electricity, however all self-consumed energy does include these costs. This is an added benefit of self-consuming and further adds to the importance of sizing a system correctly to get the most value out of the solar PV system." Really? If a consumer implements energy conservation measures (i.e. upgrade lighting to LED, replace a/c units with higher EER units, etc.), the value of the kWh savings is the difference between what you now pay versus what you paid, as calculated using a BELCO rate tariff model. There is no added benefit. How is this different from self-consumed solar PV?

RA Table 1:Summary of Results
(Page 18 of 2nd Renewable Energy Consultation)

Monthly Consumption (kWh) [1]	400	400	400	400	700	700	700	700	1100	1100	1100	1100	1500	1500	1500	1500
Annual Consumption (kWh)	4800	4800	4800	4800	8400	8400	8400	8400	13200	13200	13200	13200	18000	18000	18000	18000
PV System Capacity	2	5	10	15	2	5	10	15	2	5	10	15	2	5	10	15
Annual PV production/kW capacity	1666	1500	1514	1500	1666	1500	1514	1500	1666	1514	1514	1500	1666	1500	1514	1500
Annual PV production (kWh)	3332	7500	15140	22500	3332	7500	15140	22500	3332	7570	15140	22500	3332	7500	15140	22500
Assumed % consumption of PV kWh	60%	32%	18%	12%	81%	50%	29%	20%	94%	68%	42%	30%	99%	80%	52%	39%
Annual PV kWh consumption	1999	2400	2725	2700	2699	3750	4391	4500	3132	5148	6359	6750	3299	6000	7873	8775
Average monthly PV consumption	167	200	227	225	225	313	366	375	261	429	530	563	275	500	656	731
Annual PV exported kWh	1333	5100	12415	19800	633	3750	10749	18000	200	2422	8781	15750	33	1500	7267	13725
Average monthly PV exported production	111	425	1035	1650	53	313	896	1500	17	202	732	1313	3	125	606	1144
Exported PV sell rate per kWh	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736
Annual electricity bill w/o PV [2]	$1,674	$1,674	$1,674	$1,674	$2,984	$2,984	$2,984	$2,984	$5,225	$5,225	$5,225	$5,225	$7,236	$7,236	$7,236	$7,236
Annual average cost/kWh	$0.3487	$0.3487	$0.3487	$0.3487	$0.3552	$0.3552	$0.3552	$0.3552	$0.3959	$0.3959	$0.3959	$0.3959	$0.4020	$0.4020	$0.4020	$0.4020
Annual electricity bill w/ PV, incl. consumed	$922	$823	$743	$749	$2,034	$1,623	$1,406	$1,352	$3,895	$2,849	$2,453	$2,324	$5,852	$4,724	$3,920	$3,437
Annual average cost/kWh w/ PV	$0.3296	$0.3431	$0.3580	$0.3567	$0.3568	$0.3495	$0.3508	$0.3466	$0.3869	$0.3538	$0.3587	$0.3607	$0.3981	$0.3937	$0.3871	$0.3725
Annual PV revenue, exported	$231	$885	$2,155	$3,437	$110	$651	$1,866	$3,125	$35	$421	$1,524	$2,734	$6	$260	$1,262	$2,383
First year PV energy cost savings	$984	$1,736	$3,086	$4,362	$1,060	$2,012	$3,444	$4,757	$1,365	$2,797	$4,296	$5,636	$1,389	$2,772	$4,577	$6,181
PV System installed cost per Watt capacity	$4.63	$4.11	$4.21	$4.17	$4.63	$4.11	$4.21	$4.17	$4.63	$4.11	$4.21	$4.17	$4.63	$4.11	$4.21	$4.17
PV System installed first cost	$9,260	$20,550	$42,100	$62,550	$9,260	$20,550	$42,100	$62,550	$9,260	$20,550	$42,100	$62,550	$9,260	$20,550	$42,100	$62,550
Simple Payback (years)	9.4	11.8	13.6	14.3	8.7	10.2	12.2	13.1	6.8	7.3	9.8	11.1	6.7	7.4	9.2	10.1

Notes:

1) monthly consumption has been modeled as the same for each month (which most likely won't match the actual monthly load profile)

2) annual electricity costs are calculated using BELCO rates for the 12 month period August 2016 to July 2017

RA Table 1:Summary of Results_Modified
(Page 18 of 2nd Renewable Energy Consultation)

Monthly Consumption (kWh) [1]	400	400	400	400	700	700	700	700	1100	1100	1100	1100	1500	1500	1500	1500
Annual Consumption (kWh)	4800	4800	4800	4800	8400	8400	8400	8400	13200	13200	13200	13200	18000	18000	18000	18000
PV System Capacity	2	5	10	15	2	5	10	15	2	5	10	15	2	5	10	15
Annual PV production/kW capacity [2]	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Annual PV production (kWh)	3000	7500	15000	22500	3000	7500	15000	22500	3000	7500	15000	22500	3000	7500	15000	22500
Assumed % consumption of PV kWh	60%	32%	18%	12%	81%	50%	29%	20%	94%	68%	42%	30%	99%	80%	52%	39%
Annual PV kWh consumption	1800	2400	2700	2700	2430	3750	4350	4500	2820	5100	6300	6750	2970	6000	7800	8775
Average monthly PV consumption	150	200	225	225	203	313	363	375	235	425	525	563	248	500	650	731
Annual PV exported kWh	1200	5100	12300	19800	570	3750	10650	18000	180	2400	8700	15750	30	1500	7200	13725
Average monthly PV exported production	100	425	1025	1650	48	313	888	1500	15	200	725	1313	3	125	600	1144
Exported PV sell rate per kWh	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736	$0.1736
Annual electricity bill w/o PV [3]	$1,674	$1,674	$1,674	$1,674	$2,984	$2,984	$2,984	$2,984	$5,225	$5,225	$5,225	$5,225	$7,236	$7,236	$7,236	$7,236
Annual average cost/kWh	$0.3487	$0.3487	$0.3487	$0.3487	$0.3552	$0.3552	$0.3552	$0.3552	$0.3959	$0.3959	$0.3959	$0.3959	$0.4020	$0.4020	$0.4020	$0.4020
Annual electricity bill w/ PV, incl. consumed	$972	$823	$749	$749	$2,158	$1,623	$1,418	$1,352	$4,026	$2,827	$2,473	$2,326	$5,988	$4,724	$3,950	$3,437
Annual average cost/kWh w/ PV	$0.3241	$0.3431	$0.3567	$0.3567	$0.3618	$0.3495	$0.3505	$0.3466	$0.3878	$0.3490	$0.3584	$0.3606	$0.3985	$0.3937	$0.3873	$0.3725
Annual PV revenue, exported	$208	$885	$2,135	$3,437	$99	$651	$1,849	$3,125	$31	$417	$1,510	$2,734	$5	$260	$1,250	$2,383
First year PV energy cost savings [4]	$910	$1,736	$3,060	$4,362	$925	$2,012	$3,415	$4,757	$1,231	$2,815	$4,263	$5,634	$1,253	$2,772	$4,535	$6,181
PV System installed cost per Watt capacity	$4.60	$4.40	$4.20	$4.00	$4.60	$4.40	$4.20	$4.00	$4.60	$4.40	$4.20	$4.00	$4.60	$4.40	$4.20	$4.00
PV System installed first cost	$9,200	$22,000	$42,000	$60,000	$9,200	$22,000	$42,000	$60,000	$9,200	$22,000	$42,000	$60,000	$9,200	$22,000	$42,000	$60,000
Simple Payback (years)	10.1	12.7	13.7	13.8	9.9	10.9	12.3	12.6	7.5	7.8	9.9	10.7	7.3	7.9	9.3	9.7

Notes:

1) monthly consumption has been modeled as the same for each month (which most likely won't match the actual monthly load profile)
2) PV production ratio (kWh/kW) has been made same for each scenario
3) annual electricity costs are calculated using BELCO rates for the 12 month period August 2016 to July 2017
4) first year PV energy cost savings reflect annual BELCO savings plus exported PV kWh revenue

1.441.279.5907
www.BEsolar.bm
48 St. John's Road, Pembroke, HM 07 - Bermuda

BE Solar Response
to the Regulatory Authority of Bermuda

RE: Consultation on the Renewable Energy Metering Scheme

1st of August, 2017

1.441.279.5907
www.BEsolar.bm
48 St. John's Road, Pembroke, HM 07 - Bermuda

REGULATORY & LEGISLATIVE CONTEXT

This response follows on the original response submitted to the RAB by BE Solar on the 26th of April 2017 titled "BE Solar Consultation Response to the Regulatory Authority of Bermuda: (Transitional Measures for BELCO Limited Solar Net Metering Scheme) Emergency General Determination". It should be noted that contrary to the "Renewable Energy Metering Consultation" document published by the RAB, BE Solar provided financial data and a comprehensive response to the initial round of consultation highlighting the financial impact of the proposed EGD. It should also be noted that BE Solar has requested to meet with the RAB without stipulations on numerous occasions which were never accepted by the RAB. In addition it should be noted that the RAB has not publically consulted with the Bermudian community about this important decision and remains a relatively unknown entity to the Bermuda public.

As per the Electricity Act 2016 and specifically Section 6 "Purposes of this Act", BE Solar recognises that the law states the need to:

1) Promote the use of cleaner energy sources and technologies, including alternative energy sources and renewable energy sources;
2) To provide sectoral participants and end-users with non-discriminatory interconnection to transmission and distribution systems;
3) To protect the interests of end-users with respect to prices and affordability, and the adequacy, reliability and quality of electricity service;
4) To promote economic efficiency and sustainability in the generation, transmission, distribution and sale of electricity

Furthermore, the principal functions of the Authority set forth in Section 12 of the Regulatory Authority Act 2011 include:

a. to promote and preserve competition;
b. to promote the interests of the residents and consumers of Bermuda;
c. to promote the development of the Bermudian economy, Bermudian employment and Bermudian ownership;
d. to promote innovation; and
e. to fulfil any additional functions specified by sectoral legislation.

Our responses to this second round of consultation are grounded in the legislated points identified above. BE Solar is a 100% Bermudian company that focuses on energy efficiency, conservation and installing the highest quality solar installations. The future of BE Solar's ability to promote the use of cleaner electricity sources and empowering end-users to obtain more affordable electricity is being jeopardized by the proposed unsustainable feed in tariff model proposed by the RAB. Not only will this feed in tariff damage our business and employee retention, it will surely harm the future of the renewable energy industry in Bermuda. Lastly, it should be noted that since 2010 we have sold solar systems to our clients, on the premise of them being under a net metering or monthly net billing agreement and

going against this does not promote innovation nor the development of the Bermudian economy.[1]

REQUIREMENTS FOR SUSTAINED INVESTMENT IN SOLAR

Bermuda is at a cross roads on a local and international level. It is paramount that our country focuses on reducing the cost of electricity so as to reduce the cost of business and living. Installing renewable energy not only helps to keep more money in our local economy, it helps reduce the use of imported fossil fuel while helping to strengthen the local Bermudian economy. Solar energy in particular is a proven technology that can produce and deploy cleaner energy at a time when the world is in dire need of addressing climate change and while Bermuda is in a dire need to stimulate economic growth. Solar energy can easily be interconnected to the utility grid to reduce peak demand and offset the need to run expensive turbines that are powered with imported fuel. Solar generated power, both utility scale and on a distributed generation level, should form a primary component of a diversified generation portfolio for Bermuda. Eventually all of Bermuda's generation needs can be met through solar electricity and the use of renewable resources should be maximised to the extent it is cost effective and fair to both BELCO and the solar producers. It should also be noted that the Government of Bermuda has set a target for our energy mix to be comprised of 1% distributed solar PV and 2% bulk scale solar PV by 2020[2] and this should be factored into all decisions being made by the RAB, especially when it comes to proposed billing and tariff agreements.

An equitable tariff set forth by BELCO on September 16, 2016 in point I.C, which we will refer to as "Monthly Net Billing", highlighted an appropriate "win-win" scenario for both BELCO and solar producers. *"Residential customers will be paid avoided costs for their power after netting the power (energy, kWh) used and sold by those customers each month. For example, if they use 600 kWh and self-generate 500 kWh in a month, they will pay for 100 kWh at retail price. Conversely, if they use 500 kWh and self-generate 600 kWh, they will be paid an avoided cost price for the excess power (energy kWh)."*[3]

THE PROPOSED TARIFF WILL JEOPARDISE INVESTMENT

The Emergency General Determination (EGD) set forth by the RAB on March 2, 2017 and the related implementation of the avoided cost rate of $0.1736KWh, as well as the related termination of the prior net metering scheme, lacks integrity, fairness or innovation and more importantly is unsustainable. It does not promote economic efficiency nor sustainability in the generation, transmission and distribution and sale of electricity. The lower the feed in tariff, the less likely a consumer is willing to invest in solar.

[1] Doug Patterson – request for refund because of RAB decision
[2] https://www.gov.bm/sites/default/files/bermuda_electricity_policy___150526_3.pdf
[3] http://belco.bm/images/stories/pdf/belco_net_metering_filing_sept162016.pdf

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The example below is based on a Solar PV system owner named Mrs. Dill. She invested $20,000 into a solar PV system to prepare for retirement and save money. Like many of the BE Solar clients, she understands the long term effects of stimulating our local economy and helping to create Bermudian jobs through solar. Mrs. Dill has already invested in energy efficient appliances, LED bulbs and timers for her hot water heaters. She leaves the house early in the morning and turns off her electrical loads to be as efficient as possible. She returns late in the evening after working long days to earn enough money for health care and then takes care of her grandchildren preparing meals for them at her home.

See the return on investment comparison for Mrs. Dill below. Note how it highlights the difference between the EGD feed in tariff compared to the proposed monthly net billing agreement recommended by BELCO in September of 2016.

Example A: Mrs. Dill BELCO bill based on the monthly net-billing and avoided cost tariff rate proposed:

- Solar PV system produces 750kWh in a given month.
- Mrs. Dill needs 1,000kWh from BELCO, which would cost $338.24 without Solar PV.
- Net BELCO bill will cost $61.88 with Solar PV under monthly net billing
- Solar PV Systems savings are approximately $276.36 per month, $3,316.32 per year.
- The simple Solar PV payback is 6 years for Mrs. Dill's PV system under BELCO's proposed scheme.

Example B: Mrs. Dill BELCO bill based on the Regulatory Authority's Emergency General Determination (EGD) scheme currently in place:

- Solar PV system produces 750kWh in a given month.
- Mrs. Dill needs 1,000kWh from BELCO, which would cost $338.24 without Solar PV.
- Net BELCO bill will be $208.35 with Solar PV under EGD
- Solar PV Systems savings are approximately $130.20 per month, $1,562.40 per year.
- The simple Solar PV payback is now 13 years for Mrs. Dill's PV system under the current EGD scheme.

The examples above illustrates how financially catastrophic the new EGD rate scheme is on economic opportunities and affordability for small scale Solar PV system owners and what a shock the EGD system is to the Bermudian Solar PV industry. No doubt this will create a knock on effect that will hurt businesses and Bermudian jobs in the industry. People making investments are looking for the shortest most reasonable return on investment (typically within 7-8 years maximum and at an IRR of 19% - 21%) and will choose which investment will offer the highest returns.

Bermudian investors require a payback on their initial investment in a maximum of 7 years or less, some require a payback of less than 5 years. Subsequently the RAB's current EGD rate is completely out of touch with the reality of business in Bermuda. It creates inequality in

1.441.279.5907
www.BEsolar.bm
48 St. John's Road, Pembroke, HM 07 - Bermuda

economic opportunities and hurts Bermudian businesses, decreases employment opportunities and disrupts the ability for the island to innovate its electricity industry.

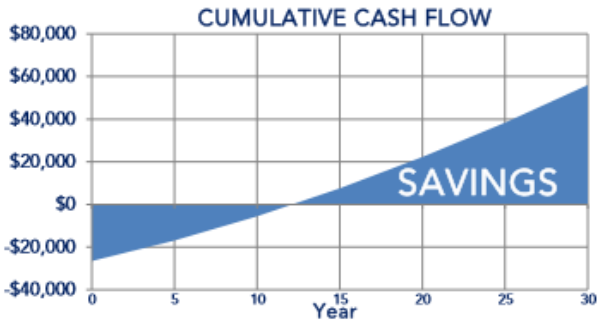
Furthermore it should be noted that the proposed EGD creates economic inequality between large home owners with solar PV and small home owners with solar PV. The financial analysis below highlights this inequality that proves to only benefit the rich and penalise the middle to lower income home and business owners that have invested in solar PV to make their energy costs more affordable. The difference is between a small low to middle income household (that is not home in the day) compared to a large home where that either spouses or staff are home during the day to maximise self-consumption.

SOLAR ELECTRICITY SYSTEM INFORMATION

SCENARIO 1: Small low to middle income household with 90% export to grid & 10% self consumption

System Capacity:	5.9kW
Annual kWh production:	9697 kWh
Monthly kWh production:	808 kWh

FINANCIAL SUMMARY	
First Year Savings:	$1,953
Monthly Savings (Avg):	$163
Installed Cost Per Watt:	$4.49
Cash Flow Break Even:	12th Year
Net Present Value:	$30,096
Internal Rate of Return:	5%
Installed Cost:	$26,480

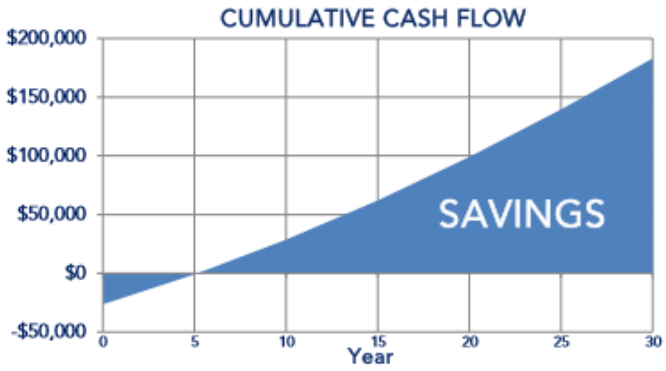


SOLAR ELECTRICITY SYSTEM INFORMATION

SCENARIO 2: LARGE HOUSE WITH 100% SELF CONSUMPTION

System Capacity:	5.9kW
Annual kWh production:	9697 kWh
Monthly kWh production:	808 kWh

FINANCIAL SUMMARY	
First Year Savings:	$4,375
Monthly Savings (Avg):	$365
Installed Cost Per Watt:	$4.49
Cash Flow Break Even:	5th Year
Net Present Value:	$116,900
Internal Rate of Return:	20%
Installed Cost:	$26,480



In essence, the current EGD creates discriminatory inequalities for solar PV interconnection to the grid. The RAB's current feed in tariff scheme rewards larger wealthier users of energy and makes it harder and more expensive for more efficient and lower income earning houses and businesses to invest in solar. This sort of discrimination and inequality does not promote the interests of the residents and consumers of Bermuda, does not promote the development of the Bermudian economy, does not promote innovation and lastly hurts the opportunities for Bermudian employment and Bermudian ownership. It contravenes the responsibilities of the RAB set out in the Regulatory Authority Act 2011.

Analysis of the table provided by the RAB in the "Renewable Energy Metering Consultation Document" Appendix C (page 11) indicates that there are inconsistencies in the variables used to determine the cost-effectiveness of solar PV installations. Two of these variables are the annual PV production rate per installed capacity (i.e. annual kWh/kW) and the installed cost per Watt (i.e. $/Watt). The kWh/kW rate should be the same for all scenarios and it isn't. For the $/Watt installation rate, the numbers used are not logical. The $/Watt rate should be scaled for all scenarios and scaled so that smaller systems cost significantly more per Watt compared to larger systems as per the reality of pricing in the local solar energy industry due to high fixed costs such as labour and planning fees.

BE SOLAR RECOMMENDATIONS

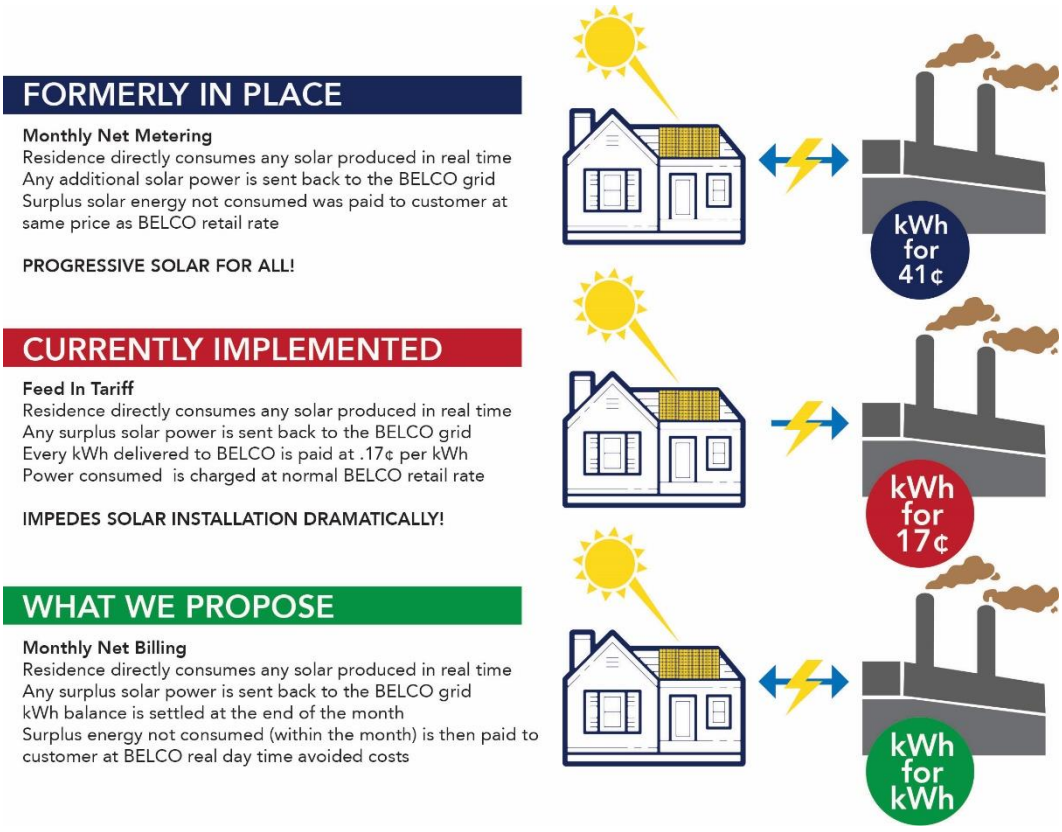
BE Solar appreciates that the RAB recognises the importance of renewable energy systems and acknowledges solar PV generating facilities as one of the "most important renewable technologies available in Bermuda."[4] If the EGD is fully implemented there will be a massive reduction of investment in the solar industry especially middle to low income earners. Investors who do have the capital will invest in solar and battery installations and subsequently create more grid defection[5] which goes against the RAB mandate "to promote economic efficiency and sustainability in the generation, transmission, distribution and sale of electricity."

[4] 17_07_17 Renewable Energy Metering Consultation Document produced by the RAB
[5] Grid Defection: http://www.utilitydive.com/news/is-grid-defection-still-a-threat-to-the-utility-business-model/440272/

1.441.279.5907
www.BEsolar.bm
48 St. John's Road, Pembroke, HM 07 - Bermuda

In the sake of fairness, integrity, innovation and the sustainability of Bermuda, BE Solar recommends the following on behalf of Bermuda's economic growth and ability to create Bermudian jobs:

1. Terminate the EGD feed in tariff and ensure that it is not the permanent tariff scheme.
2. Effectively consult with the public and all stakeholders to come to an equitable agreement that does not shock the electricity industry.
3. Perform analysis on real Bermuda businesses and home owner energy use and gather accurate data to make an informed sustainable decision that is based on fact and not theoretical modeling.
4. Implement the "Monthly Net Billing" tariff scheme as explained above as soon as possible.
5. Introduce the "Monthly Net Billing" tariff scheme for both residential and commercial Solar PV system owners up to a maximum of 1,000 applicants or 10MW of installed solar PV capacity, whichever comes first.
6. Instate a "Monthly Net Billing" tariff scheme guaranteed for at least a 25 year period in order to provide stability for investors in solar electricity.
7. That the RAB follows the recommendations of BELCO to grandfather in solar producers that were under the original net metering program that ended August 15th, 2016.
8. That all solar producers who were put under the EGD billing structure be retroactively compensated based on the "Monthly Net Billing" tariff scheme.



BERMUDA ELECTRIC LIGHT COMPANY LIMITED

P.O. BOX HM 1026, HAMILTON HM DX, BERMUDA
TELEPHONE: (441) 295-5111
FAX: EXECUTIVE (441) 292-8975
CUSTOMER SERVICE (441) 292-7832
EMAIL: info@belco.bm
WEBSITE: www.belco.bm

PLEASE QUOTE OUR REF.

Our Ref: B-R42

POSTED ON WWW.RAB.BM

28 July 2017

Regulatory Authority
1st Floor, Craig Appin House
8 Wesley Street
Hamilton HM 11

Attention: Nigel Burgess, Senior Manager Electricity Analysis and Planning

Dear Sirs,

Re: Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Metering

This letter provides the response of Bermuda Electric Light Company Limited ("BELCO") to the consultation document entitled, "Consultation on the Regulatory Authority (Renewable Energy Metering Scheme) General Determination: Preliminary Report, Preliminary Decision and Order" dated 14 July 2017 and bearing matter number 17-03-16 (the "Second Round Consultation Document"). It represents BELCO's second set of comments in the related public consultation (the "Consultation").

A consultation document was circulated by the Regulatory Authority (the "Authority") on 16 March 2017 as part of the first round of the Consultation (the "First Round"), and BELCO submitted its comments on 12 May 2017 (the "First Round Response"). Within the Second Round Consultation Document, the Authority has provided extensive commentary at Paragraphs 1 through 73 (the "Commentary") followed by, *inter alia*, a draft general determination (the "Draft General Determination").

Although BELCO often disagrees with the views expressed in the Commentary, in the interests of time, this letter does not comprehensively address every matter with which BELCO takes issue. Any failure to refer to any particular issue or aspect of the Commentary, the Draft General Determination, or the report in Appendix C should not be construed as a waiver by BELCO of any rights or remedies available to it. In fact, BELCO reserves all rights and remedies available to it,

now and in the future, to provide additional and/or complementary submissions in relation to the subject matters contained herein and/or otherwise to modify and amend its position as set out herein.

Before it responds to the one question set out in the Second Round Consultation Document, BELCO first wishes to address some inaccuracies in the Commentary that must be corrected.

The Authority's Comments in the Executive Summary

In Paragraph 1 of the Commentary's executive summary (the "Executive Summary"), the Authority alleges that the Authority's intervention by way of an emergency general determination relating to BELCO's solar photovoltaic program was necessitated by BELCO's, "failure to implement the Energy Commission's recommendation on 'net metering' (as stated in the Energy Commission's Net Metering Inquiry Response presented to the Minister of Economic Development on 11th October 2016) by 1 January 2017." This allegation is repeated in Paragraph 10(b) of the Executive Summary that states, "On 26th October 2016, the Minister of Economic Development (the "Minister") requested that BELCO implement the Energy Commission's recommendation on 'net metering', as stated in the Energy Commission's Net Metering Inquiry Response presented to the Minister on 11th October 2016."

The Authority is well aware that any suggestion that BELCO was requested to do anything or failed to do anything is categorically false and defamatory. BELCO did not fail to implement an Energy Commission ("EC") recommendation, as no such recommendation or request was made to BELCO. Recommendations were made to the Minister of Economic Development and did not constitute any directive to BELCO. In fact, the press release on the EC's inquiry into the net metering scheme issued on 26 October 2016 stated:

> The Minister…noted that due to the limitations of the existing Energy Act 2009, the Energy Commission is precluded from issuing Directives on any matter other than the rates that BELCO charges to its customers and is therefore unable to implement these specific recommendations. The rate that BELCO pays for the purchase of power is outside the authority of the Energy Commission. However, the Minister noted that the transfer of responsibility for electricity regulation from the Energy Commission to the Regulatory Authority is imminent and that he will shortly be issuing a Commencement Notice for the Electricity Act 2016. Since the new Electricity Act gives the Regulatory Authority the full scope of powers to regulate all aspects of the electricity sector, it is the Minister's hope that the Authority will, as a matter of public interest, address this issue as one of its first orders of business and issue a final decision as soon as is practically possible.

Given the above, if anything, the intervention was necessitated by the Authority's initial failure to act – as soon as possible after 28 October 2016 or when it was repeatedly prompted to do so by BELCO as early as 16 December 2016. The Authority failed to address the issue until 2 March 2017.

BELCO implores the Authority to cease and desist from maligning BELCO through the publication of incorrect information in relation to the issue.

The Authority's Comments in the Introduction

At Paragraph 16 of the Commentary, the Authority states, "Prior to the EGD, BELCO had proposed to grandfather the previous net metering scheme to all PV participants who had begun construction (i.e. submitted their development application to the Dept. of Planning) prior to 26 August 2016, and to develop a new feed-in tariff based on avoided costs. However, BELCO had since that date halted the program to new participants, ***pending an inquiry by the Minister of Economic Development*** [emphasis added]. In response to this, the Authority issued the EGD." This Paragraph misstates the position, as BELCO had closed the program to new entrants, ***pending the approval of a transitional rate***.

Consultation Procedure

Throughout the Commentary, the Authority is inconsistent in its description of the background to the proposed general determination, and BELCO repeats here its thorough historical account provided in the First Round Response.

Despite statements to the contrary throughout the Second Round Consultation Document, it is to be noted that the Authority updated the consultation document issued in the First Round on several occasions, such that the ultimate response due date was shifted from 27 April 2017 to 12 May 2017.

Authority Analysis

BELCO notes that Paragraph 61 of the Commentary includes the subscript for a footnote, but the footnote is omitted from the text.

BELCO will now address the one question set out in the Second Round Consultation Document.

3.3 The Authority proposes to adopt the Proposed Order set out in Appendix A and enact the Proposed General Determination set out in Appendix B to this Preliminary Report and Preliminary Decision. The Authority invites interested parties to comment on the Authority's conclusions with respect to the responses to the Consultation Document, Preliminary Report, the Proposed Order and the Proposed General Determination.

Draft General Determination

Given the uncertainty and disappointment that has befallen solar photovoltaic customers since the Authority's issuance of its emergency general determination on 2 March 2017, BELCO believes that the general determination imposing any transitional rate should be as certain as possible.

BELCO is of the view that the Draft General Determination is presently not drafted as clearly as possible, and as such, in the Appendix to this letter, BELCO provides a marked version containing suggested amendments.

BELCO looks forward to the publication of a general determination in connection with this public consultation in short order.

Yours faithfully,

Sean Durfy
President and Chief Executive Officer

APPENDIX

BERMUDA REGULATORY AUTHORITY

Schedule to [Regulatory Authority (Renewable Energy Metering) General Determination 2017]

General Determination

Date:

Table of Contents

This general determination (the "General Determination") is made by the Authority pursuant to section 62 of the Regulatory Authority Act 2011 ~~("RAA")~~ and establishes the transitional scheme for renewable energy metering tariffs. The adoption and implementation of this tariff is in accordance with sections 6, 14, 65(2) and 68 of the Electricity Act 2016 and the general powers granted to the Authority under section 13 of the RAA and in accordance with the procedures established for this purpose in sections 61 and 62 of the RAA.

1 Definitions

"**Authority**" means the Regulatory Authority of Bermuda;

"**BELCO**" means the Bermuda Electric Light Company Limited, as established pursuant to the Bermuda Electric Light Company Act 1951;

"**Commencement Date**" means 28 October 2016, the date on which the EA came into force;

"**CRSEER**" means the commercial renewable system excess energy rate which is the sum comprised of BELCO's avoided fuel costs and is applicable to commercial Solar PV customers.

"**EA**" means the Electricity Act 2016;

"**EC Response**" means the recommendations presented to the Minister by the EC in a paper entitled Net Metering Inquiry Response dated~~on~~ 11 October 2016;

"**EC**" or "**Energy Commission**" means the Energy Commission, the body established under the Energy Act 2009 and which (i) advised the Minister in the discharge of his functions under that Act; and (ii) considered BELCO's proposals to vary its prices or charges; and (iii) provide ~~a~~ recommendations to the Minister in relation to such proposed variations of its prices and charges; and (iv) ~~which~~ ceased to exist when the Energy Act 2009 was repealed pursuant to section 65(1) of the EA which came into effect on the Commencement Date;

"**EGD**" or "**Emergency General Determination**" means the Regulatory Authority (Transitional Measures for Bermuda Electric Light Company Limited Solar Net Metering Scheme) Emergency General Determination (the "Emergency General Determination") issued by the Authority on 2nd March 2017;

"**FAR~~Fuel Adjustment Rate~~**" means the fuel adjustment rate which is a mechanism that is designed to recover the cost of fuel used to produce electricity, calculated based on the cost of fuel per barrel and its projected usage;

"**Minister**" means the Minister responsible for the Electricity sector, which on 11 October 2016 was~~is~~ the Minister of Economic Development for Bermuda and is presently the Minister of Transport and Regulatory Affairs;

~~"Net Metering Scheme" or~~ "**Scheme"** means the scheme introduced by BELCO in or about 2010 aimed at incentivizing residential electricity customers to install ~~solar~~ Solar PV, wind and tidal energy and under which ~~they~~ customers would receive payment in respect of any excess energy generated and not consumed by such customers in any calendar month and which they sold to BELCO;

"**RAA**" means Regulatory Authority Act 2011;

"**Renewable Energy Metering Payment**" means a monthly payment by BELCO to Renewable Energy Participants in respect of Renewable Energy Participants' exported~~net excess~~ energy in any ~~Month~~month~~,~~ and which is calculated by multiplying the amount of such energy exported to BELCO's grid by a set rate;

"**Renewable Energy Participants**" means BELCO's residential and commercial electricity customers who: (i) currently sell excess energy generated by ~~solar~~ Solar

PV or Wind Generation to BELCO and (ii) any new customers who wish to sell excess energy generated by Solar PV or Wind Generation to BELCO;"

Scheme Participants" means BELCO's residential electricity customers who have participated in the Scheme;

~~"**Solar Photovoltaic**" or~~ "**Solar PV**" means a technology in which sunlight is converted into electrical power;

"**TD&R Licence**" means the Transmission, Distribution and Retail Licence referenced in section 20(1)(a) of the EA;

~~"**Tidal Generation**" means a technology in which the ocean tides (or waves) are converted to electrical power; and~~

"**Wind Generation**" means a technology in which wind power is converted into electrical power.

2 Interpretation

(1) For purposes of interpreting this General Determination:

(a) unless the context otherwise requires, words or expressions shall have the meaning assigned to them by the RAA and the EA;

(b) where there is any conflict between the provisions of this General Determination and the EA or RAA, the provisions of the EA or RAA, as the case may be (and subject to sections 3(2) and 3(3) of the EA), shall prevail;

(c) terms defined herein and in the EA and RAA have been capitalised;

(d) headings and titles used herein are for reference only and shall not affect the interpretation or construction of this General Determination;

(e) references to any law or statutory instrument include any modification, re-enactment or legislative provisions substituted for the same;

(f) a document referred to herein shall be incorporated into and form part of this General Determination and a reference to such document is to the document as modified from time to time;

(g) expressions cognate with those used herein shall be construed accordingly;

(h) use of the word "include" or "including" is to be construed as being without limitation; and

(i) words importing the singular shall include the plural and vice versa, and words importing the whole shall be treated as including a reference to any part unless explicitly limited.

3 Legislative and Procedural Background

(1) This General Determination has been undertaken in accordance with section 62 of the RAA and the exercise by the Authority of its powers under sections 6, 14, 65(2) and 68 of the EA.

(2) The Authority initiated a~~this~~ consultation by publishing a c~~C~~onsultation d~~D~~ocument (the "Consultation Document")on 16 March 2017 that invited responses from members of the public, including electricity sectoral participants and sectoral providers, as well as other interested parties. The purpose of the Authority's initial Consultation Document was to consult on the transitionary tariff set forth in the EGD.

(3) The Consultation Document asked the following questions:

Commented [BELCO1]: This term is not used.

Commented [BELCO2]: This term is not used.

- What is your view of the how renewable energy, in particular ~~solar~~ Solar PV has evolved in Bermuda? Please provide views on the uptake of this technology and other technologies which may be beneficial to Bermuda.
- Looking to the future, how important do you believe ~~solar~~ Solar PV is for Bermuda? If a respondent views ~~solar~~ Solar PV as important please provide your views on what its costs and benefits are, how these should be quantified, and how these should be reflected in the framework for electricity regulation.
- Should there be capacity limits on solar systems installed on individual customers' premises in Bermuda? Should this be included within a formal licensing framework?
    - If so, who should be responsible for assessing the system sizes and their limits (BELCO, Department of Planning, RAB, etc.)
    - Should ~~solar~~ Solar PV system sizing for a customers' premises be limited to the prior 12-month consumption of a residence/business and/or should it be based on forecasted consumption?
- The Authority has, via the Emergency General Determination, and on a transitional basis, mandated that BELCO should pay for electricity received from Solar PV systems on the basis of the Energy Commission recommendations of October 2016 (see the Determination for detail). What are your views on this transitional measure?
- What level and type of cost transparency should be mandated on BELCO to facilitate the determination of an appropriate feed-in tariff for electricity provided by Solar PV? In particular:
    - The Authority intends to mandate full accounting separation between BELCO's (i) generating, and (ii) transmission, distribution and retail activities. Please provide your views on specific aspects of BELCO's operational activities that are relevant to the cost transparency and related determination of the feed-in tariff rate?
    - What levels of cost element transparency would you expect within a BELCO feed-in tariff for Solar PV?
- What do you believe should be the economic basis for renewable energy systems in Bermuda, specifically in the context of feed-in tariffs? Alongside any general comments by respondents please provided responses to the following:
    - Should BELCO's renewable energy Metering Scheme reflect a cost-benefit methodology or an avoided cost methodology?
    - What cost rate design for R~~r~~enewable E~~e~~nergy P~~p~~articipants is best suited to incentivizing greater utilization of cleaner energy sources and technologies in Bermuda?
    - What other factors should be considered in determining the cost rate design for feed-in tariffs?
- Should ~~solar~~ Solar PV or other renewable energy programs be incentivized within a specific regulatory framework for renewables in Bermuda?
- In your view, are there any barriers to ~~solar~~ Solar PV or other forms of renewable generation investment?
    - If so, what are these barriers?

- How could they be removed to enable further investment?

(4) The Consultation Document also invited respondents to raise any other matters that the Authority should consider regarding the transitional solar feed-in tariff.

(5) Responses to the Consultation Document were solicited from the public electronically through the Authority's website at rab.bm.

(6) The response period commenced on 16 May 2017 and concluded on ~~27 April~~12 May 2017.

(7) The Authority received eighty-three responses from the public.

4 Final Determination

(1) Pursuant to section 62 of the RAA and in accordance with sections 6, 14, 17, 20 and 24 of the EA using the general powers granted to the Authority under section 13 of the RAA and in accordance with the procedures established for this purpose in section 62 of the RAA, the Authority hereby determines that:

(2) The adoption and implementation of the ~~Transitional~~ transitional ~~Measures~~ measures for BELCO's ~~Renewable Energy Metering~~ Scheme as set forth in paragraph ~~6~~ 5 of this Schedule below (the "**Transitional Measures**") is in the public interest and would (i) provide certainty on this matter to sectoral providers; (ii) promote the use of cleaner energy sources and technologies; (iii) provide sectoral participants and end-users with non- discriminatory interconnection to transmission and distribution systems; (iv) promote the Bermuda economy; and (v) promote and preserve competition.

5 Transitional Measures for BELCO's ~~Renewable Energy Metering~~ Scheme ~~("Transitional Measures")~~

(1) BELCO shall continue to operate ~~its Small Scale Residential Net Metering~~the Scheme as follows in accordance with the ~~following~~ recommendations set out in section 2 of the EC Response:

(a) The ~~The transitional solar PV power purchase program should be adopted for both the residential and commercial solar PV producers with the BELCO avoided cost proposed~~ rate of $0.1736 per KWh for new renewable energy systems shall apply to residential and commercial Solar PV producers going forward~~,~~ with no limit on the number of participants ~~as proposed by BELCO~~.

(b~~c~~) ~~–~~The financial cost of power purchase is fully absorbed by BELCO until a new power purchase regime is implemented by the Authority. Costs for power purchase are to be allocated to a FAR like recovery account as of January 1, 2017 as stated in the [EC's] recent rate case filing directive.

For the avoidance of doubt, BELCO shall pay to Renewable Energy Participants in respect of any energy exported to BELCO's grid in any calendar month and which they sell to BELCO:

(i) from 15 August 2016 until 31 December 2016, the CRSEER**;** and

(ii) from 1 January 2017 until the issuance by the Authority of an Administrative Determination on BELCO's proposed changes to the Solar Net Metering Scheme or any General Determination pursuant to section 36 of the EA, a rate of $0.1736 per KWh.

(2) BELCO shall continue to pay Renewable Energy Metering Payments to Renewable Energy Participants in accordance with paragraph 5(1) of this Schedule pending issuance by the Authority of an Administrative Determination

Commented [BELCO3]: This term is not defined above.

on BELCO's proposed changes to the ~~Renewable Energy Metering~~ Scheme or any General Determination pursuant to section 36 of the EA.

(3) BELCO shall forthwith pay to Renewable Energy Participants any difference between (i) the actual payments made by BELCO to Renewable Energy Participants under the Scheme and (ii) the amounts payable by BELCO to Renewable Energy Participants in accordance with paragraph ~~6~~5(1) of this Schedule, pending issuance by the Authority of any subsequent Administrative Determination on the Renewable Energy Metering Scheme or any General Determination pursuant to section 36 of the EA.

L. Nigel Burgess CEng

From: CHARLIE KEMPE <glacierstar@gmail.com>
Sent: Wednesday, July 19, 2017 10:25 AM
To: L. Nigel Burgess CEng
Cc: Monique Lister
Subject: Re: Domestic solar power generation / BELCO

Dear Mr Burgess,

Thank you for your response to my enquiry on the subject of BELCO's obligations to reimburse domestic producers of solar energy supplied to their grid.

I have visited the website to which you referred me for information. I now wish to submit the following for the RA's consideration:

1. Energy produced by residential photo voltaic (pv) sources should not be supplied to BELCO at BELCO's avoided cost as this will almost certainly ensure the extinction of new installations of pv equipment on residential premises.

2. The 'avoided cost' basis of remuneration will provide a positive disincentive to customers to install pv equipment as the return on investment will be extremely unattractive compared with alternative investment returns. This is no doubt driving BELCO's insistence on this basis of remuneration as BELCO is in the business of making a profit on generating and selling electricity. Multiple other parties eating into their profit margins with a competing production of electricity is something they will work hard to extinguish.

3. I have an interest in a residential pv installation. In the month of June 2017 the gross consumption by the residence was 1486 kwh and the kwh supplied to the grid by the pv installation was 555kwh. The customer supplied energy equalled 37% of the gross consumed. The charge for the gross consumption was $574. The credit to the customer on the 'avoided cost' basis was $96.
Simply put the customer supplied 37% of the total energy consumed but received credit for only 16% of the value of that consumption.

4. The 'avoided cost' valuation of energy produced by BELCO's customers is fundamentably an absolute ripoff. BELCO not only avoids the costs of the fuel and lubricants to produce the product the customer generates. It also avoids depreciation on generators which are idle when customers produce their own electricity. Generators wear out after a certain number of hours of operation. They do not depreciate when they are idle.In addition BELCO's grid absorbs customer produced kilowatt hours at a rock bottom cost and then resells that energy on the grid at a very significant profit.

5. Finally in this extremely brief submission: Currently, no one in their right mind would, under this'avoided cost' basis of valuation, ever voluntarily install residential pv equipment. The installation to which I refer above is an example of why. The installation cost was $24,000. Its projected life is 25 years. If it earns its owner $96 per month (amounting to $1,150 annually) this will amount to a simple ROI of 4.8% if one ignores straight line depreciation of 4%. Further, if one ignores the costs of giving up an alternate return on the $24,000, the remaining 0.8% return to the investor provides zero incentive to accquire, maintain and service pv equipment residentially. So that's the end of Bermuda's effort to involve individual members of society in buying into the production of renewable energy. Killed by a utility which wants no competition and is willing to swing its weight to redesign the playing field.

Unless an incentive to invest in alternate energy sources is real and not illusionary (as some seem to believe is just fine), Bermuda is not going to get citizens to buy in on an individual level as is essential for progress to be made.

Sincerely, Charles Kempe

On Mon, Jul 17, 2017 at 2:08 PM, L. Nigel Burgess CEng <NBurgess@rab.bm> wrote:

> Good day Mr. Kempe,
>
> The renewable energy metering rates have been issued by the Regulatory Authority according to Emergency General Determination of 2nd March 2017, and is currently in the process of consulting on it.
>
> I have attached the link below for the consultation.
>
> http://rab.bm/index.php/k2-information/ele-consultations/emergency-general-determination-solar-net-metering/1543-17-07-14-renewable-energy-metering-consultation-document-final/file
>
> Regards,
>
> **From:** CHARLIE KEMPE [mailto:glacierstar@gmail.com]
> **Sent:** Monday, July 17, 2017 12:14 PM
> **To:** L. Nigel Burgess CEng <NBurgess@RAB.bm>
> **Subject:** Domestic solar power generation / BELCO
>
> Dear Mr Burgess,
>
> Prior to July 2016 I installed solar panels on the roof of a residential building in Southampton in which I have an interest. A Net Metering relationship was entered into with BELCO at that time. No subsequent variations to the original contract with BELCO (signed in July 2016) have been agreed between the parties
>
> I will be grateful if you can inform me of the present in force arrangements which have been approved by The Regulatory Authority requiring BELCO to reimburse the customer in this case.
>
> sincerely, Charles Kempe
>
> **L. Nigel Burgess CEng**
> Senior Manager Electricity Analysis and Planning

1st Floor, Craig Appin House
8 Wesley Street, Hamilton, HM 11
Tel Main: +1 (441) 405-6000
Tel Direct: +1(441) 474-6025
Fax: +1(441) 474-6048
Email: NBurgess@RAB.bm
Web: www.rab.bm

The Regulatory Authority of Bermuda,
Craig Appin House, 1st Floor BY E-mail
8 Wesley Street
Hamilton HM 11

2nd August 2017

Attn. Mr. Nigel Burgess, Senior Manager Electricity Analysis & Planning

Re: Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Metering (2nd Consultation – 7-14-17, Original Document 17-0316.) (Response 2 of 2)

Dear Sirs,

We are pleased to submit the following second response of two to your second consultation document referenced above.

We are simply astounded that despite numerous responses to your first consultation predicting the collapse of the residential solar industry here if you proceed with the same FIT, you are in fact proposing to do exactly that. Please refer to Table 1 which shows the huge drop in the number of residential solar building permit and PDP permits applications since June 2017, when your FIT came into effect. We understand that the Department of Energy have asked the Planning Department to verify if the data in Table 1 is a true reflection in the drop in residential solar PV Building Permit applications and that Planning confirmed their numbers are consistent with ours.

BERMUDA YEAR TO YEAR RESIDENTIAL SOLAR PV AND TOTAL BUILDING PERMIT APPLICATIONS BY MONTH, BY DATE RECEIVED			
MONTH & YEAR	**QUANTITY OF RESIDENTIAL SOLAR PV PERMITS**	**TOTAL QUANTITY OF ALL BUILDING PERMITS (APPROX)**	**COMMENT**
June-15	3	81	
June-16	11	70	
June-17	3	73	
2016 TO 2017 % CHANGE	**-72.73%**		
July-15	7	79	
July-16	8	87	
July-17	0	50	UP TO 2ND AUGUST
2016 TO 2017 % CHANGE	**-100.00%**		UP TO 2ND AUGUST
NOTE: DATA COMPILED PRIMARILY FROM DOP'S WEBSITE, APPLICATIONS TAB			

Table 1

BAE
RENEWABLE ENERGY • EFFICIENCY • CONSERVATION

These predictions of the industry collapse were made by numerous individuals with a broad range of knowledge of the renewable energy industries in several jurisdictions. However, your new document states that the EGD will have minimal effect on the residential solar industry here! Table 1 appears to prove that the respondents referenced above were correct and that the RAB's EGD has caused an immediate collapse of the residential solar industry here. Further to Table 1, we can now confirm that as of this afternoon, no further residential solar PV PDP's appear to have been filed on Tuesday morning, the 1st of April. So the downward trend or total collapse appears to be continuing into August.

We also note that numerous respondents claimed that the EGD would have a severely detrimental effect on the ROI of their solar investment and that they would not have made the investment if your FIT rate was in effect when they purchased their systems. Yet amazingly you provide a set of financial models which show ROIs in the 8.27 to 14.37 year range and claim these ROIs will not deter solar adoption. The above Planning statistics clearly indicate the opposite and that you should have heeded the advice of the various respondents before proposing to make the new FIT permanent.

We have already spoken about some of the errors in your financial modelling in our response # 1, so we will now touch on some further ones. Your net capital cost per watt for your 10 kW system is higher than for your 5 kW version. As pricing generally decreases per watt as the systems get bigger, this is producing skewed results that make the 5 kW system look like it has a better ROI than it should, while the 10 kW's is perhaps worse.

Since our initial response, we have done far more detailed financial modelling, which we will not share unless so requested, as you claimed we did not submit this information, when clearly we did. However, we did model what the FIT would need to be in order to have minimal financial impact on existing customers that are not net exporters per year. Our modelling showed that for 7.5 kW and 15 kW systems, a FIT of $0.3300/kWh would have ROIs in the 5.65 to 6.7 year range for every type from a heavy user to a moderate net exporter respectively. Please note that this level of FIT is remarkably similar to the new CORE FIT just introduced in Cayman by the utility and RA there. We did not model systems below 5 kW, but we suspect a FIT rate closer to $0.36 would be revenue neutral, which is the rate now offered in Cayman for this size of system.

Further to the errors in using Augusta Georgia's consumption and production data in your modelling for Bermuda that we outlined in response # 1, we are pleased to submit Table 2 as an example of and actual Bermuda residence with Solar PV. The table lists all relevant production and consumption data to see the actual percentage of self consumption vs export. Even though this residence is a net annual importer of energy the percentage of self consumption was only 40.3% in the past 12 months, meaning that almost 60% of the inverter's production was exported to BELCO. This residence, like many other existing solar installations was sized to be near net zero consumption, which made good sense under the previous net metering contracts. Under you proposed FIT, this residence will export nearly 60% of its solar production at only $0.1736/kWh, or at 47% of the second block rate plus current fuels adjustment.

By contrast, a similarly sized small commercial customer operating seven days per week that is near net zero consumption, will self consume as much as 95% or even 100% of their solar production and export hardly anything to BELCO on an annual basis. The result will be that typical near net zero residential solar customer will be subsidizing small commercial solar customers, other residential customers and BELCO. This magnitude of cross subsidization of one or more customer classes and BELCO by solar customers should not be allowed to happen in any progressive society.

Sample Bermuda Residence Net Meter Readings and Solar Production Since August 2016

Meter Read Date	Net kWhs Delivered by BELCO	Net kWhs Received by BELCO	Residence's Net kWhs Since Last Read	Inverter Production (kWhs)	Total Consumed (kWhs)	Solar Self Con-sumption (kWhs)	% of Solar Production Self Consumed
26-Aug-2016	917	465	452	1034	1486	569	55.03%
28-Sep-2016	779	582	197	943	1140	361	38.28%
26-Oct-2016	574	380	194	587	781	207	35.26%
26-Nov-2016	681	459	222	697	919	238	34.15%
28-Dec-2016	703	296	407	579	986	283	48.88%
26-Jan-2017	698	283	415	538	953	255	47.40%
23-Feb-2017	601	324	277	542	819	218	40.22%
28-Mar-2017	670	462	208	810	1018	348	42.96%
26-Apr-2017	512	567	-55	864	809	297	34.38%
29-May-2017	561	573	-12	921	909	348	37.79%
28-Jun-2017	534	602	-68	904	836	302	33.41%
27-Jul-2017	528	579	-51	915	864	336	36.72%
12 Month Totals	**7758**	**5572**	**2186**	**9334**	**11520**	**3762**	**40.30%**

Note: Due to extended roof painting under all modules in early 2017,where up to four 290 watt modules were out of production at one time, listed self consumption % is higher than normal.

Table 2

If the RAB cannot find consumption and solar production modelling data similar to Bermuda's, then we recommend that for the future FIT, analysis similar to Table 2 be developed for multiple Bermuda solar customers. Perhaps the mix of BELCO customers should include the following:

5 Retired couples

5 Working Couples with no children living in the residence

5 Working Couples with children living at home

5 Couples with only one spouse working with no children living in the residence

5 Couples with only one spouse working with children living at home

5 or less Single residents, with or without children, if any own solar systems.

This size of database should be sufficient to reasonably model typical consumption and production in existing solar residences here in order to determine a fair and reasonable future FIT.

With regard to modelling the financial impact of the proposed FIT, it is now abundantly clear that the EC could never have done such modelling and that the RAB only did it after issuing the EGD and receiving our economic analysis. This contravenes the EA.

We are simply blown away that on page 1 of your Preliminary Report that you mis-quote the EA stating that the rate shall be based on:-

(i) "The actual cost of generation that BELCO avoids by purchasing power from distributed generation; and"

You have replaced the words "the TD&R Licensee" in the Act with the word "BELCO" which gives an entirely different meaning to what the FIT should include. We further note that you repeat this BELCO avoided cost wording multiple times in both the Preliminary Report and the Preliminary Decision and Order. Only once could we find the correct reference to the avoided cost of the TD&R Licensee. This speaks volumes on why the RAB is stuck on such a low and illegal FIT that does not comply with the Act and has caused the meltdown of the entire solar residential market here.

We would like to submit a few more comments, but time has now run out.

Please contact myself should you require any further information on our answers, comments and recommendations.

Yours Sincerely,

C. E. Nash, P. Eng.
Engineering Manager

CEN/nec

Cc Aideen Rattery-Pryse, Acting Permanent Secretary

Jean Nicolai, Director, Department of Energy

Aran McKittrick, Research and Development Officer, Department of Energy

Nick Duffy

From:	Christopher Heslop
To:	Renewables
Subject:	Net metering submission
Date:	Tuesday, August 01, 2017 5:29:14 PM

Dear Sir,
When BELCO and The Bermuda Government were trying to encourage residents to support alternative energy via establishing a program for the first 200 BELCO customers to invest in solar systems and in return would receive a 30 year contract which would see BELCO buy any excess energy supplied by a solar system for the same price they sold it, my wife and I decided to use a portion of our savings to support this initiative. The support we gave was; A) to assist with protecting the Bermuda environment, B) To help BELCO in small way with generating clean power for the island and C) as we were guaranteed via our 30 year contract that this would make financial sense for us.

I am extremely resentful of the fact that the Regulatory Authority have chosen to implement an "emergency order," even against what BELCO said they were willing to support, (ie the first, I believe they said 350 customers), in reducing the amount for the buyback of excess power even though this is clearly a breach of contract between the primary parties, (BELCO and ourselves) and the assumed secondary party, the Bermuda Government who stated on many occasions what the terms of the agreement would be.

I would advise the RA to really take a look at their decision for the first customers who made a financial decision on investing in renewable energy based on what they were told and promised but also if the RA wants to promote alternative and clean energy in Bermuda there must be incentives for residents to make the large investment.

Sincerely
Chris Heslop

RESPONSE TO CONSULTATION DOCUMENT 16-0819: COMMENTS ON REGULATORY AUTHORITY AND GOVERNMENT FEES PROCESS

May 12, 2017

Regulatory Authority of Bermuda

Dear Sir/Madam,

I am writing to you to convey my very serious concerns regarding the recent decision by the Regulatory Authority of Bermuda (RA) to disallow the grandfathering of net metering for existing solar photovoltaic (PV) system owners. Belco themselves have explicitly said this would not be fair in its September 2016 letter to the Energy Commission. This is extremely unfair to those individuals including myself that have invested in PV systems on the assumption of net metering. To renege on that agreement is unfair and flawed long term policy. The RA's emergency decree of March 2017 was done without public consultation and is very unclear. Even after the clarifying order, it is very difficult to understand. The government should be promoting renewable energy initiatives and in fact did so until recently through the subsidy program. I don't understand this contradictory result and would implore you to reconsider. Personally, this decision if upheld will cost me several thousand dollars and prevent me from personally combatting climate change and environmental issues. Longer term it will likely lead me to pursue removing myself from the Belco grid altogether. If others take this view, the result will in infrastructure and electricity costs being passed on to a smaller customer base. This is not good for those customers or for Bermuda. I urge you to reconsider the implications of this position.

Best Regards,

Chris Jansma

100 Harbour Road, Warwick, PG01

L. Nigel Burgess CEng

From: David Mallon <david.mallon@me.com>
Sent: Wednesday, August 02, 2017 8:28 AM
To: Renewables
Subject: Solar Power Net Metering

Dear Sir/Madam,

I'm greatly disturbed by the plan to revoke the grandfathering of domestic solar producers for net metering. In most cases people made a significant investment (in our case > $100k) to support the environment and help move Bermuda forward. Net metering is not just about off-setting investment cost (we won't make back our costs for 30 years), but also has a profound impact on the way a solar system is configured.

In our case, we use the grid as a reservoir. We export all power generated, and then import to charge our battery backup and service the load in the house. Should the grid go down we switch onto our battery backup. We'll now have to reconfigure the system (at some cost) to not export anything to the grid unless we absolutely must.

I understand that situations change and decisions must alter with them. But with so few domestic solar producers, to go against an earlier promise of net metering seems dishonest. It also hardly sets up an environment of trust between consumers, government agencies and the monopolistic Belco.

Whilst writing I should also like to stress my concern about the move to LNG. Just as most of the world embraces renewable energy, it seems that Bermuda is going to take a significant step back. It is difficult to see this in any other light than self-serving for a few individuals.

Your faithfully

Dr David P Mallon

GOVERNMENT OF BERMUDA
Ministry of Transport and Regulatory Affairs

Department of Energy

August 2nd 2017

The Regulatory Authority
Craig Appin House,
8 Wesley Street, 1st Floor
Hamilton, HM 11

Attn: Ms. Angela Berry, Chairperson

Dear Ms. Berry,

Re: Consultation on the Regulatory Authority (Renewable Energy Metering Scheme) General Determination (EGD)

The Department of Energy takes this opportunity to comment on the Consultation on the Regulatory Authority (Renewable Energy Metering Scheme) General Determination (EGD) dated 14th July 2017. The Department has three main areas of concern, namely, the methodology of the consultation, the lack of consideration for the entire National Electricity Sector Policy of Bermuda 2015/Electricity Act 2016 and the accuracy of some of the information/data used to reach the conclusions in this Emergency General Determination (EGD).

We address our concerns section by section in the following commentary.

Commentary

Section 1 Executive Summary

1.1 The Authority's responsibilities under the Electricity Act Section (6) 'Purposes'.

It is not clear if and how *all* of the 'Purposes', were considered by the Authority. The EGD does not explain in any detail how the following 'Purposes' were considered and applied during the Authority's development of the EGD;

- 6(c) to promote the use of cleaner energy sources and technologies, including alternative energy sources and renewable energy sources;
- 6(d) to provide sectoral participants and end-users with non-discriminatory interconnection to transmission and distribution systems;
- 6(e) to protect the interests of end-users with respect to prices and affordability, and the adequacy, reliability and quality of electricity service;

- 6(f) to promote economic efficiency and sustainability in the generation, transmission, distribution and sale of electricity.

4. Emergency General Determination (EGD) is appropriate given the Authority's Responsibilities under the EA.

- Without adequate explanation of how the Authority fulfilled all of their relevant responsibilities under the Electricity Policy and the Act, the Department does not agree that the EGD is "appropriate". It appears that only purposes 6(d), 6(e) and 6(f) were considered, and then only in part.
- It is also not clear if and how the Authority has considered all of the relevant policy goals of the Electricity Policy and the Act. For example the Government's vision to transform Bermuda's electricity matrix is tied to indicative targets set out in *Section 4.1 Vision* (Section 4.1) in the National Electricity Policy 2015. Setting the tariff rate at $0.1736 per KWh will have a negative impact on the uptake of renewable energy (RE) technologies due to the investment being less attractive to consumers. Any deleterious impacts to the uptake of RE will in turn affect the achievement of the Government policy goals of transforming the electricity matrix into one that provides a least cost and high-quality electricity service.

6. EGD entirely consistent with the provisions of the EA

- (**b**) ***Removes cross-subsidies that existed due to the prior net metering scheme, where non-renewable energy BELCO customers were subsidizing BELCO renewable energy customers under the prior net metering rates.*** – This statement is incorrect. Under the prior net metering scheme BELCo subsidized the renewable energy customers directly. The non-renewable energy BELCO customers did not provide or underwrite any subsidy.
- The Department does not believe that ALL of the negative consequences of removing the prior net metering scheme (a form of cross subsidy according to the Authority) have been considered in the EGD. Reducing one cross subsidy, as is proposed under the EGD, cannot be achieved without having a possible negative effect on other stakeholders within the RE industry, including ratepayers. For example removing the current Government concession of 0% duty rate to BELCO on specific business related supplies would likely result in higher electricity prices for all rate payers.

7. "…removing artificial economic returns…promotes economic efficiency."

- Removing Artificial Economic Returns (by changing the tariff scheme) should not be done without considering all the effects on *all* stakeholders and on the Government's policy goals. The Authority has not shown in this EGD that this has been done.

1.2 The lack of financial data and analysis from the solar installation industry

8. The Authority is concerned that the solar installation industry in Bermuda failed to provide any analysis or data to support its claims as to the financial impact of the EGD.

- This statement is incorrect. Submission documents contained in the Renewable Energy Metering Response Set 1,2,3 which were published to the Authority's website show that financial data was provided to the Authority by industry stakeholders. It is unclear however if and where this data was used by the Authority in its analysis. The Department believes that this information is essential to the Authority's analysis, and without it an incomplete and incorrect determination has been reached.

9. **The financial analysis carried out by the Authority has led to the Authority's conclusion that there is a negligible financial impact on the return and payback for renewable energy systems that are installed on the basis of providing self-consumption.**

- It is unclear from the limited data and supporting information provided in the EGD how the Authority came to the conclusion of 'negligible financial impact'. The Authority's decision to use load data, from a dissimilar jurisdiction (Augusta, Georgia) to that of Bermuda in their analysis, leads the Department to question this conclusion.

1.4 "The EGD delivers regulation and associated clarity into an environment where none existed"

- **"*The Authority recognizes that the EGD has introduced both regulation and a new feed-in tariff to an environment, including the market for renewable energy installations, where change was not anticipated nor calculated*"** – this statement is inaccurate. The Department of Energy is aware via its own communication with consumers and the RE industry, that change was both anticipated and calculated

(including by BELCO) but not to the extent the Authority is proposing to change it through the EGD.

- **"*In this context, the EGD is being represented by certain parties as an 'impact' of a negative nature on the market.*"** –the data contained in the EGD shows that the proposed rate scheme will have a negative impact on the local RE market as RE technologies will be a less attractive investment. The Department of Planning has confirmed that, in the period between March 1st and July 21st of this year, there have been 28 renewable energy applications received. For the same period in 2016, there were 40 applications received. This represents a 30% decrease in applications which supports the RE industry's position that the current scheme/rate has already been harmful to their businesses.

- **"*Moreover, the effect of the Authority's intervention is consistent with its statutory responsibilities and delivers the required level of economic efficiency and non-discrimination to the market.*"** – Due to the lack of adequate explanation/clarification of the information/data considered, the Department can only conclude that the Authority considered *economic efficiency* above all else when developing the EGD. There appears to have been no consideration of any other policy objectives as noted above.

Section 2: Introduction

- **14. "*The Authority recognises the importance of renewable energy systems which include solar, wind, and tidal generation. In particular, the Authority acknowledges solar PV generating facilities as one of the most important renewable technologies available in Bermuda and that efforts are required by both the Authority, as the regulator, and the Bermuda electricity industry as a whole to ensure that it forms an appreciable component of the Bermuda electricity generation mix in the near future*."** - The Department believes that the Authority's proposed FIT scheme will have the opposite effect to that outlined in this statement, as it will make investment in RE technology less attractive. There may be disagreement on the magnitude of that impact, but the impact is negative nonetheless and therefore will not serve to ensure that *solar PV generating facilities continue* to form "***an appreciable component of the Bermuda electricity generation mix in the near future*.**"

Section 4: Legislative Context

- ***39 The Authority has the powers to supervise, monitor and regulate the electricity sector in accordance with the purposes of the EA. Such purposes, as set forth in Section 6 of the EA, include: (i) "to promote the use of cleaner energy sources and technologies, including alternative energy sources and renewable energy sources", Section 6(c); and 39 (i)*** It is unclear where and how this was considered as part of the analysis conducted under the EGD.
- **40 The Principal Functions of the Authority Section 12 of the RAA include:**
  (ii.) ***"to promote the development of the Bermudian economy [and] Bermudian employment", Section 12 (c).*** Without providing a complete explanation of the analysis done it could be argued that the Authority's EGD is actually counter to this function i.e. the EGD will make the investment in renewable energy technologies less attractive and as such will affect the growth of the RE industry, development of the Bermudian economy and potentially harmful effect on employment opportunities for Bermudians.

Section 5: Summary Responses to the Initial Consultation Document

- **5.1** ***Response Method - Eighty-three written responses were received from the general public.*** All 83 responses to Round #1 of the consultation process were not published publically and in their entirety until the 18th of July 2017. Although the deadline for submissions was extended from the 28th of July until August 2nd this is still insufficient time to review all responses and respond accordingly. More time should have been allotted to Round#2 of this consultation process.
- ***5.2 Summary of Responses*** - the Department has reviewed most of the stakeholder responses to the consultation questions and does not see how these are captured in the conclusions reached within the EGD e.g. financial data and analysis provided by Bermuda Alternate Energy (BAE) was not considered by the Authority according to the Authority.

Section 6 Discussion of Responses

- ***6.1 (*****50) "*****The new transitional arrangement incentivizes the efficient level of renewable generation investment, without leading to undue increases in retail tariffs for BELCO's customers".*** In fact the opposite could be argued, the new rate will be less attractive and possibly discourage new investment in RE systems whilst encouraging current RE system owners to install electricity storage technologies, reducing their use of the grid, resulting in fewer BELCo customers supporting the grid which will lead ultimately to higher grid electricity prices for all BELCo customers. The proposed new scheme could also negatively affect current RE customer's consumption habits. It will encourage RE system owners to consume more electricity in the day to take advantage of the cheaper electricity production rates of their own systems at the time of

production. This electricity would have otherwise been exported to the grid under the old monthly Net Metering scheme and been used to offset the use of BELCo's more expensive gas turbine peaking engines.

- The Department requests clarification on how electricity produced during peak hours (worth more than $0.1736 per KWh due to BELCo having to run Gas Turbines) was calculated into the rate by the Authority.

Section 7 Authority Analysis

- ***57. The avoided cost rates are BELCO's avoided costs of fuel, lubricating oil, capital construction and transmission losses.*** Was a BELCo Cost of Service study requested by the Authority, if so can the Authority show where and how it was considered in the EGD?
- ***60.*** **Indeed, public comments received so far indicate that the feed-in tariff based on BELCO's avoided costs is greater than the cost of solar PV generation of $0.10-0.15 per kWh.** How was the cost of solar PV generation of $0.10-0.15 per kWh quoted calculated?
- ***61***. **The analysis further explained in Section 7.3 was performed on an adapted form of the System Advisor Model ("SAM") analysis tool…. -** further explanation of how the SAM program data was analysed should have been made available in the EGD.

7.1 BELCO's prior Net Metering Scheme would have the impact of increasing retail tariffs if allowed to continue

- ***64.*** What analysis if any was done on the proposed new BELCO feed in tariff scheme of August 15th 2016? Why was it not considered as the scheme of choice by the Authority? What would have been the financial impact on BELCO's non-RE customers? Was the impact substantial?

7.2 The Authority's Analysis on Transitional Impacts of the New Scheme

- ***67. The Authority finds that for residential consumers with an average-sized PV installation and average demand, the transitional arrangements are <u>likely</u> to still place these consumers in a net credit position*** – this is an incorrect/false assumption based on inaccurate information. Industry supplied data shows that a majority of small scale residential customers do not consume all of the electricity they produce at the time of production (regardless of investing in a 'right sized' or 'average' solar PV system).
- **68. ……some former small-scale residential customers are negatively affected.** Based on the analysis provided and the avoided cost model of the tariff proposed,

unless consumption is undertaken at the same time as production, all RE system owners will be negatively impacted by the EGD. What is being proposed is a FIT not a net monthly metering scheme as stated.

- **69.** ***The analysis performed by the Authority shows that there is no significant variation in the financial return between the original net metering scheme and the Authority's avoided cost scheme when exports to the grid are minimised (i.e. scheme participants with energy production closely matched to their consumption patterns). These participants are the least affected (if at all). Those most severely impacted are the scheme participants who are excessive net energy exporters****.* – this statement is incorrect. Only those small scale residential customers who consume all the electricity that they produce at the time of production will NOT be affected negatively by the proposed new scheme.
- **72. The conclusion of this analysis is that, as an investment, PV systems continue to offer a return on the investment in under half the lifetime of the system**. The assumption about 'Self-consuming' PV scheme participants is incorrect. A majority of PV scheme participants will not be consuming at the same time that they are producing (i.e. in the daytime when most self-consumption is low) so will not be able to take advantage of the more favorable rate of production of their own PV systems.

3.2 Procedural History

33. The Consultation Document asked the following questions:
    - It is unclear how the questions posed under the Consultation Document of 16th March 2017 were relevant to and affected the Authority's decisions outlined in the EGD.

<u>Conclusion</u>

The Department of Energy disagrees with the new renewable energy rate scheme proposed in the Regulatory Authority's Emergency General Determination (EGD).

The Department believes that not all of the Government's objectives for the Bermuda electricity sector set out under the National Electricity Sector Policy 2015 and Electricity Act 2016 have been considered in developing the EGD. It appears that the Authority has chosen to analyse, in isolation, only select polices and legislation which have led to inaccurate conclusions being reached.

The Authority also failed to consider all stakeholders' positions to the proposed rate scheme. The Department can see little evidence in the EGD that the will of all stakeholders, demonstrated and codified in the National Electricity Sector Policy and within a majority of the eighty three submissions from round one of the consultative process, had been adequately addressed. By the Authority's own admission the financial information and data supplied by the local renewable energy industry was not considered at all. This has resulted in the EGD containing incorrect statements and opinion which may have negatively affected the conclusions reached.

As such the format and tone of the EGD make it less of a consultative document and more a summary report justifying a decision which has already been made. This raises additional questions regarding the overall purpose of the consultative process and the methodology used.

Whist we appreciate the Authority's motivation of protecting the public interest (i.e. all BELCo rate payers), which is a recurrent theme in the EGD, 'public interest' in the context of regulation encompasses far more than simply the price of a commodity. Regulation is meant to ensure that wider issues are taken into consideration, apart from those tangibles supported by financial analysis ("economic efficiency") alone.

Recommendations

Bermuda needs a progressive renewable energy rate setting process for the renewable energy industry, that ensures all goals and objectives of the National Electricity Sector Policy 2015 and the Electricity Act 2016, as well as all stakeholder's opinions are considered.

The Department offers the following recommendations for consideration:

1. Revisit the Renewable Energy Metering Scheme consultation, to ensure that:
    a. the consultation process is genuine, inclusive and accessible, so that all of the public's opinions and supporting information/data are sought and thoroughly considered;
    b. notwithstanding any statutory requirements for transparency, the consultation process must also respect individual and businesses requests for confidentiality of sensitive information;
    c. all relevant policy should be considered as required by law; and
    d. Narrow interpretations of both public interest and the role of the regulator should be avoided.

2. Review and revise the Authority's consultation process, in order to ensure that the public is fully engaged and consulted.

The Department of Energy appreciates the opportunity to submit comments on the Consultation on the Regulatory Authority (Renewable Energy Metering Scheme) General Determination. We welcome further consultation with the Regulatory Authority on this matter.

Sincerely,

Jeane Nikolai

Jeane Nikolai
Director of Energy

cc: The Permanent Secretary, Ms. Aideen Ratteray-Pryse
The Minister of Transport and Regulatory Affairs, The Hon. Walter H. Roban, JP, MP

3rd Floor, Government Administration Building, 30 Parliament Street, Hamilton HM 12, Bermuda
P.O. Box HM 101, Hamilton HM AX, Bermuda
Phone: (441) 296-1574 Fax: (441) 296-0137 Email: energy@gov.bm Website: www.gov.bm

Douglas S. J. De Couto, Ph.D., J.P.
2 Salt Kettle Road
Paget PG 01
+1 441 707 5537
decouto@alum.mit.edu

Nigel Burgess
Regulatory Authority
1st Floor, Craig Appin House
8 Wesley Street
Hamilton, Bermuda

By email to renewables@RAB.bm and by online submission to www.rab.bm

Re: "Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Metering"

Dear Mr. Burgess,

I write with comments to the RAB's "Preliminary Report / Preliminary Decision and Order" regarding "Consultation on the Regulatory Authority (Renewable Energy Metering Scheme) General Determination", issued on 14 July 2017.

Or, in layman's terms: your report on how to handle Solar/PV net metering.

I write to strongly encourage the RAB to delay the implementation of this order to give affected participants more time to study your report and give responses. I especially urge the RAB to seek more public feedback on the specific impact this decision will have individuals who have already installed PV systems, and the PV industry in general in Bermuda.

The RAB report was issued on 14 July with responses expected by 28 July, giving interested parties only two weeks to digest a report that is over 40 pages long, with significant technical detail. In addition, time is needed for interested parties to review the 83 public responses to the initial consultation document, which have only recently been made available on the RAB website for review.

I also detail below some of my preliminary responses to specific sections of your report.

Sec 1.1.5.a.ii - "The EA shall allow compensation for an estimate of the economics benefits from distributed generation." The avoided cost of 17 cents fails to do this, for many reasons outlined in some of the public submissions, including the fact that BELCO can immediately resell fed-in electricity at the maximum marginal rate; PV users already pay a facilities cost to BELCO to cover infrastructure and other costs; in addition to pure fuel costs, the ability of PV to reduce BELCO's load at peak daylight hours further reduces their costs in areas such as

centralized infrastructure load as well as the fact that the cost avoided by BELCO at this time is much higher than the average 17 cents cited by the RAB.

Sec. 1.1.7 - "By removing artificial economic returns from renewable energy installations, the EGS promotes economic efficiency". In fact, the RAB has consistently depicted PV users as making money at the expense of BELCO and the general public. While this may be true for a handful of users, most users including myself have systems that are appropriately sized for our consumption and do not, on a daily basis, send more energy back to BELCO than is consumed. So the economic returns are not artificial. In addition, the EGD will in fact * decrease * economics efficiency be incentivizing PV users to install battery systems and generally reduce their reliance and integration with BELCO, thereby reducing the base of customers to share BELCOs' fixed costs.

Sec. 1.2. - "The lack of financial data and analysis from the solar installation industry." I cannot understand this comments because to my knowledge and as I can see from the public responses, the installers have in fact provided quite detailed analyses to the RAB.

Sec 1.3 - "The question of 'subsidation' - an issue for Government". In fact I agree that this is in deed an issue for Government. And it was in an environment of Government subsidies and promotion of renewable energy such as PV that myself and many affected persons undertook investment in PV, with the good faith assumption that key parameters about the role of PV in Bermuda would not be unilaterally changed by the RAB, which is not the Government.

Sec 1.4 - "The EGD delivers regulation and associate clarity into an environment where none existed". Unfortunately I don't believe this is true. Existing PV owners had significant clarity, as represented by their contracts with BELCO, which the EGD proposed to change, in contraventions to the wishes of both parties to that contract (BELCO & the PV owners). This clearly introduces uncertainty and doubt about the ability of the RAB to create an environment where individuals and firms can make medium to long-term plans with a modicum of certainty.

Regarding the final paragraph of this section: "... legacy environment led to a certain level of assumption and expectation that there would be no fundamental changes, for instance, to the feed-in tariffs". Indeed, this is precisely the reason we have a contract with BELCO -- so that the key parameters would not be "hopeful assumptions", but part of a legally binding agreement between the two parties.

Sec 4.39.i & Sec. 4.40.ii -- The authority purposes is to promote use of cleaner energy sources and technologies & the principal functions include to promote the development of the Bermudian economy. The EGD in fact operates contrary to both of these by decreasing if not discouraging the installation of PV systems, and by seriously disrupting the growing Bermuda PV industry, which as I pointed out in my initial response, is a rapidly growing industry world-wide that provide good hands-on technical job opportunities for a wide range of persons.

I have many other comments, but in broad brush they echo the same concerns as the above comments. I would also like to point out that although some of the EGD's principles are in fact agreeable to many existing PV owners, the retroactive and backwards-looking actions and 'moving of the goalposts' after the fact is highly disturbing, and introduces massive uncertainty in our faith in the RAB.

Regards,

Douglas S. J. De Couto

WEDGWOOD, 18 BURGESS POINT RD,
WARWICK WK 04

28th July, 2017

Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Metering

To the Regulatory Authority (RA) of Bermuda

This is my second response to your various reports. In making this second response I reconfirm all my comments and objections in the first response to the emergency general determination that was submitted in May and attach a copy of that correspondence with this letter.

I do not agree with the fundamental conclusions of your report.

In the first instance, you attempt to make a case that solar PV system owners are somehow "getting a better deal" and that non-solar producers in the general rate-paying population are effectively subsidizing us. This is couched in the language used as "non-discriminatory access". This is an erroneous assumption and the continued use of this misperception and similar language in your report has heavy socialist undertones.

To come to this conclusion you ignore these fundamental issues:

- Solar PV producers have invested heavily in the purchase and installation of their systems – no other BELCO rate payer was obliged to contribute and the BELCO rates/costs did not increase for those NOT having any self-production; the BELCO rates remained the same for the households that did not invest in the solar PV technology. Apart from the limited government incentive payment of $5,000, there was no subsidy and there is no subsidy for on-going production.
- Those of us with solar PV generation continue to pay our contribution to the maintenance of the grid and the cost of BELCO's power generation by the payment of the monthly facilities charges and fuel adjustment charges. If we are not to subsidize the general rate-paying public, we should get a credit on the fuel adjustment charges since we are drawing down less BELCO-produced power than non-solar PV customers. There is an argument that we should pay a higher facilities charge since we are 'double dipping' on the grid by using the grid for both importing and exporting electricity – this would be a fairer way of avoiding the perception that 'rich folks' with solar power are somehow getting a free pass at the expense of the 'poor folks' who couldn't afford to install solar PV generation.
- By eliminating net metering you are effectively creating a subsidy of those without solar PV installations by those of us who do. I no longer receive any credit* for the surplus electricity that I produce into the grid on a sunny day and can no longer offset this surplus generation against what I must draw from the gird during the hours of darkness or on rainy days. THIS ELIMINATION OF NET METERING FUNDAMENTALLY CHANGED THE WHOLE ECONOMIC CASE FOR INVESTING IN SOLAR PV GENERATION.

TELEPHONE: +1 441 232 0293 / EMAIL: ELSPETH@LOGIC.BM

- It is fundamentally unfair that solar PV producers are not entitled to use their own generation on a net generation/usage basis.
- The fact that my system is sized to generate excess energy on a sunny day does not automatically make me a greedy 'over-sized' producer. The system was sized to produce what was needed on an annual basis to eliminate high monthly electricity bills for someone on a limited income. By building up credit in the summer months, then drawing down on that credit in the winter months when solar production is lower, a smoothing effect on the monthly bills is created over time. By eliminating net metering, your determination has effectively removed the whole basis for installing the solar PV system that I elected to purchase.
- Hence, based on your emergency determination and on the methodology that you propose to implement now, the excess generation that goes from my roof on a sunny day is free to BELCO and they then charge other, non-solar BELCO customers at their own production rates to use it. <u>This is nothing other than a gift to BELCO shareholders.</u> You are allowing them the ability to sell power to their customers that they have not paid to generate. I have paid for the installation of the solar PV system and I am paying my contribution to the grid. They receive my excess generation for free*, then they sell it on without allowing me any credit for using that power later after the sun goes down. [*the meager avoided cost rate of 17 cents is such a low return on the cost of the installation of a solar-PV system that, without the reintroduction of net metering, no-one would ever install a system with this type of cost/return environment and whilst your paper seeks to make a case that this is not true, I would wager that as a direct result of your determinations (interference), the rate of solar PV installation in Bermuda will slow down significantly or cease altogether]. In the reasons you give for your determinations in your reports, you don't mention this windfall to BELCO shareholders, which is in direct contradiction to the stated socialist aims of your determinations.

Your report also ignores the fact that without the excess generation produced by solar-PV producers, BELCO would have to repair and upgrade their own generators sooner and more often – the cost of this will not be bourn solely by BELCO shareholders but will be spread through the rate-paying base so that everyone contributes. Those of us producing more power than we are using will be effectively subsidizing those who do not produce any power as we will remain liable for the cost of replacing the BELCO engines just as all BELCO's customers will be – even though our own personal investments will have contributed to extending the lifespan of the BELCO engines by allowing them to operate at below peak capacity when demand is highest (on warm sunny days).

I am unable to find anywhere in your report evidence for the statement in the summary that "removing artificial economic returns promotes economic efficiency". That is nothing other than unsubstantiated jargon.

Your conclusion that solar PV producers had an assumption of no changes to the feed-in tariffs is also erroneous. Certainly this producer anticipated that at some point BELCO would cease to purchase from me at the same rate that I was purchasing from BELCO as that would not be sustainable if more people became solar PV producers and I have no argument about the change to avoided cost methodology for the purchase of

TELEPHONE: +1 441 232 0293 / EMAIL: ELSPETH@LOGIC.BM

my surplus production. However, the elimination of the net metering was NOT anticipated; it was not asked for by BELCO and it is simply unjust. It was also never anticipated that the original and early adopters of this technology would not be grandfathered on the existing or similar agreements. I would welcome a legal challenge to the RA's ability to make such detrimental and fundamental changes.

Your report states that there is "negligible financial impart on the return and payback for renewable energy systems that are installed on the basis of providing self-consumption". This is not correct. My installation was installed on the basis of supplying my own energy needs on an annualized basis. By removing net metering you ignore the fact that I have to access BELCO power during the hours when I am unable to produce solar power and that has a major impact on the return and payback economics. If you think that I have suffered "negligible financial impact" I would ask you to compare my BELCO bills since your determinations were implemented with my BELCO bills from before the RA interference. I can assure you there is a sizable negative financial impact with my July 2017 bill being many multiples of what it was in 2016.

What you are also ignoring is that by taking away net metering and so altering the economic case for self-production, you are encouraging those of us who already have production capacity to invest further in storage capacity and disconnect from the grid altogether. Battery technology is now more affordable and easier to install than it was even five years ago and for an investment that would be less than 10% of the cost of what I have already spent, I can buy a battery from Tesla that will store enough of my production to power my home when I am not producing – even during several days of non-production. This would put me back to the situation that I thought I would get to by installing the solar PV system in the first place: the elimination of high & volatile monthly BELCO bills. It would also mean that I would not be contributing to BELCO's fixed costs or capital expenditures. If enough of the current solar PV producers elected to take this route, then the impact on the rate base would be immediate and THAT would certainly impact the very BELCO consumer that you seek NOT to discriminate against by making these determinations. Your own actions would cause an emergency situation for the electricity-buying Bermudian public.

Your comparison with Augusta, Ga. and your extrapolation of their data is, to be frank, less than compelling. The population of Augusta, Ga is nearly 4 times that of Bermuda [197,182 in the 2015 census]. Have your studies there included looking at how many regulatory authorities there are in Augusta? I think you will find there are none. Just as there is only one electricity utility and one power producer – and, guess what? They are both owned by the same company: Southern Company. The management of Southern Co. is answerable to the regulator: AT STATE LEVEL.

I would bet that the consumers of power in Georgia are not paying anything like $0.00475 per kWh to support the regulator. Southern Co is a publically owned company. Just like our own local utility. The difference is that our population makes us more akin the a small town in Georgia and there isn't a power company in the world that would set up business just to produce and supply power to a town with a population the size of Bermuda. We have no choice; we cannot import electricity, so we must produce it. Hence, with fewer people to spread the cost over, we will always

TELEPHONE: +1 441 232 0293 / EMAIL: ELSPETH@LOGIC.BM

pay more for our power – now even more than before because we have to pay for the cost of the RA in addition.

The fact that Southern Co effectively has a monopoly to produce, distribute and sell electricity in Georgia does not appear to mean that they or their customers suffer punishment at the hands of the regulator. Why is this relevant? It is relevant because your report indicates that you believe that electricity consumers in Bermuda will benefit from increased competition in the power generation space – yet you fail to put forward a case that shows that Bermuda consumers are disadvantaged by having only one source of power production; you do not seek to publish the case for having alternative methods of production (because there isn't one) or how they would be financed. In fact, the reverse is true: by your windfall to BELCO by not allowing them to grandfather existing solar PV producers and continue with net metering you are giving them the ability to make increased returns for their shareholders at the expense of Bermuda consumers who are solar PV producers.

After having had practically all of the incentive taken away for small-scale solar PV producers, what possible incentive is there for a power producer other than BELCO to come in and provide competition when the RA has a history of punishing independent producers and effectively removing any chance of a reasonable return on investment?

Bermuda's population is too small to have competition in the energy space and any business case that seeks to encourage that is flawed. Anyone with any energy industry experience can see that and hence it impacts the credibility of the RA that it seeks to advocate such a course of action. What Bermuda needs right now is a RA that is working with the local utility, demonstrating competence and instilling confidence – none of which is in evidence from the recent actions of the RA.

I have no confidence that the determinations in your report will be altered by anything that is received during this second consultation period, so I can only repeat my objections and hope that at some stage common sense will prevail.

Yours faithfully,
Elspeth A. Weisberg
Email: Elspeth@logic.bm
Phone: (441) 232 0293
(submitted electronically).

TELEPHONE: +1 441 232 0293 / EMAIL: ELSPETH@LOGIC.BM

George Masters
6 South Court Ave.
Paget PG06
Bermuda

Email: george.masters@gmail.com
Tel: 441 538 3936

Good Day,

Please find attached my response to the consultation for Renewable Energy Metering 2nd Consultation and follow up questions for the Regulatory Authority of Bermuda.

Here are some questions and my concerns with the current RAB legislated decision.

1. Section 1.2 of the Executive Summary states the following "the solar installation industry in Bermuda failed to provide any analysis or data to support its claim as to the financial impact of the EGD."

   Within the file "Renewable Energy Metering Responses Set 3.pdf" a sub file entitled Nicholas Duffy – RAB EGD BAE_EGD_Response_Final_120517.pdf pages 15-19 include financial breakdowns of financial data that was presented by BAE. Therefore, this statement is false, misleading and should be retracted. Why was this information missed or omitted when creating this decision?

2. In light of the current consultation, I would like to request the RAB to have an open public forum so that all users who are not familiar with the technicalities of solar can voice their opinion. Writing a counter to these decisions is counterproductive as a majority of users are unfamiliar with the technical terms discussed within these documents. A public forum would be in the best interest to solar users and the general public going forward. Would the RAB consider this proposal?

3. Now in regards to the current decision, I wish to highlight that the regulatory has now created a stance that is bias towards Belco. I will explain.

   I agree that the previous program was based on consumption of power and repayment based on the tiers of consumption and that Belco did wish to close this program and reissue a new program due to financial impact. However, a new program was proposed which allowed Net metering. i.e. allowing systems where consumption / production would be netted and any additional power would be purchased back by Belco at 0.17 cents per Kwh. In addition, limitations of size of PV systems and quantity of participants would be lifted. Under this new proposed program, producers of solar energy could then attain power independency by producing enough power to financially subsidize their consumption. If any additional power is produced, power would be purchased by Belco which then could be used to offset facility charges assessed by Belco. Now, from analyzing the current decision:

The current decision lacks the following:

a. Ability for solar users to attain power independence. If a solar user provides 1000 kwh hours per month and if a solar user consumes 1000 kwh per month, the solar user will not be able to attain power independence. A solar user would then need to expand its solar production to provide ~1300 kwh's to compensate for a 1000 kwh usage (not including fuel adjustment). To offset fuel adjustment, a solar user would need to produce ~1900 kwh per month (essentially double the power they consume) to attain power independence. The analysis does not take into account any hardship that a solar user would need to endure nor investment costs, nor physical restrictions that may occur if a solar user attempts to reach power independence by increasing the number of panels producing energy. As a majority of users have already maximized investment in solar and physical landscape of properties i.e. no extra roof space for solar, the change in this rate adversely impacts current users and future users as systems would not be able to be implemented to attain power independency based on the physical requirements needed to offset power consumption. The analysis fails to take this into consideration and no evidence is provided.

b. Solar users are subsidizing power to Belco's power requirements and allowing Belco to profit from this power in return. If a solar user produces more than they consume, and when Belco purchases this at the 0.17 reduced rate, solar users are essentially subsidizing Belco's power requirements and allowing Belco to resell this power at higher rates. This essentially allows Belco to profit from solar user's power. To reiterate this point, the analysis delves into the finite of costs etc. versus power production. As solar energy is produced, Belco can ramp down traditional power generating devices and consume energy from solar providers. This would then lower Belco's operating costs as more solar energy is adopted and produced during our daily light hours. This is not taken into account within the analysis. This then reiterates the point that, as the new proposed scheme is bias towards Belco, the RAB is in breach of the EA guidelines, in particular Section 12 (a) to promote and preserve competition.

c. Impact to solar industry companies. The analysis does not provide any data or analytical insight on how this rate/scheme could affect adoption of solar power and the companies operating within this market. The analysis does however, allude that there is an assumption that by choosing this rate and scheme, solar users will benefit and still find it financially feasible for adoption. This is flawed as there is no analytical evidence to provide the support for this assumption. i.e. No financial evidence on how the market would react and financial impact on solar companies within the industry. In addition, no analysis or evidence on employment etc. has been provided. On this point alone, without evidence, this decision forces a breach of Section 12 (ii) "to promote the development of the Bermudian economy [and] Bermudian employment". With no evidence, the RAB must reconsider this rate and provide evidence to justify this decision.

4. Finally, as it appears that the RAB has created a bias decision that benefits Belco over solar users, I wish to ask the following question. Are any RAB employee's shareholders of the

Ascendant group / Belco that worked on, consulted for advice, or aided or influenced the decision of the RAB for solar energy pricing and this decision? If so, to avoid conflict of interests, the RAB should disclose this information accordingly to the public.

I look forward to a response to my questions.

Best Regards,

George Masters

REGISTERED CHARITY No. 704

Greenrock.org

Changing the Mindset

Response to the Consultation on the Renewable Energy Metering Scheme

Greenrock regrets that it was not in a position to submit a response to the initial consultation document. While that consultation is passed, Greenrock would like to address a few of the consultation questions contained within the initial document:

1. **What is your view of how solar PV has evolved in Bermuda? Please provide views on the uptake of this technology.**

Greenrock remains in support of a transition away from fossil-fuels and towards a renewable energy or zero carbon future for Bermuda. We believe that solar power is a key component of such an energy future for Bermuda. We welcome the increase of solar PV installations, which we understand to be just under 400 residential installations to date. Despite this, we are disappointed that the uptake has not been greater and believe that more can be done to support this.

We do note that the Department of Planning has revised their building codes to be more conducive to installing solar PV, which we welcome and consider conducive to encouraging uptake.

Also welcome has been the revision of customs tariffs regarding solar and related renewable energy technologies, including solar thermal water tanks, PV and battery storage.

We also note that the BELCO reverse net metering programme has played a key role in encouraging the uptake of solar PV in Bermuda. We understand that there have been some challenges with interconnecting to the grid however, which may have led to a slower uptake than might have otherwise been expected.

There are additional policy options that we believe the Government can pursue to encourage greater uptake of residential renewable energy, such as reduced property taxes for properties with X technology installed.

2. Looking into the future, how important do you believe solar PV is for Bermuda? Please provide your views on what its costs and benefits are; how these should be quantified; and how these should be reflected in the framework of electricity regulation.

We believe that solar PV is of increasing importance for Bermuda. This is due to a combination of global climate change and the need for energy security.

Suite 324, 48 Par La Ville Road, Hamilton, HM11 Bermuda • execdir@greenrock.org ☎+1.441.747.7625

If the world - and Bermuda - is to meet the goals set out in the Paris Agreement (which represent a minimum aspiration), then we must transition to a zero-carbon economy for 2050 - or at least as close to one as we can, greatly reducing our dependence on fossil fuels. Solar PV represent a key part of the solution to this transition.
Additionally, while there have been numerous false 'peak oil' events, we must recognise that fossil fuels are a finite resource, with much of the 'low hanging fruit' of readily accessible fossil fuels rapidly approaching exhaustion. While technology may develop in such a way as to make currently less accessible fossil fuels more accessible in the future, we have no guarantee of that. Additionally, we face two unsavory options for sourcing our fossil fuels - oil, affected by uncertainties in the Middle East, Africa and South America; or natural gas deriving from fracking, with all the pollution and threats to communities that such involves.

It should be noted also that importing fossil fuels leads to a net leakage of hard currency out of Bermuda, whereas renewable energy sources such as PV would lead to a net retention of same hard currency, potentially being reinvested in the local economy.

The costs and benefits of solar PV can be measured in terms of (i) avoided greenhouse gas (GHG) emissions (and resulting avoided impacts of climate change); (ii) avoided aerial pollution (particulate matter, dioxins, etc.); (iii) avoided public health costs associated with aerial pollution; (iv) avoided costs as outlined by the RA ($0.1736); (v) fuel price hedge value, in as much as PV generation has no price fuel price uncertainty; and (vii) transmission & distribution (T&D) capacity savings in terms of PV generation helping reduce peak loading on the T&D system, thus reducing (or delaying) the need for capital investments in it.

Our position is that the $0.1736 rate proposed by both BELCO and the RA represents the absolute minimum avoided costs, and that a proper accounting of the true avoided costs from residential PV should incorporate the additional avoided costs outlined above. Rabago, et al (2012)[1] provides some indications of how to approach aspects of these additional avoided costs:

- Fuel Price Hedge Value - Calculated by determining how much it would cost to eliminate the fuel price uncertainty through procurement of commodity futures.
- T&D Capacity Savings - Equals the expected long-term T&D system capacity upgrade cost, divided by load growth, times financial term, times a factor that represents match between PV system output (adjusted for losses) and T&D system load.
- Environmental Benefits - Equals PV output times Renewable Energy Credits (REC) price - the incremental cost of offsetting a unit of conventional generation (i.e. ton carbon equivalent).

[1] Rabago, K., Libby, L., Harvey, T., Norris, B. and Hoff, T. (2012) Designing Austin Energy's solar tariff using a distributed PV value calculator.

There are a number of different approaches to valuing the price of carbon (see Baranzini, et al, 2017[2]; and also Valatin, 2014[3]). As Valatin notes, attempts to value carbon differ depending on whether one takes a societal or a market approach, with the market approach being primarily influenced by Government policy. Greenrock takes the position that a societal approach is the more appropriate approach; it may be calculated according to four approaches:

- **The Social Cost of Carbon (SCC)** - Quantifies the cost to society of emitting an extra unit of carbon dioxide equivalent (see also Stern, 2006[4], 'the impact of emitting an extra unit of carbon at any particular time on the present value (at that time) of expected wellbeing or utility', p.287).
- **The Marginal Abatement Cost (MAC)** - [of] reducing emissions or sequestering carbon that is the cost associated with reducing emissions by one unit or increasing carbon sequestration by one unit.
- **The Carbon Price (CP)** - Or pollution tax required to meet a given climate stabilization goal - or the level of MAC consistent with achieving this level of abatement.
- **The Shadow Price of Carbon (SPC)** - Derived using a cost-benefit analysis approach and defined as the pollution tax that equates the SCC and the MAC, or considered equivalent to the SCC minus distortions.

Of these four approaches to measuring the societal cost of carbon (as a proxy for the environmental avoided costs of solar PV in determining the appropriate net metering tariff), we believe that the position adopted by the UK in 2009 (as discussed in Valatin, 2014), to adopt the CP approach based on estimates of the abatement costs that would need to be incurred to meet emissions reduction targets.

It is Greenrock's position that Bermuda falls under the Paris Agreement as per the UK being a signatory to this agreement, and in the absence of the Government of Bermuda setting more aspirational targets, those set by the Paris Agreement should represent the minimum societal cost of carbon that should be incorporated into the avoided costs tariff. We believe that the RA will be able to use the UK's model as the basis for determining the correct societal cost of carbon per kilowatt hour as per BELCO's production, and that this should be added to the existing minimum tariff of $0.1736).

In short, Greenrock believes that the appropriate avoided cost tariff should be composed of the $0.1763 as noted, plus the societal cost of carbon using the UK's CP approach and the Paris Agreement targets as the default (to be amended should the Government adopt targets that go beyond that of the Paris Agreement), plus the fuel price hedge value (to be determined by the

[2] Baranzini, A., van den Bergh, J.C.J.M., Carattini, S., Howarth, R.B., Padilla, E. & Roca, J. (2017) Carbon pricing in climate policy: seven reasons, complementary instruments, and political economy considerations. WIREs Climate Change. Vol 8, July/August 2017.
[3] Valatin, G. (2014) Carbon Valuation in Forestry and Prospects for European Harmonization. Forest Research, EFI Technical Report #97.
[4] The Stern Review...

RA), plus the T&D capacity savings (to be determined by the RA). Ideally, we would also like to see the public health costs of air pollution attributable to BELCO factored in - and suggest that the model developed by Machol & Rizk (2013)[5] could be adapted to the Bermuda context for this purpose. The true avoided cost would be the sum of these factors[6].

3. Should there be capacity limits on solar systems installed on individual customers premises in Bermuda? Should this be included within a formal licensing framework?

- **If so, who should be responsible for assessing the system sizes and their limits (BELCO, Department of Planning, RA, etc.)?**
- **Should solar PV system sizing for a customers' premises be limited to the prior 12-month consumption of a residence/business and/or should it be based on forecasted consumption.**

Greenrock's position is that the only justifiable limits to residential solar PV is where there are technical challenges to connecting to the grid (i.e. unacceptable burden falling on aging substations) - responsibility of BELCO with potential for appeal to the RA - and building codes - responsibility of the Department of Planning.

This should be assessed on a case-by-case basis, with BELCO encouraged to remediate those technical challenges, such as inadequate substations to support residential solar PV. To us introducing limits to residential solar PV is contrary to the stated goals of the Electricity Act 2016 (Section 6).

4. The Authority has, via the Emergence General Determination, and on a transitional basis, mandated that BELCO should pay for electricity received from solar PV systems on the basis of the Energy Commission recommendations of October 2016. What are your views on this transitional measure?

We consider the suggested price of $0.1736 to be inadequate in as much as it fails to properly incorporate the true avoided cost. We recognise that the Electricity Act 2016 Section 36a reads that the rate shall allow compensation for 'at most' (i) the actual cost of generation that BELCO avoids; and (ii) an estimate of any economic benefits from distributed generation. However, we believe the RA has too narrowly interpreted this section and that (i) should include at least the fuel hedge value and the T&D capacity savings, while (ii) should include the externalities of the environmental and public health costs.

We also believe that the medium-term impact of this action is likely to be twofold:

[5] Machol, B. & Rizk, S. (2013) Economic value of US fossil fuel electricity health impacts. Environment International, Vol. 52, pp.75-80.

[6] Additionally, one could factor in the cost of damage to our marine environment in the event of a grounding or oil spill, or the terrestrial environment in the event of a pipeline rupture or spill. One would have to estimate the total cost of such an event and discount according to expected risk.

- Make investing in any residential solar PV less attractive, with a resulting slowdown in the uptake of residential solar PV, with consequences for BELCO's demand and the environmental impact of fossil-fuel consumption. There is a further risk that it may cost the renewable energy sector in terms of jobs and investment too. In doing so it will reinforce BELCO's monopoly in electricity generation.
- It has the potential to spur wealthy individuals to invest in energy storage devices and effectively 'going off grid' compounding the very concerns raised by BELCO about the fixed-cost burden on the rate base consumers, leading to increased electricity bills and a 'solar death spiral' for the utility beyond its control.

5. We have no position on this question at this time.

6. What do you believe should be the economic basis for solar PV in Bermuda, specifically in the context of feed-in tariffs?

- **Should BELCO's solar PV metering scheme reflect a cost-benefit methodology or an avoided cost methodology?**
- **What cost rate design for solar PV participants is best suited to incentivizing greater utilization of cleaner energy sources and technologies in Bermuda?**
- **What other factors should be considered in determining the cost rate design for feed-in tariffs?**

Our comments in response to Question 2 largely address these issues, in our opinion.

As regards the question of cost-benefit versus avoided cost methodology, what we propose (as set in our response to Question 2) is essentially a hybrid form, or, alternatively, a wider interpretation of the avoided costs. We believe that both approaches are valid and equally applicable. Cost-benefit analyses of distributed PV help identify other benefits to the utility, such as environmental, public health and T&D capacity savings, which the more narrowly focused avoided cost approach doesn't. The narrower avoided cost approach applied by BELCO and generally adopted by the RA, at least for the transitional period, represents in our opinion the lowest bound or value floor of the value of such distributed PV to the utility and ratepayers (see for example the discussion - paraphrased here - in Darghouth, et al, 2010[7]).

7. Should solar PV or other renewable energy programs be incentivized within a specific regulatory framework for renewables in Bermuda?

[7] Darghouth, N., Barbose, G. & Wiser, R. (2010) The Impact of Rate Design and Net Metering on the Bill Savings from Distributed PV for Residential Customers in California. http://escholarship.org/uc/item/6592s0zg#page-2

We are inclined to say yes, in principle. We would need to research the implications of this in more detail, including getting further clarity on the RA as to what is being proposed here.

8. In your view, are there any barriers to solar PV or other forms of renewable generation investment?

- **If so, what are these barriers?**
- **How could they be removed to enable further investment?**

The main barriers that we see are the high initial fixed capital costs of purchasing and installing solar PV. While the price continues to decrease, the initial outlay does make it difficult to ensure energy equality.

Another challenge that we see is uncertainty around matters like this, the reverse net metering. Changing the tariff rate changes the calculus involved in considering such an investment - the transitional reduced rate of approximately half of what the rate was, effectively doubles the payback time on the investment, which while not necessarily affecting the payback itself, may cause persons to choose to invest alternatively in something with a quicker rate of return.

Another challenge is the monopolistic power of BELCO itself versus the smaller, independent solar companies - leading to asymmetry in the market and the potential for BELCO to outcompete or otherwise 'squash' the solar power industry in Bermuda.

The fixed capital cost could be overturned through subsidies or special financing initiatives to assist less well-off citizens install the relevant technology, with a focus on the low hanging fruit (such as solar water heaters). BELCO itself could potentially develop just such a financing initiative for their customers.

Additional Government policies could be introduced to encourage a shift away from fossil fuels, be it through setting a cap and target regime, or introducing novel policies (such as reduced property tax for solar PV homes) to provide incentives for expanding solar PV distribution. One concept that could be considered, for example, is the introduction of a carbon tax, the revenue so raised being used to fund solar loans for lower income communities to ensure energy equality (as well as financing energy efficiency and renewable energy technologies for public buildings).

The various companies providing solar PV and related services could consider forming a cooperative or otherwise assisting each other to benefit from economies of scale or a united front to counter the asymmetry between their individual companies and BELCO. The RA may need to support this alongside the Bermuda Economic Development Corporation (BEDC) to facilitate such an initiative. Doing so would arguably fall under the remit of the RA as per Section 12c of the Electricity Act 2016 regarding promoting the development of the Bermudian economy.

Suite 324, 48 Par La Ville Road, Hamilton, HM11 Bermuda • execdir@greenrock.org ☎+1.441.747.7625

From:	Executive Director, Greenrock
To:	L. Nigel Burgess CEng
Subject:	Re: Greenrock Press Release on Consultation (EGD) Deadline
Date:	Wednesday, August 02, 2017 4:55:47 PM
Attachments:	image37f139.JPG image001.jpg

Hi Nigel,

I'm not sure if I'm going to finish this submission by 5pm today. I will send it before the end of day, but I wanted to let you know I'm unlikely to finish it for 5pm. Hopefully it will still be acceptable?

The essence of it (the challenge is providing the references and fleshing out the argument) is that

1. We believe there should be a straight kilowatt for kilowatt swap or credit for solar power generated during the day in excess and BELCO power used over the night. The simplest way here would be for a monthly accounting of the meter. It is only excess kilowatt capacity (that sold back to the grid in excess of this swap - should the home generate self-sufficiency and subsequent excess) that should be financial, as in the avoided cost suggested (but qualified).
2. For that excess kilowatt we agree in principle with the avoided cost concept - however we disagree with the calculation of the avoided cost as presented. It is far too narrow and doesn't factor in additional avoided cost in terms of (i) environmental costs (greenhouse gases, using carbon equivalent and carbon pricing; but also public health costs in terms of particulate matter); (ii) transmission & distribution capacity savings (in terms of reducing peak loading on the system - delaying the need for capital investments); (iii) fuel price hedge value (PV generation has no fuel price uncertainty); (iv) fixed capital avoided costs (encouraging distributed PV generation reduces the need for investing massively in new fixed capital for the utility to meet increased demand). The avoided cost value estimated by BELCO (and proposed subsequently by the RA) to us represents the absolute minimum or floor for the avoided cost value. Working out the exact actual avoided cost incorporating the above is not something we have had the capacity to determine as yet. However, we favour a high value for the price of carbon, noting the challenges in meeting the Paris Agreement targets as is, and the associated costs to humanity (or to Bermuda more narrowly). We suspect that the actual avoided costs far exceed BELCO's existing retail rate for kilowatt hours as a result. We can provide some starting positions for calculating the full true avoided costs, which we feel the RA can build on. In the interim we believe that the existing retail rate of kilowatts should be maintained pending such a calculation - or the proposed avoided cost be introduced with the understanding that once the proper value is determined incorporating the above, that a transition is introduced to compensate accordingly (so an even higher rate of avoided cost be implemented until the deficit is reached).
3. The rest of the submission seeks to answer - the best of our abilities - the questions initially posed in the first round of the consultation (as outlined on pages 8 and 9 of the current consultation (section 3.2).

I hope that you will accept our more fleshed out submission post 5pm which builds on the above.

Kind regards,

Jonathan Starling

Greenrock Executive Director
execdir@greenrock.org
www.greenrock.org
facebook.com/Greenrock

On Fri, Jul 28, 2017 at 1:21 PM, Executive Director, Greenrock <execdir@greenrock.org> wrote:

> Hi Nigel,
>
> Thank you for letting me know.
>
> Perhaps after Cup Match it might be useful for us to meet. It would be good to get an understanding of where the RA is now. When I last visited the RA it had only recently taken over responsibility for energy, so it was still settling into it. I'd be interested in particular about expected timelines for BELCO to submit their IRP formally to the RA (having previously done so to the now defunct Energy Commission).
>
> Kind regards,
>
> Jonathan
>
> ***Greenrock Executive Director***
> *execdir@greenrock.org*
> *www.greenrock.org*
> *facebook.com/Greenrock*
>
>
>
> On Fri, Jul 28, 2017 at 1:14 PM, L. Nigel Burgess CEng <NBurgess@rab.bm> wrote:
>
> > Good day Jonathan,
> >
> > Please note, the Authority has granted an extension to the Renewable Energy Metering Consultation deadline. The new deadline date is Wednesday 2 August 2017.
> >
> > Regards,

From: Executive Director, Greenrock [mailto:execdir@greenrock.org]
Sent: Thursday, July 27, 2017 2:57 PM
To: L. Nigel Burgess CEng <NBurgess@RAB.bm>
Subject: Re: Greenrock Press Release on Consultation (EGD) Deadline

Hi Nigel,

We didn't quite get the press release out in time yesterday, but it should be on various news sites this afternoon. Better late than never to encourage some last minute submissions I figure.

On that note, however, we've received rumours that the deadline for submissions has been delayed a couple of weeks. Is there any truth to that?

Thank you.

Kind regards,

Jonathan

Greenrock Executive Director

execdir@greenrock.org
www.greenrock.org
facebook.com/Greenrock

On Wed, Jul 26, 2017 at 12:11 PM, L. Nigel Burgess CEng <NBurgess@rab.bm> wrote:

> Good day Jonathan,
>
> Sorry I missed you earlier when you came in.

Thank you on the heads up on the press release. I believe, the information you stated is sufficient. I have also attached the RA's news release for reference of information.

Thank you.

Regards,

Nigel

From: Executive Director, Greenrock [mailto:execdir@greenrock.org]
Sent: Wednesday, July 26, 2017 12:02 PM
To: renewables@rrab.bm; L. Nigel Burgess CEng <NBurgess@RAB.bm>
Subject: Greenrock Press Release on Consultation (EGD) Deadline

Good day Mr Burgess,

With the upcoming deadline for consultation submissions regarding the EGD consultation (July 28th) we at Greenrock are considering issuing a press release to encourage any last minute submissions. Unfortunately we were unable to participate in the first round back in March/April, but intend to submit something for this Friday.

Before I send anything out, I wanted to give you a heads up and also see if there was anything in particular you think would be useful for me to include in it.

The press release I am envisioning was basically noting the deadline, what the consultation is about, and including the information on page 6 (Section 3 'Consultation

Procedure') of the consultation document, including a hyperlink to the consultation document itself.

Please do let me know if you have any thoughts on this. I intend to send something by end of day to get into the newspaper for tomorrow, giving people just under 48 hours to get any last minute submissions prepared and sent in.

Kind regards,

Jonathan

Greenrock Executive Director

execdir@greenrock.org
www.greenrock.org
facebook.com/Greenrock

Please consider the environment before printing this e-mail

L. Nigel Burgess CEng

Senior Manager Electricity Analysis and Planning

1st Floor, Craig Appin House
8 Wesley Street, Hamilton, HM 11
Tel Main: +1 (441) 405-6000
Tel Direct: +1(441) 474-6025
Fax: +1(441) 474-6048
Email: NBurgess@RAB.bm
Web: www.rab.bm

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L. Nigel Burgess CEng

Senior Manager Electricity Analysis and Planning

1st Floor, Craig Appin House
8 Wesley Street, Hamilton, HM 11
Tel Main: +1 (441) 405-6000
Tel Direct: +1(441) 474-6025
Fax: +1(441) 474-6048
Email: NBurgess@RAB.bm
Web: www.rab.bm

Regulatory Authority of Bermuda – 2nd August, 2017

Response 1 of 2 to Preliminary Report,

Preliminary Decision and Order: Renewable Energy Metering

Executive Overview

It is difficult to overstate how damaging the actions taken to date by the Regulatory Authority of Bermuda (RAB) have already been to the Renewable Energy Industry (REI) in Bermuda. The residential solar market has essentially come to a complete standstill and once the pipeline projects that were in progress before the Emergency General Determination (EGD) reach completion, we will be faced with a virtually empty order book. In addition to the almost total cessation of new business, we have also had to deal with both downsizing and cancellation of existing contracts that have resulted in additional financial losses for our business.

We have already been forced to make aggressive cuts in working hours to reduce our payroll overhead and as we complete our book of business we will simply have to lay off our workers.

In addition to the immediate and direct financial damage that has been caused by the reckless and unprecedented actions of the RAB, there is also the indirect long term cost to the industry to be considered. Assuming that some form of 'Rational and Enlightened' rate setting solution could be put in place in the very short term, it would take a herculean effort on the part of the REI to re-build any degree of public trust and confidence in the security of renewable energy and in particular 'Solar Energy' as a wise and secure investment in the future. It is likely that the damage that has already been done will impact the growth of industry for years to come.

The growth of solar in Bermuda has, to say the least, been very slow and we have fallen further and further behind other developed nations in our adoption of renewable technologies. It is therefore particularly ironic that just as we were beginning to see a steady growth in the uptake of solar installations, we have been delivered what is essentially a fatal blow by the very body that was put in place to ensure the energy market was opened to competition.

It is very difficult to understand how in 2017 we can find ourselves fighting for the survival of the renewable energy industry here in Bermuda and it raises some very important questions of how and why we find ourselves in this position, some of which we have tried to address in the body of this submission. We are now standing at a crossroad and the decisions that are made in the very near future will impact the energy landscape of Bermuda for many years to come.

BERMUDA ALTERNATE ENERGY LIMITED
Street Address: Airkool House, 9 Mill Creek Road, Pembroke HM 05, Bermuda
Mailing Address: P.O. Box HM 1095, Hamilton HM EX, Bermuda
Telephone: 441-297-3639 Facsimilie: 441-292-6887 E-mail: info@bae.bm www.bae.bm
A member of the BAC Group of Companies

1. **Consultation Process – Process & Methodology**

1.1. The consultation process that has been used by the RAB has been severely flawed from the outset as it has put the onus for communication with the stakeholders on the REI. As we stated in our original submission of 12th May, 2017, unlike the RAB, we are not staffed or funded for this type of interactive information exchange.
As we further stated, many stakeholders were completely unaware of the entire consultation process, as their installation company had gone out of business, and only learned of the drastic changes to their investment when they received their revised BELCO bill in June. Needless to say, no submissions were received from any of these stakeholders.
The RAB could quite easily have obtained a complete list of stakeholders from BELCO who already have on file 'Interconnection Agreements' with all the pertinent information that was needed;

1.2. It is difficult to understand why, <u>despite numerous requests</u>, it took the RAB 68 days to make public the 84 responses to the original consultation, which ended on 12th May. The responses were finally published on 19th July, with at least 2 omissions that we know of, 1 of which was added to the published documents 2 days later. The preliminary Report was published on 14th July, 5 days prior to the publication of the initial responses, and requested a further round of responses by 28th July. This gave us only 9 days to read and digest the 84 documents and prepare a response. Considering the RAB has a staff of approximately twenty, it seems manifestly unfair to expect us to do in 9 days what had taken you 68. And further, it is difficult to understand why the 84 responses were not published much earlier in the process, which would have allowed us to be significantly more organised in our approach to the consultation. It could be reasonably concluded that there has been a deliberate attempt by the RAB to influence the outcome of the process by withholding the information that was inherently critical to the consultative process.

1.3. On the 25th July, because of the unfavourable time constraints being imposed upon us, and the upcoming Cup Match holiday week, during which many of the stakeholders would be overseas, we requested a 14 day extension to the deadline to 11th August. On 28th July (submission deadline) we were granted a 5 day extension to 2nd August, which in reality gave us only 3 additional 'working days' and did nothing to address the fact that many of our clients are presently overseas;

1.4. It should come as no surprise to the RAB, as a direct result of these constraints that the volume of responses to this 2nd round of consultation will most likely be very low and in no way truly representative of the depth of concern that exists among the industry stakeholders.

2. Inaccurate and Misleading Information

The Executive Summary of the Preliminary Report contains information that is presented as factual but is actually completely untrue and is representative of how the entire document appears to be strongly biased to a pre-determined set of conclusions and outcome.

Section 1.2 of the Executive Summary states:

1.2 The lack of financial data and analysis from the solar installation industry

8. The Authority is concerned that the solar installation industry in Bermuda failed to provide any analysis or data to support its claims as to the financial impact of the EGD.

In fact, we provided very detailed financial modelling to the RAB in our submission on 12th May, which can now be clearly evidenced by looking at the submission on your website. Indeed our modelling was so detailed that it appears you used the overall framework and design to construct your own financial model submitted as 'Table 1: Summary of Results' in your Preliminary Report.

We met with the following members of the RAB on 26th July:

Attendees: Michael Wells, L. Nigel Burgess, Monique Lister, Tristy Smith.

At the meeting we presented detailed evidence of the financial data and financial analysis we had submitted as well as the relevant historical context of the circumstances under which we, and others, were trying to respond to the initial consultation document.

We also requested an immediate public retraction of the incorrect information, which to date has still not happened. In our opinion, the misinformation presented by the RAB has severely compromised the legitimacy of the 2nd round of consultation and has cast the entire industry in a very negative light and damaged our reputation in the eyes of the general public. Because there has been no effort by the RAB to correct the errors we brought to their attention, we can only conclude that this is another clear demonstration of what has been a consistently obstructive and prejudicial approach by the RAB to our efforts throughout the consultation process.

Without doubt, the impartiality of the RAB throughout this process must be drawn into question.

3. Meeting Notes

In the interests of full transparency and for the avoidance of doubt, we have provided the full transcript of our meeting with the RAB as part of this submission, see Section 7 below. Note, we have made minor spelling corrections to the original document submitted to the RAB on 28th July.

4. Round 1 Consultation Responses

Despite being severely hampered by the mass confusion that surrounded the interpretation of the original consultation documents, the industry participants managed, via their own communication efforts, to solicit at least 84 responses from the stakeholders. Having studied the content of the responses in the short time available, it is reasonable to assert that none of the respondents articulated a favourable response to the EGD. Specifically, it was pointed out by numerous respondents that the course of action undertaken by the RAB would result in the rapid collapse of the REI in Bermuda. It was also clearly articulated, via financial modelling, that the EGD propositions resulted in unprecedented and punitive charges being levied on solar adopters and the clear cross subsidisation of non-solar energy users.

Assuming that any genuine level of validity was given to the content of the 84 responses, it is simply impossible to comprehend how the RAB Preliminary Report could have been produced, and it clearly suggests that absolutely no value was given to the information submitted by the respondents. In fact, given that the RAB has claimed that no financial analysis was submitted to them, it strongly suggests that large amounts of the submitted content was either never read, completely ignored or not understood.

It is highly unrealistic for the RAB to expect the average respondent to be motivated to submit an additional submission given the clearly biased, ill-conceived and prejudicial conclusions that have been drawn from the first set of responses.

5. Rate Setting Principles and Expertise

Rate setting in the electricity sector is a complex process and requires a very specific set of skills. To succeed, it must be sensitive to achieving governmental policy objectives as well as satisfying legislative requirements. It is our understanding that The Regulatory Authority Act (RAA) makes provision for the solicitation of independent expertise by the RAB when required.

Even a cursory study of basic rate setting principles would indicate that most, if not all of the cardinal principles of rate setting have been ignored, misunderstood or misinterpreted based on the content of the Preliminary Report.

We would like to ask the RAB, what specific level of electricity sector rate setting expertise was utilised in the preparation of both the original EGD and Preliminary Report Documents?

6. Conflict of Interest

Section 31 of the RAA lays out the rules for participation by a Commissioner or member of staff in a decision making or advisory capacity in any adjudication or public consultation.

We would like to ask the RAB, if any 'Conflicts of Interest' have been declared, which relate to this EGD process and if so, we request copies of the relevant declarations pursuant to Section 31 (8) of the RAA.

7. **Description of Issues Discussed at Meeting with Regulatory Authority of Bermuda on 26th July 2017 @ 11.00 am**
   - Attendees: Michael Wells, RAB; L. Nigel Burgess, RAB; Monique Lister, RAB; Tristy Smith –RAB; Nicholas Duffy, BAE; Chris Nash, BAE.

Background: The meeting was requested by Bermuda Alternate Energy (BAE) after the release of the Preliminary Report (PR), Preliminary Decision and Order, dated 14th July, 2017. BAE were requested to provide an agenda for the meeting and suggested the following 4 topics:

We would propose the following four topics as a starting point for an agenda:

i) Review of the inaccurate information supplied in Section 1.2 (8) of the Executive Summary of the Preliminary Report in view of the detailed Financial Data submitted by Bermuda Alternate Energy in their response to the initial consultation document;
ii) Review of the financial impact to date of the 'Interim Orders' on the renewable energy industry in Bermuda;
iii) Determination of a Feed In Tariff that is compliance with the legislated requirements of the Electricity Act;
iv) The importance of 'Energy Netting' in residential installations to ensure right sizing of solar PV systems.

The RAB responded as follows:
"Please note that the Authority agrees to Agenda items i and ii in listen only mode. As we are currently in public consultation, the Authority is limited in terms of what it can/can't discuss. Any additional comments related to i-iv may be submitted to the Authority as a formal response to the public consultation."

Agenda Item 1 - Review of the inaccurate information supplied in Section 1.2 (8) of the Executive Summary of the Preliminary Report in view of the detailed Financial Data submitted by Bermuda Alternate Energy in their response to the initial consultation document;

The Executive Summary of the PR, Page 2, Section 1.2, 8. States:

1.2 The lack of financial data and analysis from the solar installation industry

8. The Authority is concerned that the solar installation industry in Bermuda failed to provide any analysis or data to support its claims as to the financial impact of the EGD.

Historical Context

In relation to the above section of the Executive Summary, BAE provided the historical context for the presentation of the responses to the EGD Consultation Documents, submitted on 12th May, 2017, by themselves and others. We make note of the following specific issues that made the task both extremely challenging and time consuming:

i) As late as 05th May, 2017 we were forced to make major revisions to some of the most significant elements of our response as differing interpretations of the specific meanings of critical phrases in both the original Emergency General Determination (EGD), versions 1, 2, & 3, and the 'Clarification Order' of 17th April, 2017, were acquired.

ii) In conversation with the Director of the Department of Energy on the 4th May, 2017 it became clear that the Department of Energy had arrived at a significantly different interpretation of the meaning of the EGD document than we had.

iii) In an effort to seek a final clarification, the Director (Department of Energy) interceded on our behalf, to acquire directly from the RAB, what we understood at the time to be, the 'definitive and final' interpretations of the problematic sections of the text.

iv) Within 24 hours of receiving the above 'clarification', which we are told came directly from a member of the RAB team, we subsequently received another email from the Director indicating that the information she had received from the RAB team member was now apparently incorrect:

v) These interchanges illustrated quite clearly that there was not only, mass confusion in the industry, but also, significant confusion within Government and the Department of Energy, and also between the staff within the RAB itself, over the precise meaning and intent of the documentation they have produced.

vi) We included copies of the original email exchanges between ourselves and the Department (Director) of Energy in our original submission of 12th May, 2017 to ensure full transparency.

vii) The other major solar installer (Bermuda Engineering) filed a very comprehensive 17 page submission on 26th April, 2017, which was the original submission date prior to the two week extension. As a result, they were under the same understanding as the Department of Energy, BELCO and many others that the EGD included the 'Monthly Netting Provision' that was part of the original BELCO submission. This can clearly be evidenced by simply looking at the content of their submission. It is fair to assume, had they known the true intent of the EGD was to remove all netting, that their emphasis on financial data would have been significantly different.

In the context of all the above, we were trying to produce a detailed consultation response, including financial modelling of complex data that needed numerous revisions due to the constantly changing interpretations of the very poorly worded original document. In addition, we were working to an extremely tight timeframe and without dedicated resources.

Submission of Financial Data

Despite the constraints of the 'historical content' summarised above, BAE submitted the following documents to the RAB on 12th May, 2017:

- A 21 page response to the Consultation Document addressing all questions except #2;
- A 9 Page, detailed response, specific to Question 2;
- An individual response from the Divisional Manager of BAE as a solar stakeholder;
- An individual response from the Engineering Manager of the BAC Group of Companies as a solar stakeholder;
- Other submissions forwarded to us and submitted on behalf of clients.

Our primary 21 page document contained 6 appendices, 3 of which were labelled **'Financial Impact Table' and the 4th 'Summary Table'.** Each financial impact table provided detailed modelling scenarios for a 5kW, 10 kW and 15 kW solar system in both the original Net Metering and new FIT scenarios. In addition, each table individually modelled the impact for 'Low', 'Medium' and 'High' kWh consumption. The Summary Table provided the summary of the first three tables.

It is our contention that the statement made in the RAB Preliminary report is clearly completely untrue and shows a disturbing disregard for the efforts of those of us in the renewable energy industry. We have worked extremely hard for many years under very difficult circumstances to build this fledgling industry and are now under attack by the very body that is legislated with supporting our growth.

The statement is not only untrue but is also totally misleading to all of those who have read the report and has most likely negatively influenced public opinion against the industry and severely damaged our reputation as a whole. Because of this, we believe the legitimacy of the entire consultation process has now been compromised and there is a clear demonstration of bias in the manner in which the process is being administered.

"The Authority has carried out its own analysis of the economic and financial aspects of renewable energy installations, in particular solar PV installation, which is explained in Section 7 of this Report and attached as Appendix C". - See 7.3 Table 1: Summary of Results, Page 18

It has not escaped our attention that the financial data modelled by yourselves, and referenced above, bears a remarkable similarity, in both layout and overall content, to the data we submitted to the RAB on 12th May, and were subsequently accused of not providing!

In view of all the evidence we have provided, we conclude it is now the responsibility of the RAB to immediately issue a public retraction to the statement made in 'Executive Summary 1.2' on the grounds that it is untrue, misleading and damaging to the reputation of our industry. As we stated at the close of the meeting, now that we have brought this to your attention, we believe that honesty should supersede all other procedural protocols when disseminating information to the public on an issue as important as our future energy supply.

Agenda Item 2 - Review of the financial impact to date of the 'Interim Orders' on the renewable energy industry in Bermuda.

The following is a summary of the verbal comments made by our Chris Nash, P. Eng., on the financial impacts of the Interim Orders issued in the EGD.

We are dismayed that in spite of the numerous responses made about the disastrous results the FIT proposed by the RAB will have on the solar industry here, none of this seems to have been considered in implementing the same FIT rate of $0.1736 originally proposed into the Preliminary Decision and Order. After a further two and a half months since our submissions on May 12, we can confirm that the enquiries that BAE is receiving for new residential solar installations are probably less than 15% of the levels prior to the issuance of the EGD. Furthermore, we have not made a single residential solar PV sale since receiving the clarifying order for the EGD in March. Although these sort of comments from the solar firms may be hard to believe, we now are accumulating empirical data from the Planning Department's web site that corroborates well with these opinions provided by the solar installation firms, their existing customers and other respondents in their submissions on the EGD.

Since the EGDs FIT came into effect in June 2017, Planning's web site shows that there were only three residential solar PV building permits or PDP applications filed in the month. This compares to eleven filed in the same month in 2016, or a year over year drop of 72.73% for the month. Now we appreciate that a single month's data is not statistically very reliable, so let's also look at the data for July even though the month is not complete. However, we know that perhaps 90% or more of residential solar permits are filed under the PDP permit system that calls for applications to be submitted only on Tuesday Mornings. Having checked the application log book at Planning on both Tuesday and Wednesday afternoons this week, we verified that no residential solar PV were submitted Tuesday morning or at all this week. As no residential solar permits applications were shown on the web site as being filed prior to this week, we can now say with almost 100% certainty that no residential solar PV permits have been filed in July 2017. This compares to 8 residential PV permits being filed in July 2016, or a drop of 100% year over year. For the two months together, this represents an 84.2% drop from the previous year.

Although we did not mention it in the meeting, the total number of building permits filed in June 2017 was actually higher than 2016, indicating that the drop in solar permits is specific to this industry and not a result of and overall drop in applications.

Based on the drastic drops in residential PV permit applications in June and July, we can now say with certainty that there is a very concerning downward trend in residential solar PV permits applications for the entire industry, not just for BAE. If Planning's data for August displays a similar downward trend we can only conclude that the residential solar industry in Bermuda, which is our single largest renewables industry, has been placed into a crisis state from which it may take years to recover. The EGD will be the primary cause of the demise of this industry, but other parties have also contributed to the residential public's complete loss of faith in solar PV as a sound investment. This includes the consultants hired to draft the Electricity Policy and EA, BELCO in the cessation of net meter installations starting in August 2016 and the other government entities involved in drafting and implementing the EA.

So let's look at what the RAB has done to further precipitate this apparent crisis. The RAB has proposed a FIT that is based on the one year old avoided cost to the Bulk Generation Licensee (BGL), which does not comply with what the EA requires. The EA requires the FIT to be based on the avoided cost to the Transmission, Distribution and Retail Licensee (TDRL). The EA also requires the establishment of auditable separate account for the BGL and TDRL to verify there is no cross subsidization and therefore to be able to verify the true avoided cost. To the TDRL. Not only does the proposed FIT not include the fuel customs duty hike and related other higher fuel costs this year, as seen in the much higher fuel adjustment for July 2017 compared to July 2016. Furthermore, it does not include any amortization costs, overhead, profit etc. of the BGL, which all form part of the TDRL's avoided costs.

In addition to the avoided cost to the TDRL, the EA also requires the FIT to include an economic benefit cost. Yet in spite of many of the public and solar industry responses to the EGD pointing out the economic benefits, the RAB has both failed to include for any economic benefit and failed to provide their reasons for doing so.

To put how low the proposed FIT is in comparison to other similar islands, we pointed out the following information from the Cayman Islands, which are very close to Bermuda in terms of population size, generation mix etc. The main island's electric utility, CUC, burn only #2 diesel in reciprocating diesel engines, using their one gas turbine only for emergencies. Their residential cost of electricity is pretty similar to BELCO's except that they do not have the tiered rate structure and their residential facilities charge is a small fraction of BELCO's. The Electricity Regulatory Authority (ERA) in Cayman has several years of experience in regulating the electricity sector there, whereas the RAB have less than one year's experience in this sector. In May 2017, the ERA and CUC announced their fourth FIT since 2011. The new rates for new customers converted to Bermuda dollars are as follows:

BMD$0.36/kWh for Residential Systems 5 kW and Smaller (107.4% higher than the RAB's FIT)

BMD$0.312/kWh for Residential Systems over 5 kW (79.7% higher than the RAB's FIT)

BMD$0.252/kWh for Commercial Customers

Existing customers are grandfathered at their previous rate for the remainder of their 25 year contracts.

Not only are these FIT rates substantially higher than the one proposed by the RAB, but Cayman have already reached 6MW of installed rooftop PV, which is now double Bermuda's capacity. They are also allocating another 2 MW of rooftop solar capacity in this phase of their FIT program, plus a further 1 MW for government buildings. Cayman commissioned their 5 MW solar farm in June 2017 and CUC pay the developer, Entropy, BMD$0.204/kWh for electricity produced by the solar farm. That means a 5 MW solar farm in Cayman, with a better solar resource than Bermuda's is being paid 17.5% more for its solar energy than the RAB's proposed residential FIT. These sort of numbers from Cayman adequately demonstrate how inadequate the RAB's residential FIT is, largely due to the fact that the RAB's FIT does not comply with the requirements of the EA.

The Cayman model has been so successful because they have adhered to internationally acceptable renewable tariff setting principles such as the NRELs guide to renewable tariff setting mentioned in my response to question 4 on the EGD. In contrast, what has transpired in Bermuda has broken almost all of these best practice guidelines and possibly even established new mistakes that no other jurisdictions have made. The fault for this lies with the numerous parties involved in establishing and administrating our renewable energy policies and legislation here and is not just the fault of the RAB. Again the result has been the almost complete loss of faith by potential residential customers here in solar PV as a sound long term investment.

The RAB's economic analysis of the impact of their proposed FIT show the simple ROI for residential solar PV systems here range from 8.27 to 14.37 years and has the nerve to say that these are still

attractive rates of return. Having over 40 years of experience in designing and selling energy savings technologies here, I learnt back in the seventies that anything with over a seven year simple ROI was not sellable except to maybe a few very green individuals. Indeed, just last week we were told by a leading businessman here that he was not interested in anything with an ROI of more than five years.

The above RAB ROI estimates do not include either the cost of borrowing, or the maintenance cost for such thing as removing the arrays to paint the roof every three to five years. Therefore these long ROIs are even longer or unworkable when borrowing costs etc. are included.

With regard to the RAB using Augusta Georgia's energy use patterns to model self-consumption vs energy export for residential solar PV customers here, we believe that this is a fundamentally flawed modelling approach for the following reasons.

Weather data for Augusta shows an average high temperature in July of 93°F compared to 85.4°F for Bermuda. The average daily low for Augusta in July is 70°F compared to 77.9°F for Bermuda. With much hotter daytime temperatures, better insulation in most houses and the low cost of electricity in Georgia, we can conclude that Augusta residents are far more likely to leave their air conditioning running during the day compared to Bermuda residents who mostly turn off their air conditioning systems when they are at work. However because their summer nighttime temperatures are so much cooler than ours, their residential air conditioning systems will consume far less nighttime energy than in Bermuda residences. Therefore August Georgia residents with solar PV are far more likely to self-consume their daytime solar energy production than Bermuda residences, while consuming far less nighttime energy. The result is that Bermuda solar residences are far more likely to export much more of their daytime solar energy production, while importing far more at night compared to Augusta residences of the same general size and solar capacity. Therefore, using the Augusta model will indicate a far better ROI prediction at your proposed FIT than is achievable for typical Bermuda residences.

In summary, the Planning Department's records of solar PV building permit and PDP applications for June and July 2017 indicate an 84.2% drop from the same period last year. This already seems to prove the claims made in many of the original 84 responses that the proposed FIT would cause the collapse of the residential solar industry here. Yet in spite of these numerous warnings which were ignored by the RAB, you are still proposing to carry on with the same FIT rate. BAE maintain that the proposed avoided cost FIT does not comply with the statutory requirement of the true, current avoided cost to the TRDL component and that the establishment of the true avoided cost could still be more than 12 months away. Furthermore, the proposed FIT does not contain any economic benefit component as required by the EA even though many respondents comment on this economic benefit factor. Of the five original solar firms established here between 2009 and 2011, already 2 have ceased operating prior to the EGD. If the alarming drop in PV applications continues, it is quite conceivable that a further two solar firms will close if not all three remaining. The RAB is required under the EA to promote the use of renewable energy, yet there is now an increasing body of evidence showing that you have done exactly the opposite. Similarly, the EA requires the RAB to promote competition in the electricity sector, but your EGD has done exactly the opposite and we may again end up with BELCO as the monopoly and no solar firm still in competition. Likewise, the EA requires the RAB to promote Bermudian employment, but the EGD may result in multiple lay-offs followed by redundancies for most solar workers on the Island. All of our solar staff are Bermudian and we believe that this is probably the case for the other two firms still in business.

Time did not permit us to recommend our solutions to this grave predicament we now find the Bermuda solar industry in, but the solution is contained in most of the 84 responses submitted. That is to:-

1. Reinstate net metering to existing and pipeline customers as originally proposed by BELCO.
2. Implement the revised net metering up to net export as proposed by BELCO.

3. Provide a fixed duration contract for the above customers of at least 20 years.
4. Look to establishing a future FIT based on true avoided cost to the TDRL once they can finally be established and a realistic estimate of the economic benefit of distributed solar, which may vary by BELCO's customer class type.

The quick adoption of this type of solution is the only hope of saving the renewable industry here from total collapse.

Although it was not an agenda item, we did mention to the RAB that we did not notice any responses from customers of the two solar firms that are out of business. Therefore relying on the solar firms to disseminate RAB information to customers is flawed and that the RAB should instruct BELCO to disseminate the information as they have an accurate database of all net meter installations.

Team Solar
Bermuda Alternate Energy
(441) 297 3639
2nd August, 2017

Cc: Jeane Nikolai – Director, Department of Energy
Aran McKittrick – Research and Development Officer, Department of Energy
Aideen Ratteray Pryse – Acting Permanent Secretary

L. Nigel Burgess CEng

From: Peter~G <plparker123@gmail.com>
Sent: Thursday, July 27, 2017 5:36 PM
To: Renewables
Subject: RESPONSE TO PRELIMINARY REPORT

RESPONSE TO PRELIMINARY REPORT,PRELIMINARY DECISION AND ORDER: RENEWABLE ENERGY METERING.

Unfortunately I have just received your report (not from you, but from an interested friend) and therefore have had little time to craft a response. In this regard, I would reference the word FAIRNESS in your webpage header. I don't see fairness when it appears you did not send a copy of the report to all those persons who responded to your preliminary Order, nor is it fair to give only a two week window of opportunity to respond to such a complex document..

Nevertheless, here are my comments:

1. Your decision to maintain your preliminary position is based as much on faulty mechanics as on faulty rationale. For example, in the computation of the "avoided cost" it appears that you have accepted BELCO's computation of $0.17 as fair and accurate. Belco has informed me of the elements they have considered in computing that value (and you also showed those components in the Report) and I submit that Belco (and the RAB) have grossly understated the avoided cost by failing to included some of the most important elements. To illustrate and because of the time constraint would ask you to refer to three documents: (i) A Brookings Institute Report "Rooftop Solar: Net metering is a net benefit" (www.brookings.edu/research/rooftop-solar), (ii) A Report from Environment America "Shining Rewards: The Value of Rooftop Solar Power for Consumers and Society (www.environmentamericacenter.org/reports/amc/shining-rewards). This report found that "A review of 11 recent analyses shows that individuals and businesses that decide to go solar generally deliver greater benefits to the grid and society than they receive through net metering, and (iii) a report published by The Institute of Local Self Reliance (www.ilsr.org) on the U.S.State of Minnesota's Solar Powering analysis. This report outlines "value of solar" as an alternative to net metering; a methodology which further illustrates the ultimate benefit of solar not just to the operator, but to the community as a whole.

2. A general comment on the quality of your Report. Although perhaps technically correct, the report is written in what some would call "legalese" making it difficult to understand and follow the logic. When reading the Report and the Appendices, one sees an overabundance of repetition of both words and numerical tables. It makes one wonder if the report if written to confuse rather than enlighten.

3. In Section 6. you discuss the Responses to the first Report. Apart from the tone of the discussion, which I found to be arrogantly dismissive of the legitimate and sincere concerns of the respondents, your paragraph 50 states "the transitional measures do not actively disincentivise the adoption of renewable energy installations in future". Whether or not this will disincentivise future installations is a judgement call which I do not believe you are entitled to make, and in any event I think you called it wrong.

I sincerely hope you will take the time to review the documents referenced above. It can be easily stated that what happens in USA doesn't really apply here in Bermuda, but an analysis of the principles is indeed in order and I think the principles and the rationale do indeed apply.

I am sorry not to have prepared a more thorough response, but given your deadline, I did not have the opportunity.

Sincerely

Peter L. Parker

6 Tranquillity Lane
St,David’s DD01

From:	The Cards
To:	Renewables
Subject:	Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Metering
Date:	Friday, July 28, 2017 5:26:15 PM

Re: "Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Metering" and should otherwise comply with Rules 18 and 30 of the Authority's Interim Administrative Rules, which are posted on the Authority's website.

_____

Dear Mr. Burgess,
Below please find a copy of my (belated) comments on the EGD (Response to Consultation Document 17-0316 : Comments on Regulatory Authority Emergency General Determination).
Please read them as additional comments to those below with respect to the Preliminary Decision and Order.

With respect to the PD&O;

Para 3)
refers to section 6 of the EA as the foundation for the RA's rate setting authority and quotes sections d, e, and f but ignores sections a, b, and c. As the order implies the EA actually puts supply sustainability and promoting "the use of cleaner energy sources and technologies, including alternative energy sources and renewable energy sources" AHEAD of interconnection access, affordability and efficiency.
On this basis and others it is clear that the RA is free to depart from a pure calculated "avoided cost" number in creating a feed-in tariff. You should have the courage to do so.

para 5)
this appears an attempt to justify the avoided cost as an upper limit on the feed-in tariff. Particularly in the case of small, privately built PV systems at this early stage of implementation there is clear room to set rates above avoided cost in order to accelerate early adoption and increase the installed distributed generation capacity. section 36.a.ii is included specifically for this purpose.

in 6)
The elimination of a "cross-subsidy" is in fact a red herring. There is no reason to eliminate such cross-subsidies when the objective is to finance a transition from a monopoly supplier to a regulated supplier and distributor utilising small, distributed private inputs. There is conceptually no difference between setting a high feed-in rate and simply mandating a renewable fraction in cases where it is known that the renewables cost will be higher than the non-renewable cost. This latter case is also "cross-subsidisation" and is accepted everywhere. It is not inherently evil as your paragraph implies.

in 7)
With due respect to the brevity of this paragraph; What nonsense!
At the levels of implementation we have currently and at the system sizes we now see there is no appreciable effect on economic "efficiency". Similarly, given the state of flux of the technology (both in terms of cost and technology) payback periods of 8 years are hardly indicative of "artificial economic returns" the removal of which need to be the focus of RA action. A premium on avoided cost is universally accepted as the most effective way to stimulate adoption and capacity growth.

in 9)
it is mentioned that the RA has used, as a premiss for it's analysis, that private PV systems would be sized on the basis of providing for self consumption. This is wrong and is inconsistent with the RA's obligations under the EA to promote the use of renewables. The RA should, at lest, be agnostic to system size and should actually be actively maximising installed capacity.

in 10)
in a) This is, respectfully, a misreading of the RA's responsibilities.
in b) The RA seeks to explicitly avoid making any decisions on what it calls "subsidisation". This based on the Minister's having requested that BELCO implement the Energy Commission's 2016 Recommendations. This is a cowardly abrogation of responsibility. It is clearly one of the intentions of the EA and RA Act that the RA is the chosen instrument at the cutting edge of change in the way we generate and distribute electricity. It is also clear that this change is intended to lead in the direction of increased renewables use in general as well as increased Distributed Generation, a Smarter Grid and more PV in particular. For the RA to take the position that it cannot use it's rate-making authority to set rates which incentivise and

accelerate development in these directions, including cross-subsidisation, is derelict. If the RTA insists on explicit quantified legislative instruction for such action, paralysis will result and we will find ourselves with a single monopoly supplier, a dumb grid and criminal levels of carbon emissions in 20 years time. Just as we are now.
This Clear Regulatory and Legislative Framework will have achieved only stasis!

in 12)
Missing from the RA's "overarching" responsibilities are any of the objectives of sections 6a, b, and c of the EA, not to mention the others mentioned in section 12 of it's own act.

In overview, I believe the RA should embrace the responsibility it is clearly given by the EA and it's own Act to use it's rate-setting authority to accomplish energy goals which have been clearly stated and which are clearly in the interests of all users. This should include:
- a rate structure which incentivises early adoption by explicitly (and transparently) connecting feed-in rates to system investment by providing an assured return over the anticipated system pay-back life. This should be explicitly not a permanent state of affairs but should have a 5 year window with annual rate review. At some point it may well be that the rate would fall to avoided cost and the criterion of supporting investment would disappear.
- wording which takes account of the future increased use of storage.
- a requirement that BELCO implement tiered rates and make the grid smart enough to deal with them.
- reduce regulatory "Red Tape" and become the Single-point-of-contact for distributed systems (especially smaller, privately owned ones).
- make explicit allowances for rates for private sale of electricity over the grid.
- make explicit provision for shared ownership and shared revenue for DG systems.
- For the avoidance of doubt, request legislative action on the subject of mandated Renewable Fractions for BELCO generation and the ability on the part of the RA to set a separate tariff for BELCO's shortfalls on the mandate.

Yours Very truly,
Jan Card.

———— Prior (belated) response to Matter 17-03-16 (Edited) ————————

Mr. Nigel Burgess
Senior Manager Electricity Analysis and Planning
By Email: <renewables@rab.bm>

Dear Mr. Burgess,
I realise the date for submissions in this matter has past. Nonetheless, attached please find my comments which I hope will be of some effect.
My comments are inserted into the Document Sections in italics below.
Should there be any way I can be of assistance in your work on this issue, please do not hesitate to ask.
Jan Card

———————————————-

Consultation Document
Matter: 17-03-16
Date: 16 th March 2017, updated 17th April and 24 th April 2017
Responses Due: 12 th May 2017

Responses to this consultation document should be filed electronically in MS Word format.
Parties filing comments should go to the Regulatory Authority's website, www.rab.bm, follow the link to the Consultations and Response page, and click the "Click here to submit a response" icon which appears at the top of the page. All comments should be clearly marked "Response to Consultation Document 17-0316 : Comments on Regulatory Authority Emergency General Determination" and should otherwise comply with Rules 18 and 30 of the Authority's Interim Administrative Rules, which are posted on the Regulatory Authority's website.

———————————————

7.1

Please respond to any or all of the following questions, referencing them by number:
1. What is your view of the how Solar PV has evolved in Bermuda? Please provide views on the uptake of this technology.

As an engineer in the 70's I was aware of the increasing risks of hydrocarbon fuels and the development of alternatives. In the 80's and early 90's Solar thermal was clearly the least expensive alternative for low grade heat generation in Bermuda. While lip-service was paid to its use, the reality is that no public policy steps were taken to accelerate it's use. At a time when any new residential unit built in Israel was required to meet 80% of it's DHW needs through Solar, in Bermuda residences, commercial premises and even Hotels were still being built to use multiple small capacity electric hot water heaters. This trend persists today. In spite of the decreased cost of Solar Thermal and PV systems and the high local cost of alternatives, we lag in implementation. Retrofit costs are an issue for Solar Thermal and Storage costs are the hurdle for PV. Notwithstanding this, the simple truth is that relatively straightforward and easily implemented Public Policy steps over a short timespan could accelerate adoption with enormous benefits to both individuals and to the community in general.

2. Looking to the future, how important do you believe Solar PV is for Bermuda? If a respondent views Solar PV as important please provide your views on what its costs and benefits are, how these should be quantified, and how these should be reflected in the framework for electricity regulation.

Solar PV is the single highest potential renewable technology prospect for distributed use for Bermuda. Every square metre of south or west-facing roof represents potential. Potential wealth for the owner, potential work for the installers/maintainers/ potential foreign exchange savings in fuel purchase, potential capital savings in generators in Pembroke, potential Greenhouse Gas emission reductions and potential revenue for the grid operator. We are not at the stage where quantification should be the top priority. We are at the qualitative stage and will be for a decade yet.
The exploratory public discussions which took place 10 years ago made it clear that we were far behind the curve in Energy terms and that the immediate projects were to mandate a smart grid, mandate renewable implementation, mandate distributed PV and mandate early adopter buy back tariffs that guaranteed a return on projects. These moves toward renewables should be financed by electricity rates. The California Model, where renewable mandates on supply could be satisfied by the Utility engaging in financing energy efficiency and distributed generation projects should be embraced. By creating a regime where BELCO could engage with homeowners in financing Solar Thermal retrofits and satisfy renewables mandates, hundreds of units would be built. Hundreds of jobs created. Hundreds of KWh in demand avoided and hundreds of Barrels of oil fuels not burned. The same model would see thousands of Solar PV units installed as well. The benefit list would be similar and the extra factor would be the increasing experience with and confidence in our ability to implement and succesfullly integrate Distributed Generation into our increasingly Smart Grid. In the short run, the grid, and displacing hydrocarbon burn, is the ideal replacement for storage.

3. Should there be capacity limits on solar systems installed on individual customers' premises in Bermuda? Should this be included within a formal licensing framework?

We are far away from any reasonable practical limits on Distributed Generation. Some mini-grids are stable at distributed fractions approaching 40% of load. Until we approach system limits there should be no restrictions on installation size. The onus should be on BELCO (or the grid operator) to demonstrate that a particular installation might be a risk. It should be noted that any logic that supports size limits has at it's core the fact that our current distribution system is "dumb". These arguments evaporate as the Grid becomes "Smarter".

a. If so, who should be responsible for assessing the system sizes and their limits (BELCO, Department of Planning, RAB, etc.)

The model for any restrictions should be that the grid operator could raise an objection with respect to a particular project with the RA. The RA would then be empowered to mediate the project design and the grid-connection parameters to achieve a safe compromise. The stated policy objective should be to maximise connected capacity in the medium term.

b. Should Solar PV system sizing for a customers' premises be limited to the prior 12- month consumption of a residence/business and/or should it be based on forecasted consumption?

NO! The objective must be to maximise distributed generation capacity and minimise hydrocarbon burn at reasonable prices.

4. The Authority has, via the Emergency General Determination, and on a transitional basis, mandated that BELCO should pay for electricity received from Solar PV systems on the basis of the Energy Commission recommendations of October 2016 (see the Determination for detail). What are your views on this transitional measure?

Too little, Too Late, Wrong Premise. The buy-back rate at this stage of implementation shooud be based on a reasonable

return on the project and financed from general rates. This to accelerate early adoption which is clearly "in the best interests of the residents and consumers of Bermuda".

5. What level and type of cost transparency should be mandated on BELCO to facilitate the determination of an appropriate feed-in tariff for electricity provided by Solar PV? In particular:
a. The Authority intends to mandate full accounting separation between BELCO's (i) generating, and (ii) transmission, distribution and retail activities. Please provide your views on specific aspects of BELCO's operational activities that are relevant to the cost transparency and related determination of the feed-in tariff rate?
b. What levels of cost element transparency would you expect within a BELCO feed in tariff for Solar PV?

There is plenty of time to address the need for cost and rate transparency in the future as we transition from early adoption and a dumb grid to having a smart grid and a reasonable fraction of distributed generation. At this point, and for years to come, the feed-in rate policy should be to set rates to ensure early projects achieve reasonable returns and installed Distributed Generation capacity grows. Rates will have to be set by the RA and adjusted as technology and costs change. Larger projects would have rates set individually based on the technology used and budgeted costs. Application would be made in advance for a rate ruling based on project budgets.

6. What do you believe should be the economic basis for Solar PV in Bermuda, specifically in the context of feed-in tariffs?

Feed-in rates set to ensure early adopter projects achieved reasonable returns would likely be 25% to 50% above avoided direct cost. This premium would be offset to BELCO by increasing general rates. Over a period of a decade this regime could transition toward avoided cost, as mandated renewable fractions were imposed to allow BELCO treat this buy back as renewable purchases. If and as sufficient cost information was made available. "Avoided cost" calculations should include the avoided cost of new generation, reserve capacity and standby reserve capacity as well.

Alongside any general comments by respondents please provided responses to the following:
a. Should BELCO's Solar PV Metering Scheme reflect a cost -benefit methodology or an avoided cost methodology?

At this stage and for the near future; Neither.

b. What cost rate design for Solar PV participants is best suited to incentivizing greater utilization of cleaner energy sources and technologies in Bermuda?

For smaller projects a rate should be set to assure reasonable (Base + 3%) return on investment. This could be adjusted yearly to reflect technology and cost changes. For larger projects, application could be made to the RA on a project-by-project basis for a "rate ruling" to set a rate based on project design and cost estimates.

c. What other factors should be considered in determining the cost rate design for feed in tariffs?

In the early stages, none.

7. Should Solar PV or other renewable energy programs be incentivized within a specific regulatory framework for renewables
in Bermuda?

Absolutely, positively.

8. In your view, are there any barriers to Solar PV or other forms of renewable generation investment?
a. If so, what are these barriers?
b. How could they be removed to enable further investment?

The principle barrier is the lack of Policy Clarity and prompt action to clearly show that Public Policy will prioritise Distributed Generation, Smart Grid development and renewable fraction and will ensure that early adopters will achieve reasonable returns on investments.
A second barrier is the red-tape factor. A One-Stop licensing process should be run by the RA. Planning and other Regulatory functions should be either delegated to RA staff or performed under RA direction by seconded staff. Safety and interconnect issues would be addressed under RA authority with BELCO sign-off. The RA should take ownership of the entire bureaucratic process with the intent to identify issues and resolve them expeditiously to allow licensing to proceed seamlessly and quickly.
A third barrier is financing. Joint project ownership and revenue sharing should be enabled. The RA should undertake to

open a dialogue with potential lenders to find out what actions it can take to facilitate lending on small and large projects. A second objective should be to encourage and facilitate the lenders to create, possibly together with suppliers, loan packages based on feed-in revenues or even turn-key installed projects.

Yours Very Truly, Jan Card.

Jan Card (P.Eng)
Gulfstream Engineering
Delivery & Courrier:
#22 Water St.
St.George, Bermuda. GE-05
Post:
P.O.B. 2687
Hamilton, Bermuda. HMKX
T:(441)292-3731
F:(441)295-2833
M:(441)504-7068
E:<HCard@northrock.bm>

Jan Card (P.Eng)
Gulfstream Engineering
Delivery & Courrier:
#22 Water St.
St.George, Bermuda. GE-05
Post:
P.O.B. 2687
Hamilton, Bermuda. HMKX
T:(441)292-3731
F:(441)295-2833
M:(441)504-7068
E:<HCard@northrock.bm>

Response to the Regulatory Authority of Bermuda
RE: Consultation on the Renewable Energy Metering Scheme
2nd August, 2017

FROM: Stratton Hatfield "Topwood" 11 Westwood Lane, Paget, PG05

I write this response not only as a staff member of BE Solar and investor in solar technology (on island and overseas) but also as a concerned young Bermudian who is passionate about Bermuda and addressing the effects of energy inequalities and Climate Change.

The Emergency General Determination (EGD) set forth by the RAB on March 2, 2017 and the related implementation of the avoided cost rate of $0.1736KWh, as well as the related termination of the prior net metering scheme, lacks integrity, fairness or innovation and more importantly is unsustainable. **The EGD does not promote economic efficiency nor sustainability in the generation, transmission and distribution and sale of electricity.**

I have worked for BE Solar for two years now in the position of Director of Development focusing on sales and marketing. I have sold over 500kW of solar electricity during this period and have sold it based on the premise that our clients would be under a net metering or net billing agreement. The EGD goes against what was promised to our clients and has negatively impacted their feelings towards BE Solar and the renewable energy industry.

It is crucial that Bermuda focuses on reducing the cost of electricity so as to reduce the cost of living. Installing renewable energy not only helps to keep more money in our local economy, it helps reduce the use of imported fossil fuel while helping to strengthen the local Bermudian economy. Solar energy is a proven technology that can produce and deploy cleaner energy at a time when the world is in dire need of addressing climate change and while Bermuda is in a dire need to stimulate economic growth. Solar energy can easily be interconnected to the utility grid to reduce peak demand and offset the need to run expensive turbines that are powered with imported fuel. Solar generated power, both utility scale and on a distributed generation level, should form a primary component of a diversified generation portfolio for Bermuda. Eventually all of Bermuda's generation needs can be met through solar electricity and the use of renewable resources should be maximised to the extent it is cost effective and fair to both BELCO and the solar producers. Bermuda should be leading in the renewable energy industry!

In the sake of fairness, integrity, innovation and the sustainability of Bermuda, I personally recommend the following on behalf of the entire renewable energy industry in Bermuda in an effort to enable Bermuda's economic growth and the ability to create Bermudian jobs:

1. Terminate the EGD feed in tariff and ensure that it is not the permanent tariff scheme.
2. Effectively consult with the public and all stakeholders to come to an equitable agreement that does not shock the electricity industry.
3. Perform analysis on real Bermuda businesses and home owner energy use and gather accurate data to make an informed sustainable decision that is based on fact and not theoretical modeling.
4. Implement the "Monthly Net Billing" tariff scheme as explained above as soon as possible.

5. Introduce the "Monthly Net Billing" tariff scheme for both residential and commercial Solar PV system owners up to a maximum of 1,000 applicants or 10MW of installed solar PV capacity, whichever comes first.
6. Instate a "Monthly Net Billing" tariff scheme guaranteed for at least a 25 year period in order to provide stability for investors in solar electricity.
7. That the RAB follows the recommendations of BELCO to grandfather in solar producers that were under the original net metering program that ended August 15th, 2016.
8. That all solar producers who were put under the EGD billing structure be retroactively compensated based on the "Monthly Net Billing" tariff scheme.

Please act with conscience and our future in mind as this decision should be for our grandchildren and most importantly for our planet.

Thank you,

Stratton Hatfield

L. Nigel Burgess CEng

From: Taran Card <taran.card@gmail.com>
Sent: Friday, July 28, 2017 10:19 AM
To: Renewables
Cc: wroban@parliament.bm
Subject: Comments on Response to Preliminary Report, Preliminary Decision and Order: Renewable Energy Metering

Dear Sir,

I would like to put forward my comments on your preliminary report.

First however I would like to express some disappointment in your initial consultation. I missed your notice for consultation and I suspect judging by the numbers of responses you had that many other people who would have made valuable contributions also missed the notification.

Considering the amount of fanfare made when regulations are passed I feel that's additional forms of community notice for consultation documents could be provided.

I do not, at the moment, have a PV installation on my home, however it is something I have been seriously considering for the last few years. The final decisions of your order will make a large contribution in my decision.

I also think that you're mistaken that the RAB does not have a role in fostering new industry in Bermuda. That should be precisely the role of your organization; looking forward in a holistic way to foster the best potential for the island as a whole instead of one monopoly business.

I also think that you are in correct in your assumption that the purpose of putting a PV installation on your roof is to mitigate your daytime use. When I am doing the calculation for how much PV installation I need on my house, my goal is to have a zero electric bill. This will also be my justification when I go to the bank to get a loan for the equipment. If I do the installation and still have to pay for the electricity at night making a net payment to Belco there is no point to me.

Belco will always be required to provide base load electricity at night, however, their own statistic show that their peak loads are daytime summer. These loads could be drastically reduced his large amounts of PV installations are installed in a distributed fashion. This would lower the overall footprint of Belco, reduce our reliance on fossil fuel, and foster small businesses throughout the island.

However, Belco will always claim that this idea is on achievable. Mostly because it reduces the amount of electricity that they have to produce to sell to customers.

The rate for electricity should be one rate regardless of how the electricity is produced! I remain available should you wish to discuss anything further, my sincere regrets for missing your initial consultation. I do not believe that your current order is in the best interest of the island as a whole, in the long term.

Sincerely.

Taran Card

L. Nigel Burgess CEng

From: Thomas Hands <thomas.hands@gmail.com>
Sent: Friday, July 28, 2017 8:14 PM
To: Renewables
Subject: Re: Undeliverable: solar rebates

On Fri, Jul 28, 2017 at 6:57 PM, <postmaster@rab.local> wrote:

> **Delivery has failed to these recipients or groups:**
>
> renewable@rab.bm
> The email address you entered couldn't be found. Please check the recipient's email address and try to resend the message. If the problem continues, please contact your helpdesk.
>
> Final-Recipient: rfc822;renewable@rab.bm
> Action: failed
> Status: 5.1.1
> Diagnostic-Code: smtp;550 5.1.1 RESOLVER.ADR.RecipNotFound; not found
>
> ---------- Forwarded message ----------
> From: Thomas Hands <thomas.hands@gmail.com>
> To: <renewable@rab.bm>
> Cc:
> Bcc:
> Date: Fri, 28 Jul 2017 18:57:29 -0300
> Subject: solar rebates
> Hi RAB,
>
> I believe that once you reduce the price at what Belco buys back the solar, you will reduce all incentives for home owners to move towards solar. Although solar is not a total solution to Bermuda's energy issues, it is a good start.
>
> My preference is for the RAB to leave the prices as they were. As Belco has costs to recover for powerline and other maintenance, I could live with say a 5 to 10 cent reduction in what Belco purchases electricity.
>
> Thanks,
>
> Tom Hands