FAIR TRADING COMMISSION

CONSULTATION PAPER

FEED-IN-TARIFFS FOR

RENEWABLE ENERGY SOURCES

Document No.FTC/URD/CONFIT-2019-03 **Date of Issue: May 29, 2019**

DOCUMENT NUMBER: FTC/URD/CONFIT-2019-03
DOCUMENT TITLE: Consultation on Feed-In-Tariffs for Renewable Energy Sources

ANTECEDENT DOCUMENTS

Document Number	Description	Date
FTC/UR/MTNDECRER 2016-03	Decision on the Motion to Review the Renewable Energy Rider	July 13, 2016; Revised July 25, 2016

TABLE OF CONTENTS

Purpose of Document

This paper outlines the Fair Trading Commission's (the Commission) process for the determination of feed-in-tariffs (FITs) that apply to the supply of renewable energy (RE) from various sources.

In the Barbados National Energy Policy (BNEP), the Barbados Government articulated its intention to move the island to a position where 100% of its energy will be generated from RE by the year 2030. This is in an effort to reduce the island's dependency on fossil fuel; currently, 95% of electricity generation is from this source. This high dependency on fossil fuel has the potential to jeopardise the sustainability of the island's economic and social development.

One of the major components that is required to achieve this 2030 goal is the establishment of a pricing framework which facilitates the move to RE. Specifically, the establishment of tariffs that would be applied to grid connected systems. In discussions with the relevant Government ministries and stakeholders, it was considered that for RE installations sized 1MW and under, the methodology that will be used to determine the tariff structure will be FITs. The structure and quantum of these tariffs are to be determined by the Commission.

The Commission is specifically charged, under the Fair Trading Commission Act, CAP. 326B (FTCA) of the Laws of Barbados, to consult with interested persons and stakeholders when discharging certain functions. Consequently, the views and opinions of stakeholders are being sought through this public consultation. The Commission, in making its determination, will take these contributions into consideration.

This paper is intended, therefore, to solicit comments on:

a) The structure and quantum of tariffs for RE installations; and
b) The applicability of other tariff methodologies for larger independent power producers/installations greater than 1 MW.

The consultation period will begin on 29 May, 2019 and end on 19 June, 2019.

SECTION 1 BACKGROUND

Barbados has a long history of using local RE resources to its benefit, having harnessed wind energy to power windmills in sugar production and harnessing solar energy for water heating. Technological advancements have led to a significant reduction in the costs associated with the use of these resources. These advancements also provide significant potential benefits to Barbados, especially in view of the country's impending move to 100% clean energy.

Currently, Barbados' electricity demand is serviced by the Barbados Light and Power Company Limited (BL&P), a vertically integrated utility which provides generation, transmission and distribution. This power is generated primarily from conventional fossil fuel, with a current installed capacity of 239 MW. Recently, there has been a drive towards RE generation, and the BL&P now owns a 10MW solar photovoltaic (PV) plant. Additionally, BL&P purchases power from customers who, as of March 2019, own 21.6 MW of distributed solar PV. The estimated cost of fossil fuel generated electricity fluctuates with the price of oil on the international market.

There has been a concerted effort to move the country away from fossil fuel dependency, to take advantage of primarily locally available renewable resources, as well as the promotion of sustainable energy practices. In 2009, approval was granted for the BL&P to implement a Renewable Energy Rider (RER) programme on a pilot basis. The RER was designed to facilitate the sale of excess electricity to the grid by customers using solar PV or wind RE systems, on an avoided cost basis. In July 2012, the BL&P made an application to the Commission to implement the RER on a permanent basis, with amended terms and conditions. This was approved in August 2013. Moreover, after industry stakeholders raised concerns about the survival of the sector, the Commission adjusted the RER to increase the eligible capacity limit from 50kW to 500kW in July 2016. Further to this, the Commission approved a temporary resource cost based RER credit of $0.416/kWh for solar PV and $0.315/kWh for wind, for all units supplied to the grid.

SECTION 2 LEGAL FRAMEWORK

Under Section 4(3) (a) of the Fair Trading Commission Act, CAP. 326B (FTCA) of the Laws of Barbados, the Commission is responsible for establishing principles for arriving at the rates to be charged by service providers. The Commission also has this duty under Section 3(1) of the Utilities Regulation Act, CAP. 282 (URA) of the Laws of Barbados, which states:

> *"The functions of the Commission under this Act are, in relation to service providers, to*
>
> *(a) establish principles for arriving at the rates to be charged".*

In accordance with Section 2 of the FTCA and the URA, "principles" mean the formula, methodology or framework for determining a rate for a utility service.

Additionally, Section 2 of the URA states that "rates" include

> *(a) "every rate, fare, toll, charge, rental or other compensation of a service provider;*
> *(b) a rule, practice, measurement, classification or contract of a service provider relating to a rate; and*
> *(c) a schedule or tariff respecting a rate;"*

According to Section 13(3) of the Electric Light & Power Act (ELPA) of the Laws of Barbados:

> *"The public utility shall purchase electricity from a licensee or other person referred to in subsection (1) at such rate as may be agreed by the parties and approved by the Commission".*

In view of the fact that the mandate of the Commission, under Section 13(3) of the ELPA, is to approve rates which were agreed to by the BL&P and RE suppliers, it is evident that the ELPA envisages a form of rate negotiation occurring between these parties. Moreover, the ELPA affords RE suppliers, with generators of all sizes, an opportunity to enter into an agreement with the BL&P for the supply of electricity at

an agreed rate which must be approved by the Commission. It should be noted that, if the parties do not agree on the terms and conditions of such agreement or a dispute arises, then, pursuant to Section 13(4) of the ELPA, the dispute will be resolved by the Commission, subject to Sections 46(1) and (2) of the FTCA:

Section 13(4) of the ELPA states:

> *"Where parties fail to agree on the terms and conditions of an agreement referred to in this section or a dispute arises in respect of such an agreement, any party may, in writing, refer the matter to the Commission for determination."*

Commission's duty to consult with stakeholders

The Commission is duty bound to consult with stakeholders when performing its rate-setting functions under section 4(3) of the FTCA. Section 4(4) of the FTCA states:

> '*The Commission shall, in performing its functions under subsection 3(a), (b), (d) and (f) consult with the service providers, representatives of consumer interest groups and other parties that have an interest in the matter before it*.'

SECTION 3 ANALYSIS OF FEED-IN-TARIFFS

A FIT may be defined as a rate which is paid to producers of RE by an electric utility or government for energy produced, usually over a guaranteed period. It is essentially an effective policy instrument for the promotion of RE objectives. As such, it is usually set at a level which incentivises investment in RE projects. Moreover, FITs have historically been instrumental in the push towards energy independence, which in turn encompasses multiple benefits, e.g. enhancement of security and stability in energy supply, greater economic competitiveness, greater environmental sustainability.

Potential Benefits of a FIT Programme

A responsive market pricing mechanism for RE technologies can effect greater uptake of energy from these sources. FITs designed to acknowledge critical issues in the market will more likely reflect the appropriate price signals associated with the increased magnitude of RE that displaces fossil fuel based electricity. Such an energy pricing initiative can realise the following net benefits, which will accrue to the RE investor, electricity consumers, the wider society and the environment.

Reduced Foreign Exchange Expenditure for Fossil Fuel Purchases

Barbados' fossil fuel cost statistics, as shown in Figure 1, depict the total foreign exchange expended for the past five (5) years. Estimated fuel costs in United States dollars (USD) for 2014 – 2018 were $322,700,000[1], $226,200,000[2], $367,095,000[3], $313,100,000[4] and $356,100,000[5], respectively. These figures generally reflect a high fuel bill. The fuel costs for 2015 were below US $300,000,000, which was the lowest

[1] Barbados Today. 2016. "30% Drop in Gov't Fuel Import Bill." April 23, 2016. Accessed April 24, 2019. https://barbadostoday.bb/2016/04/23/30-per-cent-drop-in-govts-fuel-import-bill/.
[2] Ibid.
[3] Barbados, Government of. 2019. Barbados Economic Report Energy Chapter 2017. April 24. Accessed April 24, 2019. http://www.energy.gov.bb/web/component/content/article/59-bulletin/271-barbados-economic-report-energy-chapter-2017.
[4] The Barbados Advocate. 2019. Business Monday: Oil Import Bill on the Rise. March 4. Accessed April 30, 2019. https://www.barbadosadvocate.com/business/business-monday-oil-import-bill-rise.
[5] Ibid.

expenditure on fuel over the five (5) year period. Fuel purchases for electricity production in 2018 were estimated at 2.77% of the Nominal Gross Domestic Product (US $5,086,700,000[6]). This was an increase of less than 0.5% in comparison to the 2017 estimate. For the first quarter of 2019, fuel expenditure associated with electricity production registered at about 2.27%. The total fuel cost is impacted by the quantities purchased and the per unit market price, which is naturally volatile.

The share of fuel cost for electricity production fell from approximately 56% (2014) to 24.85% (2016) and gradually climbed to 39.52% (2018). A major reduction in the quantity of fossil fuel consumed in the electricity sector was attributed to the increasing share of RE utilisation online from consumer owned generation (20.8 MW) and that of the utility (10 MW solar plant).

The opportunity to export a greater percentage of RE from consumer owned generation systems to the electricity grid can offset the amount of foreign exchange to be spent on fossil fuel. The intent to establish stable rates for RE technologies (solar, wind, biomass, etc.) facilitates this goal.

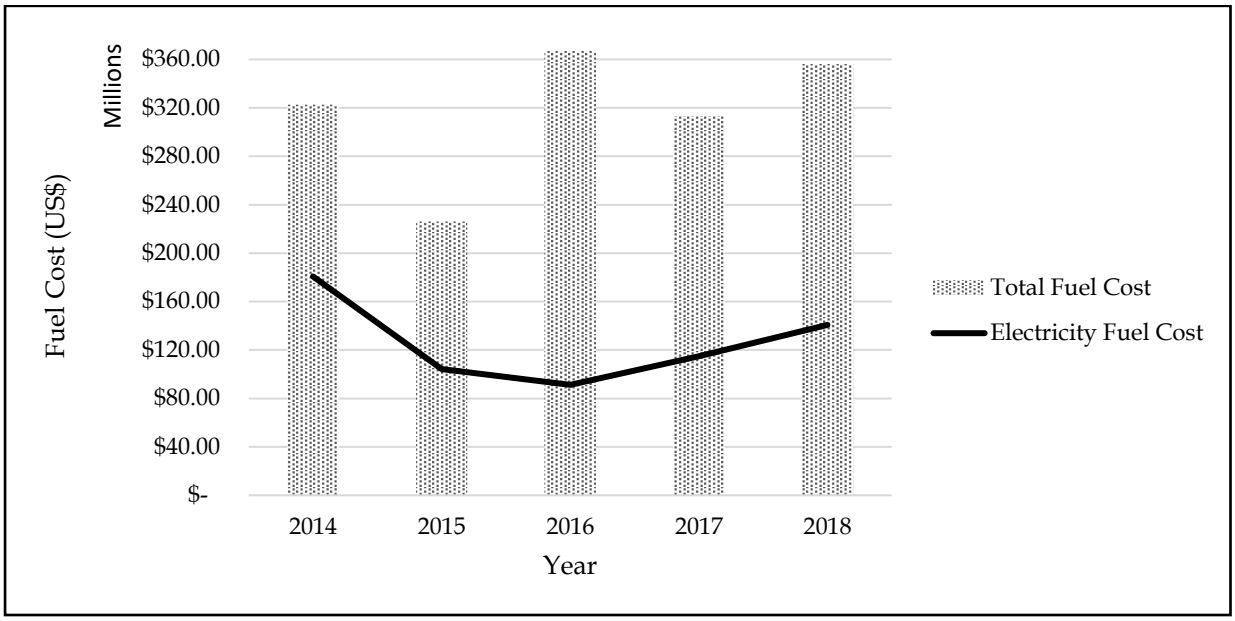

Figure 1- Estimated Annual Expenditure for Fossil Fuel 2014 - 2018

[6] Central Bank of Barbados. 2019. "Central Bank of Barbados Review of Barbados' Economy: January-March 2019." Central Bank of Barbados Web site. Accessed May 8, 2019. http://www.centralbank.org.bb/Portals/0/CBB%20Review%20of%20Barbados'%20Economy%20(January%20-%20March%202019).pdf.

The annual average avoided fuel cost during 2014 – 2018, based on consumer owned generation, as shown in Figure 2, shows the positive potential of an increasing RE penetration on fuel purchases. By December 31, 2018, more than US $950,000 in savings had accrued as a consequence of the RE deployment.

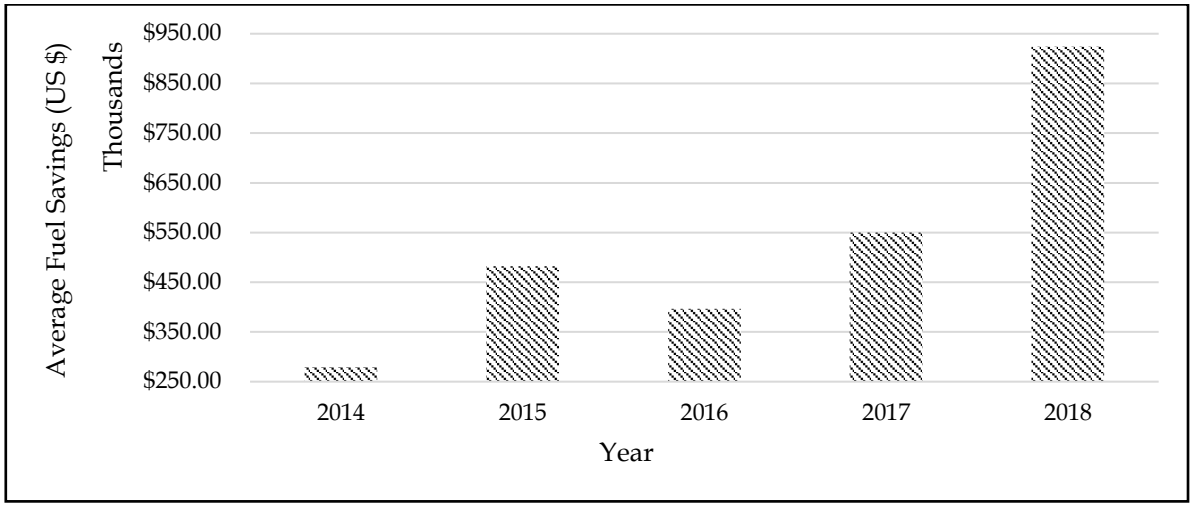

Figure 2 - Average Avoided Fuel Cost over 2014 - 2018

In 2018, electricity from fossil fuel conversion accounted for approximately 97% of the total electricity demand, based on an average daily petro-chemical consumption of 5,037 barrels of oil. Barbados consumes about 9, 000 barrels of oil equivalent (BOE) per day, which is 100% imported. Fossil fuel consumption for power production accounts for about 50% of the total BOE imports[7]. It is contemplated that the institution of a stable pricing regime will create an influx of RE installations and encourage more utilisation of these energy resources, thereby reducing the nation's dependency on fossil fuels. The upward trend, as seen in Figure 3, shows the energy share associated with consumer owned generation for 2014 – 2018; this ratio is likely to be exceeded when higher RE uptake displaces more fossil fuel based generation. Presently, consumer owned generation represents about less than 3% of the total energy demand. Barbados' local RE resource statistics indicate an average solar irradiance of

[7] Inter-American Development Bank (IADB). 2016. "Achieving Sustainable Energy in Barbados: Energy Dossier." IADB. August. Accessed April 25, 2019. https://publications.iadb.org/en/publication/12572/achieving-sustainable-energy-barbados-energy-dossier.

5.6 kWh/m^2/day[8] and wind speed margins of 6.15 - 8.78 m/s[9]; these statistics are ranked among the best in the world and this suggests that local natural energy resources should be fully exploited.

Currently, the avoided contribution occasioned by the RER programme is 43 BOE/day. The establishment of FITs is expected to reduce the aggregate fossil fuel imports required for electricity production. Additionally, the consumption of RE directly contributes to curtailment of greenhouse gas (GHG) emissions.

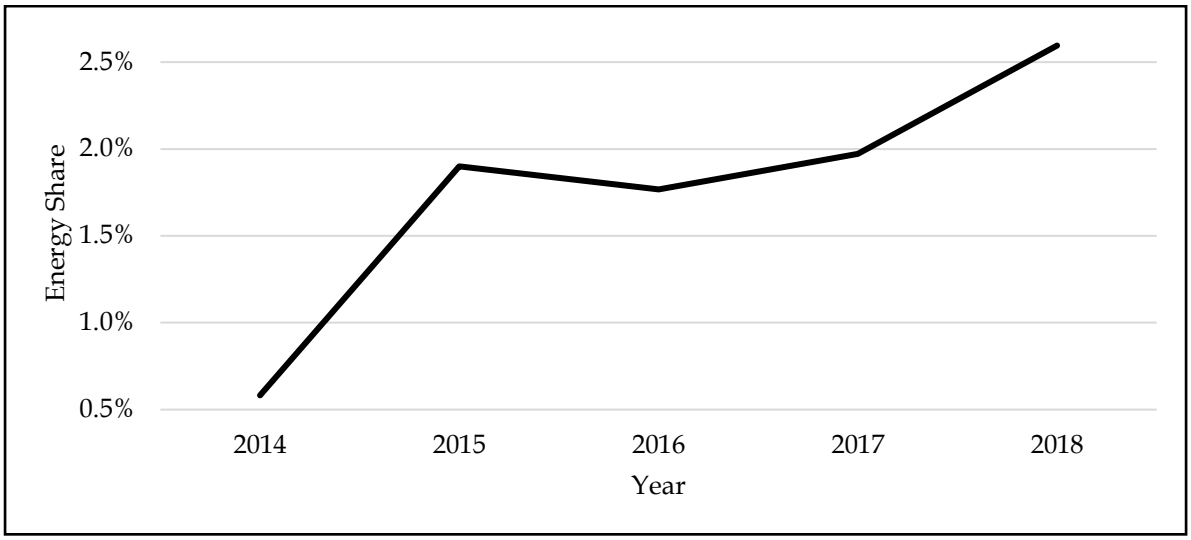

Figure 3 - Annual RER Share of Gross Energy Production

Reduced Greenhouse Gases

The transition to clean energy generation resources has the potential to improve air quality, boost the country's marketability as a green tourism destination and further reduce air pollution attributed to fossil fuel combustion from electricity production. The conversion of RE to useful energy is emission free, i.e. there is no formation of Carbon Dioxide (CO_2), Mercury (Hg), Nitrous Oxide (N_2O), Sulphur Dioxide (SO_2), or particulate matter (P.M), as is the case with fossil fuels which pollute

[8] System, Caribbean Energy Information. 2015. *Solar Swells in Barbados; Capacity Set to Double in 2016.* November 24. Accessed April 24, 2019. http://www.ceis-caribenergy.org/solar-swells-in-barbados-capacity-set-to-double-in-2016-2/.
[9] Tukiainen, Matti. 2019. *Gaisma, Barbados.* Accessed April 25, 2019. https://www.gaisma.com/en/location/bridgetown.html.

the air, water and soil. Furthermore, health and respiratory ailments associated with fossil fuel combustion are minimised or eliminated as RE uptake increases. These attributes can work to preserve our natural habitat, while the inexhaustible energy supply is fully exploited. Unlike fossil fuel conversion, RE does not require extensive use of other natural resources, e.g. water use while in operation, which is unsustainable, especially in a water scarce country like Barbados. Based on 2018 RE share from consumer owned generation systems, as shown in Figure 3, the RE foot print is relatively small with regard to electricity production. As RE online production gradually increases relative to electricity production from conventional plant, the GHG concentration is expected to decline. CO_2 emissions account for the majority of GHG emissions, i.e. 94%. The fossil fuel conversion to electricity produces approximately 827,000 tonnes of CO_2 , i.e. 74% of the national total[10].

The establishment of a rigorous FIT framework for all applicable RE technologies can essentially facilitate Government's clean energy goal of 100% RE by 2030. The use of FITs have been a proven strategic policy instrument to initiate rapid but controlled RE deployment. A major outcome when renewables are promoted this way is the direct decarbonisation of the electricity sector. Aside from this environmental benefit, this initiative seeks to directly establish Barbados' energy independence.

Increased Energy Independence & Security

Establishing confidence in the energy sector via a stable pricing framework for all applicable RE technologies is expected to stimulate further growth in this sector. The utilisation of indigenous RE resources naturally creates greater energy independence given that the converted energy is not dependent on imported fossil fuels, which are subject to the inclinations of the supply state. The application of FITs to RE technologies indirectly creates a forum for communities to gain acceptance of RE project proposals, encourage community-based participation, initiate

[10] International Business Publication. 2017. "Barbados Energy Policy, Laws and Regulations Handbook: Volume 1 - Strategic Information and Regulations." Google Books. Accessed April 25, 2019. https://books.google.com/books?id=-AcABwAAQBAJ&pg=PA66&lpg=PA66&dq=barbados+energy+policy+law+and+regulation&source=bl&ots=eOluXNeWAD&sig=ACfU3U1lY_9F1rofXdBv1VMlde5GwNgv9g&hl=en&sa=X&ved=2ahUKEwi1xvvrm-nhAhVwvFkKHX08BxEQ6AEwB3oECAkQAQ#v=onepage&q=barbado.

opportunities for partnerships with foreign or local investors and guarantee grid access for RE projects.

With respect to RE, especially solar and wind, consumption of the energy resource is climate dependent and not prone to disruptions in transportation or geopolitical pressures. These technologies have intrinsic characteristics which affect the quality of output. This effect can be mitigated when RE systems are co-located with energy storage. The energy security and energy reliability of variable sources such as wind and solar PV, can be improved by the use of storage; this facilitates constant and reliable output and makes the energy more economically viable. This also creates an opportunity for special pricing to be developed based on the quality of the energy delivered from variable RE. Currently, the existing RE rates do not distinguish between firm or variable RE. The rollout of RE generation systems and the associated pricing mechanism also assist in the planning of the energy framework for Barbados. Improved energy security is an innate feature of any energy strategy to transition a cleaner and more resilient energy sector.

Improved Energy Planning, Reliability and Resilience

Energy planning, which considers the impact of the potential rapid uptake of RE generation systems, ensures the felicitous use of RE technologies. This also aids in further diversification of the electricity market in the planning for electric mobility. FITs can also spur innovation and entrepreneurship in energy storage and create niches in ancillary services for grid support. This, in turn, facilitates a greater scale of grid modernisation - as a smarter, digital grid evolves, energy consumption can be computed in real time thereby enhancing system efficiency, reliability and flexible energy pricing for customers.

Additionally, an indirect benefit which can result from the application of tariffs for applicable RE technologies is the reduction in overall system losses. Research on the impact of RE technologies on the system grid suggests that system losses can be significantly reduced when these technologies are appropriately deployed.

Expanded Green Entrepreneurship/Job Offerings

Internationally, the RE sector has been identified as the fastest growing job generator in the energy market, compared to jobs initiated by the conventional electricity sector. It was estimated that, globally, about 10.3 million jobs directly or indirectly associated with RE were created in 2017[11]. This effect is likely to be mirrored by the institution of FITs for RE technologies integrated on the national grid in Barbados. Responsive energy prices can act as a catalyst for job creation. Examples of entrepreneurship opportunities in the RE market are the creation of installers, compliance inspectors, PV generation system manufacturers, research and development (R&D) roles in RE applications, project managers, energy auditors, etc. Within the Barbados energy context, it is hoped that a domino effect on employment and new business ventures will occur.

Assist in Shaping Energy Policy Directives

It is widely accepted in the international sphere that market responsive energy prices, such as FITs, will assist in carving out a sustainable energy framework. FITs that are set at the appropriate level will incentivise more investment, ensure market confidence and account for the level of development in the sector and the deployment required annually in the country. FITs for RE deployment are usually instituted in a phased manner and the rate adjusted according to the scale of deployment required to meet the policy objective. The design of FITs take into account the aforementioned considerations and is reviewed and adjusted to reflect market conditions.

Potential Disadvantages of a FIT Programme

Notwithstanding the above, FIT programmes are not without some shortcomings. There are some issues inherent in the design of FITs that may lead to a loss of public support and even market distortions. A number of general disadvantages to FITs are

[11] International Renewable Energy Agency (IRENA). 2018. "Renewable Energy Jobs - Annual Review 2018." IRENA Website. Accessed April 26, 2019. https://www.irena.org/publications/2018/May/Renewable-Energy-and-Jobs-Annual-Review-2018.

listed below. It must, however, be noted that they are general in nature and not necessarily specific to Barbados.

Information Asymmetry and Price Distortions

During the planning phase of a FIT programme, regulators may be subject to information asymmetry with respect to true production or technology costs. This could lead to excessively high pricing where the goal is to incentivise investment which, in turn, could result in unnecessarily high public costs. Moreover, a FIT rate that is set too high may result in excessive and unjustified profits for RE suppliers. A solution is to ensure that the price adjusts downwards over time as installed capacity increases. Conversely, there is a possibility that the price could be set too low and in this instance, there is little scope for investors to earn a reasonable return. Further, a low price discourages new investment and as such, the FIT would not be achieving its objective of encouraging investment in RE.

Higher Potential Energy Costs

Historically, FIT programmes have been implemented through the use of subsidies. In these instances, a premium is added to the FIT rate as an incentive to spur investment. A potential consequence is higher energy costs to the consumer. As a result of the premium placed on the FIT rate, the offtaker, usually an electric utility, is faced with paying more than the market price for the energy from the RE supplier. In turn, the offtaker passes these higher costs to the consumer.

Alternatively, a FIT programme may include indirect support mechanisms, such as tax concessions. These concessions may be financed by tax increases in other areas, which are likely to affect the consumer. This, however, may not be strictly applicable to Barbados, as the Government has not advised of any specific subsidies at this time.

Historically Unresponsive to Changing Market Conditions

A FIT programme is usually structured for a period that matches the design life of the specific RE system, i.e. 20 to 25 years. However, as it is not possible to predict all potential outcomes, having conditions set for this length of time may create difficulties in the face of changing market conditions. In the event that unforeseen problems or

new information/data arise, there may be a need to renegotiate or readjust the FIT. This may lead to a revised price, which may not be conducive to maintaining investor confidence. To mitigate against this, there may be a need to structure the FIT with a built-in renegotiation element so that investors are made aware from the initial stages.

Challenges with Market Integration

In the case of competitive electricity markets, where there are many suppliers, it may be prudent to set the FIT rate at a competitive level relative to the market price. Historically, FIT programmes have been found, in many instances, to be incompatible with competitive market prices in that they do not always encourage investors to respond to the market's price signals. In this way, FIT programmes have made it difficult to integrate into the existing market structure. This particular disadvantage is general and is not necessarily applicable in the Barbados context.

SECTION 4 SPECIFIC PROPOSED CONSIDERATIONS

The Barbados electricity market is relatively small and isolated. It is therefore important that the design elements of any FIT programme be appropriate for the local context. These elements should balance the expectations of the investor, including the BL&P, with the needs of the consumer, in order to ensure that the policy leads to technically, financially and environmentally sustainable outcomes.

As at March 2019, the BL&P reports that there are 1,858 customers with an installed capacity of 21,613 kW. Total installed capacity of RE systems, including BL&P's own solar plant, represents approximately 12% of the island's total generation. Additionally, there are a number of individuals and/or companies seeking to invest in the sector.

Over time, the cost of RE technologies has decreased and is likely to continue to do so in line with technological advances. Therefore, a flexible pricing methodology is required such that changing costs are more accurately and easily reflected. At a stakeholders' meeting in November 2018, it was considered that FITs would be applied to RE systems up to 1MW. As yet, no consideration has been given to what will apply to capacities beyond this limit.

This consultation investigates the setting of FITs for Roof Mounted Solar PV, Ground Mounted Solar PV, Wind, Biomass from Manure, Biomass Gasification, Solid Biomass Combustion, and Solid Waste Combustion at the various size ranges. It is expected that the FITs will be based on the levelised cost of electricity (LCOE)[12] that provides for the following features, which the Commission proposes to consider:

a. The minimisation of investor and financing risks to allow for low risk debt financing and low risk returns on investment;
b. A degression schedule to reflect the declining cost of production over time and to incentivise innovation;

[12] LCOE is the net present value of the unit cost of electricity over the lifetime of a generating asset. It is often taken as proxy for the average price that the generating asset must receive in a market to break even over its lifetime.

c. Inflation adjustments;
d. Front end loaded tariffs to enable positive cash flow from the early years of operation;
e. A time of delivery differentiator;
f. Bonus payments for community ownership;
g. Guaranteed 20-year feed-in-tariffs;
h. Ownership by impact;
i. Temporary capacity cap regulations for grid sub-sections to ensure grid stability and reliability; and
j. The broadest possible eligibility of all appropriate renewable energy technologies of all sizes and of all domestic investors to encourage democratisation of the energy landscape.

The aforementioned features are explained in greater detail below.

a. The minimisation of investor and financing risks to allow for low risk debt financing and low risk returns on investment

When considering any major project, investors are generally encouraged by the opportunity to generate stable and predictable cash flows. This feature is intended to allow the investor to obtain debt financing at rates that reflect a low risk enterprise, as well as allow the investor to earn reasonable rates of return.

b. A degression schedule to reflect the declining cost of production over time and to incentivise innovation

As a result of technological innovation, the cost of RE technologies has decreased over time and it is anticipated that these costs will continue to fall. A degression schedule is a mechanism which takes into account these falling costs. The global weighted average LCOE of utility scale solar PV fell 73% between 2010 and 2017 to US $0.10/kWh[13]. There has also been evidence of reductions in other RE technologies. A degression schedule built into the tariff structure will allow the consumer to benefit

[13] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf

from the reduced cost of the RE inputs. This also encourages the adoption of technological innovation and efficiency gains.

c. Inflation adjustments

The ongoing costs of an RE installation, such as operation and maintenance, taxes, duties, land lease payments and insurance, will be impacted by changing inflation rates. The FIT rate should therefore be a market responsive price so that it reflects the level of inflation in the market. The design of the FIT should enable the price to move in line with that of the inflation rate, i.e. when inflation rises, the tariff will rise. From the perspective of the investor, there is some protection of the level of their returns. The nominal price for the consumer is higher, but in real terms, the price remains the same.

d. Front end loaded tariffs to enable positive cash flow from the early years of operation

This feature allows investors to recover the cost of their investments earlier, i.e. it reduces the payback period.

e. A time of delivery differentiator

The FIT design may incorporate a facility that incentivises investors to supply energy during times of greatest need. Rates may be differentiated according to the delivery of energy at peak and off peak times.

f. Bonus payments for community ownership

The tariff may be structured such that a premium is paid to locally based community power producers, e.g. small neighbourhood organisations or groups. In this way, small-scale owners can benefit from the sector. This aids in the democratisation of the sector. Moreover, consideration may be given to the allocation of capacity to locals, or to community-based projects.

g. Guaranteed 20-year feed-in-tariffs

FITs are generally set for long terms in line with the expected design life of the assets. Additionally, this feature provides a guarantee of stability to the investor.

h. Ownership by impact

This mainly relates to persons who reside within a specific radius of a wind energy installation. It provides for these individuals to be granted a pre-specified share of ownership in the project. This is to encourage local acceptance of wind energy and seeks to mitigate the NIMBY[14] syndrome.

i. Temporary capacity cap regulations for grid sub-sections to ensure grid stability and reliability

This seeks to ensure that no one section of the grid is inundated with variable RE in order to protect and maintain the stability of the overall system.

j. The broadest possible eligibility of all appropriate renewable energy technologies of all sizes and of all domestic investors to encourage democratisation of the energy landscape

The eligibility parameters built into the FIT design will determine which technologies fall under the tariff structure. A narrow spectrum of eligibility is restrictive as it relates to the number of investors. Instead, the aim is to facilitate a broad subscription from a wider range of investors. This ensures that local participants can benefit financially from the investment in local resources. It also promotes the diversification of the energy source and resilience.

[14] Not In My Back Yard.

SECTION 5 CONSULTATION QUESTIONS

One of the key design options of FITs is tariff differentiation, which specifies the FIT rates that each RE technology will receive. The issue of tariff differentiation can impact a broad range of policy considerations, including policy costs, energy access, administrative complexity, economic development and diversity of the electricity mix. Another important design option is tariff setting, where the quantum of the tariff may be set to incentivise RE development. Policy costs ought to be balanced with investor costs. Other general design considerations include:

- Specific RE technology employed (i.e. wind, solar PV, biomass etc.)
- Project size
- Quality of the RE resource (i.e. wind speed achievable at a particular location)
- Technology application (i.e. ground mounted PV vs roof mounted PV)
- Ownership structure (i.e. community-based vs privately owned)
- Geography/Location

The previous section outlined the various considerations that the Commission may include in its determination of the FITs. The following section outlines a number of questions for consultation respondents that are related to, *inter alia*, the aforementioned considerations.

1) **What are your views on the appropriateness of the aforementioned criteria? Are there any other criteria that you consider priority? Please explain why.**

Many different incentive schemes are used worldwide to promote the advancement of RE. These include FITs, quotas and certificates, grants, tax and fiscal incentives and tendering. They differ in significant ways and it is necessary to determine what model best fits the Barbados situation and the associated goals determined in the promotion of RE. Certificates, such as renewable energy credits (REC), are tradable, non-tangible energy commodities that represent proof that electricity was generated from a renewable resource. In terms of the Barbados situation, there is currently no market

for the trade of energy certificates, neither are there any quota obligations. As previously mentioned, an RER is currently in place, which is somewhat analogous to a FIT rate. In order to encourage growth in the RE sector, the chosen incentive mechanism must be prudent and take into account the conditions existing in the local market.

2) **What are your views on using incentives to encourage investment in the RE sector? What types of incentives do you think are appropriate in the Barbadian context? Who should pay for incentives and for how long?**

3) **Should the Government offer improved income tax incentives to reduce the tax burden, and thus increase the positive cash flow, of entities investing in renewable energy, particularly at the front-end when there is significant capital plant investment? What should these tax incentives be and for what time period?**

4) **Should there be accelerated depreciation rates on capital plant investment for income tax determination purposes only. What should these rates be, and over what length of time should these be in effect for each entity?**

5) **In any particular year and for income tax determination purposes only, should there be an immediate write-off of capital plant investment up to a maximum level? What should be the maximum limit of write-off for any one year, and for what length should this be in effect?**

6) **What type of mechanisms should be employed in the FIT design to ensure stable and positive cash flows within a reasonable timeframe?**

Investors generally look for predictable revenues and transparent rules related to policy support. These goals exist in an environment where there are continued advancements in technology and emerging markets for investments, as well as an expanding range of broader socio-economic strategic goals that impact renewable energy policies.

Low risk debt financing could only be based on the interest rate from the lenders. That is, a stable, predictable and adequate revenue stream reduces the lenders' risk and encourages lenders to offer RE investors and suppliers a low rate of interest. Therefore, the Commission's task is to ensure that the rate is designed such that it offers a stable, predictable and adequate revenue stream. The Commission has no control over the investor's production costs and as a result, the main instrument for achieving the above would be the rate of return on investment that is approved.

7) **Do you agree that the FIT design should be rooted in principles that lead to low risk debt financing and low risk returns on investment?**

8) **What features do you consider essential in the FIT to minimise financial and economic risk to RE investors and consumers? State how these attributes will reduce risk.**

9) **State, giving reasons, whether you agree that FIT should include a reward system for community-based RE projects. How should this be determined and treated in any FIT rate or other mechanism?**

The Government's vision, as stated in the BNEP, is to encourage democratisation of the energy landscape. The FIT programme should facilitate and encourage a wide range of domestic investors, from utility scale independent power producers (IPP) to individual households, who ought to be able to benefit financially. This may be facilitated by community-based RE projects. Such projects can then be further encouraged through the establishment of a reward system, such as bonus payments, to encourage investment at this level.

As previously discussed, FITs are not the only form of incentive mechanism available. Another option is tendering, which is a form of competitive bidding or, alternatively, auctions. RE auctions are a type of model where the government/regulator issues a call for tenders to supply a certain capacity of renewable energy generation. Prospective developers submit bids at the most favourable unit price that facilitates successful project completion. The bids are evaluated based on a number of

predetermined criteria, and power purchase agreements (PPA) are established with the successful bidder or bidders.

In an auction system, bidders are forced, due to the competitive nature of the process, to submit proposals that would allow the enterprise to be viable, while minimising costs. A newer strategy is somewhat of a hybrid, which employs a FIT along with a competitive bidding process, where the FIT rate is set as the upper limit and the government/regulator considers bids that come in under this rate. This can result in downward pressure on the rate.

10) **Should IPP's and installations larger than 1MW be under the same tariff mechanism as projects of 1MW or less? If not, please provide recommendations for a more appropriate tariff methodology for these larger installations. Are any types of auctions suitable and/or advantageous for larger installations? Explain why and how this would work.**

11) **Are RE systems currently affordable for the average individual household? If not, please state possible solutions to address this issue.**

The price of RE is a critical factor in how well the needs of the investor and the consumer are met. If the resource is priced high, relative to the cost of fossil fuel investment, while the investors earn high profits, this will be at the expense of the consumer. Consideration of the price and how this price is integrated into the overall energy mix is an important part of the determination.

Investors need to know that they will receive a reasonable return on the resources that they devote to an RE project, including their capital. Moreover, it is usually more attractive to the investor if the returns are such that the bulk of the investment is recovered earlier in the life cycle of the project. Consequently, it is important that the tariff regime offers reliable returns over time sufficient to cover the investment, as this is vital for attracting new and continued investment.

12) **What do you think is an appropriate rate of return for investors and why? Based on different technologies of RE, the size of the related capital investment, the make-up of financing, or other factors, should there be different rates of return associated with different levels of risk for investors? How should this risk and the related return on investment be evaluated and established in each case?**

13) **What duration do you think is appropriate for FITs and why? Should this vary by type of RE technology that may have different economic life spans?**

14) **What are your views about the appropriate timeframe within which to recover the investment? Should this vary by type of RE technology that may have different economic life spans?**

RE installations can provide either variable or fixed energy depending on the type of technology involved. For example, solar energy provides a variable resource due to the intermittency of direct sunlight, i.e. the efficacy of a solar PV system is lessened during cloudy and rainy days. These are generally unpredictable factors. Similarly, wind speed is not always consistent. Variable resources must be used immediately unless there is a storage facility in place. In comparison, the use of biomass technologies to generate electricity is not affected by unpredictable variability. Biomass is a source of renewable fixed carbon, closely resembling conventional fossil fuels, which can be stored and used as required. The utility's energy demand obligations remain, regardless of the variability of the output from the IPP. This issue of reliability can be addressed by the use of storage, either by the IPP or by the utility company.

15) **What are your views on requiring the IPPs to include storage in any installation? Should this apply to projects over a particular size? What would be the recommended applicable size?**

Generally, FITs are designed as long-term policy instruments. This offers a level of stability to the investor. A guaranteed FIT structure, over a specified period, will allow

the investor to know up front the various conditions under which he/she has the opportunity to earn a reasonable rate of return. Since the rate built into the FIT is based on the LCOE, it is prudent to set the FIT period to coincide with the asset's useful life. However, projections of future costs and other conditions based on initial assumptions are inherently risky. Over time, several unpredictable variables, such as the state of technology and changes in the tax regime, can impact the costs of production. Consequently, it may be prudent to require periodic review of the FIT.

16) **Do you agree that FIT should be guaranteed over the lifetime of the RE generation asset? State reasons to support your response. Should the FIT be reviewed periodically to reflect the true cost of energy in the market? What would be a reasonable review period?**

Increasing levels of variable RE resources, such as solar PV, can present challenges when integrated into the existing electricity grid. Distributed resources can potentially cause voltage and/or current violations on distribution feeders. Where power from distributed resources exceeds a certain load on a feeder, voltages are likely to rise. Additionally, where significant levels of distributed resources are clustered or aggregated, feeder currents can rise well above recommended levels. Such occurrences present challenges for grid stability and reliability. To mitigate the potential for grid instability, capacity limits based on location and feeder capacity may be required.

17) **Do you agree that capacity limits for RE systems, that are differentiated based on location and feeder capacity, should be implemented for the grid as a stability safeguard?**

FITs usually incorporate degression schedules as crucial design elements. A degression schedule takes into account falling costs of production due largely to technological innovation. This mechanism establishes a rate structure that will adjust in line with these falling production costs, i.e. investors will know up front that the

FIT rate will fall over time in correlation with production costs. As a result, investors will be encouraged to innovate and increase efficiency in order to maintain or even increase profits over time. This in turn leads to lower costs for the consumer.

18) **State with reasons, whether you believe FIT design should incorporate a degression schedule over the lifetime of the RE assets. What would be the appropriate time frames to be applied to the schedule?**

There may be specific barriers to entry that exist in Barbados that do not exist to the same degree in other states or nations that are competing for the same potential RE investors/developers. These barriers may include:

- High levels of bureaucracy leading to delays in the processes of securing licenses and other permissions
- Lack of technical expertise
- High license fees
- A regulatory or legislative framework that is not conducive to investment

It is therefore important for Barbados to be on equal footing or better with other nations in order to robustly compete and attract the investment of RE investors/developers.

19) **Identify specific legal, financial, economic, policy, competitive, demographic and other barriers to entry for potential RE investors/developers in Barbados. Explain how these can be changed or mitigated. Provide specific examples of barriers to entry that exist in Barbados but do not exist to this degree in other states or nations competing for the same RE investors/developers.**

The Commission is developing a model to calculate an LCOE for various types of RE technologies, which will be used to develop FITs and for which various inputs and assumptions can and should be changed over time. The LCOE of BL&P, over time, can also provide useful information to the Commission for the purposes of

determining the level of incentives, or related support or subsidy, included in the FIT for RE providers, and for assistance in determining any potential FIT levy assessed to customers.

However, the Commission is not privy to certain internal management decisions or other factors that can affect these entities' operating expenses, capital investment, weighted average cost of capital (WACC), or the related costs tied to the future energy mix of BL&P. These costs may result from phasing out of reliance on fossil fuels, increased reliance on renewable energy technologies, and/or any impact of increased reliance on natural gas. All of these factors can significantly impact the LCOE calculation for RE providers and BL&P, which in turn can impact the determination of the FIT rate and related incentives. If the FIT rate paid to RE providers remains constant over time while BL&P's LCOE declines, this could result in RE providers receiving an unintended increase in returns. This is not the intent and would require a change or re-evaluation of the FIT rate. Similarly, if the FIT rate remains constant, and BL&P's LCOE increases over time, this could result in RE providers receiving an unintended disincentive. Similarly, it would also require review or re-evaluation of the FIT rate.

20) Explain how changes in cost and other inputs and assumptions to the LCOE of RE providers and BL&P can best be identified by the Commission for purposes of periodic update of its model for calculating the LCOE (and related FITs). Should RE providers and BL&P be required to file periodic reports to identify changes in certain inputs and assumptions to the LCOE? How often should these reports be submitted and what type of information should be included?

The Commission is evaluating whether a FIT levy should be assessed to BL&P customers as a separate line item on customer bills. This FIT levy would collect any "support or subsidy" amounts that BL&P pays to RE providers via the RER (or FIT) that exceeds BL&P's tariffed retail rate charged to its customers. The "support or subsidy" amount may be viewed as an incentive payment to renewable energy providers that is over and above the cost of BL&P's electricity service. BL&P pays a

level of support or subsidy to RE providers and has the opportunity to recover these amounts in rates from its customers. In this regard, consideration must be given to whether this should be made explicit on customer bills for easy monitoring and transparency.

21) Identify and explain the advantages and disadvantages of identifying the level of support or subsidy that BL&P pays to RE providers. Should this be reflected on customer bills?

22) Explain how the amount of support or subsidy paid by BL&P to RE providers should be identified and calculated for potential recovery from its customers.

23) Explain how often any FIT levy assessed to customers should be changed or updated and identify the factors that should trigger the FIT levy changes. Should changes or updates to the FIT levy occur when:

- **a. There are significant changes in the RER/FIT rate?**
- **b. There is a significant increase in the number of RE providers and related volumes on which the RER/FIT is paid?**
- **c. RE providers impose significant costs or capital investment upon the BL&P network?**
- **d. The FIT levy increases by a certain significant dollar amount or percentage threshold (such that minimal changes do not require updates)?**
- **e. There is a filing by BL&P with necessary supporting documentation?**

24) Explain how the FIT levy should be assessed to customers, so that the impact on low-income customers can be eliminated or mitigated.

The RE providers can, at times, cause capital investment and other costs to be incurred by the BL&P, due to the impact of RE on BL&P's network or system. The treatment and recovery of these types of costs can be negotiated or resolved between BL&P and the RE providers without the Commission's intervention. Disputes that arise may be

referred to the Commission for resolution and may result in additional costs being incurred by either or both parties.

25) Explain how the above situations are currently addressed between BL&P and RE providers, and how related costs are treated and recovered by each party. Identify and explain if there should be any changes to this process and how this impacts the BL&P, RE providers, and potential customer rates.

The increased investment of RE providers in Barbados has the potential to have significant positive impacts on various sectors and the economy as a whole. This may include:

- Increased taxable revenue streams;
- Higher levels of employment;
- Improved infrastructure;
- Increased economic activity in the tourism sector;
- Higher levels of foreign direct investment;
- An overall positive multiplier effect on the economy, as new investment and jobs create increased spending in various other sectors; and
- The positive acclaim of Barbados becoming a recognisable leader in RE in the region.

26) Explain how these positive economic and other impacts on various sectors of the economy can best be identified, tracked and monitored. Should BL&P and other RE providers provide certain periodic reports to a Barbados government agency so that these impacts can be identified? Identify those tools that other states or nations are using to identify or estimate these positive impacts on the economy.

SECTION 6 CONSULTATION PROCESS

This consultative document includes a series of specific topics and questions upon which comments may be made. If it is considered appropriate, respondents may wish to address other aspects of the consultation, which the Commission has not specifically addressed. Failure to address all topics will in no way reduce the consideration given to the entire response. Commercially sensitive material should be clearly marked as such and included in an annex to the response.

Responses to Consultation Paper

The Commission invites and encourages written responses in the form of views or comments on the matters discussed from all interested parties including BL&P, other licensed operators, Government ministries, non-governmental organisations (NGO'S), consumer representatives, consumers and businesses.

The Consultation period will begin on, Wednesday, May 29, 2019 and end on Wednesday, June 19, 2019, **at 4:00 p.m**. Given a number of constraints, there will be no extension of this consultation period. All written submissions should be received by this deadline. The Commission is under no obligation to consider comments received after 4:00 p.m. on Wednesday, June 19, 2019.

The Consultation Paper may be accessed on the Commission's website, http://www.ftc.gov.bb.

Respondents to the Consultation may submit responses in electronic format. Email responses should be forwarded to info@ftc.gov.bb, prepared as Microsoft Word documents and attached to an email cover letter.

Responses may also be faxed to the Commission at (246) 424-0300. Mailed or hand delivered responses should be addressed to the Chief Executive Officer at

Fair Trading Commission
Good Hope
Green Hill
St. Michael
BB12003
BARBADOS

Confidentiality

The Commission expects to receive views from a wide cross section of stakeholders and believes that views and comments received should be shared as widely as possible with all respondents.

Respondents should therefore ensure that they indicate clearly to the Commission any response or part of a response that they consider to contain confidential or proprietary information.

Analysis of Responses

The Commission expects, in most consultations, to receive a range of views. Through its decision, the Commission will seek to explain the basis for its judgments and, where it deems appropriate, give the reasons why it agrees with certain opinions and disagrees with others. Instances may arise where analysis of new evidence presented to the Commission will cause it to modify its view stated in this paper. In the interests of transparency and accountability, the reasons for such modifications will be set out and, where the Commission disagrees with major responses or points that were commonly made it will, in most circumstances, provide justification.