



BERMUDA  
**REGULATORY  
AUTHORITY**

## **Feed-in Tariff Methodology**

Preliminary Report

Preliminary Decision and Order

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Responses Due: September 26, 2018

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## I. INTRODUCTION

1. The purpose of this Preliminary Report, Preliminary Decision and Order is for the Regulatory Authority of Bermuda (the “Authority”) to: (i) present the Authority’s assessment of the responses to the Consultation Document (the “Consultation Document”); (ii) present an updated methodology (the “Methodology”) for assessing the level of the Feed-in Tariff (“FIT”); and (iii) invite comments on the Preliminary Report, Preliminary Decision and Order. At the end of the consultation process the Authority will issue a General Determination (“GD”) setting the Methodology. The draft GD is attached to this Preliminary Report, Preliminary Decision and Order in Annex 2.
2. The Authority is responsible for the regulation of the electricity sector in Bermuda, and its overarching responsibilities are to:
  - regulate tariffs and the quality of service provision to end-users;
  - ensure that access to the electricity infrastructure by current and prospective generators in Bermuda is transparent, fair, reasonable, and non-discriminatory;
  - investigate and respond to complaints from end-users regarding the provision of electricity.
3. Section 36 of the Electricity Act 2016 (“EA”) provides that the Authority shall determine the FIT in accordance with the methodology set by GD and in accordance with the principles set out in the EA.
4. On 2 March 2018, the Authority issued a GD mandating that the Bermuda Electric Light Company Ltd (“BELCO”)<sup>1</sup>, in its capacity as the TD&R licensee, should pay a FIT for electricity produced by distributed renewable energy systems in accordance with the net avoided costs of generation methodology described in the GD (“Transitional Methodology”).
5. On 27 April 2018, the Authority issued the Consultation Document, which presented a full methodology for assessing the level of the FIT that the Transmission, Distribution & Retail (the “TD&R”) licensee would pay to distributed generators for the purchased renewable energy.
6. The Authority received six responses to the Consultation Document.
7. This Preliminary Report, Preliminary Decision and Order summarises the responses to the Consultation Document and presents a draft GD setting forth the Methodology for assessing the level of the FIT in light of the responses, inter alia, to the Consultation Document.
8. In accordance with the EA, this Preliminary Report applies to all technologies used by distributed generators to produce renewable energy.<sup>2</sup>

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<sup>1</sup> That is, the TD&R licensee in Bermuda.

<sup>2</sup> e.g. solar, wind, biomass, landfill gas, municipal solid waste, ocean (including tidal, wave, current, and thermal), geothermal, or hydro resources, see Electricity Act 2016, p. 6.

9. The rest of this Preliminary Report, Preliminary Decision and Order is structured as follows:
  - a. section II outlines the consultation procedure;
  - b. section III sets out the legislative context that underpins the development of the proposed Methodology;
  - c. section IV summarises the responses to the Consultation Document;
  - d. section V summarises the proposed decision;
  - e. Annex 1 sets forth the proposed Order;
  - f. Annex 2 sets forth the proposed GD.

## II. CONSULTATION PROCEDURE

10. This consultation is being undertaken in accordance with sections 62 and 69 to 73 of the Regulatory Authority Act 2011 (“RAA”) and section 36 of the EA. The procedure and accompanying timelines (as set out in section 70 of the RAA), under which this consultation is taking place, has been set out in Part 1 below.
11. Written comments should be submitted before 5:00 PM (Bermuda time) on 26 September 2018.
12. The Authority invites comments from members of the public, electricity sector participants and sectoral providers, and other interested parties.
13. Responses to this Preliminary Report, Preliminary Decision and Order should be filed electronically in MS Word or portable document format (pdf). Parties filing comments should go to the Authority’s website and follow the link <https://rab.bm/public-consultations> to the Consultations and Response page, and click the “Submit Your Response” icon, which appears on the page. All comments should be clearly marked “Response to Preliminary Report, Preliminary Decision and Order: Comments on FIT General Determination” and should otherwise comply with Rules 18 and 30 of the Authority’s Interim Administrative Rules, which are posted on the Authority’s website.
14. The Authority intends to make responses to this Preliminary Report available on its website. If a commenting party’s response contains any information that is confidential in nature, a clearly marked “Non-Confidential Version”, redacted to delete the confidential information, should be provided together with a complete version that is clearly marked as the “Confidential Version”. Redactions should be strictly limited to “confidential information”, meaning a trade secret, information whose commercial value would be diminished or destroyed by public disclosure, information whose disclosure would have an adverse effect on the commercial interests of the commenting party, or information that is legally subject to confidential treatment. The “Confidential Version” should highlight the information that has been redacted. Any person claiming confidentiality in respect of the information submitted must provide a full justification for the claim. Requests for confidentiality will be treated in the manner provided for in Rule 30 of the Authority’s Interim Administrative Rules.
15. In accordance with section 73 of the RAA, any interested person may make an *ex parte* communication during this consultation process, subject to the requirements set forth in this paragraph 13. An *ex parte* communication is defined as any communication to a Commissioner or member of staff of the Authority regarding the matter being consulted on in this Preliminary Report, Preliminary Decision and Order, other than a written submission made pursuant to the process set forth in this section II. Within two business days after making an *ex parte* communication, the person who made the *ex parte* communication shall submit the following to the Authority: (i) a written description of the issues discussed and positions espoused; and (ii) a copy of any written materials provided. This will be posted on the Authority’s website, along with a notice of the *ex parte* communication.

16. The principal point of contact at the Authority for interested persons for this Preliminary Report, Preliminary Decision and Order is Markez Laws, Regulatory Financial Analyst. He may be contacted by email, referencing “Comments on FIT General Determination”, at [electricity@RAB.bm](mailto:electricity@RAB.bm) or by mail at:

Markez Laws  
Regulatory Authority  
1st Floor, Craig Appin House  
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17. In this Preliminary Report, Preliminary Decision and Order, except insofar as the context otherwise requires, words or expressions shall have the meaning assigned to them by the EA, the RAA and the Interpretation Act 1951.
18. This Preliminary Report, Preliminary Decision and Order is not a binding legal document and does not contain legal, commercial, financial, technical or other advice. The Authority is not bound by this Preliminary Report, Preliminary Decision and Order, nor does it necessarily set out the Authority’s final or definitive position on particular matters. To the extent that there might be any inconsistency between the contents of this Preliminary Report, Preliminary Decision and Order, the due exercise by the Authority of its functions and powers, and the carrying out of its duties and the achievement of relevant objectives under law, such contents are without prejudice to the legal position of the Authority.

### III. LEGISLATIVE CONTEXT

19. The RAA established a cross-sectoral independent and accountable regulatory body “to protect the rights of consumers, encourage the deployment of innovative and affordable services, promote sustainable competition, foster investment, promote Bermudian ownership and employment and enhance Bermuda’s position in the global market”.<sup>3</sup>
20. In June 2015, the Ministry of Economic Development of Bermuda published the National Electricity Sector Policy (the “Policy Document”).<sup>4</sup> The Policy Document set out the groundwork for the establishment of the subsequent EA and the desired structure of the electricity sector of Bermuda, and it also outlined four broad policy objectives for the sector. These policy objectives encourage the pursuit of an electricity service that is (i) least cost and high quality, (ii) environmentally sustainable, (iii) secure and (iv) affordable.<sup>5</sup>
21. The EA established an electricity sector regulatory framework within the meaning of the RAA. The EA received Royal Assent on 27 February 2016 and came into operation on 28 October 2016 pursuant to the Electricity Act 2016 Commencement Day Notice 2016 (BR 101/2016). The EA repealed the Energy Act 2009.
22. The Minister responsible for electricity is currently the Minister of Transport and Regulatory Affairs (the “Minister”). The Minister can issue Ministerial declarations that establish policies for the electricity sector<sup>6</sup> and can also issue Ministerial directions to the Authority regarding any matter within his authority with regard to the electricity sector.<sup>7</sup> In formulating Ministerial directions, the Minister shall set priorities and resolve trade-offs or conflicts that arise from the purposes of the EA in a way that he thinks best serves the public interest.<sup>8</sup>
23. The Authority has the powers to supervise, monitor and regulate the electricity sector in Bermuda in accordance with the purposes of the EA. Such purposes, as set forth in section 6 of the EA, are:
  - (a) “to ensure the adequacy, safety, sustainability and reliability of electricity supply in Bermuda so that Bermuda continues to be well positioned to compete in the international business and global tourism markets;
  - (b) to encourage electricity conservation and the efficient use of electricity;
  - (c) to promote the use of cleaner energy sources and technologies, including alternative energy sources and renewable energy sources;
  - (d) to provide sectoral participants and end-users with non-discriminatory interconnection to transmission and distribution systems;

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<sup>3</sup> Regulatory Authority Act 2011, p. 5.

<sup>4</sup> Ministry of Economic Development (2015), ‘The National Electricity Sector Policy of Bermuda’, Bermuda.

<sup>5</sup> Ministry of Economic Development (2015), ‘The National Electricity Sector Policy of Bermuda’, Bermuda, p. 4.

<sup>6</sup> Electricity Act 2016, section 7(2).

<sup>7</sup> Electricity Act 2016, section 8(1).

<sup>8</sup> Electricity Act 2016, section 9.

- (e) to protect the interests of end-users with respect to prices and affordability, and the adequacy, reliability and quality of electricity service;
  - (f) to promote economic efficiency and sustainability in the generation, transmission, distribution and sale of electricity.”
24. The principal functions of the Authority set forth in section 12 of the RAA are:
- (a) “to promote and preserve competition;
  - (b) to promote the interests of the residents and consumers of Bermuda;
  - (c) to promote the development of the Bermudian economy, Bermudian employment and Bermudian ownership;
  - (d) to promote innovation;
  - (e) to fulfil any additional functions specified by sectoral legislation.”
25. To further the purposes of the EA, the EA grants various functions to the Authority. Section 14 of the EA provides that the function of the Authority is generally to monitor and regulate the electricity sector. Section 14 (2) (c) (ii) of the EA states that the functions of the Authority shall include, among other things, the making of administrative determinations<sup>9</sup> to provide for the control and conduct of the provision of electricity services, including transparency measures and notice requirements relating to the rates, charges, and other terms and conditions for the provision of electricity services for the benefit of end-users.
26. The Policy Document<sup>10</sup> provides guidance in relation to the objectives that a FIT should achieve. In particular, the tariff structure should be set such that it:
- (a) “Ensures cost recovery by reflecting the Electric Utility’s cost of providing services to distributed generators (energy, demand, and grid access services), and”
  - (b) “Fairly compensates distributed generators for the value of any energy produced by their distributed generation system. This may be set to reflect financial value (according to avoided generation cost), as well as economic value (accounting for externalities and benefits not captured in avoided cost).”
27. To establish the approved FIT, section 37 of the EA requires the Authority to conduct feed-in tariff reviews in accordance with the methodology set by general determination and in accordance with the principles set in section 36 of the EA. This Preliminary Report, Preliminary Decision and Order invites comments on the proposed GD setting forth the methodology to conduct feed-in tariff reviews.

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<sup>9</sup> Defined in the RAA as including a General Determination, order, direction, decision or other written determination by which the Authority establishes the legal rights and obligations of one or more Sectoral Participants but does not include an advisory guideline (or an adjudicative decision and order. General Determination is defined as a statutory instrument made pursuant to Section 62 of the RAA that is applicable to all Sectoral Participants or categories of Sectoral Participants as fall within the scope of the Statutory Instrument.

<sup>10</sup> The National Electricity Sector Policy of Bermuda Section 5.6



#### IV. CONSULTATION RESPONSES

28. The Authority has received six responses to the Consultation Document from:
- (a) Bermuda Alternate Energy Limited (“BAE”);
  - (b) Bermuda Solar Energy Association;
  - (c) Bermuda Electric Light Company Ltd (“BELCO”);
  - (d) the Department of Energy (“DOE”);
  - (e) Mr. Kurt Repose;
  - (f) Mr. Carl Shechtman.
29. The responses are summarised by consultation question and topic of discussion below. The rest of this section is structured as follows.
- (a) Section A discusses the types of costs that should be considered in estimating the avoided cost of generation (consultation questions 1–7 and 9).
  - (b) Section B considers whether the level of the FIT should vary for different distributed generation technologies (consultation question 8).
  - (c) Section C discusses the approach for conversion of avoided costs and economic benefits into a FIT (consultation question 10).
  - (d) Section D provides a discussion on whether FIT should be revised periodically (consultation question 11).
  - (e) Section E provides additional responses to the queries highlighted by Bermuda Solar Energy Association;
  - (f) Section F provides additional responses to the queries highlighted by the Department of Energy.
  - (g) Section G provides a rationale for using a gross metering rather than net metering approach for setting the FIT.
  - (h) Section H outlines the next steps for the establishing the FIT, including the data-gathering process.
- A. Which types of costs and benefits should be considered in estimating the feed-in tariff (consultation questions 1–7 and 9)?**
30. BAE, BELCO and Mr. Kurt Repose provide their comments on each type of cost and benefits proposed by the Authority for determining the FIT in the Consultation Document. These are summarised in Table 1.

**Table 1 Responses to the Consultation Document—types of costs and benefits to be considered for determining the FIT**

Note: ✓—indicates that the cost/benefit should be included in the determination of the FIT; ✓✘ —indicates that it is not clear if the cost/benefit should be included in the determination of the FIT (additional assessment required); ✘—indicates that the cost/benefit should not be included in the determination of the FIT.

Type of cost	BAE	Mr. Kurt Repose	BELCO	Comments
<b>Avoided costs of generation</b>				
<b>A</b> Reduction in fuel costs and other variable operating costs of generation	✓	✓	✓	<ul style="list-style-type: none"> <li>○ <b>BAE</b> considers that the definition of avoided costs of generators should include a fixed cost component.</li> <li>○ <b>BELCO</b> does not believe that the benefit of avoided fuel taxes should be passed on to distributed generators.</li> </ul>
<b>B</b> Reduction in bulk generation capacity requirements	✓	✘	✓	<ul style="list-style-type: none"> <li>○ None of the parties provided detailed comments.</li> </ul>
<b>C</b> Reduction in the TD&R licensee's network losses	✓	✓	✓✘	<ul style="list-style-type: none"> <li>○ <b>BAE</b> notes that international precedent on network losses should be considered, highlighting Cayman Utilities Company as a relevant comparator.</li> <li>○ <b>BELCO</b> indicated that it would like to better understand how the reduction in network losses is expected to be calculated on a case-by-case basis.</li> </ul>
<b>D</b> Increase in the network costs of the TD&R licensee	✘	✘	✓	<ul style="list-style-type: none"> <li>○ According to <b>BAE</b>, this cost will be negligible until distributed solar capacity reaches at least 30MW.</li> <li>○ <b>Mr. Kurt Repose</b> considers that the fraction of network costs attributable to distributed generation is small, and therefore that the cost should borne by the network.</li> </ul>
<b>E</b> System balancing costs and costs associated with services such as frequency response and operating reserves	✘	✘	✓	<ul style="list-style-type: none"> <li>○ <b>BAE</b> considers that this cost will be negligible until distributed solar capacity reaches at least 30MW.</li> <li>○ <b>Mr. Kurt Repose</b> considers that distributed generators do not cause a significant impact on system balancing costs.</li> </ul>
<b>F</b> Increase in the cost of economic stranding of existing generation or network assets	✘	✘	✓	<ul style="list-style-type: none"> <li>○ <b>BAE</b> considers that this cost will be negligible until distributed solar capacity reaches at least 30MW.</li> <li>○ <b>Mr. Kurt Repose</b> considers that existing generation assets are unlikely to be stranded, arguing that Bermuda will continue to mainly rely on fossil fuels in the future.</li> </ul>

Note: ✓—indicates that the cost/benefit should be included in the determination of the FIT; ✓✗ —indicates that it is not clear if the cost/benefit should be included in the determination of the FIT (additional assessment required); ✗—indicates that the cost/benefit should not be included in the determination of the FIT.

Type of cost	BAE	Mr. Kurt Repose	BELCO	Comments
<b>G</b> Changes in thermal plant efficiency	✗	✗	✓	<ul style="list-style-type: none"> <li>○ <b>BAE</b> points out that based on available data, thermal plant efficiency is unlikely to decrease with the wider adoption of distributed generation.</li> <li>○ <b>Mr. Kurt Repose</b> disagrees with inclusion of this cost in the methodology because changes in thermal plant efficiency would not be accurately measurable.</li> </ul>
<b>Economic benefits</b>				
<b>H</b> Reduction in costs associated with meeting environmental standards	✓	✓	✓✗	<ul style="list-style-type: none"> <li>○ <b>BELCO</b> notes that it is not necessarily the case that an increased deployment of distributed generation (of renewable energy) will reduce costs associated with meeting the environmental standards. <b>BELCO</b> argues that the greatest positive environmental impact for Bermuda will be achieved through the introduction of natural gas and not from wider deployment of distributed generation.</li> </ul>
<b>I</b> Increased economic activity	✓	✓	✓✗	<ul style="list-style-type: none"> <li>○ <b>BELCO</b> questions whether rate payers should shoulder the financial burden of stimulating increased economic activity. It argues that the economy is better stimulated when rate payers pay less for their electricity.</li> </ul>

31. The detailed comments to the responses summarised in Table 1 are provided below.

### Reduction in fuel costs and other variable operating costs of generation (Cost A)<sup>11</sup>

32. **BAE**—with regard to reduction in fuel costs and other variable operating costs of generation, BAE states that the fixed cost component of a power purchase agreement (or arrangement, as appropriate)<sup>12</sup> should be considered within the Methodology. The Authority considers that the feed-in tariffs should be based on the costs that are avoided by the electricity system as a whole. Specifically, it considers that some fixed costs associated with generation (e.g. cost of installed infrastructure) would not be avoided by

<sup>11</sup> Distributed generation of renewable energy may permit the avoidance of some variable operating costs that would otherwise be incurred by a bulk generation licensee. For example, since distributed generators supply renewable energy to the network, the TD&R Licensee can then purchase less energy from a conventional bulk generation licensee.

<sup>12</sup> Condition 24 of the TD&R License specifies that a power purchase agreement should be between the TD&R licensee and an independent power producer and a power purchase arrangement should be defined between the TD&R licensee and the generation business unit of the vertically integrated utility.

the electricity system regardless of the level of production of electricity by renewable generators. Inclusion of such fixed costs in determination of the FIT would be misleading in measuring avoided costs, as per relevant legislative and policy framework. Therefore, the costs that are *not* avoided by the electricity system due to the electricity produced by renewable generation technologies should *not* be included in the determination of the feed-in tariff.

33. In addition, the Authority would like to clarify that the determination of the avoided cost of generation would depend on variable costs of generation, i.e. the costs that change depending on the number of kWh produced or purchased (e.g. fuel costs and some maintenance costs which would vary with electricity volumes). The determination of the variable costs would not necessarily align with the terms of a transfer pricing arrangement for the vertically integrated utility (i.e. BELCO having TD&R and bulk generation business units within the same company). Rather, the Authority will analyse the overall costs incurred by the vertically integrated utility to identify the variable costs of generation that would be avoided, due to electricity produced by renewable generation technologies.
34. **BELCO** argues that the benefit of avoided fuel taxes should not be passed on to distributed generators. The Authority does not consider that it is appropriate to exclude fuel tax from the Methodology. When purchasing electricity from distributed generators instead of conventional generators, the TD&R licensee avoids compensating a Bulk Generation licensee for all fuel costs, including compensation for the fuel tax. Therefore, the benefit of avoided fuel tax should be included in determining the FIT.

#### **Reduction in bulk generation capacity requirements (Cost B)<sup>13</sup>**

35. **Mr. Kurt Repose** indicated that the reduction in bulk generation capacity requirements should not be included in determination of the feed-in tariff. However, the response did not provide a detailed justification for this position. The Authority considers that it is appropriate to keep this avoided cost item in the Methodology.

#### **Reduction in the TD&R licensee's network losses (Cost C)<sup>14</sup>**

36. **BELCO** indicated that it would like to understand how the reduction in network losses is expected to be calculated on a case-by-case basis. The Authority considers that the approach for calculating network losses would depend on the information received as part of the data-gathering process. The data-gathering process is described in section H below.

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<sup>13</sup> Distributed generation may mitigate the need for further investment in centralised generation capacity. In this case, additional investment cost to the system would be avoided.

<sup>14</sup> Where there is a high correlation between a customer's demand and on-site generation, less energy would have to be supplied through the electricity network. Therefore, otherwise unavoidable energy losses associated with transmission and distribution of electricity may decrease.

### Other categories of avoided cost of generation (Costs D–G)<sup>15</sup>

37. The Authority acknowledges that according to **BAE** and **Mr. Kurt Repose**, the costs D–G are unlikely to arise, or are not worth quantifying. However, since there is at least one response supporting the need for quantification of these costs (i.e. the response from BELCO) and that there may be informational asymmetry between BELCO and other stakeholders, the Authority considers it appropriate to request that BELCO provide additional information about these costs, to assess whether or not these should be included in the FIT.
38. Finally, **BELCO** proposes that any extraordinary costs to interconnect a distributed generation system should be included in the assessment of the FIT. The Authority notes that these costs are included in the Methodology under item D: “Increase in the network costs of the TD&R licensee”.

### Economic benefits (Cost H–I)

39. **BAE** and **Mr. Kurt Repose** agree that determination of economic benefits should be consistent with the relevant government policy.
40. **BELCO**, on the other hand, highlights that that it is not necessarily the case that the increased deployment of distributed generation (of renewable energy) would reduce costs associated with meeting the environmental standards. It also notes that rate payers should not shoulder the financial burden of stimulating increased economic activity in a form of higher FIT.
41. The Authority will carefully examine the data that would support inclusion of any economic benefits as part of the level of the FIT. This analysis will establish the existence and magnitude of the relevant economic benefits.

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<sup>15</sup> D - Integrating distributed generation facilities into the existing grid may increase the TD&R Licensee’s network costs associated with providing the necessary connection assets, network reinforcements and metering services.

E - Introducing distributed generation to an electricity system—especially intermittent generation such as solar PV—may increase the amount of ‘dispatchable’ (or controllable) generation capacity that must be held in reserve, to cope with short-term fluctuations in electricity output resulting from variable solar or wind conditions.

F - Significant distributed generation capacity may displace some capacity of bulk generation licensee(s) or lead to under-utilisation of network assets. This could imply a system cost in the form of economic stranding of existing generation and network assets (i.e. where existing generation and network assets are unable to earn the expected return).

G - Adding variable distributed generation to a grid may result in a reduction in the conversion efficiency of conventional plant, e.g. due to increased partial, sub-optimal loading or more frequent changes in output from thermal plants that may be required to balance electricity demand and supply at all times.

H - Distributed generation of renewable energy is likely to provide environmental benefits relative to existing and planned conventional generation. A higher degree of distributed generation of renewable energy would therefore help in achieving the environmental objectives of the government of Bermuda.

I - Distributed generation may create economic benefits in the form of increased economic activity (such as gross value added from direct employment, or duties and taxes generated from economic activity in relation to the installation of solar PV in Bermuda). The magnitude and distribution of the expected benefits from increased economic activity should be subject to guidance from the government.

**B. Should FIT vary for different distributed generation technologies (consultation question 8)?**

42. **BAE, Mr. Kurt Repose, and BELCO** agree with the Authority's proposal that the FIT may vary depending on the distributed generation technology. Although neither Mr. Kurt Repose nor BELCO provide any additional comments, BAE points out that different technologies allow the avoidance of different levels of fuel cost, and therefore the FIT should vary accordingly.
43. The Authority considers that setting different levels of the FIT for different distributed generation technologies is appropriate, and it will consider any data that is provided as part of the data-gathering process regarding differentials in avoided cost by different technology. The Authority will consider whether there is sufficient penetration of each technology type to make it proportionate that a differentiated FIT level is determined by technology.

**C. What should be the approach for conversion of avoided costs and economic benefits into a FIT (consultation question 10)?**

44. In the Consultation Document, the Authority outlined the proposed approach for converting the avoided costs and economic benefits into a FIT. Specifically, the Authority has suggested that the avoided cost of generation and net economic benefits that relate to the electricity produced by distributed renewable energy systems should be divided by the forecasted system total kWh produced by distributed generators.
45. **BAE, the Department of Energy and BELCO** agree with the general approach for conversion of avoided costs and economic benefits into a FIT. However, BAE and the Department of Energy have queried the methodology for estimating avoided costs and economic benefits to be considered for determining the FIT.
46. **Mr. Kurt Repose** disagreed with the proposed approach, suggesting that distributed renewable energy systems should be paid back for the electricity exported to the network at the retail rate. The remuneration of the production of distributed renewable energy at the retail rate (i.e. a net metering approach) is not appropriate. Section G explains why a gross metering approach, as proposed in this methodology, should be used for remuneration of distributed renewable energy systems.
47. The response also suggested the investigation of a distributed energy market model, where consumers have an ability to choose from where to purchase their power. Such market is prohibited by section 20(2) of the EA, which only allows a single TD&R Licensee to be permitted to sell electricity to consumers..

**D. Should FIT be revised periodically (consultation question 11)?**

48. Four out of six respondents provide their comments with respect to the periodicity of the FIT revision (see Table 2).

*Table 2 Responses to the Consultation Document—FIT periodical revision*

<b>Respondent</b>	<b>Comments</b>
<b>BAE</b>	The FIT should be revised periodically, for example, every three years. However, once the FIT has been determined for a given applicant, it remains fixed for the remaining lifetime of the asset.
<b>Mr. Kurt Repose</b>	The FIT should be revised at least once a year.
<b>DoE</b>	Both the FIT and the FIT methodology should be revised every five years or less, as determined by the Authority.
<b>BELCO</b>	The FIT should be revised annually.

49. The Authority notes that BAE interprets the EA such that the FIT should remain fixed for a given applicant for the lifetime of the asset. However, the Authority considers that the FIT should be updated for all applicants periodically. The Authority also notes that most of the respondents agree with its position that in order to satisfy the requirements of the EA to ensure cost reflectivity, the FIT should be revised periodically over the lifetime of the asset.
50. The Authority notes that the FIT review periods should be aligned with the periodicity of retail tariff review in the interests of ease of implementation and predictability of the regulatory regime.

#### **E. Responses to queries raised by Bermuda Solar Energy Association**

51. **Bermuda Solar Energy Association** raised a number of concerns in relation to the determination of the FIT that currently applies to distributed generators of renewable energy, in particular concerns in relation to the data used to determine the fuel costs, generator efficiencies, lubricant cost, transmission losses and changes in the data over time.
52. The Authority would like to highlight that the Authority is required to conduct a FIT review in line with the Methodology to establish the new FIT. Therefore, the concerns raised by Bermuda Solar Energy Association will be addressed as part of the FIT review.

#### **F. Responses to additional queries raised by the Department of Energy**

53. The **Department of Energy** raised a number of queries in relation to the proposed Methodology. The Authority summarises the queries and provides the responses in Table 3.

*Table 3 Responses to the Consultation Document—Department of Energy*

<b>Comment</b>	<b>Response</b>
<p>The Consultation Document stated that a system-wide modelling approach would ideally be used to calculate overall net avoided cost of generation and net economic benefits.</p> <p>Please explain what this model would like and how it would benefit the overall net avoided cost of generation? [sic]</p>	<p>The Authority considers that the identified categories of costs and benefits should be analysed as part of an overall assessment in order to prevent double-counting. The precise methodology would depend on the information gathered as part of the FIT review. The proposed approach for establishing the FIT is described in Section H.</p>
<p>The Consultation Document stated that in the absence of any explicit environmental performance targets or incentive schemes, environmental benefits may be approximated using metrics such as traded carbon prices to value the reduction in carbon emissions.</p> <p>What is being used as the 'Proxy Value' in this statement?</p>	<p>The precise valuation of the environmental benefits will be established as part of the FIT review. The proposed approach for establishing the FIT is described in Section H.</p>
<p>How will the RA's recent decision to approve BELCO's purchase of 10 MW of battery storage be considered when determining the FIT?</p>	<p>The Authority will consider the impact of 10 MW of battery storage on the FIT as part of overall net avoided cost of generation. For example, the battery storage may decrease the costs associated with system balancing or the costs associated with a potential reduction in thermal plant efficiency.</p>
<p>How will the RA's recent decision to approve BELCO's purchase and installation of 56MW of new generation be considered when determining the FIT?</p>	<p>The Authority will consider the impact of 56MW of new generation on the FIT as part of estimating the overall net avoided cost of generation. For example, the new generation may decrease the avoided fuel costs, assuming that the new generation units would displace less efficient existing generation units.</p>
<p>The Authority stated that network reinforcement costs are unlikely to arise at low levels of distributed generation (e.g. solar photovoltaic "PV") penetration. However, higher levels of distributed generation penetration would be more likely to involve costs of integrating the distributed generation into the existing grid.</p> <p>Please provide a definition of low levels and higher levels of distributed generation and what data/examples the assumption stated above is based on?</p>	<p>The Authority will evaluate the impact of the renewable generation technologies on the network reinforcement costs as part of the tariff review. The proposed approach for establishing the FIT is described in Section H.</p>

**G. Gross vs net metering**

54. **Mr. Kurt Repose** and **Mr. Carl Schectman** have queried the rationale for using a gross metering approach for the FIT. In this section, the Authority outlines the rationale for gross metering.
55. The FIT is paid by the TD&R licensee to distributed generators—small-scale producers of renewable energy—that are connected to Bermuda's electricity network. The primary purpose of a FIT is to compensate distributed generators for the electricity that they supply.



56. There are two potential approaches for compensating distributed generators of renewable energy for the supply of electricity.
- (a) Net metering—a charging system based on net imports and exports of electricity, where:
- $$\text{Net electricity (kWh)} = \text{imported electricity (kWh)} - \text{exported electricity (kWh)}$$
- With this charging arrangement, the price the customer is charged for importing electricity from the grid is effectively identical to the price the customer is paid for exporting electricity to the grid, because the amount of electricity exported to the grid is directly deducted from the imported electricity;
- (b) Gross metering—a charging system based on gross imports and exports of electricity, i.e. electricity import and export volumes are measured separately, with different electricity prices potentially applied to the electricity imported from the grid to that exported to the grid.
57. According to the EA, the FIT should reflect two components—(i) avoided cost of generation for the TD&R licensee arising from purchasing electricity from distributed generators, and (ii) other economic benefits provided by distributed generators. As a result, the use of a net metering approach would contravene the EA. Therefore, the FIT should be set on the basis of a gross metering approach.
58. The Authority also notes that the focus on avoided costs of generation is consistent with the principle of cost reflectivity, which is one of the objectives for the FIT outlined in the Policy Document. In particular, the cost of consuming the electricity (i.e. the TD&R licensee’s average production costs) is likely to be different to the benefits of generation (i.e. the TD&R licensee’s avoided costs) at customers’ premises. In particular, the TD&R licensee’s fixed costs are largely unavoidable. These fixed costs relate to the TD&R licensee’s fixed generation costs, its network infrastructure, as well as some of its retailing activities (e.g. maintaining customer records, metering, and billing). As these fixed TD&R costs are not avoided if more distributed generation capacity is installed, the FIT should be set primarily with reference to the TD&R licensee’s avoided costs. This will also ensure that an increase in distributed generation capacity would not increase the overall cost of electricity for customers who have not installed their own distribution generation capacity.

#### **H. Next steps for establishing the FIT, including the data-gathering process**

59. This section describes the process for establishing the FIT by outlining (i) the procedural steps for establishing the Methodology and (ii) the approach for gathering the relevant data for determining the FIT.
60. Specifically, the determination of the FIT would follow the process outlined below.
- (a) **Preliminary Report, Preliminary Decision and Order** (current stage). This document provides responses to the Consultation Document and provides a draft general Determination with the proposed Methodology.

- (b) **General Determination.** After the Preliminary Report, Preliminary Decision and Order is complete, the Authority will will issue the General Determination to set the Methodology.
- (c) **Tariff review.** Once the Methodology is established, the Authority will initiate the tariff review for FIT. As part of the tariff review, the Authority would assess the existence and magnitude of the economic benefits as well as the avoided costs of generation.

## **V. PROPOSED DECISION**

61. The Authority proposes to issue a GD enacting the FIT methodology, as set out in Annex 2.

## **ANNEX 1: PROPOSED ORDER**



BERMUDA  
**REGULATORY  
AUTHORITY**

**Proposed Order:  
Feed-in Tariff Methodology**

Proposed Order  
Date: [ ]

**1.1** The Regulatory Authority, pursuant to Sections 44, 52 and 62 of the Regulatory Authority Act 2011 and Sections 6, 14, 17 and 36 of the Electricity Act 2016, hereby:

- (a) Adopts the General Determination attached hereto, setting forth the methodology for calculating the feed-in tariff;
- (b) Directs the Chief Executive of the Regulatory Authority to forward the General Determination to the Cabinet Secretary; and
- (c) Authorises the General Determination to be effected on the date of its publication in the Royal Gazette.

**1.2** So Ordered this [ ] day of [ ] 2018

## **ANNEX 2: PROPOSED GENERAL DETERMINATION**



**BERMUDA**  
**[Regulatory Authority (Feed-in Tariff Methodology) General Determination]**

**BR/2018**

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The Regulatory Authority of Bermuda, in the exercise of the power conferred by section 62 of the Regulatory Authority Act 2011, as read with sections 44 and 52 of that Act and sections 6, 14, 17 and 36 of the Electricity Act 2016, makes the following General Determination:

**Citation**

1 This General Determination may be cited as the [Regulatory Authority (Feed-In Tariff Methodology) General Determination].

**Interpretation**

2 In this General Determination, unless the context otherwise requires, terms shall have the meaning given in the Regulatory Authority Act 2011, the Electricity Act 2016, and the Schedule to this General Determination.

**General Purpose**

3 This General Determination establishes the methodology for calculating the feed-in tariff.

**Determination**

4 (1) This General Determination is made pursuant to the Consultation entitled "Consultation on the Feed-In Tariff Methodology" dated 27 April 2018 and the Regulatory Authority's Decision on it.

(2) Taking into account the six received responses to the Consultation and for the reasons given in the Decision, the Regulatory Authority determines that the feed-in tariff methodology set forth in the Schedule is consistent with the purposes of the Electricity Act 2016, including to seek to: (a) ensure the adequacy, safety, sustainability and reliability of electricity supply in Bermuda; (b) encourage electricity conservation and the efficient use of electricity; (c) promote the use of cleaner energy solutions and technologies; (d) provide sectoral participants and end-users with non-discriminatory interconnection to transmission and distribution systems; (e) protect the interests of end-users with respect to prices and affordability, and the adequacy, reliability and quality of electricity service; and (f) promote economic efficiency and sustainability in the generation, transmission, distribution and sale of electricity.



### **Terms and conditions of General Determination**

5 (1) The Schedule to this General Determination has effect.

(2) The Schedule is also published on the Regulatory Authority's website ([www.rab.bm](http://www.rab.bm)), and is also available for inspection at the offices of the Regulatory Authority [1<sup>st</sup> Floor, Craig Appin House, 8 Wesley Street, Hamilton HM 11) during ordinary business hours.

### **Effective Date of General Determination**

6 This General Determination shall become effective on the day it is published in the Official Gazette.



REGULATORY  
AUTHORITY

**Bermuda**

**Schedule to [Regulatory Authority  
(Feed-in Tariff Methodology) General  
Determination 2018]**

General Determination

Date: September 11, 2018

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## 1 DEFINITIONS

The “Authority” means the Regulatory Authority established under the Regulatory Authority Act 2011.

“Avoided cost of generation” means a component of a feed-in tariff defined in the Electricity Act 2016 as the cost of generation that the TD&R Licensee avoids by purchasing power from distributed generation.

“Bulk generation licence” means a licence granted under section 25 of the Electricity Act 2016.

“Bulk generation” means generation using a system with an installed capacity at or above the licence threshold (as defined in section 2(i) of the Electricity Act 2016).

“Carbon price” means the monetary value associated with offsetting one unit of CO<sub>2</sub> emissions.

“Connection assets” means assets required to connect an additional generating unit, including distributed generating units, to the network.

“Conventional generation” means electricity generated by fossil fuels.

“Conversion efficiency” means the portion of input energy that can be converted into usable electricity.

“Cost of economic stranding” refers to the cost associated with an investment that cannot be recovered because the assets, in which the investment was made, are under-utilised or no longer used.

“Demand-side management” means all activities or programs undertaken by any person to influence the amount of electricity or timing of electricity they use.

“Demand-side resources” means the reduced demand for electricity resulting from demand side management (as defined in section 2(i) of the Electricity Act 2016).

“Dispatchable generation capacity” means the total generation capacity available in the system for dispatch on demand.

“Distributed generator” means a person that has a Standard Contract 2016 (as defined in section 2(i) of the Electricity Act 2016).

“Distributed generation” means generation using a system with an installed capacity below the licence threshold (as defined in section 2(i) of the Electricity Act 2016).

“Distributed generation penetration” refers to the amount of distributed generation in the system as a ratio.

“Distribution” means conveying electric power below 22 kilovolts (kV) (as defined in section 2(i) of the Electricity Act 2016).

“EA” means the Electricity Act 2016.

“Economic benefits” refers to the quantifiable benefits less quantifiable costs associated with distributed generation that apply to the general public and other stakeholders, and that are not included in a feed-in tariff as avoided cost of generation.

“Electricity sector” means the regulated industry sector involving the supply, transmission, distribution and consumption of electricity (as defined in section 2(i) of the Electricity Act 2016).

“FIT” means a Feed-in Tariff. This is the pre-determined rate at which renewable energy is purchased by the TD&R Licensee from a distributed generator, for a pre-determined period, and under pre-determined conditions (as defined in section 2(i) of the Electricity Act 2016).

“Frequency response” means a continuous service provided in order to ensure that the electricity output is changing in line with continuous changes in demand.

“Generation” means the process of producing electric power. This includes generation of renewable energy.

“IPP” means an independent power producer. This is an entity that provides energy, capacity, and ancillary services for commercial purposes at a bulk scale to the electric utility under long-term contracts.

“IRP” means integrated resource plan, an energy plan for the supply of electricity in Bermuda approved by the Authority (as defined in section 2(i) of the Electricity Act 2016).

“Licence” means a valid licence granted by the Authority under the Electricity Act 2016 (as defined in section 2(i) of the Electricity Act 2016).

“Licensee” means a person that holds a valid licence in accordance with the Electricity Act 2016 (as defined in section 2(i) in of the Electricity Act 2016).

“Load-following plant” means a power plant that can change its power output to meet fluctuating electricity demand.

“Network costs” means the costs associated with providing the necessary connection assets, network reinforcements etc.

“Network loss” means a loss of energy as it is transferred through the transmission and distribution system mainly in the form of heat.

“Network reinforcement costs” refer to network expenditures associated with accommodating changes in the amount and pattern of electricity demand and supply while ensuring that the network delivers a safe and reliable supply of electricity.

“Operating reserves” means the additional generating capacity available to continue to meet demand, e.g. in the event of a disruption to supply due to the failure of a generating unit.

“Particulate pollution” means pollution caused by small particles and liquid droplets that are suspended in the air.

“Peak” means a time period when the electric system experiences relatively high demand. These periods often occur in daily, weekly and seasonal patterns (as defined in the National Electricity Sector Policy of Bermuda).

“Renewable energy” means energy that is obtained from naturally occurring sources that are replenished. This includes, but is not limited to, solar, wind, ocean wave, ocean thermal, geothermal, hydropower, and tidal energy (as defined in section 2(i) of the Electricity Act 2016).

“Required capacity margin” means a measure of available capacity over and above the capacity required to meet expected demand.

“Retail” means the sale of electric power at the designated tariff rate by the TD&R Licensee to the end-user (as defined in section 2(i) of the Electricity Act 2016).

“Solar photovoltaic (PV) technology” means a renewable energy technology that converts solar radiation into direct current electrical energy (as defined in the National Electricity Sector Policy of Bermuda).

“Standard Contract” means a contract referred to in section 49 of the Electricity Act 2016.

“System balancing” refers to services associated with ensuring that electricity supply is sufficient to meet electricity demand.

“TD&R” means transmission, distribution and retail.

“TD&R Licence” means a licence granted under section 25 of the Electricity Act 2016.

“Thermal plant” means a power plant that uses heat energy to generate electric power.

“Transmission” means conveying power at or above 22 kilovolts (kV) (as defined in section 2(i) of the Electricity Act 2016).

“Variable operating costs of generation” means costs to the generator that vary as the amount of electricity generated changes.

## 2 INTERPRETATION

- (1) For purposes of interpreting this General Determination:
  - (a) unless the context otherwise requires, words or expressions shall have the meaning assigned to them by the RAA and the EA;
  - (b) where there is any conflict between the provisions of this General Determination and the EA or RAA, the provisions of the EA or RAA, as the case may be (and subject to sections 3(2) and 3(3) of the EA), shall prevail;
  - (c) terms defined herein and in the EA and RAA have been capitalised;
  - (d) headings and titles used herein are for reference only and shall not affect the interpretation or construction of this General Determination;
  - (e) references to any law or statutory instrument include any modification, re-enactment or legislative provisions substituted for the same;
  - (f) a document referred to herein shall be incorporated into and form part of this General Determination and a reference to such document is to the document as modified from time to time;
  - (g) expressions cognate with those used herein shall be construed accordingly;
  - (h) use of the word "include" or "including" is to be construed as being without limitation; and
  - (i) words importing the singular shall include the plural and vice versa, and words importing the whole shall be treated as including a reference to any part unless explicitly limited.

### **3 LEGISLATIVE AND PROCEDURAL BACKGROUND**

- (1) This General Determination has been undertaken in accordance with section 62 of the RAA and the exercise by the Authority of its powers under sections 6, 14, 17 and 35 of the EA.
- (2) The Authority initiated a consultation by publishing a Consultation Document on 27 April 2018 that invited responses from members of the public, including electricity sectoral participants and sectoral providers, as well as other interested parties. The purpose of the Authority's initial Consultation Document was to consult on the proposed Feed-In Tariff Methodology.
- (3) The Consultation Document invited respondents to comment on the proposed methodology for assessing the Feed-In Tariff for distributed generation.
- (4) Responses to the Consultation Document were solicited from the public electronically through the Authority's website at [rab.bm](http://rab.bm).
- (5) The response period commenced on 27 April 2018 and concluded on 4 June 2018
- (6) The Authority received six responses from the public.



#### **4 FINAL DETERMINATION**

- (1) Pursuant to section 62 of the RAA and in accordance with sections 6, 14, 17 and 36 of the EA using the general powers granted to the Authority under section 13 of the RAA and in accordance with the procedures established for this purpose in section 62 of the RAA, the Authority hereby determines that:
- (2) The adoption and implementation of the Feed-in Tariff Methodology as set forth in Annex 1 of this Schedule below is consistent with the purposes of the Electricity Act 2016, including to seek to: (a) ensure the adequacy, safety, sustainability and reliability of electricity supply in Bermuda; (b) encourage electricity conservation and the efficient use of electricity; (c) promote the use of cleaner energy solutions and technologies; (d) provide sectoral participants and end-users with non-discriminatory interconnection to transmission and distribution systems; (e) protect the interests of end-users with respect to prices and affordability, and the adequacy, reliability and quality of electricity service; and (f) promote economic efficiency and sustainability in the generation, transmission, distribution and sale of electricity.

# **ANNEX 1 – FEED-IN TARIFF METHODOLOGY**

## 1 METHODOLOGY

1. This methodology focuses on the determination of the Feed-in-Tariff (“FIT”) level in relation to the overall system costs and benefits that arise from higher levels of distributed generation penetration. In line with the Electricity Act 2016 (“EA”), this General Determination applies to all forms of renewable energy generation technologies.
2. The EA requires that the FIT will, at most, allow only compensation arising from the following sources.<sup>1</sup>
  - (a) **Avoided cost of generation.** This is the cost of generation that the Transmission, Distribution & Retail (“TD&R”) Licensee avoids by purchasing power from distributed generation.
  - (b) **Economic benefits.** Economic benefits associated with distributed generation.
3. This requirement is consistent with the National Electricity Sector Policy, which states that the reformed electricity sector in Bermuda will introduce competition between existing generation facilities, prospective third-party bulk generators (independent power producers (“IPPs”)), distributed generators, and other demand-side resources.<sup>2</sup> In order to ensure that the benefits of such competition are realised, it is necessary for all electricity resources to have access to the electricity network on fair, reasonable, and non-discriminatory terms. In turn, this requires that the FIT for distributed generation systems reflects the system-wide costs and benefits of this technology.

### 1.1 Costs and benefits affecting FIT

4. As required by the EA, the FIT will be based on the avoided cost of generation and economic benefits.

#### 1.1.1 Avoided cost of generation

5. Firstly, the following categories are directly relevant in estimating the net avoided cost of generation which would constitute a benefit from the deployment of distributed generation of renewable energy (section 36(a)(i) of the EA).
  - (a) **Reduction in fuel costs and other variable operating costs of generation.** Distributed generation of renewable energy may permit the avoidance of some variable operating costs of overall system generation that would otherwise be incurred. For example, since distributed generators supply renewable energy to the network, the TD&R Licensee can then purchase less energy from a conventional bulk generation licensee. Consequently, the conventional Bulk Generation licensee reduces its fuel and lubricating oil costs and other variable operating costs.<sup>3</sup> The

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<sup>1</sup> Electricity Act 2016, section 36.

<sup>2</sup> Ministry of Economic Development (2015), ‘The National Electricity Sector Policy of Bermuda’, Bermuda.

<sup>3</sup> Where distributed generation capacity is not large enough to make any discrete units of planned bulk generation capacity redundant, it is unlikely that a bulk generation licensee will avoid its fixed operating costs. The bulk generation licensee will also not avoid the capital costs that have already been incurred. However, even if a part of the bulk generation capacity becomes redundant due to the distributed generation, the extent to which the fixed operating costs and capital cost of the bulk generation licensee are avoided would depend on the agreement between the TD&R and the bulk generation licensees.

reduction in fuel and lubricating oil costs and other variable costs does not have to be estimated based on the costs of conventional bulk generators currently connected to the network. For example, where data is available, it would be appropriate to consider the reduction in costs that would arise in a projected least-cost scenario within an integrated resource planning (“IRP”) process.

- (b) **Reduction in further generation capacity requirements.** Distributed generation may mitigate the need for further investment in conventional bulk generation capacity. For example, if, according to the IRP, the existing bulk generation licensees’ capacity is not sufficient to meet total demand, or is not able to maintain the required level of system reliability, a significant amount of distributed generation capacity could allow the avoidance of some additional fixed costs of installing further conventional bulk generation capacity.<sup>4</sup>
  - (c) **Reduction in the TD&R Licensee’s network losses.** Where there is a high correlation between a customer’s demand and on-site generation, the energy losses associated with transmission and distribution may decrease with connecting distributed generators to the network.
6. In addition, the following categories are indirectly relevant in estimating the net avoided cost of generation, resultant from the deployment of distributed generation of renewable energy (section 36(a)(i) of the EA).
- (a) **Increase in the network costs of the TD&R Licensee (cost to the system).** Integration of distributed generation facilities to the existing grid may increase the TD&R licensee’s network costs associated with providing the necessary connection assets, network reinforcements and metering services.<sup>5</sup>
  - (b) **Increase in the cost of system balancing (cost to the system)** and associated services such as frequency response and operating reserves, especially arising from intermittent distributed generation such as solar *photovoltaic* (“solar PV”) generation. Introducing distributed generation to an electricity system may be expected to increase the amount of dispatchable generation capacity that must be held in reserve, to cope with short-term fluctuations in electricity output resulting from variable solar or wind conditions.
  - (c) **Increase in the cost of economic stranding of existing generation or network assets (cost to the system).** Significant distributed generation capacity may displace some capacity of bulk generation licensee(s) or lead to under-utilisation of network assets. This could imply a system cost in the form of economic stranding of existing generation and network assets.
  - (d) **Changes in thermal plant efficiency (cost to the system).**<sup>6</sup> Adding variable distributed generation to a grid may result in a reduction in the conversion efficiency of thermal plants, due to (among other things) more frequent changes in the output

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<sup>4</sup> System reliability refers to the ability of the electricity system as a whole to meet all connected load requirements.

<sup>5</sup> Network reinforcement costs are unlikely to arise at low levels of distributed generation (e.g. solar PV) penetration. However, higher levels of distributed generation penetration would be more likely to involve costs of integrating the distributed generation into the existing grid.

<sup>6</sup> Costs such as this could conceivably be taken into account when quantifying the FIT if the availability of data permits robust estimation in the electricity sector of Bermuda.

of load-following plant assets, greater use of more flexible but potentially less efficient plants, and more frequent plant 'start-up' and 'shutdown' measures.

### 1.1.2 Economic benefits

7. There are a number of economic benefits and costs that could deliver wider government policy objectives (section 36(a)(ii) of the EA). The magnitude of such benefits would depend on the relevant guidance from the government and may include the following:
  - (a) **Reduction in costs associated with meeting environmental standards (economic benefit).** Distributed generation of renewable energy is likely to provide environmental benefits relative to existing and planned conventional generation. A higher degree of distributed generation of renewable energy would therefore help in achieving the environmental objectives of the government of Bermuda. If the TD&R Licensee is subject to, or will be subject to, explicit environmental performance targets, the environmental benefits of distributed generation can be measured as the reduction in the cost to the TD&R Licensee of meeting its environmental performance targets. In the absence of any explicit environmental performance targets or incentive schemes, environmental benefits may be approximated using metrics such as traded carbon prices to value the reduction in carbon emissions. The inclusion of such benefits in the determination of the level of the FIT should be guided by government policy.
  - (b) **Reduction in costs associated with meeting environmental standards (economic benefit).** Distributed generation of renewable energy is likely to provide environmental benefits relative to existing and planned conventional generation. A higher degree of distributed generation of renewable energy would therefore help in achieving the environmental objectives of the government of Bermuda. If the TD&R Licensee is subject to, or will be subject to, explicit environmental performance targets, the environmental benefits of distributed generation can be measured as the reduction in the cost to the TD&R Licensee of meeting its environmental performance targets. In the absence of any explicit environmental performance targets or incentive schemes, environmental benefits may be approximated using metrics such as traded carbon prices to value the reduction in carbon emissions. The inclusion of such benefits in the determination of the level of the FIT should be guided by government policy.
  - (c) **Increased economic activity (economic benefit).** The distribution of the benefits from increased economic activity (such as gross value added from direct employment or taxes generated from economic activity in relation to the installation of solar PV in Bermuda) should also be subject to guidance from the government. Based on government policy, the value impact of the increase in distributed generation on wider economic activity may be reflected in the FIT. Including the benefit from increased economic activity in the calculation of the FIT would shift the incidence value of these benefits from the wider economy to the distributed generators.
8. The estimation of the level of the FIT may vary for different distributed generation technologies. The methodology outlined above would reflect the idiosyncrasies of the different technologies for which the FIT is proposed (e.g. solar PV and wind). The net

system costs and benefits associated with increased penetration of different distributed generation technologies are likely to differ. Also depending on the maturity and existing penetration of the different technologies, there may be differences in the degree to which government chooses to subsidise further deployment of particular technologies.

9. Therefore, the Authority considers that setting different levels of the FIT for different distributed generation technologies is appropriate, and it will consider any data that is provided as part of the data-gathering process regarding differentials in avoided cost by different technology. The Authority will consider whether there is sufficient penetration of each technology type to make it proportionate that a differentiated FIT level is determined by technology.

## 1.2 Calculation of the FIT based on avoided costs and economic benefits

10. It is proposed that the FIT is calculated as the sum of the avoided cost of generation and any net economic benefits, divided by forecast system total kWh produced by distributed generators. It will be important to consider avoided cost of generation, net economic benefits and production over the same period, e.g. on an annual basis. As a formula, the FIT is calculated as follows:

$$\text{FIT}(\$/\text{KWh}) = \frac{\text{avoided cost of generation} (\$/\text{p.a.}) + \text{economic benefits} (\$/\text{p.a.})}{\text{forecast system production by distributed generators (kWh/p.a.)}}$$

11. It should be noted that there are general limitations to the calculation of individual components of net avoided cost of generation and net economic benefits. In particular, cost categories are likely to overlap. For example, an increased system reserve requirement for short-term balancing may interact with the required capacity margin needed to meet peak demand. Therefore, it is important to ensure that the avoided system costs and other net economic benefits are not double counted.
12. Finally, the Authority takes the view that the FIT cannot be fixed for the duration of the investment and shall be updated with the periodicity that is aligned with the retail tariff reviews.