



BE Solar Consultation Response
To the Regulatory Authority of Bermuda:
(Transitional Measures for
BELCO Limited Solar Net Metering Scheme)
Emergency General Determination

26th of April, 2017

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1.0 Background

1.1 Consultation

- Consultation issued 16 March 2017
- Responses due by 17:00 on 27 April 2017
- RA has issued an emergency general determination that BELCO must pay a feed in tariff (FiT) to PV producers
- Response must comply with rules outlined in section 3 of the consultation document.

1.2 Solar Tariffs

- 15 Aug 2015: BELCO letter to the Energy Commission (EC) advised they would:
 1. close net metering scheme to new participants,
 2. adopt a monthly net-metering up to zero kWh net balance based on BELCO's definition of avoided costs for new customers
 3. continue to pay Commercial Owner's Excess Energy Rate (CSEER) to commercial participants and anyone who had begun construction as of the date of the letter.
- 26 Aug 2016: Minister directs EC to conduct inquiry into:
 1. BELCO's proposal to close net metering to new participants
 2. BELCO's proposed new rates for solar from residential and commercial customers
- 16 Sep 2016 BELCO NET Metering Filing to Energy Commission
- 11 Oct 2016: EC presents findings to Minister 'Net Metering Inquiry Response & Recommendations'
- 26 Oct 2016: Minister re-iterates EC's recommendations, but held off on implementation due to imminent transfer of authority from EC to RA.
- 28 Oct 2016: Regulatory Authority (RA) comes into force
- 14 Feb 2017: RA finds that BELCO letter ceasing all payments to solar customers is contrary to sections 6(c) and (d) of the EA and 12(a) and (c) of the RAA.

1.3 Emergency General Determination

As a result of the above, the RA issued an Emergency General Declaration (EGD) requiring BELCO to operate its solar net metering scheme as follows (based on the Energy Commission's recommendations):

1. Original scheme to run in parallel with transitional programme until 31 December 2016, at which time it will be terminated to avoid subsidising PV customers. All PV customers to be migrated to transitional scheme by 1 January 2017.
2. Commercial and residential PV (Feed in Tariff) FiT will be set at \$0.1736 per kWh for new solar PV systems going forward, with no limit on number of systems as proposed by BELCO.
3. Financial cost of FiT to be absorbed by BELCO until a new power purchase regime is implemented by the RA. Costs to be placed in a (Fuel Adjustment Rate) FAR like recovery account.
4. Payments to be calculated on a monthly basis.

2.0 Response to Questions

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

Solar PV has developed rapidly in Bermuda since the first grid connected systems were installed around 8 years ago. The island now has at least one Megawatt of Solar PV generation capacity and a steady stream of new projects being installed day to day. The costs of Solar PV have fallen significantly during this time, with solar electricity now costing substantially less than electricity generated from oil (approximately \$0.10 - \$0.15 per Solar PV kWh versus \$0.40 per BELCO kWh).¹

Uptake has generally been limited to organisations and individuals with sufficient capital to purchase systems outright, or those who are able to secure financing. There is a now an increasing need to ensure that widespread access to the benefits offered by Solar PV is available to residents of Bermuda, regardless of their level of income or home ownership status.

¹ Solar PV cost per kWh based on actual contracts closed in Bermuda and BELCO costs per kWh based on actual higher residential and commercial tier rates.

2 Looking to the future, how important do you believe Solar PV is to 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 critically important to Bermuda and will form a major component of the electricity generation mix in the future. Dozens of countries now obtain substantial proportions of their electricity from Solar PV and several small island states now obtain all of their electricity from Solar PV. Many countries have made ambitious targets in regards to drastically reducing and eliminating reliance on fossil fuel generated electricity as the realities of the economics of health costs and climate change due to fossil fuel use are realized and observed².

Global investment in renewable energy capacity was more than double that of fossil fuels in 2016. Solar and wind have clearly established themselves as the leading electricity producing technologies, with total installed solar capacity forecast to reach 300GW by the end of the year and investment of \$114 billion in 2016. Costs are forecast to continue to decline and intermittency is no longer a concern with seamless integration of forecasting, demand side management and energy storage technologies into electricity grids³.

The long-term trends are clear, to do anything but promote expansion of solar would be to take Bermuda backwards relative to the rest of the world and harm our ability to remain an attractive competitive economic jurisdiction to do business and visit.

Costs

Solar PV systems⁴ in Bermuda currently cost in the range of \$4,500 to \$5,000 per kW of DC capacity, for a fully installed system including costs associated with interconnection and the Department of Planning. The levelised cost of electricity produced by these systems typically ranges from \$0.10 - 0.15 per kWh⁵.

Benefits

With most systems producing around 1600kWh per kW of solar PV each year, depending on tilt and orientation, and solar technology, over their 30 year lifetime each solar PV kW is likely to generate around 46,000 kWh of electricity.

Based on these assumptions, each kW of Solar PV installed offers the following benefits:

- Avoids the need to import 67 barrels of heavy fuel oil

² 77 countries sign the Paris Agreement on Climate Change targets, the UK has committed to reducing carbon emissions by 57% by 2032, BBC news reports.

³ The UK, for example, already has over 3GW of operational energy storage.

⁴ These prices reflect costs of typical system sizes from 3-8kW. Costs for smaller systems increase disproportionately due to fixed costs of planning, interconnection, site setup etc.

⁵ Accounting for system degradation, maintenance and time value of money. The cost of energy produced is not an accurate indication of appropriate feed in tariff levels, as these would not provide a payback period of less than 7 years, which is typically necessary to justify investment in Solar PV.

- Reduces the trade deficit of Bermuda by avoiding the flow of around \$6,000 offshore to purchase fuel⁶. Approximately 50% of the capital cost of the system remains in the local economy to pay for labour, parts, taxation, planning and other expenses.
- Avoids the emission of 35 tonnes of carbon dioxide.
- Avoids the emission of air pollutants such as SO₂, NO_x, PM₁₀, PM_{2.5}, which are harmful to human health and have significant health care cost ramifications.
- Costs residential and commercial customers approximately 60-75% less than purchasing from BELCO.
- Supports local businesses that provide stable employment to Bermudians.
- Reduces exposure of both the system owner and Bermuda's economy to fuel price volatility.
- Provides more jobs per kWh and costs less per kWh vs. oil.

Quantification of Costs

Both system costs and the levelised cost of solar electricity could be quantified by the government or RA by compiling annual statistics on installed system costs and energy production. This is done in other jurisdictions and used to inform development of policies, regulations and tariffs.

Quantification of Benefits

- I. **Financial** - The financial benefits of Solar PV can be calculated either on an individual system level or on a national level. A very significant benefit, which is often overlooked, is that real electricity prices can be *completely stable for the lifetime of the system*⁷, if so desired by the RA. Considering individual versus national system costs and benefits:
 - a. The financial benefits of individual systems are typically quantified through conventional financial appraisal methods, with the internal rate of return and net present value methods favoured by BE Solar. Many investors are very focused on simple payback, *which they often expect to be 7 years or less*⁸.
 - b. On a national level, we believe comparison of the long-term cost per kWh between solar and fossil fuels, based on a sensible range of scenarios⁹, will clearly show the financial benefits.

- II. **Environmental** - Both benefits and costs may be quantified by using carbon dioxide emissions as a proxy. This is a widely used metric in other jurisdictions and allows simple yet accurate comparison of the environmental benefits of Solar PV with other generation technologies, and also allows simple

⁶ Assuming, conservatively, a purchase cost of \$90 per barrel of fuel over a 30 year period not including local costs such as tax and pipeline charges.

⁷ In jurisdictions where prices for solar electricity have been set for extended periods, *nominal* prices tend to increase predictably based on formulae that link them to common inflation indices

⁸ This is something we believe the government and RAB should take into consideration as it develops tariffs for solar electricity.

⁹ Attempting to compare the financial benefits of Solar PV with fossil fuels without applying a range of cost scenarios for fossil fuels inevitably produces misleading results due to the inherent volatility of fossil fuel prices.

comparison between Bermuda and other jurisdictions. As an example, electricity produced from oil typically has a carbon factor of **780g CO₂/kWh**, whereas electricity produced from Solar PV typically has a carbon factor of **40g CO₂/kWh**, as such Solar PV achieves a **95% reduction** in carbon factor vs. oil generated electricity.

- III. **Societal** - Societal benefits may be determined through more complex analysis of financial and environmental impacts of the technology, and associated co-benefits. A few examples include increased employment opportunities, reductions in exposure to fuel price volatility, reduced risk of fuel spillages and reduced exposure to harmful air pollutants, increased opportunities for tourism and business from an increasingly sustainability and clean energy demanding international clientele¹⁰.

¹⁰ For example, international businesses, including insurance companies have sustainability charters which limit the jurisdictions where they do business, tourism demand for more sustainable destinations is ever increasing, various news articles confirm these trends, as well as The United Nations World Tourism Organization.

Reflecting costs and benefits in the Framework for Electricity Regulation

We believe the costs of Solar PV should be reflected in the framework for electricity regulation as follows:

- I. **Financial** - Regulation could seek to:
 - a. Reduce costs as far as possible through the use of simple, effective regulation to reduce administrative burden that increases the 'soft costs' of Solar PV systems¹¹.
 - b. Reduce costs of financing by establishing a stable regulatory environment, with clear and stable long-term tariff structures and interconnection procedures. This should seek to ensure investors in Solar PV are able to obtain financing for similar rates to an established utility such as BELCO.
 - c. Satisfy the key financial criteria required to encourage sustained investment in Solar PV¹². Investors in Solar PV should receive the same entitlement to receive a fair return on investment as investors in BELCO have done under previous and existing legislation.
 - d. Accurately project the cost of electricity from different generation technologies, including Solar PV, to inform decision making.

- II. **Environmental** - Regulation could require reporting of the carbon dioxide factor per kWh of electricity produced based on a methodology provided by the RA.

The clear and numerous benefits of Solar PV need to be identified and taken into consideration as regulations are developed and implemented.

¹¹ Examples include straightforward, efficient interconnection procedures and avoiding unnecessary licensing systems for small systems.

¹² For example, by ensuring tariffs achieve a 7 year simple payback, a reasonable IRR and NPV for Solar PV systems owned by different customer groups, in sensible locations so far as exposure to solar irradiation is concerned.

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

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

There should not be pre-determined capacity limits on Solar PV systems, with the exception of technical constraints that are imposed directly by the property's service entrance capacity^{13,14}.

Our justification for adopting this position is based on consideration of how to maximise the benefits of Solar PV for the whole community, rather than for individual systems. In most neighbourhoods a proportion of the buildings either have poor solar exposure, or consume more energy than could be provided by their own Solar PV system. In these situations, surplus generation from neighbouring properties is a desirable outcome that we believe is in the national interest. To limit the system size on each property would be to unnecessarily limit the extent to which Bermuda can take advantage of Solar PV.

We do not support the introduction of a licensing framework for small Solar PV systems in Bermuda as systems are already covered by:

- Rigorous international standards for PV modules and inverters
- Bermuda's building codes and the Department of Planning's associated processes
- BELCO's interconnection process and inspections
- Bermuda's compliance with the National Electric Code (NEC) which refers directly to solar PV installations in section 690.

We are not aware of any jurisdictions where licensing for small Solar PV systems is required, however we are aware and support certification programmes for installers through organisations such as NABCEP.

a) We respect and support BELCO's role as the owner and operator of the electricity grid, and therefore believe they should be responsible for assessing system sizes and their limits, should they wish. We do however feel it is important that a straightforward appeals process is in place with the RA to ensure any disputes can be resolved fairly.

b) We do not believe that Solar PV sizing should be limited to prior or forecasted energy consumption, based on the same justification for not imposing capacity limits. This would distort the market and create perverse incentives, such as property owners intentionally increasing their energy consumption prior to installing a

¹³ We would support the development of a schedule of capacity limits based on service entrance capacity either through an open consultation process, or through independent technical verification of the proposed limits.

¹⁴ In the case that the service entrance capacity imposes a limit on the Solar PV system size, we believe there should be a clear process, approved by the RAB and solar industry, by which an applicant may request for the service entrance capacity to be increased.

system. Tariffs for imported and exported electricity have and will continue to provide clear price signals that will result in the installation of the most financially efficient system size¹⁵.

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

The transitional Emergency General Determination (EGD) measure was ambiguous in its wording and has caused significant confusion. The EGD, clarified as a Solar PV Feed in Tariff (FiT) at \$0.1736 on the 17th of April, 2017 is inadequate and shocking for the Solar PV industry in Bermuda. The current highest tier retail electricity rate in Bermuda is \$0.4262 per kWh, the current EGD FiT is 41% of this rate, or rather, compared to net-metering the FiT will result in a reduction of 49% of the value of Solar PV energy production kWh. This is unreasonable and is undesirable for many reasons, including the increased potential of legal challenges, Bermudian Solar PV industry job loss risks, further confusion, anger and loss of trust in the RA from stakeholders and society and the increased potential for grid defection of existing and new Solar PV system owners¹⁶.

It is important to note that BELCO itself suggested that existing Solar PV net-metering clients whose Solar PV systems were confirmed before August 15th, 2016, those who were early adopters in Solar PV in Bermuda, would be honoured and grandfathered on the existing Solar PV net-metering program as per BELCO's letter to the EC on the 16th of September, 2016. This was a sensible request as the original 325 Solar PV clients made significant financial investments in their Solar PV systems on the basis of BELCO's net-metering agreement parameters and resulting returns on investment in a legal agreement between BELCO and the system owner. For the EGD to not respect and honour the original early adopters of the Bermudian Solar PV industry is unreasonable and we request the RA consider this very carefully.

Furthermore, BELCO's letter on the 16th of September, 2016 also requested that new residential Solar PV system owners, whose solar PV systems were confirmed after August 15th, 2016, should be compensated on their solar PV system kWh production based on a new tariff, a monthly net-metering to 0 kWh balance, with an avoided cost FiT for excess kWh produced. This proposed scheme is sensible as it values a Solar kWh at the same value as a retail kWh while valuing an oversized Solar PV system less, which encourages the continuing and growing investment in the Bermudian Solar PV industry, creating jobs and keeping more money in our local economy. However, the current EGD rate scheme, as stated above, values solar PV at a much lower rate and effectively makes a residential Solar PV investor subject to the existing rules of a commercial Solar PV customer, which is unsatisfactory and unreasonable, usage patterns are very different for commercial versus residential customers.

Solar PV owners whose systems were confirmed after the 16th of September, 2016 reasonably expected that the RA would accept BELCO's rate scheme. Over six months have passed and all stakeholders were under the

¹⁵ There are often significant economies of scale for Solar PV systems, therefore larger systems produce cheaper energy and should be encouraged. Our community needs clean affordable energy, therefore investment in Solar PV should be encouraged.

¹⁶ The current EGD encourages Solar PV clients to increase their desire to install electricity storage technologies and sever their connection to the grid, which will result in fewer clients supporting the grid which will lead to higher grid electricity prices and more people defecting from the grid.

impression that monthly net-metering was the current rate scheme, including the Department of Energy and BELCO as communication with the RA implied. This meant that a significant number of Bermudian households (estimated to be over 50) invested a significant amount of limited resources (estimated to be over \$1,000,000) in Solar PV systems based on BELCO's proposed scheme and their investment payback is now retroactively significantly reduced. It is very surprising that the RA did not include a clear example of how the EGD rate scheme would work. Such an example could be compared to the monthly net-metering avoided cost rate scheme proposed by BELCO and an example is provided below to show how the EGD compares to what was expected by stakeholders in the industry.

This example is based on a Solar PV system owner, Mrs. Jones, who invests \$20,000 on solar PV system to prepare for retirement and invest in Bermuda's future for her and her Grandchildren knowing Climate Change will impact them greatly. Mrs. Jones leaves the house early in the morning and turns off all of her electrical loads to be as efficient as possible and returns late in the evening after working long days and helping her family after work.

Example A - Mrs. Jones' BELCO bill based on the monthly net-metering and avoided cost tariff rate proposed:

- Solar PV system produces 750kWh in a given month
- Mrs. Jones needs 1,000kWh from BELCO, which would **cost \$338.24 without Solar PV**
- Net BELCO bill will **cost \$61.88 with Solar PV**
- **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. Jones' PV system under BELCO's proposed scheme.

Example B, 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. Jones 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. Jones' PV system under current EGD scheme.

The above example illustrates how financially catastrophic the new EGD rate scheme is on existing Solar PV system owners and what a shock the EGD system is to the Bermudian Solar PV industry and the what the knock on effect on business and Bermudian jobs in the industry would be.

We request that the RA accepts the monthly net-metering to 0 kWh then avoided cost rate scheme as proposed by BELCO on the 16th of September, 2016. That this rate scheme should be eligible 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. The monthly net-metering to 0 kWh then avoided cost rate scheme should be locked in for at least a 20 year period for these system owners, with 30 years preferable, in order to ensure investment stability for PV system owners and investors in 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 produced 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 the 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?**

We believe a high level of cost transparency is necessary to enable efficient regulation. From a regulatory standpoint, high resolution cost information is most likely to enable the development of competitive prices for electricity as it will allow better informed decisions.

A specific concern is that costs should be transparent enough to differentiate between the cost of generating and delivering solar energy. Owners of Solar PV systems should receive a fair price for *generating* energy, while BELCO should receive a fair price for *delivering* this energy¹⁷.

a) We support the proposed approach, and would additionally recommend the following:

- Determine the cost of standby capacity¹⁸
- Determine the cost of generation based on time of production¹⁹
- Allocation of fixed vs variable charges²⁰

b) We believe a Solar PV FiT should:

- Clearly show the price at which energy from Solar PV has been purchased
- Clearly show the price at which energy purchased from Solar PV has been sold
- Be set for at least 20 years to provide long-term cost transparency
- Have built-in inflation adjustment mechanisms based on government derived indicators such as the CPI or RPI to provide long-term cost transparency
- Be based on system size, to acknowledge the very different economies of scale

¹⁷ As a hypothetical example, assuming the cost of generating solar energy is \$0.18 per kWh and BELCO's cost of delivering this energy is \$0.02 per kWh, BELCO could be permitted an 8% net profit on the delivery cost of \$0.02, while the solar investor would be permitted an 8% net profit on the \$0.18 cost of producing the energy.

¹⁸ Intermittency of Solar PV and the requirement for backup power has been used to justify higher monthly facilities charges for some customers. The cost of generation capacity necessary to provide standby power should be determined to enable accurate pricing to be developed. This policy discriminates unfairly against customers with Solar PV as there is no technical reason why customers should be charged for variations in demand caused by Solar PV but not charged for variations in demand caused by loads within their buildings.

¹⁹ BELCO's cost of generation varies based on time of production, and may often peak when Solar PV output is high. Time of use tariffs could therefore offer an efficient rate mechanism that improves the financial case for Solar PV.

²⁰ BELCO has some of the highest fixed facilities charges we are aware of in any country. The use of higher fixed charges enables kWh charges to be reduced, which reduces incentives for energy efficiency and Solar PV.

6 What do you believe should the economic basis for PV be in Bermuda, specifically in the context of feed-in-tariffs? Alongside any general comments by respondents please provide responses to the following:

- a) Should BELCO's Solar PV Metering Scheme reflect a cost-benefit methodology or an avoided-cost methodology?**
- b) What cost rate design for Solar PV participants is best suited to incentivising greater utilisation of cleaner energy sources and technologies in Bermuda?**
- c) What other factors should be considered in determining the cost rate design for feed in tariffs?**

The economic basis for PV in Bermuda should be the provision of a healthy level of competition in the electricity sector and stable, predictable electricity prices for individual households, organisations and the whole community. Feed in tariffs offer the practical means through which this may be achieved.

a) The cost-benefit approach should be the primary method through which rates are developed to ensure rates are practical. Using a balance of both methods should account for the requirements of both investors in Solar PV and BELCO by producing a range, within which the most appropriate tariff(s) can be set.

The avoided cost methodology tends to be BELCO-centric as it is based around their cost structures, therefore it may suggest rates that would work for BELCO but may not be appropriate for investors in Solar PV. A key weakness of this method is that fossil fuel prices are volatile and difficult to predict, so avoided costs can change suddenly. Establishing a feed in tariff based on BELCO's avoided costs would therefore tend to undervalue the price stability that is offered by Solar PV and unnecessarily expose the solar industry to fossil fuel price volatility. The cost-benefit methodology is more Solar-PV centric and may suggest rates that work well for Solar PV systems but are not appropriate for BELCO or its customers.

b) Our modelling of different electricity rate structures clearly indicates that a *degression²¹ based feed in tariff* based on system size would be the most economically efficient and sustainable tariff structure for Solar PV. Many other jurisdictions with more mature PV markets have tried other tariffs and settled on feed in tariffs²², often with degression mechanisms²³. Key findings of the modelling that support this conclusion were:

- **Net metering:** Achieves a 5-7 year simple payback, but not financially sustainable as internal rate of return (IRR) is excessive therefore benefits investors in Solar PV but these benefits are not shared with other electricity users.
- **Avoided fuel cost:** Simple payback is over 10 years therefore would not encourage investment in Solar PV despite the levelised cost of energy over the system's lifetime being very competitive.

²¹ Degression could be either fixed or responsive, and set by the RAB.

²² As of early 2014, 74 countries use some form of feed-in-tariff.

²³ Examples include Germany, UK, Denmark & Phillipines.

- **Degression based FiT:** Can be tailored to provide a 6-7 year simple payback and sufficient IRR to encourage investment in Solar PV, while providing the most competitive levelised cost of energy over the system lifetime, which ensures financial benefits are shared among all electricity users.

We believe that the feed in tariff should be designed to ensure that Solar PV systems can achieve a 6-7 year simple payback, with an IRR of at least 15% and positive net present value (NPV). It is relevant to note that the government and/or RA may be able to take steps outside of setting feed in tariffs to improve the financial performance of Solar PV systems. Examples include reducing the facilities charge for solar PV system owners and changing planning fees and planning requirements for Solar PV system approvals to make them less cumbersome.

c) We believe the following factors should also be considered in determining the feed in tariffs:

- 1 The period over which the import and export of energy between a customer's property and the electricity grid is summed up, as this has a significant effect on the financial performance of the system and also affects the system design.
- 2 The facilities charge for customers with Solar PV systems.
- 3 The need for long-term stability to encourage investment.
- 4 The value of decarbonisation of the grid.
- 5 The value of the offset health costs of burning fossil fuels.
- 6 The value of increased attractiveness of tourism and international business from Solar PV for Bermuda.



7 Should Solar PV or other renewable energy programmes be incentivised within a specific regulatory framework for renewables in Bermuda?

Yes, a quantitative, long-term, national target should be set to decarbonise the electricity grid, based on the adoption of carbon factors as suggested in our response to Question 2. This would provide stability and clear direction for all members of the industry, and inform generation mix planning.

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?**

We believe there are a range of barriers to Solar PV and other forms of renewable generation investment, which are identified and discussed below:

- **Lack of long-term national targets for renewable energy generation and/or GHG emissions:** This could be addressed by either the RAB or the government adopting quantitative targets.
- **Major changes to the economics of Solar PV without industry consultation or warning:** Examples include removal of the government rebate programmes and ending of the net metering programme. We hope to work constructively with BELCO and the RAB to ensure that future changes are introduced via consultation and planning to allow our business and customers to prepare.
- **Retroactive changes to existing rate structures for Solar PV:** The size, layout and orientation of each Solar PV system is specifically designed to suit each client based on the rate structures in place at the time of installation. Retroactive changes to these structures can jeopardise the financial performance of Solar PV systems and discourage potential future investors in Solar PV.
- **Lack of legislative, regulatory and policy stability for the energy sector:** This creates a very difficult environment in which to operate a business, encourage investment or to secure competitive rates of financing. Stability is the key to obtaining the lowest cost energy from renewables.
- **Lack of a stable long-term tariff structure for Solar PV:** This has limited investment and increased the cost of financing. A legislated long-term feed in tariff could be used as leverage to reduce the cost of financing for Solar PV, making it accessible to those who cannot afford to buy systems outright.
- **Planning setback policies:** Costly DAP1 planning applications are sometimes required as a result of a small part of a system being installed on an existing structure within a setback area. The application of discretion or use of an approval letter from a neighbour could offer a more common sense approach.
- **Residential facilities charge:** This is a good example of a retroactive change to an existing rate structure, which substantially affected the financial performance of some Solar PV systems. We believe the present charge is counterproductive as it prevents small energy efficient homes from investing in Solar PV and is also creating a strong incentive for people to go 'off-grid'.
- **Lack of support for smaller systems:** Smaller Solar PV systems are not economically viable due to the large facilities charge and relatively high fixed costs associated with obtaining planning approval and interconnection. This is preventing many people on lower incomes, small roofs or those who use energy efficiently from investing in Solar PV. To ensure the benefits of Solar PV are shared among all socioeconomic groups, the government and/or RAB could work with the solar industry to reduce these fixed costs, or could set a higher feed in tariff for smaller systems.
- **Electricity grid capacity:** The electricity grid was designed based on a central rather than distributed generation model. At some point technical limits will be reached in terms of how much distributed energy the grid can cope with. Beyond that point it will be necessary to upgrade the grid to enable greater penetration of renewable energy. There is currently no incentive for BELCO to do this, even though it may be the most cost-effective option from a national standpoint.



- **Offshore Wind:** Bermuda has an excellent wind resource and offshore wind costs are increasingly competitive. The government and/or RAB could issue a request for proposals for a large offshore wind project with a view to getting a project online if costs are competitive and there are no technical or environmental barriers.
- **Deep Ocean Thermal:** Bermuda has excellent potential to utilize proven Ocean Thermal Energy Conversion technology, primarily for air- conditioning purposes

Thank you for your time and consideration on this critical topic and we hope and trust you, the Regulatory Authority of Bermuda, will come to a sensible conclusion as soon as possible for the betterment of Bermuda and beyond.

Sincerely,

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