



FAIR TRADING COMMISSION

DECISION AND ORDER

On

Feed-in-Tariffs for Renewable Energy Technologies up to and Including 1 MW

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LIST OF ABBREVIATIONS

BL&P	Barbados Light & Power Company Limited
BNEP	Barbados National Energy Policy
BRA	Barbados Revenue Authority
BREA	Barbados Renewable Energy Association
COD	Commercial Operation Date
ELPA	Electric Light and Power Act, 2013-21
FCA	Fuel Clause Adjustment
FIT	Feed-in-Tariff
FTCA	The Fair Trading Commission Act CAP. 326B
GDP	Gross Domestic Product
GoB	Government of Barbados
IDC	Interest During Construction
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IRR	Internal Rate of Return
LCOE	Levelised Cost of Energy
MEWR	Ministry of Energy and Water Resources
MSBEC	Ministry of Small Business, Entrepreneurship and Commerce
NREL	National Renewable Energy Laboratory
O&M	Operations and Maintenance
PV	Photovoltaic
RE	Renewable Energy
REC	Renewable Energy Credit
REFCA	Renewable Energy Fuel Clause Adjust
RER	Renewable Energy Rider
ROR	Rate of Return
TOR	Terms of Reference
The Commission	The Fair Trading Commission
URA	Utilities Regulation Act CAP. 282
The Consultant	Ostrander Consulting
VAT	Value Added Tax
WACC	Weighted Average Cost of Capital

SECTION 1 SUMMARY

The GoB in the BNEP 2019 - 2030 has outlined a roadmap for transitioning the country from a fossil fuel dependent nation to one that is 100% RE based and carbon neutral. As a consequence, the Commission has undertaken to determine a pricing framework for RE technologies for installations sized up to and including 1 MW. The FIT was identified as the methodology for arriving at the rates applicable to the framework. This was agreed to by industry stakeholders in November 2018.

FITs are a highly effective instrument in the promotion of RE goals as they guarantee investors access to the grid and the opportunity to sell 100% of project output at a specified price for a known duration. The FIT programme determined in this Decision was based on a multi-criteria approach, seeking to achieve a number of the objectives outlined in the BNEP including, *inter alia*, encouraging a level of RE deployment commensurate with the attainment of the 100% RE goal, technology and size differentiation and facilitating effective competition in the market. Consideration was also given to the potential impact of the FIT on the consumer, basing the analysis on the full 625 MW of projected RE deployment over the period 2019 to 2030. Costs to customers are anticipated to be less than the expected effect of maintaining the current status quo of continuing to use fossil fuels as the main energy source. Expected cost savings over this timeframe is BDS\$52.5M in nominal terms, based on the avoided cost of fuel. Noticeably, this does not even consider the cost of the BL&P replacing most of its existing aged fossil-fuel driven plant with new similar fossil-fuel driven plant, which would be a necessity. It must be noted that this Decision speaks only to a subset of the overall capacity requirement and as such, the direct impact of this iteration of the FIT on the consumer is not immediately measurable.

International experience with the implementation of FIT programmes and the associated increase in RE deployment has shown that a number of social and economic benefits accrue. These include:

- A cleaner environment;
- Increased job creation;
- Reductions in foreign exchange outflow;

- Energy security and independence; and
- Broad participation in the energy sector.

In view of the foregoing, the Commission has determined the following:

- I **The effective start date for the FIT programme shall be October 1, 2019. The applicable categories, rates and capacity allocations shall be as set out at paragraph IV hereof and shall remain in effect until December 31, 2021 or until such time as the expiration of the existing capacity, stated herein, whichever comes first. Thereafter the rates shall be reviewed annually. New rates shall be announced three (3) months prior to the end of each review period.**

- II **All terms shall remain constant for the duration of the 20-year contract. New or revised terms, conditions and tariff prices shall only be applicable to new projects entering the market in future programme years.**

- III **The FIT shall be based on a 20-year fixed tariff with no front loading and differentiated by technology and size. The tariff is based on the LCOE, using a multi-criteria approach according to the guidelines espoused in the BNEP.**

Fit Policy Design

FIT Policy Element	RE Systems up to 1 MW
Proposed Effective Date	1/10/2019
Rate: Fixed, Tiered or Variable Options	Fixed
Rate: Differentiated by Technology & Size	Yes
Tariff Duration	20 years
Administratively-Determined or Competitively-Bid	Administratively-Determined
Presumed Off-taker	BL&P
Quantity Covered by FIT	100% of output
Periodic Review of Rates and MW Allocation	27 months initially, thereafter, annually

FITs Differentiated by Technology and Size (Up to and including 1 MW)

Technology Category	Size Category
Solar	Up to 10 kW
Solar	Above 10 kW to 100 kW
Solar	Above 100 kW to 250 kW
Solar	Above 250 kW to 500 kW
Solar	Above 500 kW to 1 MW
Land-Based Wind	Up to 10 kW
Land-Based Wind	Above 10 kW to 1 MW
Anaerobic Digestion	Up to 1 MW
Solid Biomass	Up to 1 MW

IV The applicable categories, rates and capacity allocation shall be as outlined below:

Technology, Size Category	Oct. 1, 2019 - Dec. 31, 2021 FIT (BDS cents/kWh)	Oct. 1, 2019 - Dec. 31, 2021 Allocation (MW)
Solar, Up to 10 kW	42.75	5
Solar, Above 10 kW to 100 kW	44.75	
Solar, Above 100 kW to 250 kW	41.75	8
Solar, Above 250 kW to 500 kW	38.25	
Solar, Above 500 kW to 1 MW	36.25	12.7
Land-Based Wind, up to 10 kW	39.75	3
Land-Based Wind, Above 10 kW to 1 MW	38.25	
Anaerobic Digestion, Up to 1 MW	44.25	2
Solid Biomass, Up to 1 MW	52.25	2
Total Allocation		32.7

V Capacity shall be allocated on a first come first served basis.

- VI** The total MW to be allocated for the period October 1, 2019 to December 31, 2021 of the FIT programme is 32.7 MW, with the addition of any roll-over from the transition period (capacity allocated prior to September 27, 2019). Any un-utilised capacity shall rollover from one (1) iteration of the FIT to the next.
- VII** Current RER customers will be grandfathered and maintain their existing arrangements for the period of twenty (20) years commencing from the system's original commissioning date.
- VIII** Under the FIT programme, systems of 3 kW or less shall utilise the "sale of excess" billing arrangement at the appropriate rate, while those above 3 kW and up to 1 MW shall use the "buy all/sell all" mechanism.
- IX** A multiplier of 10% in the first iteration of the FIT programme shall apply to all Community - Shared RE Projects. The criteria for Community - Shared RE Projects shall be: 1) a minimum of fifteen (15) residential customer investors, and 2) no single entity owning more than 50% of a single project.
- X** The maximum allowed duration between project licensing and COD is determined according to technology as follows:
- Solar up to 1 MW: 12 months
 - Wind up to 1 MW: 12 months
 - Anaerobic Digestion: 36 months
 - Solid Biomass: 36 months
- One (1) 6-month extension is allowed for solar and wind up to 1 MW, with no security, and no opportunity for further extension. For anaerobic digestion and solid biomass up to 1 MW one (1) 12-month extension is allowed, with no security, and no opportunity for further extension.
- XI** Only one (1) FIT project per parcel of land is allowed.
- XII** The FIT includes the purchase by the BL&P of all present and future commodities and/or environmental attributes generated by the project - including energy capacity, RECs or other commodities that may exist now or in the future. All

rights, titles and interests in RECs shall be affirmatively purchased as part of the FIT and retained/retired so as to be counted towards the achievement of Barbados' RE goals. Further, the resale of RECs by the BL&P to fulfill any other claims or commitments, or for financial gain in international markets is not allowed.

XIII At the end of the 20-year FIT contract period, a new contract would need to be negotiated based on the existing value of the assets, the avoided cost of fuel or such other factors as may be determined by the Commission, in its sole discretion, at that time.

SECTION 2 INTRODUCTION

A FIT may be defined as a rate which is paid to producers of RE by an electric utility or government agency for energy produced, usually over a guaranteed period. It is an effective policy instrument for the promotion of RE objectives. As such, it is usually set at a level that encourages individuals and businesses to invest in RE projects. FITs are customarily vital in enabling the march towards energy independence, which in turn catalyzes further benefits, such as enhancement of security and stability in energy supply, greater economic competitiveness, and greater environmental sustainability.

Given its mandate as set out in Section 4(3) (a) of the FTCA and Section 3(1) of the URA, of the Laws of Barbados, the Commission is tasked with establishing principles for arriving at the rates to be charged by service providers, as well as setting the maximum level of such rates. The GoB in BNEP has initiated a move to a position where 100% of the island's energy will be generated from RE by the year 2030. This is in an effort to reduce 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.

A major requirement for the achievement of this 2030 goal is the establishment of a pricing framework, which facilitates the transition from fossil fuels to RE i.e., the establishment of tariffs that would be applied to grid connected systems. After stakeholder consultation in the latter quarter of 2018, it was determined that, for RE installations sized 1 MW and under, the methodology to be used to determine the tariff structure will be FITs. The purpose of this Decision is to outline the determination of the structure and quantum of these tariffs.

A consultant was contracted to develop a FIT model for the computation of rates applicable to RE technologies in Barbados.

On May 29, 2019, the Commission issued a public consultation to seek the views and opinions of stakeholders 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.

There were six (6) responses to the consultation and these are summarized in the appendix of this Decision. In arriving at its determination, the Commission took the contributions of the stakeholders into account as a complement to its own research and analysis and the work of the Consultant. In view of the foregoing, the Commission presents herein its analysis and determination in respect of the FIT mechanism that shall apply to RE technologies of sizes up to and inclusive of 1 MW. It must be noted that the FIT mechanism will replace the current RER but all existing RER projects/systems will be grandfathered.

2.0 Background

Fossil fuel consumption is a significant driver of Barbados' economic and social development. Sustaining economic growth relies heavily on fuel oil imports. Barbados expends approximately 9,000 barrels of oil per day¹ to meet energy needs, while 1,000 barrels per day are locally produced. Power production in Barbados accounts for approximately 50% of the aggregate fossil fuel imports, while 33% is consumed as energy in the transport sector². This high portion of fuel consumption for power production results in an electric energy per capita per year of about 3,655 kWh. The current average electricity cost to consumers is BDS \$0.49 per kWh³. Electric power is mainly supplied by the BL&P, a vertically integrated utility. Electricity delivered to the national grid consists of an energy mix of fossil fuel and RE sources. The total energy demand for Barbados is met by BL&P's 239 MW of legacy plant and a 10 MW solar PV farm, as well as 24 MW of distributed RE, which is customer owned.

The evolution of distributed RE generation in Barbados was initiated by the efforts of the BL&P and the Commission in 2010 through the RER pilot programme. In recognition of the importance of RE to the sustainable development of Barbados' economy, this programme was later approved by the Commission on a permanent basis in August 2013.

Similarly, in November 2013, the GOB, being cognisant of the significant benefits to be derived from the integration of RE derived electricity to the national grid, outlined the requisite legislative amendments to the ELPA, which would facilitate further RE deployment.

¹ 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>.

² Government of Barbados. 2018. Barbados National Energy Policy 2019 - 2030. Policy, Bridgetown: Government of Barbados.

³ Average electricity price for July, 2019.

The continued reliance on fossil fuel imports and its consumption remains a major concern for Barbados in its quest towards energy independence and security of supply, energy reliability and resilience, climate change mitigation and environmental sustainability, and affordable electricity rates. Fuel expenditure related to Barbados' electricity production accounts for 4% of Government's nominal GDP⁴; total fuel imports however, represent about 7% of GDP. These observations indicated a need for a significant reduction in foreign exchange disbursement for energy requirements, and the expansion of the island's local energy sector through the exploitation of naturally available energy resources. Additionally, the exploitation of RE sources is accepted as an opportunity to produce electricity more efficiently, increase energy conservation, improve air quality, reduce respiratory health related issues, democratise the energy landscape, as well as promote innovation and create new niche market opportunities for Barbadians.

Given the myriad potential benefits which may accrue from the exploitation of Barbados' RE rich potential, the GoB pursued an RE Market Study which concluded in 2017. The study sought to devise rates for a diverse mix of RE resource based technologies; these include solar PV, wind, biomass, waste-to-energy and storage. By the end of December 2017, the BNEP was instituted which proposed a goal of 75% RE by 2035.

In July 2018, a shift to a more aggressive RE energy target of 100% by 2030 was tabled by the current Government; this is intended to transform Barbados to a fully carbon neutral state with widespread electric mobility. In fulfillment of the new policy agenda, the Commission remains committed to the objectives outlined under the 100% RE vision.

The Commission remained cognisant of the need for a stable energy pricing regime for RE-based technologies, which will facilitate attainment of objectives of the BNEP 2019 - 2030. The Commission's July 13, 2016 Decision established temporary rates for solar PV of 41.6 BDS ¢/kWh and 31.5 BDS ¢/kWh for wind generation systems, delinking the price of RE from fossil fuel generation. These rates applied to systems up to 500 kW in capacity. The institution of these rates was intended to provide certainty for investors in the RE market by having a

⁴ 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\(January%20-%20March%202010\).pdf](http://www.centralbank.org.bb//Portals/0/CBB%20Review%20of%20Barbados'%20Economy%20(January%20-%20March%202010).pdf).

fixed price for RE derived electricity. This adjustment to rates in 2016 resulted in 2.4% additional RE capacity deployed under the RER programme.

Currently, the cumulative installed capacity of this programme represents 3.84% of the 625 MW⁵ forecasted capacity requirement stipulated in the BNEP 2019 – 2030. These proxies highlight potential opportunities to harness available RE resources. Additionally, in 2019, applications for licenses were approved for approximately 20 MW of additional RE capacity and this activity is expected to continue at a rapid pace.

Given the urgency to transform the energy sector and include a wide range of RE resource based technologies, while seeking to stimulate local and foreign investment, the Commission, in consultation with the MEWR, the MSBEC and other stakeholders, commenced the process of establishing a sustainable pricing mechanism for the RE sector. On consultation, stakeholders agreed to employ FITs as the pricing instrument for generation systems up to 1 MW. In light of this, the Commission issued its TOR on February 26, 2019 to contract technical assistance to facilitate a FIT study.

Core objectives of the TOR included the recommendation of FITs based on the LCOE, the development and design of FITs for the RE sector and the consideration of potential impacts of FIT recommendations on, IPPs, distributed RE generators and end users. The proposed recommendations for FITs, as outlined in the *Study for the Establishment of a Stable Price for Electricity from Renewable Sources of Energy* (September 2017), were also considered. These are:

- a. Low risk debt financing and low risk returns on investment;
- b. A degression schedule which accounts for declining production cost;
- c. Inflation adjustments;
- d. Front-end loaded tariffs to facilitate early positive cash flows;
- 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 caps for grid stability and reliability; and

⁵ Government of Barbados. 2019, page 48

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

Inclusion of the aforementioned features is expected to provide the necessary incentives to spur investment. 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

Stakeholder Engagement

Successful FIT programme development is generally enhanced by robust stakeholder engagement and consultations. Moreover, the Commission's legislative mandate stipulates that it must consult with stakeholders and interested parties on the setting of rates. In instances where the quantity and quality of data is essential, communicating directly with stakeholders and market participants facilitates this. The use of consultation papers, surveys, meetings and teleconferences fosters the necessary dialogue to advance greater understanding of the issues and programme objectives, which can lead to increased programme uptake.

Feedback was solicited from the following stakeholders:

- The MEWR,
- The Ministry of Finance, Economic Affairs and Investment,
- The BRA,
- BL&P,
- BREA,
- The Inter-American Development Bank,
- Caribbean Development Bank,
- The European Union,
- Williams Industries,
- Williams Solar,

- Williams Caribbean Capital,
- The ELPA Committee,
- The Barbados National Oil Company,
- A number of individual RE investors, and
- Commercial banks and insurance companies

On May 29, 2019 the Commission issued a public Consultation Paper on FITs. This sought to solicit feedback from a wide cross-section of stakeholders on this energy pricing mechanism. The consultation document outlined an analysis of FITs, proposed considerations in determination of the FITs and a catalogue of questions. Stakeholders' responses to these questions served to inform the determinations outlined herein.

A total of seven (7) submissions were received from the following parties by the date of closure:

- BREA
- Mr. Hallam Hope, CARITEL
- Mr. Michael Ray
- Mr. Khalid Grant, Solar Genesis
- William Industries
- BL&P
- Blackstone Megawatt Energy Services Inc.

A synopsis of the responses from the aforementioned parties is presented in the attached Appendix.

2.1 Legislative Framework

Pursuant to **Section 4(3) (a)** of the FTCA of the Laws of Barbados, the Commission has responsibility for establishing principles for arriving at rates to be charged by service providers. The Commission also has this duty under **Section 3(1)** of the 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;
- (b) Set the maximum rates to be charged;
- (c) Monitor the rates charged to ensure compliance”.

By virtue of **Section 2** of the URA, “principles” means the formula, methodology or framework for determining a rate for a utility service. Additionally, **Section 2** of the URA stipulates 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.

Section 13(2) (ii) and (iii) of the ELPA stipulates that interconnection services referred to in subsection (1) shall be offered at points along the public grid subject to

(ii) such agreement between the parties as may be approved by the Commission for the purpose; and

(iii) the payment of such fee as may be specified by the public utility and approved by the Commission in respect of interconnection. Further, **Section 13(3)** of the ELPA states that “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”.

The Commission considers that the provisions of the ELPA, URA and FTCA, when read together, empower the Commission to set rates for the supply and distribution of electricity in the RE sector of Barbados as set out in this Decision.

SECTION 3 FEED-IN-TARIFF DESIGN AND ASSUMPTIONS

This section outlines the methodology and rationale underpinning the most appropriate design and assumptions for a resource cost-based FIT in Barbados. While there are other bases available for FIT rate setting, such as avoided cost and value-based approaches, the resource cost approach is the Commission’s favoured option, as it reaffirms the commitment to the de-linking of RE rates from the price of fossil fuel, as previously outlined in the 2016 Decision on the Motion to Review the Renewable Energy Rider (Document No: FTC/UR/MTNDECRER 2016-03). To this end, in conjunction with the Consultant, the Commission set about to establish FITs for RE projects up to 1 MW based primarily on LCOE.

The FIT methodology, using a multi-criteria approach, gave consideration to social and environmental factors. FITs are primarily determined via the LCOE, considered on a technology specific basis for the various RE resources, i.e. solar, wind, biogas, etc. The LCOE is a measure of the price required for RE projects to cover costs, meet debt obligations and furnish a reasonable rate of return to investors.

Table 1: FITs Differentiated by Technology and Size (Up to and including 1 MW)

Technology Category	Size Category
Solar	Up to 10 kW
Solar	Above 10 kW to 100 kW
Solar	Above 100 kW to 250 kW
Solar	Above 250 kW to 500 kW
Solar	Above 500 kW to 1 MW
Land-Based Wind	Up to 10 kW
Land-Based Wind	Above 10 kW to 1 MW
Anaerobic Digestion	Up to 1 MW
Solid Biomass	Up to 1 MW

A number of respondents to the consultation were generally in favour of differentiation according to project size and technology. Their recommendations were generally in line with those given in Table 1. It is considered that size differentiation facilitates benefits from the economies of scale generated by larger projects, which would be incorporated into the FITs.

The Model

The Consultants developed the FTC FIT Model 2019, which is based on their own experience in the development of a sophisticated modelling tool for the United States' NREL. Out of a need for the most accurate results attainable under the circumstances, Barbados-specific data was used wherever possible in estimating the LCOE for the range of RE technologies and sizes being considered. In calculating the LCOE, the Model allows for the adjustment of multiple inputs/variables that are used in the derivation thereof. These often exogenous variables include project costs, financing and a wide array of other factors.

There are different FIT options that correspond to different objectives i.e. if the objective is to prioritize cost minimization, then a rate at the lower end of the spectrum is appropriate. Conversely, if the objective is to encourage investment and thus spur deployment, then a higher rate is appropriate. It is noteworthy that, contrary to traditional regulatory tenets, least cost is not the primary focus in this instance. The FITs established herein take into account a balanced multi-criteria approach to the achievement of objectives outlined in the BNEP, such as:

- Technology, size and application diversity;
- Maximizing local participation;
- Sufficient deployment to meet the 100% RE by 2030 goal; and
- Facilitating effective competition in the market.

These and other objectives are considered all the while seeking to contain costs to ratepayers.

FIT Policy Design Features

The following section outlines the specific characteristics of the FIT design and the underpinning assumptions and analyses. Taken together, the design elements of the FITs are intended to provide long-run revenue and policy stability to RE investors. This is expected to redound to the ability to attract lower cost capital, stabilize energy prices and lessen exposure to the volatility inherent in fossil fuel prices.

Official Commencement and Review Period

It is determined that the new FITs shall take effect from October 1, 2019. It is considered that alacrity is necessary in furnishing the industry with an approved FIT programme due to the need to incentivize RE deployment and facilitate realisation of the 2030 goal. These rates will be applicable to all eligible projects receiving licenses subsequent to this date. Moreover, the FITs shall be subject to review after twenty-seven (27) months, in the first instance, and then annually thereafter. New rates will be issued three (3) months prior to the expiration of the existing rate. The initial period is longer to account for inherent challenges in data acquisition that are likely in the infancy of the programme as well as some human resource capacity development, which will be required for the management of nascent technical vicissitudes.

Annual review allows for the observation and consideration of changes in component costs, financing terms, required rates of return and other market-oriented adjustments that could have some effect on the LCOE of eligible projects. Taking into account the recommendations of the Consultants, the Commission further determines that the review process shall be responsive to market conditions, i.e. if in any given year there are several projects utilising the full capacity allocation, a downward price adjustment may be warranted for the next period. Conversely, if there are little to no projects, rates should be adjusted upwards to attract investment and spur on the achievement of policy objectives. Respondents to the Consultation paper tended to agree with this approach, stating, in some instances, that annual review allows control of investment flows by changing the price signals in the market. Review shall be initiated based on capacity utilisation or expiry of term, whichever is first.

Eligibility Parameters

In order to be eligible for the FIT, project developers must submit the relevant license application to the Ministry responsible for energy. It must be noted that residential projects of less than 5 kW and commercial projects of less than 25 kW do not require licenses. Eligible RE technologies include solar, wind, solid biomass and anaerobic digestion (biogas). Capacity shall be allocated on a first come first served basis, out of a total capacity of 32.7 MW in this first iteration. The submission of the complete license application secures a spot in the queue of eligible projects. Adequate criteria for remaining in the queue once entered is vital. This is to ensure that the progress of viable projects is not stymied by failed projects. The maximum

allowed duration between project selection and COD is determined according to technology, as follows:

- Solar up to 1 MW: 12 months;
- Wind up to 1 MW: 12 months;
- Anaerobic Digestion: 36 months; and
- Solid Biomass: 36 months

For both solar and wind, a one-time extension of six (6) months with no security required is allowable subject to adequate justification. For all other technologies, the extension shall be twelve (12) months. In order to safeguard against various forms of gaming the system for example, separating a large project into several smaller projects in order to receive a higher rate, only one (1) FIT project per parcel of land is allowed.

Contract Tenure and Price Structure

The FIT shall apply to the relevant RE technologies on a fixed price 20-year basis. Since it has been considered by both international and local stakeholders that long-term price certainty is a strong incentive for developer and investor interest, a twenty (20) year term, which attracts finance at least cost and provides long-term price stability, is deemed the most appropriate. It is considered that a term, which promotes cost recovery and a reasonable return over a shorter period, is a disincentive to the investor with respect to efficient operations and maintenance over the useful life of the asset. This in turn could have negative effects on ratepayers in the form of higher energy prices and the burden of financing abandoned projects.

For solar and wind projects up to 1 MW, the FITs shall be administratively determined and subject to review as previously outlined. It has been considered that this approach is one of clarity and certainty and attracts the requisite level of investment to support rapid deployment and the eventual attainment of RE targets. For projects at this level of capacity, administratively determined prices are preferred as they do not carry the same level of pressure on margins as a competitive bidding approach. This results in a lower incidence of project failure.

The contract will be for a fixed price over its duration and not have a tiered approach which front-loads cost recovery. A tiered approach is likely to lead to higher electricity prices for ratepayers in the short run and a loss of anticipated economic benefits if RE developers are

inclined to neglect their projects once their investment is recouped. Additionally, if a developer is satisfied that costs have been recovered after ten (10) years, there may be an inclination to operate the next portion of the contract less efficiently as long as a basic return on investment is being met. It is further determined that all terms shall remain constant for the full term of the contract. Only new projects entering the programme shall be eligible for revised terms and prices.

Community - Shared RE Projects

This concept is distinct from local ownership, as the FITs outlined herein already take into account the cost of debt and equity associated with local ownership. Community - Shared Projects refer to projects in which a number of consumers who, individually, may not have adequate rooftop or ground space at their locations, or the ability to attract the requisite financing, assume ownership of a particular project. Community, in this context, refers either to a group of investors in a physical location or a group of investors brought together for a communal purpose. It is considered that, based on stakeholder feedback and the experience of other jurisdictions, a suitable multiplier for these types of projects would be 10%. That is, the applicable FIT would increase by 10% for projects that meet the criteria to qualify as a Community - Shared RE Project. The multiplier enables recovery of the cost associated with assembling the number of investors required to own the project. The applicable criteria for these projects shall be as follows:

- No less than fifteen (15) residential customer investors.
- No single entity shall own more than 50% of a project.

In the first iteration of the FIT outlined in this Decision, the multiplier shall be 10%.

Counterparty and Obligation to Purchase

The BL&P, as the sole electric utility responsible for transmission and distribution, shall serve as the counterparty under the FIT programme and will purchase 100% of the output of each respective RE facility for a period of twenty (20) years from the facility's COD. In purchasing the output of the RE facilities, the BL&P will also be acquiring all environmental attributes generated by the project, potentially in the form of RECs. RECs are not currently recognized, created, or traded in Barbados but may become a part of the process with respect to

demonstrating compliance with objectives in the future. If RECs are sold outside of the country, Barbados would lose the right to claim the associated RE production because that right was sold to an external party that now owns the descriptive characteristics of that power, which cannot be double counted. Barbadian policymakers would want to preserve the opportunity to utilize these rights. Therefore, the BL&P shall not be allowed to sell RECs.

Billing Structure

The “sale of excess” and the “buy all/sell all” arrangements are billing mechanisms used by the BL&P for current RER customers. Under the “sale of excess” billing arrangement, an RER customer is billed at the normal rate for what he/she uses from the grid and is credited for the excess electricity that he/she sells to the grid (i.e. the electricity generated from the RE system that was not used). Under the “buy all/sell all” billing arrangement the customer is billed for all the energy consumed, regardless of the source, at the normal electricity rate, and credited for all the electricity generated from the RE system at the RER credit rate.

Current RER customers will be grandfathered and maintain their existing arrangements. On commencement of the initial FIT programme, systems of 3 kW or less will utilize the “sale of excess” billing arrangement at the appropriate rate, while those above 3 kW and up to 1 MW shall use the “buy all/sell all” mechanism.

The Impact of the FIT on Customer Rates

The Commission acknowledges that, owing to the costs associated with the implementation of the relevant technologies in the march toward 100% RE by 2030, customer rates will likely be affected. This inevitability aside, there are a number of mitigating factors. Firstly, the impact of RE on customer rates is expected to be less than what would obtain if the current status quo was maintained and the BL&P replaced most of its existing aged fossil-fuel driven plant with new similar fossil-fuel driven plant. A primary consideration related to this issue is that, fossil fuel based plants rely on very volatile and expensive imported fuel oil, diesel, and jet fuel. It is therefore expected that costs associated with fossil fuel will increase over time, especially as the world is beginning to grapple with the concept of ‘Peak Oil’, while it has been shown that RE is a declining cost technology.

The GoB's transition to RE has been well timed given that much of the BL&P's fossil fuel plant will be subject to retirement and/or replacement within the next ten (10) years. This is analogous to the same period anticipated for transitioning to 100% RE by 2030. The alternative would see the BL&P replacing existing plant with new fossil fuel driven assets with a likely lifespan of forty (40) years. This would in effect result in a delay of thirty (30) years or more in substantive advancement towards RE. Such a significant delay is costly, untenable, backward-looking, and would leave Barbados in the difficult position of playing "economic and environmental" catch-up with the remainder of the world regarding the transition to RE and related benefits, that are not associated with fossil fuel driven energy generation. These benefits include:

- Enabling the GoB to march towards energy independence;
- The promotion of economic and social development;
- A cleaner and more environmentally friendly sector;
- A diminution in the outflow of foreign exchange; and
- Maximisation of local participation (individual and corporate) in distributed RE generation and storage, resulting in the democratization of the energy sector.

Finally, projections based on some empirical evidence suggests that over the period 2014 to 2030, the average FIT will be less than the average cost of fossil fuel, with the average FIT at BDS\$.3061/kWh (30.61 cents) and the average cost of fossil fuel at BDS\$.3110/kWh (31.10 cents). This indicates an expected savings, small though it may be, associated with the transition to RE versus maintaining an unsustainable fossil fuel driven energy sector.

Feed-in-Tariffs Modelling Assumptions

The following is a summary of the assumptions that have been used in the determination of the FIT model.

It must be noted that every attempt has been made to use Barbados specific data in determining the final outcome of the FITs. In some instances, this has not been possible and proxy data from the region and/or internationally source information was used instead. Both

historical and proposed cost data was accumulated through the stakeholder engagement process. Model inputs are broken down into four (4) broad categories:

- Installed costs and performance data;
- Operating cost inputs;
- Financial inputs; and
- Other inputs.

Installed Cost and Performance Assumptions

Table 2: Installed Cost & Performance Input Assumptions

Installed Cost & Performance Inputs				
Solar	Installed Cost ¹ (BDS\$/kW)	Net Capacity Factor	Annual Degradation	Analysis Term
Up to 10 kW	\$6,088	18%	0.5%	20 years
Above 10 kW-100 kW	\$4,652	18%	0.5%	20 years
Above 100 kW-250 kW	\$4,194	19%	0.5%	20 years
Above 250 kW-500 kW	\$3,696	19%	0.5%	20 years
Above 500 kW-1 MW	\$3,580	20%	0.5%	20 years
Wind				
Up to 10 kW	\$8,292	25%	0.5%	20 years
Above 10 kW-1 MW	\$5,712	30%	0.5%	20 years
Other Technologies				
Anaerobic Digestion	\$16,354	75%	0%	20 years
Solid Biomass	\$10,740	91%	0%	20 years
1. Including funding of reserve accounts and other financing-related costs, and including \$300/kW for all projects above 500 kW (see also 'Interconnection Cost' note below).				

Installed Costs, Capacity Factors and Degradation

All of the estimates related to these inputs are based on Barbados-specific data. This data was accumulated through a combination of stakeholder participation and license application data provided by the MEWR, which related to the cost and performance of installations, both

planned and those already commissioned. The cost modelling estimates were derived through the aggregation and allocation of the data into appropriate size and technology based FIT categories.

Interconnection Costs

Currently under the RER, interconnection costs related to RE projects under 500 kW are borne by the BL&P. This is because the installations have been proposed at locations with adequate interconnection facilities, or minimal investment was required by the utility. It has been assumed that projects under 500 kW will continue to be minimally capital intensive in this regard. In future, however, expectations are that for projects over 500 kW, the BL&P will seek to recover these interconnection costs from the IPPs, including costs related to additional metering, transformer upgrades or other equipment. The model therefore includes an assumption for interconnection costs for projects over 500 kW.

VAT

All RE projects are assumed to be VAT exempt and therefore VAT is not assessed. The installed costs are estimated as excluding VAT. It has been noted by some investors that VAT is assessed and then refunded to the investor. Only the former option has been included in the model.

Import Duties

All RE projects are assumed exempt from import duties, based on information from the BRA.

Interest during the Construction Phase

The interest charged during the construction phase of major infrastructure projects generally differs from the permanent financing of completed projects. Accrued interest on construction financing is assumed for all projects. For solar and wind projects, the IDC is added to an initial estimate of total project cost. A 7.75% annual interest rate is assumed for all relevant projects. IDC is calculated assuming a linear drawdown schedule over the following period:

- Solar:
 - up to 100 kW: 2 months
 - Above 100 kW to 250 kW: 3 months
 - Above 250 kW to 500 kW: 4 months
 - Above 500 kW to 1 MW: 5 months

- Wind
 - up to 10 kW: 2 months
 - Above 10 kW to 1 MW: 6 months

Analysis Term

The analysis term is twenty (20) years for all projects and a 20-year term is recommended for all FITs. Based on this, the model determines the appropriate 20-year levelized tariff that would enable the modelled project, depending on its technology and size, to recover all of its costs and achieve the assumed after tax return on equity required by the end of the 20-year term.

Operating Cost Assumptions

Table 3: Operating Cost Input Assumptions

Operating Cost Inputs – Year 1 Expenses (subject to inflation)					
Solar	Fixed O&M (BDS\$/kW-yr)	Site Lease (BDS\$/kW-yr)	Insurance (units below)	Project Mgmt (BDS\$/kW-yr)	Land Tax³ (% of rev.)
Up to 10 kW	\$100	N/A	BDS\$4/mille	Incl. in O&M	0%
Above 10 kW-100 kW	\$35	N/A	BDS\$4/mille ²	\$40	0.95%
Above 100 kW-250 kW	\$35	N/A	BDS\$4/mille ²	\$76	0.95%
Above 250 kW-500 kW	\$35	\$25	BDS\$4/mille ²	\$64	0.95%
Above 500 kW-1 MW	\$32	\$25	BDS\$10/mille ²	\$60	0.95%
Wind					
Up to 10 kW	\$70	N/A	BDS\$4/mille	Incl. in O&M	0%
Above 10 kW-1 MW	\$70	\$25	BDS\$10/mille ²	\$73	0.95%
Offshore	\$240	\$25 ¹	0.4% of cost	Incl. in O&M	N/A
Other Technologies					
Anaerobic Digestion	\$600	\$25	0.4% of cost	\$36	0.95%
Solid Biomass	\$475	\$25	BDS\$53/kW-yr	\$36	0.95%
<ol style="list-style-type: none"> 1. Proxy for comparable benefits assumed paid in lieu of a site lease. 2. \$4/mille for equipment replacement and \$6/mille for business interruption insurance. Mille = Thousand 3. Rate of BDS 30¢/kWh used as proxy for value of electricity sold to calculate tax. 					

Inflation

These estimates are based on Barbados-specific data. All operating costs are subject to a long-term annual inflation rate of 2% per year. The recommended FIT therefore reflects a levelization of operating expenses that are modelled to increase over time.

Fixed O&M and Project Management

These estimates are based on Barbados-specific data. Differentiations in the level of detail of information from the stakeholders has meant that this category can be either combined or treated separately. This differentiation also applies to the allocation of certain labour and oversight tasks to Fixed O&M or Project Management. However, this does not impact the output of the model.

Site Lease

These estimates are based on Barbados-specific data. A fixed lease payment with a 2% escalation factor is used in the model.

Insurance

These estimates are based on Barbados-specific data. The RE sector in Barbados is very new, therefore, the insurance industry has not yet responded adequately to its emergence. Costs are therefore higher than in international markets. It is assumed that local RE exposure will be mitigated by local insurance players and these costs are therefore reflected in the FIT model. Projects up to 10 kW are assumed to carry equipment replacement insurance. Projects over this size are assumed to carry both equipment replacement and business interruption insurance.

Land Taxes

It is assumed that installations on residential properties will not result in an increase in land tax expenses. Installations owned by commercial entities are assumed to incur land taxes at a rate of 0.95% of the value generated by the facility's output.

Fuel Expenses & Tipping Fees

In addition to the costs summarized in Table 3, the fuel-based technologies (anaerobic digestion and solid biomass) incur costs related to fuel acquisition, handling and/or disposal. Fuel can also be a supplemental revenue source:

- **Anaerobic digestion** is assumed to have a net-zero fuel expense, where the tipping fee associated with the deposit of food waste is offset by handling and sorting expenses (to prepare the fuel for digestion). Where manure is the fuel source, no

explicit expense is assumed, but the farm is assumed to benefit from a site lease payment and reduced waste management expenses.

- **Solid biomass** is modelled with a more conventional approach. A fuel expense of \$55/ton and an ash disposal fee of \$20/ton (both escalated at 2% per year) are applied to the project economics.

Financing Assumptions

Table 4: Financing Input Assumptions

Financing Inputs				
Solar	% Debt	Debt Term	Interest Rate	Cost of Equity ¹
Up to 10 kW	50%	7	6.00%	6%
Above 10 kW -100 kW	80%	7	6.00%	14%
Above 100 kW-250 kW	75%	7	6.00%	14%
Above 250 KW-500 kW	70%	10	6.25%	14%
Above 500 kW-1 MW	70%	10	6.25%	14%
Wind				
Up to 10 kW	50%	7	6.00%	6%
Above 10 kW-1 MW	65%	10	6.25%	14%
Other Technologies				
Anaerobic Digestion	50%	15	6.50%	14%
Solid Biomass	50%	15	6.50%	14%
<i>1. Model solves for FIT rate that meets this equity return target after-tax.</i>				

There is currently limited involvement by local lending institutions in the RE market. This is expected to change with the evolution of policy. It is therefore assumed that local lending institutions will fund this emerging sector.

Debt to Equity Ratio, Term and Interest Rate

Estimates are largely based on Barbados data. The source of this data was companies with existing RE projects as well as new entrants to the market.

Debt/Equity:

The degree of leverage is based on estimated cash flow and available collateral.

Terms

For residential and small commercial projects, this is not expected to exceed seven years. For larger projects, the terms are expected to increase with project size up to fifteen (15) years. Overall, local commercial banks are not expected to offer terms beyond fifteen (15) years.

Interest Rates

With respect to interest rates, there is significant liquidity in Barbados dollar investment capital. Increasing Barbados dollar investments will reduce foreign currency risk. However, Barbados dollar investments cannot be hedged and converted to fixed interest rates for extended periods of time in the same way as foreign currency investments. Nonetheless, the attractiveness of the local lending market, in combination with a fixed price 20-year FIT, may translate into fixed interest rates for longer periods of time than historically possible.

Loan Interest Deduction

Section 3.4 of the *Renewable Energy and Energy Efficiency Fiscal Incentives Booklet for Individuals and Companies* defines a deduction for interest paid on loans. A deduction of 150% of loan interest is modelled.

Lender Fee

Based on stakeholder feedback, a fee of 1.25% of the total loan amount is included in the total project cost estimate for all projects.

Debt Service and O&M Reserve Accounts

The funding of two (2) reserve accounts – one (1) for debt service and one (1) for O&M, is also included in the estimate of total project costs. The debt service reserve is funded to cover six (6) months of debt service obligation, and the O&M reserve is funded to cover six (6) months of operating expenses. Both reserves are assumed as a requirement for all projects and have been included in the total project cost.

Cost of Equity

The model calculates an LCOE over a 20-year period. The derived LCOE is intended to cover all project costs and allow the equity investor to achieve a target rate of return over the full

duration of the tariff. The target after-tax equity return is a model input. That has been determined as 14% for all corporate-owned projects and 6% for those individually owned. These targets represent the opportunity cost for alternative use of funds. It is noted that a fixed return on equity is not guaranteed.

Other Inputs

The model also includes other assumptions and deductions that relate to circumstances in the Barbados market. These are:

Special Deductions

Owners of residential projects may benefit from fiscal incentives in the form of a special deduction of 75% of project costs up to \$50,000, with a maximum deduction of \$10,000 per year for the first five (5) years. There is an additional one-time deduction of \$5,000 for qualifying residential projects. For commercial projects, the deduction included in the model is 150% of project costs, with a maximum deduction of \$25,000 per year for the first five (5) years.

Depreciation

Depreciation is modelled on a 20-year straight-line basis for all corporate owned projects. No accelerated depreciation incentives for income tax deduction purposes are included.

Decommissioning

A dedicated reserve is accumulated over the first ten (10) years of the project and is used to fund the cost that is required to decommission an RE installation. This cost exceeds the salvage value of the equipment and is funded from the operating cash flows.

Capital Expenditures during Operations

The model developed includes estimates for expenditures that are incurred during the operation of the installation, which would require capitalization and depreciation, similar to any other generating asset. These would include inverter replacements in the case of solar installations, and blade and gearbox replacements for wind installations.

Taxes

The model assumes that no taxes are applied to RE projects owned by individuals. With respect to corporations, a 10-year income tax holiday is assumed, followed by corporation tax of 5.5% thereafter. These assumptions are based on information from the BRA. Where net operating losses are present, they are carried forward for up to seven (7) years. It is noted that should a higher tax rate than the one assumed be applied to existing projects, that would require a higher FIT for those existing investors and could reduce further market participation and investment. A stable and predictable tax rate is beneficial for the expansion of RE in Barbados.

Residual Value

Residual value refers to the price at which the facility output will be sold after the expiration of the 20-year FIT. The FIT is determined to cover all costs and enable an assumed target rate of return. The achievement of this target means that an acceptable assumption for the residual value has been determined to be zero. The Commission acknowledges that at the end of the 20-year period, a project's infrastructure is likely to still be viable and as such, should an investor want to continue as a going concern, a new contract will need to be negotiated, based on the existing value of the assets, the avoided costs of fuel or such other factors as may be determined by the Commission, in its sole discretion, at that time.

SECTION 4 THE DETERMINATION

A FIT is an effective policy instrument for encouraging persons and corporations to invest in RE. The GoB, through the BNEP, has plotted the course towards a goal of 100% RE by 2030. To facilitate this undertaking, it was considered that a stable pricing framework would be required to enable the transition from fossil fuels to RE. Moreover, it was determined that a FIT programme would be the accepted methodology for establishing a stable price for electricity generated from renewable resources. To this end, the Commission was tasked with setting FITs according to guidelines outlined in the BNEP. In view of the foregoing, the Commission has determined the following:

- I The effective start date for the FIT programme shall be October 1, 2019. The applicable categories, rates and capacity allocations shall be as set out at paragraph IV hereof and shall remain in effect until December 31, 2021 or until such time as the expiration of the existing capacity, stated herein, whichever comes first. Thereafter the rates shall be reviewed annually. New rates shall be announced three (3) months prior to the end of each review period.**
- II All terms shall remain constant for the duration of the 20-year contract. New or revised terms, conditions and tariff prices shall only be applicable to new projects entering the market in future programme years.**
- III The FIT shall be based on a 20-year fixed tariff with no front loading and differentiated by technology and size. The tariff is based on the LCOE, using a multi-criteria approach according to the guidelines espoused in the BNEP.**

Fit Policy Design

FIT Policy Element	RE Systems up to 1 MW
Proposed Effective Date	1/10/2019
Rate: Fixed, Tiered or Variable Options	Fixed
Rate: Differentiated by Technology & Size	Yes
Tariff Duration	20 years
Administratively-Determined or Competitively-Bid	Administratively-Determined
Presumed Off-taker	BL&P
Quantity Covered by FIT	100% of output
Periodic Review of Rates and MW Allocation	27 months initially, thereafter, annually

FITs Differentiated by Technology and Size (Up to and including 1 MW)

Technology Category	Size Category
Solar	Up to 10 kW
Solar	Above 10 kW to 100 kW
Solar	Above 100 kW to 250 kW
Solar	Above 250 kW to 500 kW
Solar	Above 500 kW to 1 MW
Land-Based Wind	Up to 10 kW
Land-Based Wind	Above 10 kW to 1 MW
Anaerobic Digestion	Up to 1 MW
Solid Biomass	Up to 1 MW

IV The applicable categories, rates and capacity allocation shall be as outlined below:

Technology, Size Category	Oct. 1, 2019 - Dec. 31, 2021 FIT (BDS cents/kWh)	Oct. 1, 2019 - Dec. 31, 2021 Allocation (MW)
Solar, Up to 10 kW	42.75	5
Solar, Above 10 kW to 100 kW	44.75	
Solar, Above 100 kW to 250 kW	41.75	8
Solar, Above 250 kW to 500 kW	38.25	
Solar, Above 500 kW to 1 MW	36.25	12.7
Land-Based Wind, up to 10 kW	39.75	3
Land-Based Wind, Above 10 kW to 1 MW	38.25	
Anaerobic Digestion, Up to 1 MW	44.25	2
Solid Biomass, Up to 1 MW	52.25	2
Total Allocation		32.7

V Capacity shall be allocated on a first come first served basis.

VI The total MW to be allocated for the period October 1, 2019 to December 31, 2021 of the FIT programme is 32.7 MW, with the addition of any rollover from the transition period (capacity allocated prior to September 27, 2019). Any un-utilised capacity shall rollover from one (1) iteration of the FIT to the next.

VII Current RER customers will be grandfathered and maintain their existing arrangements for the period of twenty (20) years commencing from the system's original commissioning date.

VIII Under the FIT programme, systems of 3kW or less shall utilise the "sale of excess" billing arrangement at the appropriate rate, while those above 3 kW and up to 1 MW shall use the "buy all/sell all" mechanism.

IX A multiplier of 10% in the first iteration of the FIT programme shall apply to all Community - Shared RE Projects. The criteria for Community - Shared RE Projects shall be: 1) a minimum of fifteen (15) residential customer investors, and 2) no single entity owning more than 50% of a single project.

X The maximum allowed duration between project licensing and COD is determined according to technology as follows:

- **Solar up to 1 MW: 12 months**
- **Wind up to 1 MW: 12 months**
- **Anaerobic Digestion: 36 months**
- **Solid Biomass: 36 months**

One (1) 6-month extension is allowed for solar and wind up to 1 MW, with no security, and no opportunity for further extension. For anaerobic digestion and solid biomass up to 1 MW one (1) 12-month extension is allowed, with no security, and no opportunity for further extension.

XI Only one (1) FIT project per parcel of land is allowed.

XII The FIT includes the purchase by the BL&P of all present and future commodities and/or environmental attributes generated by the project - including energy capacity, RECs or other commodities that may exist now or in the future. All rights, titles and interests in RECs shall be affirmatively purchased as part of the FIT and retained/retired so as to be counted towards the achievement of Barbados' RE goals. Further, the resale of RECs by the BL&P to fulfill any other claims or commitments, or for financial gain in international markets is not allowed.

XIII At the end of the 20-year FIT contract period, a new contract would need to be negotiated based on the existing value of the assets, the avoided cost of fuel or such other factors as may be determined by the Commission, in its sole discretion, at that time.

Dated this of 2019

.....
Tammy Bryan
Chairman

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Brian Francis
Commissioner

.....
John Griffith
Commissioner

.....
Ruan Martinez
Commissioner

.....
Samuel Wallerson
Commissioner

APPENDIX 1

Summary of Responses to Questions

1. **What are your views on the appropriateness of the aforementioned criteria⁶? Are there any other criteria that you consider priority? Please explain why.**

Respondents' Comments

Four (4) submissions expressed differing views about the appropriateness of the criteria presented. Two (2) submissions approved the criteria as appropriate for RE tariff differentiation. Another submission strongly supported technology type, project size, and technology application as appropriate criteria but expressed reservations about differentiated tariffs based on quality of resource and geography/location. It however, concluded that the merit of these criteria should be considered based on the need for the resource. With regard to ownership structure, it would support a mechanism that encourages fair exploitation of the benefits of ownership. The submission also suggested that a tariff should be developed for energy storage, given the value-added benefits its integration will bring to the grid, its potential for investment opportunities, as well as its role in facilitating the achievement of the 100% RE goal. Similarly, another submission supported differentiated RE rates based on RE technology type and project size but opposed the utilisation of the remaining criteria, since it was considered likely to complicate the tariff structure and increase costs associated with attaining the RE target. Another submission did not object to the criteria but recommended that criteria are needed to evaluate the impact of local against foreign funding and ownership, foreign exchange impacts, economic policy considerations, overall economic fairness, quality jobs, local ownership and social stability.

Commission's Comments

The Commission notes that the selection of the appropriate criteria to establish RE rates specific to Barbados' energy context was balanced against electricity cost, policy objectives for meeting the 100% RE goal and the cost effectiveness of achieving policy objectives. The Commission has determined that this can be best achieved by FIT payments which are

⁶ The criteria referred to here is mentioned on Page 8 of this Decision.

differentiated by technology type and project size. The Commission also noted that these criteria will encourage a diverse energy mix and facilitate participation at different scales.

The Commission is cognisant of the requirement for energy storage to support the transition to RE and accepts that, given its value-added benefits to the grid, it should precipitate a specific rate design to further facilitate its deployment. The Commission expects that a rate will be determined in the near future based on empirical data from grid studies.

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?

Respondents' Comments

The majority of submissions concurred with incentivising RE investment. One (1) respondent opined that the FIT should offer sufficient incentive. Another suggested that rental of rooftop space could leverage greater local participation in the RE sector. Four (4) submissions recommended a fixed long-term tariff as an essential incentive. One (1) of these submissions asserted that the utility fund the FIT through its avoided cost of fuel, until attainment of the 100% RE target. Another of these respondents expected the existing suite of tax exemptions - corporation tax, duty, and VAT - to continue and suggested potential incentives for land tax ease, accelerated depreciation on RE assets and tax allowances. Another respondent concurred with the current level of tax exemptions offered to the RE sector but argued that the FIT determined must be balanced against the need to recover investment costs associated with the integration of RE assets on the grid. It suggested that retaining the existing billing mechanism, adoption of cost trackers and revenue decoupling were appropriate incentives, which would facilitate benefits to customers.

Commission's Comments

The Commission noted that the availability of innovative incentives would play a critical role in facilitating investments in the RE sector. Given one of the tenets of the BNEP - energy democratisation, strategic and financial incentives, as well as partnership initiatives, would assist in implementing this objective. The Commission also notes that the rates took into account the need to incentivise greater RE investment, provide a level of certainty and

guarantee market reflective rates over the long term. The Commission expects that the existing tax incentives and other initiatives will create a greater enabling environment for confidence to grow, as the build out of the RE sector takes place.

- 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?**

Respondents' Comments

Three (3) submissions supported the need for improved income tax incentives as it relates to RE investments. However, two (2) of these respondents believed that a long term fixed rate would be more effective, as opposed to taxes below what currently obtains. One (1) submission suggested that the construction of RE facilities should attract little or no tax, as well as tax exemptions on RE revenue until the initial investment has been recovered. An alternative view posed was that education and awareness was required to inform investors about access to Government's existing income tax incentives.

Commission's Comments

Enhanced tax incentives, which are aligned to attaining the 100% RE goal, would assist in driving greater RE deployment. The Commission is cognisant, however, that incentives must be balanced against the country's existing economic circumstances. It is also accepted that market reflective FITs which signal certainty to investors could act as an incentive for rapid uptake of RE based technologies. The Commission also noted that the fixed long-term rates are so designed as to allow the opportunity for a reasonable return on investment.

- 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?**

Respondents' Comments

Four (4) submissions suggested that accelerated depreciation rates would be beneficial. However, two (2) of these agreed that the private sector could benefit from allowances made

over a shorter period as opposed to the twenty-five (25) year depreciation period. One (1) of these suggested a period of ten (10) years. Another agreed that a shorter period would facilitate meeting loan commitments.

Commission's Comments

The provision of strategic incentives will be critical to meeting the 100% RE goal. These provisions however, must be carefully examined such that the cost-effectiveness of achieving the RE goal is realized. Accelerated rates would mean higher rates in the short term, which places a financial strain on the end-user. This, however, may be advantageous to the investor. A balance must be struck.

- 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?**

Respondents' Comments

One (1) submission indicated that the write-off period should facilitate meeting cash flow and loan commitments, while another suggested that immediate write-off of capital plant investment should be up to ten (10) years. One (1) respondent highlighted the need for investors to educate themselves on available incentives.

Commission's Comments

The Commission is of the view that write-off of investments could incentivise further deployment of RE based technologies. However, it is noted that the provision of incentives must be balanced against prevailing economic circumstances and the need to generate revenue, since this could impose a burden on the average taxpayer.

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

Respondents' Comments

One (1) submission advised that an appropriate ROR be set and allow RE investors to determine the cash flow, while another objected that ROR was a difficult mechanism to implement since it depends on the type of project. Two (2) submissions suggested that it is advantageous to utilise a FIT mechanism over a 20-year horizon that accounts for frontloading for the first half of this period. Similarly, another submission supported 20-year purchase contracts but cautioned that care must be exercised in frontloading a FIT in the initial contract period. It advised that an appropriate ROR would ensure stable cash flows.

Commission's Comments

The Commission has acknowledged that frontloading offers the opportunity to recover capital investments early in the RE asset's operating life. While this would be advantageous to an investor, it would impose upward financial pressure on prices for electricity customers. The Commission, being cognisant of this potential outcome, also considered the impact of the FITs on the consumer and the investor. The determination of fixed market reflective FITs over a predetermined period would not only offer a measure of price stability and certainty of investment, but would also mitigate the effects of increased electricity cost resulting from frontloaded FITs.

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?

Respondents' Comments

There was general agreement by respondents that low risk debt financing and low risk returns on investment should be features of the FIT design. However, two (2) respondents suggested that satisfying the differing risk profiles of investors would be a challenge.

Commission's Comments

One of the attributes of a well-designed FIT scheme is its ability to reflect desired policy objectives. Under Barbados' 100% RE vision, it is recognised that the achievement of this goal would be contingent on creating the appropriate investment space, which would assure certainty and mitigate against unnecessary risk. The provision of appropriate fixed FITs over the long-term would facilitate this.

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.**

Respondents' Comments

Respondents concurred that the FIT should provide a fixed, long-term contract rate to reduce financial and economic risk to RE investors and consumers. These features would encourage investment and add certainty for investors. One (1) respondent was of the view that a front-loaded FIT would facilitate early payback for loan commitments. An alternate view posed was that the FIT should include curtailment rights without the obligation to compensate RE suppliers in high penetration scenarios where appropriate. This, they suggested, would mitigate against associated "financial, economic and technical risks".

Commission's Comments

The Commission noted that a guaranteed fixed payment for RE production over the economic life of the asset would provide confidence for investment in the RE sector and also would result in lower rates for consumers. Additionally, differentiated rates by capacity and technology type would ensure that consumers benefit from economies of scale.

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?**

Respondents' Comments

The consensus was that an adder or premium for Community Based RE Projects would be appropriate. A suggestion was that the premium could be a percentage of the FIT (about 10%) which, when added to the base rate of the FIT, would incentivise local participation. One (1) respondent posited that the reward should be apportioned according to the risk of investment.

Commission's Comments

One of the policy objectives under the 100% RE goal is encouragement of local participation through democratisation of RE. The provision of premium type rates for Community Based RE Projects would spur local involvement.

- 10. Should IPP's and installations larger than 1 MW be under the same tariff mechanism as projects of 1 MW 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.**

Respondents' Comments

The majority of respondents agreed that IPPs and installations beyond 1 MW should be under a different energy pricing scheme. An alternate view was that above the 500 kW benchmark, a reasonable rate could be either negotiated between the off-taker and each IPP or through a competitive bidding process. Similarly, another respondent supported the use of auctions to discover the tariff for large projects but recommended that potential bidders demonstrate the ability to sustain the project prior to bidding, in order to avoid abandonment of projects. However, three (3) respondents opposed auctions for large projects since, in their view, it limits local participation, ownership and energy democratisation.

Commission's Comments

The Commission noted that a pricing methodology applicable to RE systems beyond 1 MW would require consultation with all stakeholders.

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

Respondents' Comments

The consensus amongst respondents was that RE systems are economically unattractive to average households. A fixed tariff over the long-term was highlighted as a common solution; this would encourage funding by financial institutions and further investment in RE. A front-loaded tariff was posed by one (1) respondent as a solution since this, they considered, has the potential to increase householder participation and enhance the resilience of the roofing stock.

Commission's Comments

The cost of RE systems, particularly solar PV, is steadily declining. The Commission acknowledged that RE education and awareness for investors and financial institutions is required and this should inform the creation of innovative funding packages targeted at the

domestic market. The provision of fixed tariffs would also reduce investor risk and boost confidence in such projects.

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?

Respondents' Comments

One (1) respondent recommended an ROR of 13% to 15% to stimulate local and international investment given the 2030 RE goal. Another asserted that RE projects should attract a high WACC. Considering the average financial structure of 60% debt and 40% equity, a 5% to 7% debt and 12% to 15% equity, a WACC of 10% is achievable. At this rate, a 12% to 15% ROR would be required to meet investment needs. Another view raised was that an ROR above 15% would be appropriate to meet investment needs over a minimum of 3 to 5 years. One (1) respondent argued that currently, a 10% ROR is allowed which was based on risk of investment as a means to evaluation. Hence, this approach should be applied to RE investments. Another suggested setting a target ROR and FIT, and allow the market process to work.

Commission's Comments

The ROR should be determined based on local market conditions. This is an area which could be used to incentivise investors to further encourage participation in the energy sphere.

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?

Respondents' Comments

A FIT with a twenty (20) year horizon was recommended by the majority of respondents, since this timeframe would cater to the recovery of capital investment and provide the opportunity to earn a reasonable return, and ensure stable cash flow. There was a general agreement that the duration of the FIT should vary by technology type.

Commission's Comments

The duration of the FIT should be long enough to allow recovery of investment and a reasonable return, while ensuring that rates are affordable to the end-user.

- 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?**

Respondents' Comments

The recommended timeframe for recovery of investment suggested ranged from six (6) to twenty (20) years. There was general agreement that the recovery period should vary by technology type.

Commission's Comments

This should be technology specific and account for part of the asset's operating life. The FITs determined provide guaranteed rates which are intended to capture the assets' costs over the economic life, and offer the opportunity to the investor to earn a reasonable return. The level of the FIT and its duration would ensure that these considerations are adequately addressed.

- 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?**

Respondents Comments

Six (6) respondents generally agreed that energy storage should be required while one (1) respondent recommended 5 MW as the benchmark, and another suggested 250 kW. Two (2) respondents opined that the requirement for energy storage should attract a premium rate, which is reflective of the quality of the energy resource produced.

Commission's Comments

The inclusion of energy storage could provide multiple benefits to the grid at any size. However, a separate pricing regime would be required for the different value services offered. This will be addressed in a future investigation.

- 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?**

Respondents Comments

There was consensus that the FITs should be guaranteed over a twenty (20) year horizon and reviewed every two (2) years. Six (6) months prior notice was suggested for implementation of new rates.

Commission's Comments

The duration of the FIT accounts for a portion of the asset's design life. A review of the FIT is intended to take into account changes in technology and reflect current market prices. In order to facilitate the efficient operation of the FIT programme, an average review period of twelve (12) months would be reasonable. This would add certainty for investors. Other jurisdictions, e.g. Ontario, review FITs every two (2) years, however, the Commission has considered that the attainment of RE capacity targets should also trigger a FIT review.

- 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?**

Respondents' Comments

There was consensus that capacity limits for RE systems should be considered within the constraints of the grid, and that system modelling be utilised to investigate the impact of the capacity to ensure safe operation. An alternate view raised by one (1) respondent was that this issue should be addressed within the Grid Code and IRP.

Commission's Comments

The Commission acknowledged that capacity limits should be initiated based on the appropriate grid and feeder studies to ensure safe and reliable operation.

- 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?**

Respondents' Comments

One (1) respondent recommended a degression schedule that accounts for declining production cost of RE assets over time, while most respondents agreed that a fixed rate tariff was appropriate. One (1) respondent disagreed with the use of a degression schedule.

Commission's Comments

The Commission recommended a FIT with a fixed rate to cover payments over a 20-year period. The review of the FIT would provide the necessary information to inform the required adjustments for new projects.

- 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.**

Respondents' Comments

Issues highlighted included a lack of a fixed long-term rate, planning and permitting, issuance of licence, project inspections, interconnection approvals, availability of land, cost of land, development cost and the apparent bias towards local projects compared to foreign ones. Respondents also raised issues related to the absence of innovative finance and insurance products, exemptions on import duties, provision of subsidies/tax concessions, FCA mechanism impacts, the lack of sector education and awareness amongst institutions, and the need for greater collaboration among stakeholders. The 2028 expiration date of the existing utility franchise limits the offering of long-term PPAs beyond this period. One (1) respondent highlighted elements of the local Exchange Control Act, which they opined could significantly decrease project returns.

Commission's Comments

The Commission has acknowledged that attainment of the national 100% RE goal could be further enhanced by removing those impediments associated with processing RE applications, e.g. permitting, licensing and planning processes. The Commission anticipates that as the

transition to RE advances, the effects of these barriers should subside since there is a direct benefit of learning from our specific circumstances. As these issues become less prevalent, a more conducive environment should evolve.

- 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?**

Respondents' Comments

One (1) respondent suggested that the FIT should be determined to provide a 10% to 12% IRR based on feedback on project costs. Another respondent was of the view that the LCOE approach could be enhanced with minimal financial impact on society if it captured job creation relative to RE, environmental issues and democratisation of capital through local ownership. It was suggested that periodic reports with updated LCOE information should be submitted by the utility bi-annually. Another respondent noted that it is within the purview of the Commission to request all relevant information as required. One (1) respondent suggested that regular consultation with local and international stakeholders should be required.

Commission's Comments

The Commission anticipates that pertinent data will be required from all relevant stakeholders. This would allow the LCOE model inputs to be reviewed and revised, so that appropriate rates can be determined based on existing market conditions. The types, and format of this information will be determined via direct dialogue with the parties.

- 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?**

Respondents' Comments

The majority of respondents agreed that the support or subsidy should be reflected on the bill for transparency. One (1) respondent cautioned that any noticeable increase on the bill may create division on RE support.

Commission's Comments

The Commission considered that transparency helps consumers understand the cost of providing a service and facilitates them making informed choices, i.e. energy conservation and energy efficiency.

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.

Respondents' Comments

One (1) respondent suggested that no subsidy was required and another posited that the support be created from an assumed generation based on a specific capacity, and the KWh be spread across the customer base. The respondent further recommended that this amount be paid from a pool of fuel savings from RE projects. Another respondent opined that the level of subsidy becomes more complex as RE penetration increases and baseload energy is displaced. One (1) respondent asserted that the existing FCA mechanism could be used to highlight RE purchases separately on customers' bills.

Commission's Comments

The Commission anticipates that a flexible instrument or modification of the existing mechanism would be developed to facilitate recovery and reflect RE costs.

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?

Respondents' Comments

There was no consensus among respondents regarding this question. One (1) respondent was of the view that subsequent to a FIT review, the FIT levy would be expected to change but the quantum of energy purchased would be contingent on the bulk of RE produced. He cautioned that this must be carefully addressed to avoid public confrontation related to increased electricity costs. In terms of interconnection costs, it was noted that the BL&P would be able to determine this impact. This respondent agreed that the FIT should be updated if a filing is made by the BL&P. Another respondent opined that the FIT should be reduced to deter further investments when the national RE capacity required is exceeded. Another respondent supported the recovery of power purchased through a mechanism such as a REFCOA and payment of compensation to RE suppliers made via the customer's bill. The respondent also supported the continuance of the buy-all-sell-all billing arrangement to facilitate this.

One (1) respondent objected to the use of a FIT levy but recommended a cost tracker to capture and recover grid investments associated with increased RE penetration.

Commission's Comments

The Commission anticipates that changes to the FIT would be triggered by exhaustion of allocated RE capacities and or the expiration of a specified date. Additionally, energy sector market conditions would also dictate the changes in FIT levy. These include the type and magnitude of financial incentives, tax exemptions, etc.

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

Respondents' Comments

One (1) respondent indicated that if the FIT is linked to RE generation, then the amount paid should be apportioned to the level of consumption, provided that correlation exists between

income and electricity cost. He also recommended the promotion of energy conservation and energy efficiency for all customers. Two (2) respondents opposed the FIT levy but recommended an appropriate cost recovery mechanism to capture generation costs; these include REECA and cost trackers.

Commission's Comments

The Commission acknowledged that an evaluation of the impact on low income customers would be essential. This would depend on the volumes of RE produced and purchased. The level of impact on low-income customers would also be contingent on the relative consumption amongst the customer classes and how cost is allocated across these. Currently, the first tariff block (150 kWh) for electricity caters to the most vulnerable customers.

- 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.**

Respondents' Comments

One (1) respondent suggested that RE investors be offered an appropriate ROR and the resulting FIT should be financed by the avoided fuel cost. Another respondent explained that currently, the BL&P absorbs all cost associated with interconnection of RE systems up to 500 kW, except for line extensions and transformer upgrades; this is expected to continue with the exception of grid upgrades (line extensions) which may require sharing of the cost. Similarly, two (2) respondents advised that as a consequence of RE grid interconnections, additional capital and operating cost expended on infrastructure to facilitate these, such costs are not recovered from RE investors. As higher capacities are installed, the associated cost of these will need to be recovered.

Commission's Comments

The Commission expects that given the 100% RE vision, increases in RE capacity which require upgrades to facilitate their integration and may impose additional costs on the utility. As a consequence, these cost increases will have to be shared equitably to the benefit of all consumers.

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.

Respondents' Comments

Respondents agreed that the requisite RE information should be recorded and reported by the utility or a Government institution. Three (3) respondents indicated that this would facilitate information retrieval from the utility by Government if that entity is the sole data collection entity. One (1) respondent asserted that it was required to provide operational and financial information to the Commission at specific periods and that this process could facilitate any supplemental information, if required.

Commission's Comments

The Commission acknowledged that it has regulatory oversight on the requisite data collection as it relates to regulated entities. It was noted that, given the transition to RE, there will be a need to expand the data collection requirements for the utility and other stakeholders. This expanded role will aim to address the quality of information submitted, so that timely and informed decisions can be taken, as it pertains to the efficient operation of the FIT programme, and the provision of a safe, reliable, and efficient electricity service. The ability to routinely capture data from entities other than the utility will need to be provided for in legislation.