# FAIR TRADING COMMISSION

# CONSULTATION PAPER

# Feed-in-Tariffs for Renewable Energy Technologies Above 1 MW and up to 10 MW

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**DOCUMENT TITLE: Feed in Tariffs for Renewable Energy Technologies Above 1MW and up to 10 MW**

**ANTECEDENT DOCUMENTS**

| Document Number | Description | Issue Date |
|---|---|---|
| **FTC/URD/CONFIT-2019-03** | Consultation Paper on Feed-in-Tariffs for Renewable Energy Sources | May 29, 2019 |
| **FTCUR/DECFIT/2019-04** | Decision on Feed in Tariffs for Renewable Energy Technologies up to and Including 1MW. | September 24, 2019 |
| **FITCUR/DECFIT/2020-01** | Decision on Feed in Tariffs for Renewable Energy Technologies above 1 MW and up to 10 MW | September 30, 2020 |
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# LIST OF ABBREVIATIONS

| | |
|---|---|
| BLPC | Barbados Light & Power Company Limited |
| BNEP | Barbados National Energy Policy |
| $CO_2$ | Carbon-dioxide |
| ELPA | Electric Light and Power Act, 2013-21 |
| FIT | Feed-in-Tariff |
| FTCA | The Fair Trading Commission Act, CAP. 326B |
| FTCA 2020 | The Fair Trading Commission (Amendment) Act, 2020 |
| GoB | Government of Barbados |
| ICSID | International Centre for Settlement of Investment Disputes |
| IPPs | Independent Power Producers |
| LCOE | Levelised Cost of Energy |
| NDC | National Determined Contribution |
| NGOs | Non-governmental Organisations |
| PV | Photovoltaic |
| RE | Renewable Energy |
| The Commission | The Fair Trading Commission |
| URA | Utilities Regulation Act CAP. 282 |
| URA 2020 | Utilities Regulation (Amendment) Act, 2020 |

# PURPOSE OF DOCUMENT

**Introduction**

This call for comments outlines the Fair Trading Commission's (the Commission) review of the September 30, 2020 Decision on Feed-in Tariffs (FIT) for renewable energy (RE) technologies above 1 MW and up to 10 MW.

The intent of this review is to build on the foundation which was established by the aforementioned Decision by soliciting and assessing comments, views and proposals from stakeholders which will inform the development of fair market rates for eligible RE generators and the refinement of the structures and policies that define the FIT programme.

Public participation is a critical aspect of the decision-making process and the Commission therefore invites written submissions from the general public, the Barbados Light and Power Company (BLPC) Limited, Government agencies, the business community, public consumer bodies or advocates, Non-governmental Organisations (NGOs), educational institutions, and any other interested party.

Through this stakeholder-wide consultative process, the Commission expects diverse perspectives on the attendant issues in the RE sector.

# STRUCTURE OF PAPER

The sections of this paper are presented as follows.

- Section 1 introduces the importance of the FIT programmes as a component of the national climate change mitigation strategy.
- Section 2 outlines and explains the regulatory authority of the Commission.
- Section 3 presents an appraisal of the FIT programmes.
- Section 4 discusses proposals with respect to issues facing the RE sector.
- Section 5 outlines a proposal for the treatment of interconnection costs.
- Section 6 sets out other Impacts.
- Section 7 presents a list of questions for stakeholders.

## RESPONDING TO THIS DOCUMENT

The Commission considers that responses to this paper would be most useful, if they:

- relate to the specific question posed;
- provide a clear, concise response and rationale; and
- include any other issues you consider to be crucial but not addressed herein.

This suggested approach would allow the Commission to garner the greatest benefit from this feedback process.

A copy of this document may be accessed on the Commission's website at, http://www.ftc.gov.bb.

## SUBMISSION OF COMMENTS

The call for written feed-back on this paper will commence on Tuesday, July 12, 2022 and ends Friday August 5, 2022 at 4:00 p.m. All submissions must be made within the allocated timelines. The Commission is not obligated to accept or consider submissions made after 4:00 p.m. on August 5, 2022.

Electronic submission of comments in the form of a Microsoft Word format or Portable Document format should be accompanied by a cover letter and be sent to info@ftc.gov.bb. Alternatively, responses may be faxed to the Commission at (246) 424-0300. Mailed or hand delivered responses should be addressed to the:

Chief Executive Officer
Fair Trading Commission
Good Hope, Green Hill
St. Michael, BB12003
BARBADOS

## TREATMENT OF SUBMITTED COMMENTS

Responses to this consultation paper will be reviewed, analysed and discussed with stakeholders where appropriate. Staff will consider the outcome of this consultative process and make recommendations towards a final determination.

## SUBMISSION OF CONFIDENTIAL INFORMATION

The Commission advises that the inclusion of a standard confidentiality statement in an email will not meet the obligation to approve a confidentiality request. If a respondent views the submitted information as commercially sensitive, a formal request should be made to the Commission pursuant to Section 11 of the FTCA, 2020. The Commission in discharge of its functions under this review will exercise discretion with regard to the request for confidentiality.

# SECTION 1 NATIONAL CLIMATE CHANGE PERSPECTIVE

## 1.1 Background

The Government of Barbados (GoB) remains committed to contributing to the worldwide mission of limiting global warming to below 2 degrees Celsius as stipulated in the Paris Agreement 2015[1]. The solemnity of this obligation is evidenced by the submission of the updated National Determined Contribution (NDC)[2] which is required under the treaty.

Enshrined in the NDC are principal activities to be implemented towards the evolution of a low carbon economy. The utilisation of RE sources are acknowledged as a vehicle to facilitate this transition and to realize the climate mitigation targets, e.g. 70% economy-wide emissions reduction by 2030[3]. RE derived technologies like solar photovoltaic (PV) and wind technologies generate zero-carbon emissions and therefore, unlike fossil fuel combustion, their use contributes to the reduction in carbon dioxide ($CO_2$) pollutants in the natural environment.

The intent of the NDC is harmonised with the objectives articulated in the Barbados National Energy Policy (BNEP) 2019 – 2030 which calls for the implementation and operationalisation of a diverse energy mix of RE technologies.

The future energy mix under the BNEP targets technology deployment of solar PV, wind, biomass and energy storage systems which is expected to save BDS $400 - 800 million annually in energy over the policy horizon[4].

[1] The Paris Agreement is an international treaty on climate change which was ratified by 196 countries in December 2015. This concordat was effectuated in November 2016.

[2] National Determined Contributions is an action plan which is targeted towards the reduction of Greenhouse Gas emissions. This report can be viewed here
Government of Barbados. 2022. "NDC Registry (Interim)." NDC Registry. January 12. Accessed January 12, 2022.
https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Barbados%20First/2021%20Barbados%20NDC%20update%20-%2021%20July%202021.pdf.

[3] Ibid, 18.

[4] Government of Barbados. 2021. "Barbados National Energy Policy." Ministry of Energy, Small Business and entrepreneurship. October 21. Accessed October 21, 2021. https://energy.gov.bb/publications/barbados-national-energy-policy-bnep/.

Additionally, the draft Integrated Resource and Resilience Plan (IRRP) charts a path over the medium term for the adoption of an ascendant fossil-fuel free economy.

This transition to a predominantly indigenous future RE supply is gradually gaining momentum through the induction of the FIT programmes. The RE sector and by extension, the FIT programmes, are recognised as a channel towards economic enfranchisement and liberalisation for Barbadians.

The above 1 MW and up to 10 MW FIT programme by design offers investment, employment, educational and research and development opportunities to locals. These modes of participation are expected to facilitate the expansion and growth in the RE sector.

## 1.2 Objectives of Review

This review will assess the effectiveness of the policy objectives which were incorporated in the programme design. The key considerations in this review are: using a multi-criteria approach to maintain balance, energy affordability, the trajectory towards the 2030 deployment goal, market competition and local participation. The refinement of the FIT programme will depend on feedback about issues experienced during the eighteen (18) month period. After the review, the Commission intends to: (1) deduce useful information from the RE deployment trend, (2) determine the level of adjustments required in consideration of the policy objectives, (3) analyse data received during consultation to inform on the determination of new rates and (4) make judgments based on research and the feedback received. The successful outcome of this review is premised on the consideration of the concomitant issues and the implementation of reasonable actions which can enhance the objectives of the FIT programme.

## 1.3 Data Collection

The Commission uses a data-driven approach to determine appropriate rates for RE technologies. The principal function of a rate is that it must be adequate to facilitate recovery of investment, provide an opportunity for a reasonable return on said expenditure and satisfy policy directives. To achieve price discovery that is oriented to these key

considerations, the Commission relies on technical and financial data from RE projects that is valid, accurate and reliable in order to promote the investment opportunities needed to realise the transition to the new net-zero carbon economy by 2030.

The legislative provisions set out in Sections 3(2A) and 24B (5) of the URA 2020 establishes the authority of the Commission to garner the requisite information from renewable energy providers (REPs), Independent Power Producers (IPPs) and the service provider.

The data to be requested from IPPs will primarily be used for evaluation purposes. This allows the Commission to make credible judgments based on the price trajectory of RE assets and facilitates the determination of rates for the RE sector.

Accessible data from a wide cross-section of renewable energy producers presents a unique benefit to the rate making process, the expansion of the RE sector and building investor confidence; all of which are crucial for the sustainability of investment opportunities and business development.

The Commission is cognisant of the challenges associated with data requests from renewable energy producers in the past and acknowledges that it is now critical that all future requests must be executed through a formalised process. A formulised process is expected to significantly improve monitoring and evaluation of incoming price signals in the RE market and lead to rates that are consistently fair and reasonable.

Without an established stream-lined data collection process, proxy data will have to be utilised which is not an effective method of price discovery for the indigenous RE market.

Given the pertinence of local data for the targeted expansion of the RE sector, the Commission intends to implement a stream-lined data collection framework to facilitate prudent assessment of RE project information. The framework will require all IPPs to submit the required financial and technical project data to the Commission in the first instance. A technical assessment of the proposed project based on industry approved software (e.g.

PVsyst, PV*Sol) will be required. Following the commissioning of the specific RE generators, actual financial and technical information will be required in the second instance. All data to be collected from IPPs will be initiated on a quarterly cycle for the duration of the FIT programme or until all the requisite data is collected from all programme participants prior to and after project installation. The collection of this information will be utilised to compare budgeted expenses with actual expenses for all RE generators.

Additionally, a prudent assessment of this information will assist the Commission in tracking the price movements of all applicable licensed RE technologies throughout the FIT programme cycle[5], predicting and making informed decisions with respect to the quantum of future market rates for specific RE technologies, issuing rates timely to the public and detecting triggers for immediate review of the programme.

The Commission is of the view that this approach will further advance the price discovery of RE technologies and the development of market reflective rates for the sector.

In order for this initiative to be successful, the Commission will formulate a FIT programme register which will capture all accredited RE generators within the programme cycle. The information aforementioned (financial, technical) will be required for these RE generators.

The following section highlights the enabling legislation which empowers the Commission to execute its functions with regard to the rates for the RE sector.

[5] Defines the effective start and termination date of the programme.

# SECTION 2 LEGISLATIVE FRAMEWORK

## 2.1 Introduction

The Commission as the sole economic regulator of utility services has jurisdiction under the FTCA 2020 of the Laws of Barbados to "safeguard the interests of consumers, to regulate utility services supplied by service providers, to monitor and investigate the conduct of service providers, renewable energy producers and business enterprises, to promote and maintain effective competition in the economy, and for related matters." Similarly, the URA 2020 of the Laws of Barbados expands the role of the Commission with regard to renewable energy producers and associated matters.

Pursuant to **Section 2** of the FTCA 2020 and URA 2020, the Commission has regulatory oversight of the principles utilised to establish a rate.

""Principles" means the formula, methodology or framework for determining a rate for a utility service".

By virtue of the **Section 2** of the FTCA 2020 and the URA 2020:

""Rates", include:

*(a) every rate, fare, toll, charge, rental or other compensation of a service provider or renewable energy producer;*

*(b) a rule, practice, measurement, classification or contract of a service provider or renewable energy producer relating to a rate; and*

*(c) a schedule or tariff respecting a rate;".*

Additionally**, Section 2** of the FTCA 2020 states that, ""*Independent power producer" means a commercial entity other than an electric utility, which;*

*(a) produces or stores; and*

*(b) supplies*

*electricity using renewable energy resources for sale to the public grid*;

*"public grid" means the grid to which the public has access for the supply of electricity;*

*"renewable energy producer"includes a generator, distributor or person who stores and supplies electricity generated from a renewable energy resources for sale to the public grid;"".*

Pursuant to **Section 4(3)** of the FTCA 2020, the Commission has the regulatory authority to:

*(a) establish principles for arriving at rates to be charged by service providers and renewable energy producers;*

*(b) set the maximum rates to be charged by service providers and renewable energy producers;*

*(c) monitor the rates charged by service providers and renewable energy providers to ensure compliance;*

*(d) ……..;*

*(e) ……;*

*(f) carry out periodic reviews of the rates and principles for setting rates of service providers and renewable energy producers;".*

The Commission's duty to consult with the public on the aforementioned is stipulated under subsection (4) which states that:

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

## 2.2 Information Gathering

Subsection (4A) outlines the Commission's function with regard to data requests from specific entities:

"*The Commission shall, in performing its functions under subsections (3)(a),(b), (c) ,(d), (e), (f) and (g), request*

*(a) a service provider;*

*(b) a renewable energy producer; or*

*(c) a licensee under the Telecommunication Act, 282B or the Electric Light and Power Act (2013-21)*

*to provide the Commission with information relating to its operations, finances or such other information as the Commission may consider necessary to perform its functions.*"

Similarly, section 3 (2A) of the URA 2020 the Commission can request data from a service provider. This section states that, *"In performing it functions under subsection (1), the Commission may request a service provider to provide the Commission with information relating to its operations, finances or such other information as the Commission may consider necessary to perform its functions."*

The Commission's powers are derived from s**ection 3(1)** of the URA, which sets out its functions. Section 3(1) (a) to (c) 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*".

Section 24B (1) of the URA 2020 stipulates that, "The functions of the Commission, in relation to a renewable energy producer entering into an interconnection agreement or other agreement to supply electricity to the public grid, are to

*(a) establish principles for arriving at the rates to be charged;*

*(b) set the terms and conditions of the agreements;*

*(c) set the maximum rates to be charged under the agreements; and*

*(d) direct renewable energy producers to submit the proposals for the rates and terms and conditions relating to their agreements."*

## 2.3 Duty to Consult

Further to subsection (1), Section 24B (2) states that:

"the Commission shall consult with renewable energy producers, representatives of consumer interest groups and other interested parties and shall have regard to:

*(a) the national energy policy;*

*(b) the national environmental policy;*

(c) *the requirement to promote renewable energy and to enhance the security, affordability, safety and reliability of the supply of electricity."*

Additionally, subsection (3) outlines what the Commission is required to consider as it executes its functions set out in subsection (1) (a); subsection (3) provides that "the Commission shall have regard to:

*(a) the promotion of efficiency on the part of renewable energy producers;*

*(b) ensuring that an efficient renewable energy producer will be able to finance its functions by earning a reasonable return on capital;*

*(c) such other matters as the Commission may consider appropriate."*

# SECTION 3 OVERVIEW OF FEED-IN TARIFF PROGRAMMES

## 3.1 Background

The pronouncement of the BNEP 2019 – 2030 in July 2018 set out the vision towards rapid RE deployment and the expansion of the RE sector. On 1 October, 2019 the FIT programme for renewable energy technologies up to 1 MW-AC in rated capacity came into force. This scheme replaced the previous renewable energy rider (RER), which was a Commission approved initiative of the BLPC. Prior to the institution of the FIT scheme, the aggregate RE capacity online was approximately, 21.00 MW-AC. By the first anniversary of the October 2019 programme, customer-owned generation capacity grew by 19.00 MW-AC. In recognition of the need to expand the RE sector, democratize local investment opportunities further, and unlock the benefit from economies of scale associated with utility class RE projects[6], new rates for solar PV and land-based wind technologies above 1 MW, and up to 10 MW were issued in September, 2020. By the end of December 2020, the aggregate grid connected RE capacity reached approximately, 42 MW-AC. Based on this cumulative increase in system deployment, the RE penetration[7] returned was 5.01%. The estimated energy contribution from customer-owned RE generation to demand for 2021 was about 18. 00 GWh, and this represents about 7.00% of the gross demand. The total RE capacity is dominated by solar PV projects and as of 31 December, 2021 this capacity reached 56.0 MW-AC. The growth in RE presence online reflects a keen interest in developing the sector and an opportunity for further local economic enfranchisement. In addition to the natural energy supplemented under the Feed-in tariff programmes, there are also economic and social benefits which result including the reduction of carbon emissions, career development, job generation, and the promotion of technology innovation.

## 3.2 General Benefits of FIT Schemes

### 3.2.1 Participation Growth

The increased deployment of RE systems as aforementioned also reflects the growth in customer participation since the institution of these programmes. For the period October 2019 to October 2020, membership under the FIT schemes increased by 65.46%, namely, 651

[6] Utility scale in the Barbados RE context refers to projects larger than 1 MW-AC in capacity.

[7] The ratio of total RE generation online to the total system energy demanded. This value only relates to customer-owned generation.

customers more than the 1,300 recorded for 2019. At the end of October 2021, participants grew by 16.22%, an increase of 349 members since October 2020. Up to December 2021, the total number of customer subscriptions registered 2,546 and this number represents a 95.84% increase since the inception of the FIT programmes. These increases in membership are synonymous with the energy saving accruals realized from the growing capacity of customer-owned generation.

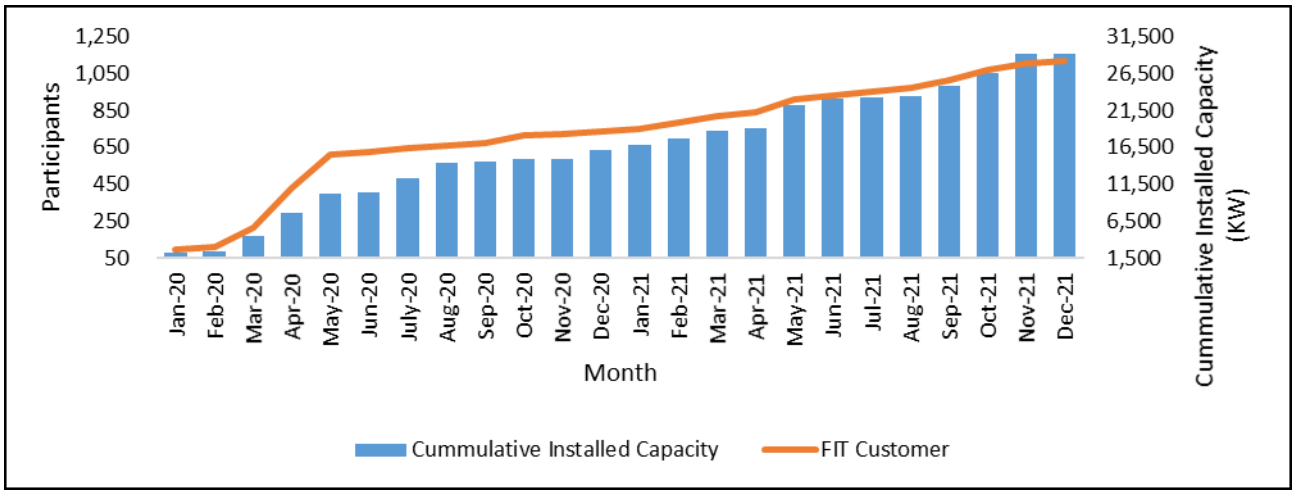


Figure 1- Capacity and Participation Growth

The monthly membership trend (Figure 1) depicts a reasonable estimate of the number of participants under the FIT programme for 24 months commencing 2020 January. The profile shows that participant numbers grew sharply from February – May, 2020 and continue to grow at a steady rate up to the end of December 2021. The total capacity grew at a steep rate up to August 2020, remained steady up to November, and gradually increased up to December 2021. With this increase in total capacity online, more RE was exported to the grid.

### 3.2.2 Energy Savings

The increased utilization of RE generation from the public grid reduces fossil fuel consumption, expenditure, and $CO_2$ emissions. These benefits will become more prominent as the total RE production gradually dominates net energy demand.

By the end of December 2020, customer-owned RE generation saved an estimated 15,000 tonnes of fuel with a value of approximately BDS $14 million. Consequently, this quantity of unconsumed fuel implies that 49,000 tonnes of $CO_2$ did not pollute the environment.

Similarly, at the end of December 2021 the amount of fuel avoided by customer-owned RE generation reached an estimated 20,000 tonnes of fossil fuel, an increase of 35.31% above the 2020 value.

Based on this quantity of fuel, the estimated value returned was BDS $30 million and this reflected 105% savings in fuel expenditure compared to the 2020 figure. These increased savings were also correlated with 66,000 tonnes of $CO_2$ emissions which were avoided.
These realised savings are strong indicators of the need to further exploit the RE potential in Barbados.

### 3.2.3 Job Creation

Globally, the RE sector generated 12 million jobs in 2020 compared to 10.3 million in 2017. Jobs are expected to increase to 38 million by 2030[8]. Locally, RE is also anticipated to promote economic development. The gradual expansion of this sector is leading to career development, and business creation for the industry. The evolution of this industry has influenced banks and financial institutions to incorporate RE portfolio services in their business provisions. An important development for the sector was the launching of the Barbados Sustainable Energy Cooperative Society Limited which was registered in 2020[9]. Through the implementation of the BNEP it is expected that full dispensation of knowledge creation, green jobs development[10], and financial support structures will be realised.

In light of the GoB 2030 goal of 100% RE, educational institutions are offering RE related courses. These include the Barbados Community College, the Samuel Jackman Institute of Technology, and the University of the West Indies, Cave Hill.

[8] International Renewable Energy Agency (IRENA) and International Labour Organisation (ILO). 2021. Renewable Energy and Jobs: Annual Review 2021. Study, Abu Dhabi, Geneva.: International Renewable Agency and International Labour Organisation.
[9] Barbados Sustainable Energy Cooperative Society Ltd. 2020. CoopEnergy Background. Accessed March 1, 2022. https://www.coopenergy.org/.
[10] International Labour Organization 2018. 2019. "Skills for Green Jobs in Barbados." International Labour Organization . May 30. Accessed November 15, 2021. https://www.ilo.org/skills/projects/WCMS_706853/lang--en/index.htm.

## 3.3 Structure of Utility Scale FIT Programme

This FIT programme consists of two (2) technology and capacity categories, an above 1 MW and up to 5 MW and above 5 MW and up to 10 MW category for solar PV and land-based wind technologies, respectively. The first capacity band of this programme was assigned a total duration of eighteen (18) months and this expired on 31 March, 2022. The second capacity band of the programme was an interim measure with a seven (7) month duration and its continuance remains contingent on the completion of the competitive procurement framework which is still under development by the Ministry with responsibility for capacity. The initial expiry date of this component was 31 March, 2021. However, the Commission at that time undertook a review but later considered that it would be more appropriate to execute a comprehensive review at this time. The following (Table 1) shows the ascribed rates and assigned capacity caps for each capacity band of the programme. Each generator is paid for every unit of energy (kWh) it exports to the grid. The structure of each FIT encapsulates capital, development, operating, and decommissioning expenses, interest rates, and inflation adjustment; these inputs being subject to terms and conditions such that investors can achieve an opportunity to make a return on investment.

**Table 1- Capacity Allocation**

| Technology, Size Category | (BDS cents/kWh) | (MW-AC) |
|---|---|---|
| **Solar PV, above 1 MW and up to 5 MW** | 23.25 | 30 |
| **Land-based Wind, above 1 MW and up to 5 MW** | 22.25 | 10 |
| **Solar PV, above 5 MW and up to 10 MW** | 21.75 | 25 |
| **Land-based Wind, above 5 MW and up to 10 MW** | 20.25 | 10 |
| **Total Allocation** | | **75** |

## 3.4 Measuring Success of the FIT Programme

The number of approved projects provides a quick prognosis about the level and rate of achievement over the duration of the programme.

Based on reporting data supplied to the Commission from the Ministry with responsibility for capacity, 23.0 MW were approved projects and three (3) installations were registered over the duration of the FIT programme.

These outcomes help frame the context for the review of the rates under both segments of the scheme.

Primarily, a key objective of this FIT programme was to incentivize further deployment of RE technologies based on its designed parameters. This intended objective was envisioned through the provision of stable market rates which evolved from the cost of RE generation, project size and technology differentiation, inflation adjustment, typical long term contract duration of 20 years, and guaranteed grid access.

The Commission notes that the quality of the rates prescribed under this programme was based on the veracity of RE project data submitted by stakeholders and pertinent information obtained through its own research.

Given the aforementioned results, the following section therefore explores a review of the design and implementation components of the scheme, the inputs which were utilised in the modelling of rates, and other issues which may have impacted the deployment potential of the programme.

# SECTION 4 FIT DESIGN ISSUES

## 4.1 Background

The review of design, implementation and operationalization of the FIT scheme provides learning opportunities which can promote achievement of the intended policy objectives. This activity should be executed as frequently as is necessary in order to assess the scheme's alignment with the designed policies. Monitoring, reporting, and evaluation of the scheme ensures its efficient operation and informs on any pitfalls or necessary adjustments to be addressed. Activation and administration of these control mechanisms seek to mitigate against exceeding the allocated capacity and arriving at an unbalanced rate. Rate and capacity adjustment are two (2) pertinent characteristics of FIT reviews. The reconciliation of the cumulative capacity for accredited potential RE projects with the allocated capacity of the FIT programme during the operation of the programme is one example of an event that can trigger a review. Similarly, where the RE deployment is slow and remains unchanged for a significant portion of the programme, or is expected to exceed the assigned capacity cap, these events can signal that issues are present in the market which may warrant a programme review.

The inclusion of capacity and project caps therefore allows important conclusions to be drawn about the pace of expected deployment, the appetite for future deployment and needed policy adjustments if warranted. Taking into account the time that approved projects can be realistically built against the duration of the FIT programme can yield important information about the effectiveness of the scheme.

During the period 2020 to 2021 a number of issues surfaced with respect to the eligibility of approved projects including gaming, COVID-19 pandemic impacts, installed cost, level of FIT, annual degradation rates, subdivision of existing capacity bands, billing and compensation scheme, capacity factor, and interconnection cost, etc. These important issues are in more detail.

## 4.2 Scheme Duration

A utility scale project up to 5 MW-AC can take 4 – 6 months to complete. While the initial duration of the scheme was set at 18 months, it may be important to extend this time to 24 months so that actual capacity utilization can be appropriately assessed during this timeframe. While there is merit in allocating capacity to approved projects, the actual cumulative installed capacity of projects built will provide a better trigger for capacity consumption during the subscription period of the programme. Based on this logic, the Commission is proposing to extend the duration to 24 months. This amount of time will provide a reasonable measure of certainty to investors.

1. **Should the duration of the above 1 MW and up to 5 MW component of the FIT programme be extended to 24 months to allow an accurate assessment of capacity utilization? Please provide a reason for your response.**

Currently, there is 12 MW of unused capacity for the above 5 MW and up to 10 MW category and the seven (7) months duration assigned to this segment of the programme should be retained as well as the competitive procurement proviso.

## 4.3 Review Period

With regard to the proposed 24 months duration of the programme, it may be prudent to conduct a review, three (3) months prior to the programme's termination date. Attainment of policy objectives should inform and drive decision making on the periodicity of reviews after the initial review concludes. Ideally monitoring and evaluation of the programme should be conducted on a quarterly basis.

2. **Do you agree that the above 1 MW and up to 5 MW segment of the programme should be reviewed three (3) months before the programme concludes? State a reason for your response.**

## 4.4 Capacity Caps

Capacity caps provide a measure of price control over the duration of the programme. The amount of capacity allocated to the scheme offers a level of certainty to investors about its overall size.

Monitoring the movement of capacity during the scheme's time horizon provides critical information about the health of the programme and whether timely adjustments can eliminate the deficiencies experienced. The evaluation of these movements helps to avert potential oversubscription and also informs on the effective management of the scheme. These important aspects of the programme can signal how potential projects will be treated against the frequency of capacity allocation and those actually built.

Where the uptake of projects is slow within the duration of the scheme this could prompt the need to incentivize greater participation. The total capacity which was prescribed to this round of the scheme was 75 MW.

The BNEP speaks to 100% RE by 2030 with a projection of 105 MW, 205 MW and 150 MW for distributed solar PV, centralized solar PV, and land-based wind technologies, respectively. It is expected that some of these deployments are expected to be addressed through the FIT programme. In order to meet these targets in a reasonable timeframe, capacity caps must be accurately monitored taking into consideration the limitations of the grid.

3. **Should capacity allocations be limited and flexibly applied in consideration of the thermal capacity limitation of feeders and feeder congestion status? Please give a reason for your answer.**

## 4.5 Participation Initiative

In order to promote more opportunities for local participation under the FIT programme the Commission is proposing to disaggregate the capacity bands as follows:

**Table 2- Capacity Bands**

| Existing Bands | Proposed Bands |
|---|---|
| **Solar PV and Land-based wind** | |
| Above 1 MW and up to 5 MW | Above 1 and up to 3 MW |
| | Above 3 MW and up to 5 MW |
| Above 5 MW and up to 10 MW | Above 5 MW and up to 7.5 MW |
| | Above 7.5 MW and up to 10 MW |

The Commission emphasizes that the proposal to subdivide the existing bands as depicted in Table 2 will be conditional on the provision of accurate financial information.

4. **Do you agree with the initiative to create the following project categories, above 1 MW and up to 3 MW, above 3 MW and up to 5 MW, above 5 MW and up to 7.5 MW, and above 7.5 MW and up to 10 MW within the existing capacity bands above 1 MW and up to 5 MW and above 5 MW and up to 10 MW, respectively? Please support your response with a reason.**

5. **Do you agree that creating additional categories as proposed at question 4 may provide more opportunities for local participation? Please support your response with a reason.**

## 4.6 Project Capacity Threshold

Under the existing capacity bands there are no triggers to adequately determine how potential projects qualify for the assigned rates. The inclusion of a minimum capacity criteria can dictate which system size is eligible within the proposed capacity bands. As an example, if the minimum eligible capacity for the proposed capacity band above 1 MW and up to 3 MW is 1.25 MW, any project that is at least this capacity or greater would qualify for the FIT for that band. Similarly, if 1.5 MW is the capacity threshold for eligibility, any project capacity that is equal to or above the value would qualify for the applicable FIT for the capacity band.

6. **Do you agree that the size of the project should meet a minimum capacity requirement to be eligible to participate under the proposed project caps? Please give a reason for your answer.**

## 4.7 Eligibility

Eligibility dictates which projects can participate and how. This feature aids the effective operationalization of the FIT programme. The timing of approved projects and rate assignment must fall within eligibility guidelines, particularly when an application is submitted close to the end of an existing programme termination date but is approved after the effective date of the new programme.

The issuance of new rates should apply to the new RE projects entering the market. Based on the scenario aforementioned, clarity is needed to determine whether the approved project is eligible for the new rate, or the old rate. Where there is a doubt about which rate should apply, such projects should be evaluated for eligibility of the old rate or new rate based on its cost structure. This may avoid projects being incorrectly assigned a rate in such circumstances and discourage gaming the system by applicants.

## 4.8 Gaming Issues

FIT programmes must seek to mitigate against gaming issues where appropriate. Ongoing collaboration and communication with key stakeholders on such issues may stymie the development of gaming effects. One typical gaming concern relates to the subdivision of land to facilitate the construction of higher paying tariff projects which are ideally smaller in capacity. Similarly, where adjacent lands are owned by an individual, the aforementioned gaming issue may be potentially conducted.

This type of activity if not controlled can lead to an unusual increase in the overall price of electricity. Allowing an investor the opportunity to earn a higher rate of return for utility scale projects may deter this practice.

7. **Do you agree with the proposal that an increased rate of return may address this issue? Please provide a reason for your response.**

8. **What do you think should be done to circumvent the occurrence of this type of gaming issue?**

## 4.9 Billing Mechanism

The "buy all sell all" billing mechanism was stipulated for projects under this FIT programme. In retrospect, this mechanism may not be cost effective as a metering solution for projects at this scale. Revenue metering should conform to industry standards and best practices where appropriate. Utility scale projects are connected for parallel operation with the grid, such that the exported energy is directly purchased by the off-taker (the BLPC). The exported energy excludes self-consumption. Net metering may be more applicable for utility scale projects. Metering however, should be designed according to the specificity of the project.

9. **Do you agree that "sale of excess" billing can be adopted for utility scale projects under the FIT programme? Please support your response with a reason.**

## 4.10 Review of FIT Model Inputs

The FIT Model 2019 rate setting tool examines the behavior of various input parameters used to determine valid rates for the solar PV and land-based wind technologies. The accuracy of these values is driven by IPP data, research, review of RE technology price curves, industry accepted benchmarks, prevailing market conditions, and the economic and consumer impacts.

The following reference tables will be used to capture the areas considered for review.

### 4.10.1 Installed Costs

The installed cost for solar PV and land-based wind technologies were based on aggregated data, compiled to reflect the average cost for the capacity bands assigned. These costs ($) per

kilowatts (KW-AC) were computed from the total costs and rated capacities of the specific RE systems. In the United States, the installed cost for land-based wind turbines projects saw a 1.81% rise from BDS$2,872/KW (2019) to BDS$2,924/KW (2020)[11]. Wind turbine prices are expected to remain high during 2022 due to labour impacts, shipment challenges and supply chain logistics.[12] Solar PV module price increased from BDS $ 0.50/$w_p$ to BDS$ 0.64/$w_p$ from 2020 to 2021 and is also expected to increase to BDS$ 0.70/$W_p$ in 2022. The growth in prices in the U.S is a clear indicator of the impact in price movements when these products are imported.

With reference to the installed costs for the solar PV categories (Table 3), these two (2) values did not reflect the true cost associated with projects sizes in that category. However, the rates associated with those bands reflect the actual values computed.[13]

10. **How has the magnitude of the installed cost ($/KW) for solar PV and land-based wind technologies changed for the capacity bands since the institution of the programme? Please provide a reason for your response.**

11. **What strategies should be adopted given the surge in technology prices?**

[11] Stehly, Tyler, and Patrick Duffy. 2022. 2020 Cost of Wind Energy Review. Technical Report, Golden, CO 80401: National Renewable Energy Laboratory (NREL).
[12] Bloomberg NEF. 2022. Wind-10 Predictions for 2022. January 28. Accessed March 01, 2022. https://about.bnef.com/blog/wind-10-predictions-for-2022/.
[13] Please see Table 1 on page 21

**Table 3 - Installed Costs**

| Technology, Size Category | Installed Cost BDS $/kW | Capacity Factor | Annual Degradation | Analysis Term |
|---|---|---|---|---|
| Solar PV, above 1 MW, and up to 5 MW | $1,900[14] | 22.00 % | 0.25% | 20 years |
| Solar PV, above 5 MW, and up to 10 MW | $1,804 | 22.00% | 0.25% | 20 years |
| Land-based Wind, above 1 MW, and up to 5 MW | $2,980 | 35.00 % | 0.20% | 20 years |
| Land-based Wind, above 5 MW, and up to 10 MW | $2,725 | 35.00% | 0.20% | 20 years |

### 4.10.2 Capacity Factor

The capacity factor is an important input into the Levelized Cost of Energy (LCOE) determination for RE projects. This value represents the ratio of the actual generation to the potential generation of the system expressed as a percentage. The adopted 22% and 35% value for solar PV and land-based wind respectively, were based on the data available at the time. These values were reassessed based on additional data and the following updated inputs – 20% and 30%, respectively, were obtained.

**12. Do you agree with the proposed capacity factors for solar PV and land-based wind technologies? Please provide a reason for your response.**

### 4.10.3 Annual Degradation

Annual degradation impacts the annual production of the generator overtime. This value varies amongst module manufacturers. Generally, the generating system equipment is not designed for the tropical climate in Barbados. As the RE sector matures, research in this area will further inform how these systems perform over a reasonable time horizon.

The adoption of a 0.25% for solar PV and 0.20% for land-based wind in the existing Decision was predicated on incentivizing the use of more efficient equipment. The Commission

[14] These values were incorrectly reported. The corrected values are $2,517/KW and $2,404/KW, respectively, for projects above 1 MW and up to 5 MW and above 5 MW and up to 10 MW.

accepts that these values may not be representative of the share of RE systems currently in operation and is proposing to utilize 0.5% (solar industry benchmark)[15] for solar PV and land-based wind technologies, respectively.

13. **Do you agree with the proposal to amend the existing annual degradation rates for solar PV and land-based wind technologies? Please provide a reason for your response?**

#### 4.10.4 FIT Contract Term

A 20-year term has been the standard for FIT contracts. Extending the contract can reduce LCOE payments while allowing recovery. This could mean lower rates over the contract period. In September 2019 the World Bank's International Centre for Settlement of Investment Disputes (ICSID) ruled against Spain for IPPs OperaFund Eco-Invest and Schwab Holding with respect to FIT cuts. The court ruled in favor of IPPs that the solar PV technology has a minimum lifespan of 35 years[16]. A longer contract duration may result in lower rate impact on customers. The applicability of any contract extension will need to be assessed based on the existing energy and economic context.

14. **What are your views on extending the contract term to 25 years under this FIT programme? Please explain your response.**

#### 4.10.5 Interest during Construction (IDC)

This aspect of financing is very import to support the construction of RE projects for a prescribed time and mitigates against construction risk. The IDC represents the charge incurred on the loan during the construction of the project. During this phase of the project, interest is accumulated on the debt until the project is able to generate revenue for debt service. The level of interest used under the existing programme was 7.75%.

[15] While this value is assumed to be the industry standard for modelling solar PV, research on the degradation of modules in the immediate operating environment should provide greater clarity on a median value to adopt.
[16] International Centre for Settlement of Investment Disputes (ICSID). 2019. "https://icsid.worldbank.org/cases/case-database." https://icsid.worldbank.org/. September 6. Accessed December 15, 2020. http://icsidfiles.worldbank.org/icsid/ICSIDBLOBS/OnlineAwards/C4806/DS12832_Sp.pdf.

15. **How has this rate changed in the energy sector over the FIT programme duration? Should this value be retained or amended? Please provide a reason for your response.**

#### 4.10.6 Interconnection Costs

This input reflects the costs of interconnecting the RE project to the utility's grid and accounts for the necessary physical infrastructure required to make this a reality. It is realized that all IPP connection scenarios differ and will incur varying levels of costs which are delimited by the project's proximity to the grid. Given the pertinence of this component to the FITs, this aspect will be covered in a separate chapter in this document.

### 4.11 Operating Cost Assumptions

#### 4.11.1 Operation and Maintenance Cost

A reasonable estimate for Operation and Maintenance (O&M) costs ensures that the RE project is able to be adequately maintained on a periodic basis. These costs can include but not limited to hiring, billing, budgeting, diagnostics, alarms management, planned and unplanned maintenance events, and inspections, cleaning etc. It is important to capture a realistic level of annual O&M costs expected for projects which can sustain its reliable operation throughout the duration of the FIT programme.

16. **What in your opinion reflects an adequate estimate of O&M costs for solar and land-based wind projects within the capacity bands since institution of the FIT programme? Explain why the estimate is reasonable.**

#### 4.11.2 Site Lease

Utility scale RE projects require a lot of land space, typically, 4 - 5 acres per MW-DC[17] or in some cases more. Site lease provisions account for situations where the investor rents land to site a project. This is an expense to the investor/IPP. Given the thrust towards RE, there may be a demand for access to land and this could lead to an unusual increase in the cost of land

[17] This is a rule of thumb stipulation in the solar industry. A 5 MW solar plant may require about 22.0 acres to accommodate modules, equipment, and roadways.

or land rental fee. The change in land tax regime in 2019 may force land owners to increase land lease amounts as well.

17. **What could be a reasonable estimate for site lease to facilitate a RE project? Please give a reason for your estimate.**

18. **What measures do you consider can be put in place to mitigate against the unnecessary increase in land values?**

#### 4.11.3 Insurance

The inclusion of an insurance estimate in the FIT Model protects the investors against construction and operational risk. The evolution of RE projections as an asset is gaining attention in the insurance arena. Insurance estimates for RE projects are being refined as the RE sector matures and access to more data increases.

19. **What level of insurance estimate would be reasonable for solar PV and land-based wind projects? Please explain your answer.**

#### 4.11.4 Project Management

This expense allows the various phases of project development to be executed smoothly throughout the project cycle. These tasks may include procurement and consultancy costs, site preparation, land lease, taxes, duties, audits, etc.

20. **Should the existing estimate for project management be amended? What would be a reasonable estimate for the expense? Please provide a reason for your answer.**

**Table 4 – Operation Cost Inputs**

| Technology, Size Category | Fixed O&M BDS $/kW/Yr | Site Lease BDS $/kW/Yr | Insurance (BDS$/mille) | Project Management BDS $/kW/Yr | Land Tax (% of net Income) |
|---|---|---|---|---|---|
| Solar PV, above 1 MW, and up to 5 MW | $32.00 | $25.00 | $10/mille | $12.00 | 0.95% |
| Solar PV, above 5 MW, and up to 10 MW | $32.00 | $25.00 | $10/mille | $6.00 | 0.95% |
| Land-based Wind, above 1 MW, and up to 5 MW | $70.00 | $25.00 | $15/mille | $15.00 | 0.95% |
| Land-based Wind, above 5 MW, and up to 10 MW | $70.00 | $25.00 | $10/mille | $6.00 | 0.95% |

### 4.11.5 Inflation

Inflation can impact the level of cash flows RE projects are to receive. Its occurrence is inevitable in the financial world because of the value of cash which changes with time. Increases in inflation reduces the real value of expected revenue for RE projects. To compensate for these changes over the duration of the FIT programme an annual estimate of 2% was assumed in the FIT modeling. Inflation adjustments in this way act as a security for the RE investment and at the same time offer a level of price stability.

**21. Given the existing RE market conditions, what is your perspective on retaining or amending the inflation value? State a reason in support of your response.**

## 4.12 Financing Input Assumptions

The RE sector in Barbados is gradually expanding, as evidenced by the more than 50 MW of capacity online. The sector has been pronounced by Government as a key pillar and revenue generator for the economy. The level of interest in this sector continues to be visible and this recognition is evident by the financing provisions being offered by key lending agencies to facilitate the expansion of the sector. Table 5 following presents some of the financial inputs utilized in the modelling of the FITs.

### 4.12.1 Debt Ratio

RE projects invariably require financing at various stages of its life cycle - pre-construction, construction, and post-construction phases of the project. Debt is considered a cheaper option than equity financing, primarily due to the repayment security and priority obligations which limits risk to lenders.

**Table 5 – Financing Cost Inputs**

| Technology, Size Category | % Debt | Debt Term (Years) | Interest Rate | Cost of Equity |
|---|---|---|---|---|
| Solar PV, above 1 MW, and up to 5 MW | 50.00% | 15 | 6.25% | 14.00% |
| Solar PV, above 5 MW, and up to 10 MW | 60.00% | 15 | 6.25% | 14.00% |
| Land-based Wind, above 1 MW and up to 5 MW | 60.00% | 15 | 6.25% | 14.00% |
| Land-based Wind, above 5 MW and up to 10 MW | 60.00% | 15 | 6.25% | 14.00% |

22. **Given our specific energy context, should the debt ratio for the RE technologies be amended upward? What range of debt financing would be ideal for this scale of RE projects given the need to increase local participation under the FIT programme? Please provide a reason for your response.**

23. **Do you think the existing interest rate is adequate for utility scale projects? Please support your response with a reason.**

### 4.12.2 Lender or Commitment Fee

The lender fee or commitment fee is a one-time cost charged by the lender upon approval of a lending facility. A rate of 1.25% of the value of the lending facility was considered under the existing FIT structure for lender or commitment fees.

24. **Should this rate be amended given the current economic circumstances? Please support your response with a reason.**

### 4.12.2 Cost of Equity

Investors under this FIT programme were given an opportunity to achieve a rate of return of 14% over the 20-year contract term. This value was computed assuming that a fully functioning RE project would generate an adequate revenue to yield the targeted return to investors.

**25. Do you consider this level of return reasonable? Please explain your response.**

# SECTION 5 TRANSMISSION INTERCONNECTED EQUIPMENT

## 5.1 Introduction

Interconnection of RE generators to the grid is a necessary activity to facilitate the bulk export and sale of each unit of generation produced by the generator. It describes the process, physical connection, facilities, conditions, and operations which the incumbent RE generator complies with in order to be connected. The execution of this process evaluates the viability of the potential connection for the RE facility and ensures that the safety, stability and reliability of the transmission network is not compromised.

Interconnection of potential RE generators to the BLPC'S 24.9 KV transmission network depends on the outcome of feasibility, impact, and facility studies which provide insights as to the consequences of the requested connection. Invariably, the connected generator should not cause any undesirable effects when it operates. Moreover, the design of a suitable electrical switching configuration is critical feature of interconnection; this integrates the RE asset with the transmission network and by design should circumvents any negative result while the RE generator operates.

## 5.2 Statutory Obligation to Interconnect

The BLPC is required under section 13 (1) of the ELPA to provide interconnection services to a licensed RE system. The transmission network is the most important domain of the power grid since it manages the bulk of energy flows for the entire power system. Given this unique function of the BLPC's 24.9 KV network, generators to be connected to the public grid are required to comply with the BLPC's Grid Code.

According to section 1.7.1 (b) of this Grid Code, connections to the 24.9 KV line or feeder is limited to 25 MW-AC. This caveat ensures that the thermal limit of a feeder or transmission line is not exceeded. Section 5.2 of the Code stipulates technical requirements for generators under this FIT programme. Additionally, section 3.6[18] indicates that connection of the

[18] A Connection Impact Assessment identifies requirements or impediments to the connection

generator will be guided by the execution of a Connection Impact Assessment (CIA) by the BLPC.

While the Grid code currently does not inform on the selection criteria for applicable electrical switching configurations to interface utility scale RE generators with its 24.9 KV network, the BLPC is solely responsible for ensuring that the safety and reliability of the transmission domain is not negatively impacted. The type of electrical configuration required to interconnect the specific RE generator(s) at a potential generation site can inform the investor as to the magnitude of costs required to build the interconnection facility. Ideally, the BLPC should provide a reasonable cost estimate to the potential IPP with regard to the requested connection of the RE project. These estimates, as well as the terms for interconnection fall under the Commission's jurisdiction as outlined in the URA 2020.

### 5.3 Demarcation of Interconnection Costs

Typically, the amount of costs a RE generator is to incur depends on its size, proximity to medium voltage[19] line or feeder, and substation. The further away the generation site is from the transmission network, the higher the interconnection costs associated with that connection.

Ideally, generators are responsible for their own interconnection costs and this is usually demarcated by the point of common coupling (PCC)[20].

Connections to the 24.9 KV network will require a substation and connection infrastructure to interconnect the RE generator at a new site.

Notably, these costs can be significant compared to generators which are closer to the feeder or transmission line and this can be a major disincentive to RE investment under the FIT programme.

[19] Medium voltages as defined by the IEC 60038 standard are voltages from 1000 V to 35 kV.
[20] Section 5.2.5 of the Grid Code sets out typical responsibilities of the generator with respect to the PCC.

### 5.3.1 Interconnection Cost Structure

The current rates for solar PV and land-based wind technologies include an interconnection cost component. However, at the time of determining rates for potential RE systems it was difficult to identify potential generation sites and the closeness of these to transmission infrastructure. Given that interconnection costs increase by order of magnitude with the distance from the transmission line or feeder, there is a need to revisit how these costs could be equitably allocated. The review of this input will provide clarity to stakeholders about the components which quantify the fixed and variable costs[21] captured within the rate and the treatment of these variable costs components.

The following are typical components which are associated with interconnection costs for RE generators. These include but are not limited to:

- Transformers
- Switchgear and control gear (breakers, disconnects, relay panel, etc.)
- Metering
- Overhead/underground transmission lines
- Communication infrastructure[22]
- Substation building
- Poles/structures
- Land/Right of Way
- Professional Services

Typical interconnection costs for RE generators under this FIT programme should capture the material, foundation, and installation costs for transformers, switchgear, and cabling up to the riser pole with surge protection – for overhead lines or where underground cabling concludes. These costs are indicated as fixed for a generator, while costs beyond this point are termed variable (Figure 2).

[21] Fixed costs include all cost components from the transformer to the riser pole. Variable costs include all costs beyond the riser pole inclusive of the substation.
[22] Section 5.7 of the grid code indicates the communication requirements of generators.

The solid transmission line shown is assumed to traverse between two (2) utility substations and the grid extension line (dotted) links the RE generator to the transmission network via an electrical switching configuration. This area is indicated by a dotted square.

Consideration of these costs will allow the FIT to be more equitable for IPPs and may increase the deployment rate of potential projects. Costs beyond the riser pole/underground cable to the interconnection point[23] (Figure 2) is proposed to be shared between the IPP and the BLPC. The proposed shared costs is expected to cover the poles/structures, line extension, interconnecting switchgear, substation, communication cables, etc.

This suggested approach is intended to address the variability in costs amongst IPPs based on project size and location. As a consequence, a cost sharing and recovery mechanism will need to be implemented.

[23] This is the point of physical connection to the transmission network.

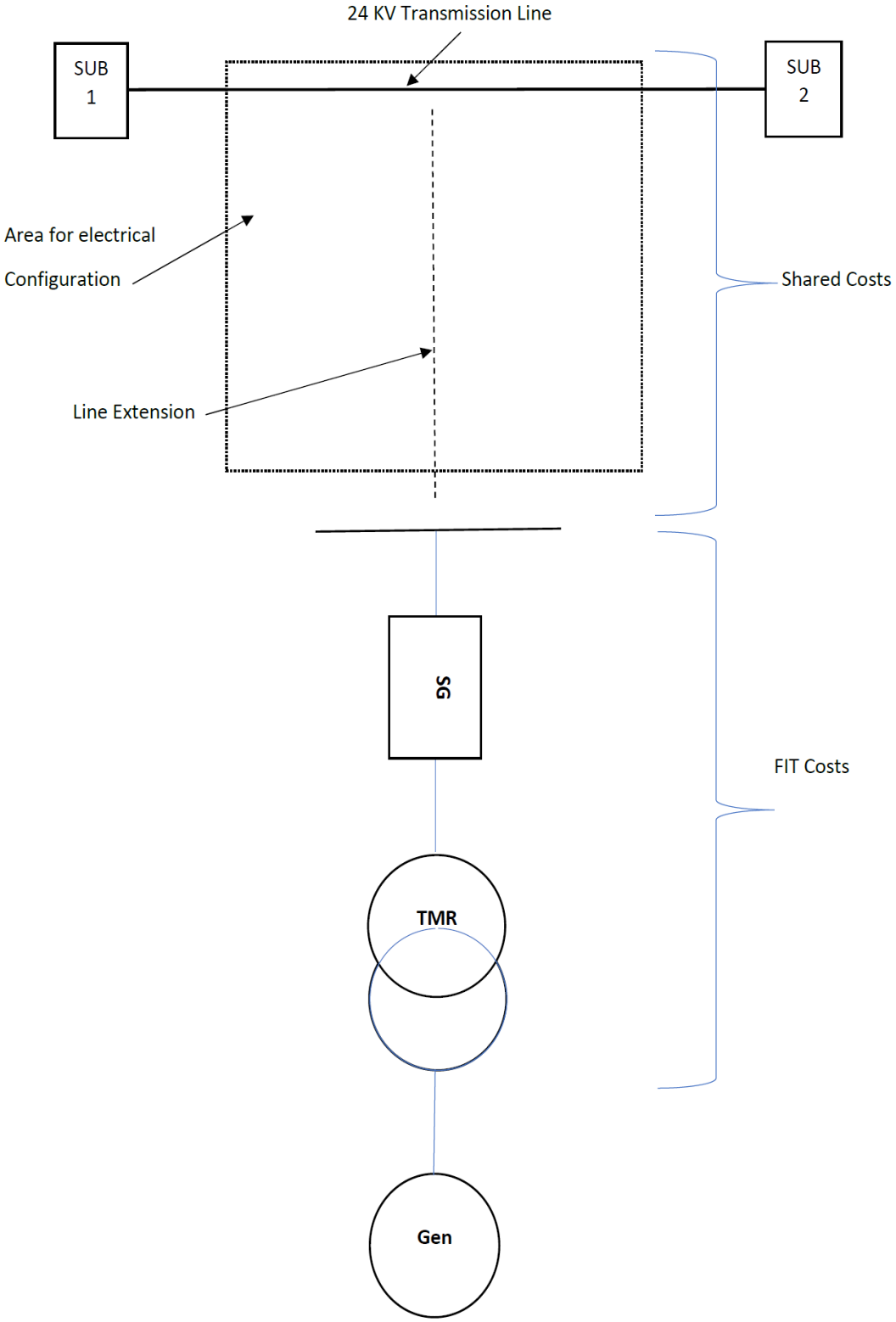


Figure 2 – Interconnection Diagram[24]

[24] Please note that Gen, TMR, and SG refers to Generator, Transformer, and Switchgear, respectively.

#### 5.3.1.2 Electrical Grid Configurations

An electrical switching configuration facilitates the integration of the RE generator with the medium voltage network. There are many configurations which are applied to the specific needs of the transmission network; these include a direct line tap, three breaker ring bus, breaker and a half, etc. Each of these configurations vary in costs with the line tap connection being the least costly. It is important to note that the type of configuration is also premised on set utility derived criteria. Where a configuration is employed, a building must be built to house this switchgear and control gear equipment.

## 5.4 Cost Sharing

The new interconnecting substation allows the initial IPP's generator to connect to the 24.9 KV transmission network. Sharing interconnection costs may enable a larger number of RE projects to be connected online compared to a situation where burden sharing is absent, since all IPPs may not be in a position to undertake the full costs of interconnection under the FIT programme. Furthermore, the escalation of interconnection costs is triggered by the distance between the generation site and the existing transmission infrastructure and consequently, this imbalance in costs can result in a rate that over compensates or under compensates an IPP. Deconstruction of the interconnection cost into fixed and variable costs provides clarity on how the variable costs should be shared.

The suggested approaches seek to rebalance costs by apportioning the reasonable cost of interconnection between IPPs and the BLPC.

## 5.5 Transmission Interconnection Proposals

### 5.5.1 Existing RE Generators

With reference to Table 1, page 21 the Commission is proposing the following measures to address the treatment of interconnection cost for all utility scale generators under the FIT programme:

(i) All licensed RE projects sized above 1 MW and up to 5 MW and eligible for the existing tariffs (Table 1) are required to pay the full interconnection cost which was assumed

in the FIT calculation[25]. The cumulative licensed capacity for these RE generators should not exceed the total allocated capacity (40 MW) as stipulated in the September 30, 2020 FIT Decision or the capability of the grid.

(ii) All licensed RE projects greater than 5 MW and up to 10 MW in size, and where their aggregate capacities do not exceed the stipulated allocated capacity of 35 MW, these projects are required to pay the full interconnection cost that is incorporated in the tariffs (Table 1);

(iii) Where it is evident that the cost estimate for interconnecting a RE generator to the transmission network exceeds the ascribed interconnection cost in the tariff (Table 1) for the respective capacity bands, it is proposed that the utility be required to contribute towards the balance;

(iv) The utility be allowed to recover all prudently incurred costs that are associated with each generator interconnection through an appropriate approved cost recovery mechanism;

(v) Where the actual or estimated cost of interconnecting a RE generator is less than the amount allocated in the tariffs (Table 1), the RE generator be required to refund the difference in cost to all utility customers, and;

(vi) The utility may be required to recoup this cost differential and pass it on to all utility customers as a credit on their bills.

The Commission wishes to emphasize that the interconnection cost estimates which are included in the tariffs for the respective capacity bands were based on the best available information at the time.

[25] The FIT Decision when issue did not specify the quantum of interconnection cost applicable for generators. A reasonable estimate of $300/kW was assumed in the tariff determination.

To minimise the potential occurrence of "free ridership" under the FIT programmes, the Commission reserves the right to verify all cost estimates which feed into the final tariff, including interconnection costs.

26. **What are your concerns with the proposed treatment of interconnection cost for existing RE market participants, requiring each IPP to pay the full cost captured in the tariff? Explain your response.**

27. **What are your views on the proposed sharing of interconnection costs between the BLPC and IPPs as stated above? Please support your response with a reason.**

28. **Do you agree that the BLPC should recoup the portion of interconnection costs through an appropriate cost recovery mechanism once prudently incurred? Please support your response with a reason.**

*Sharing of substation facilities*

Indoor substation facilities may be required to be built to accommodate interconnection equipment/switchgear at a generation site and also provide coverage for energy and infrastructural resilience. To be cost effective, it is recommended that where practicable, a substation facility be utilised to facilitate multiple-generator interconnections – other generators which are within close proximity to the site. The interconnection of RE generators at a single site should be encouraged as long as these connections are in compliance with the requirements and capacity limitations stipulated in the BLPC's Grid code. This proposal will eliminate the need for individual substations at each generator site and promote greater local deployment of applicable RE technologies.

### 5.5.2 New Market Participants

The accessibility to, and the utilization of accurate financial and technical information on RE resource technologies under the FIT programme remains a pertinent issue. In order to fully deliberate on an effective interconnection cost allocation strategy for potential RE generators, adequate costing information must be provided to the Commission for appraisal. Given the challenges experienced with garnering current interconnection costing data to date, the Commission is proposing the following measures which should improve greater deployment under the revised FIT programmes.

***Revised FITs***

1) All RE projects which are above 1 MW and up to 10 MW in size are to include interconnection costs which capture prudent expenses from the step-up transformer and up to the riser pole only (at the boundary)[26], in the case of an overhead connection. The same concept should be applied to an underground connection. This cost component represents the fixed cost of interconnection only and should exclude the cost associated with the 24.9 kV electrical configuration, poles, powers cables and the substation building costs, etc. Costs associated with the interconnection which is beyond this point - variable costs are to be treated through the following option:
    (i) all variable costs of an interconnection generator to be incurred by the utility; and,
    (ii) the quantum of such costs to be recovered through an appropriate cost recovery mechanism.

***Substation Building***

The expenses associated with this facility should not be included in the fixed component of the FIT since it is proposed that these will facilitate connectivity of other RE generators to the transmission network. The use of a facility is expected to accommodate other RE generators connections where practicable.

[26] This is the boundary as described in figure 2 which shows the fixed interconnection cost component.

*Shared Interconnection Facilities*

As previously indicated, substation facilities when shared can lower costs to the RE generator and increase deployment. It is proposed that the cost of these facilities be borne by the utility. Costs incurred should be applicable for recovery through an approved appropriate cost recovery mechanism.

### 5.6 Verification of all interconnection costs

In order to ensure that all costs associated with each interconnection are prudently incurred, the Commission will require all licensed RE generators and the utility to provide accurate costing information. Additionally, the utility should be required to submit on a quarterly basis, an itemized list of RE projects and costs incurred for the interconnection of these projects to the grid.

The Commission is of the view that the aforementioned proposals once implemented can result in a more cost effective and equitable approach to addressing interconnection related issues.

29. **What are your views on the proposed interconnection cost treatment for new RE market participants under the FIT programme? Support your response with a reason.**

30. **Do you agree that the BLPC be allowed to recover all prudently incurred costs in a timely manner? State a reason for your response.**

31. **What other approaches do you consider would be reasonable to implement for the treatment of interconnection costs? Please explain your answer.**

32. **Do you support the proposal to verify all interconnection costs associated with the FIT programme? State why you agree.**

# SECTION 6 OTHER IMPACTS

## 6.1 COVID-19 Impacts

The COVID-19 pandemic continues to disrupt the supply chain for goods, services and logistics globally. This disruption triggered RE market associated costs to spike, namely, prices of raw materials – metals, silicon, glass, equipment – racking and mounting, modules, electrical - inverters, electrical accessories, and transportation fees, etc. Primarily, shortages in silicon resulted in elevated prices and the reduced human resources impeded production schedules for suppliers. Increases in freight transit times, fuel costs, shipping fees, transportation, and container costs further compounded timelines for RE project planning, development, and execution[27]. Despite these realities, the solar PV prospects in 2021 were expected to be 9% better than in 2020[28] due to the lower cost materials for utility scale projects.

Fees for storage (40-foot container) more than doubled and shipping route fees showed increasing trends from 2020 to present[29].

The expansion of the RE sector in Barbados is reliant on the price movements of RE technology and the relative ease of access to procure associated equipment and materials. Stable pricing remains a precondition of reasonable price discovery of new rates for solar PV and land-based wind technologies.

Given these realities, the pricing of RE systems may be irregular and the associated costs being time dependent and unpredictable may present a challenge in obtaining stable pricing for PV projects due to the protracted nature of obtaining quotations from suppliers and uncertainty around the change in prices.

[27] Europe, Solar Power. 2021. "News and Resources Category: Reports." Solar Power Europe. July. Accessed 03 08, 2022. https://www.solarpowereurope.org/wp-content/uploads/2021/07/SolarPower-Europe_Global-Market-Outlook-for-Solar-2021-2025_V1.pdf.
[28] Ibid, 5.
[29] FREIGHTOS. 2022. Freightos Baltic Index (FBX). March 11. Accessed March 11, 20222. http://www.fbx.frieghtos.com.

33. **Should the current FIT programme be further extended until RE technology prices stabilize? Please give a reason for your response.**

34. **Should the rates be revised based on the proposals in the interim? Please give a reason for your response.**

## SECTION 7 CATALOGUE OF QUESTIONS

As part of the consultation, the list of questions following have been prepared for stakeholders. These generally summarise the main issues requiring comments.

**1. Should the duration of the above 1 MW and up to 5 MW component of the FIT programme be extended to 24 months to allow an accurate assessment of capacity utilization? Please provide a reason for your response.**

**2. Do you agree that the above 1 MW and up to 5 MW segment of the programme should be reviewed three (3) months before the programme concludes? State a reason for your response.**

**3. Should capacity allocations be limited and flexibly applied in consideration of the thermal capacity limitation of feeders and feeder congestion status? Please give a reason for your answer.**

**4. Do you agree with the initiative to create the following project categories, above 1 MW and up to 3 MW, above 3 MW and up to 5 MW, above 5 MW and up to 7.5 MW, and above 7.5 MW and up to 10 MW within the existing capacity bands above 1 MW and up to 5 MW and above 5 MW and up to 10 MW, respectively? Please support your response with a reason.**

**5. Do you agree that creating additional categories as proposed at question 4 may provide more opportunities for local participation? Please support your response with a reason.**

**6. Do you agree that the size of the project should meet a minimum capacity requirement to be eligible to participate under the proposed project caps? Please give a reason for your answer.**

**7. Do you agree with the proposal that an increased rate of return may address this issue? Please provide a reason for your response.**

**8. What do you think should be done to circumvent the occurrence of this type of gaming issue?**

**9. Do you agree that "sale of excess" billing can be adopted for utility scale projects under the FIT programme? Please support your response with a reason.**

**10. How has the magnitude of the installed cost ($/KW) for solar PV and land-based wind technologies changed for the capacity bands since the institution of the programme? Please provide a reason for your response.**

**11. What strategies should be adopted given the surge in technology prices?**

**12. Do you agree with the proposed capacity factors for solar PV and land-based wind technologies? Please provide a reason for your response.**

**13. Do you agree with the proposal to amend the existing annual degradation rates for solar PV and land-based wind technologies? Please provide a reason for your response?**

**14. What are your views on extending the contract term to 25 years under this FIT programme? Please explain your response.**

**15. How has this rate changed in the energy sector over the FIT programme duration? Should this value be retained or amended? Please provide a reason for your response.**

**16. What in your opinion reflects an adequate estimate of O&M costs for solar and land-based wind projects within the capacity bands since institution of the FIT programme? Explain why the estimate is reasonable.**

**17. What could be a reasonable estimate for site lease to facilitate a RE project? Please give a reason for your estimate.**

**18. What measures do you consider can be put in place to mitigate against the unnecessary increase in land values?**

**19. What level of insurance estimate would be reasonable for solar PV and land-based wind projects? Please explain your answer.**

**20. Should the existing estimate for project management be amended? What would be a reasonable estimate for the expense? Please provide a reason for your answer.**

**21. Given the existing RE market conditions, what is your perspective on retaining or amending the inflation value? State a reason in support of your response.**

**22. Given our specific energy context, should the debt ratio for the RE technologies be amended upward? What range of debt financing would be ideal for this scale of RE projects given the need to increase local participation under the FIT programme? Please provide a reason for your response.**

**23. Do you think the existing interest rate is adequate for utility scale projects? Please support your response with a reason.**

**24. Should this rate be amended given the current economic circumstances? Please support your response with a reason.**

**25. Do you consider this level of return reasonable? Please explain your response.**

**26. What are your concerns with the proposed treatment of interconnection costs for existing RE market participants, requiring each IPP to pay the full cost captured in the tariff? Explain your response.**

**27. What are your views on the proposed sharing of interconnection costs between the BLPC and IPPs as stated above? Please support your response with a reason.**

**28. Do you agree that the BLPC should recoup the portion of interconnection costs through an appropriate cost recovery mechanism once prudently incurred? Please support your response with a reason.**

**29. What are your views on the proposed interconnection cost treatment for new RE market participants under the FIT programme? Support your response with a reason.**

**30. Do you agree that the BLPC be allowed to recovered all prudently incurred costs in a timely manner? State a reason for your response.**

**31. What other approaches do you consider would be reasonable to implement for the treatment of interconnection cost? Please explain your answer.**

**32. Do you support the proposal to verify all interconnection costs associated with the FIT programme? State why you agree.**

**33. Should the current FIT programme be further extended until RE technology prices stabilize? Please give a reason for your response.**

**34. Should the rates be revised based on the proposals in the interim? Please give a reason for your response.**

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