



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

FEED-IN TARIFF MODEL AND STANDARD PPA

8 February 2013
MI 1312

FEED-IN TARIFF MODEL AND STANDARD PPA

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY.....	5
II. IMPLEMENTING FIT	7
1.1. SELECTED APPROACH	7
1.2. ELIGIBILITY.....	8
1.2.1. Technology	8
1.2.2. Scale	9
1.2.3. Overall Cap	9
1.3. DETERMINATION OF TARIFFS.....	10
1.3.1. Technology Breakdown	10
1.3.2. Duration Of The Incentive	10
1.3.3. Time OF Use (TOUs)	10
1.3.4. Currency Nomination and Indexation	10
1.3.5. Degression	12
1.3.6. Review FITs.....	13
1.3.7. FIT Calculation.....	13
Technical Parameters	13
The figures above are given in USD, because those are the reported values for oil-fired plant. In fact, the tariffs will be in GMD, with an index to Euro. An exchange rate of US\$ 1 = 30GMD was used in the tariff calculation. Financial Parameters.....	14
Calculation Using Model	14
2.1. LICENSING.....	18
2.2. ROLES OF INSTITUTIONS.....	18
2.3. MANDATORY POWER PURCHASE AND PRIORITY DISPATCH	19
2.4. DISTRIBUTION OF THE COST	19
2.5. FIT SETTLEMENT.....	19
2.5.1. Net Metering.....	20
2.6. BENEFITS OF "EMBEDDED" GENERATION	21
2.7. ALLOCATION OF NETWORK INVESTMENT COSTS	21
4.1. RATIONALE	24
4.2. POTENTIAL COMPLEMENTARY MECHANISMS.....	24
4.2.1. Support to Producers	25
4.2.2. Allocating IFI funding to producers: Recommended Approach	26
4.2.3. IFI funding to Utility	28
4.3. RECOMMENDED APPROACH	28
III. SUGGESTED REGULATION AND AGREEMENTS.....	29
IV. WORKSHOP AND STAKEHOLDER FEEDBACK.....	30
ANNEX A : DRAFT FEED IN TARIFF RULES & PROCEDURES	33
PART I. PRELIMINARY	33

PART II.	ELIGIBILITY	34
PART III.	FEED IN TARIFF	35
PART IV.	PRIORITY CONNECTION AND PURCHASE	36
PART V.	REPORTING.....	36
PART VI.	ADMINISTRATION OF FEED IN TARIFFS.....	36
PART VII.	FINAL PROVISIONS.....	37
ANNEX B	: ANNUAL AUTHORITY ANNOUNCEMENT	38
ANNEX C	: STANDARD POWER PURCHASE AGREEMENT	39
ARTICLE 1.	DEFINITIONS AND RULES OF INTERPRETATION.....	39
ARTICLE 2.	UNDERLYING PRINCIPLES.....	41
ARTICLE 3.	THE SERVICES	42
ARTICLE 4.	RIGHTS AND OBLIGATIONS.....	43
ARTICLE 5.	SALE AND PURCHASE.....	45
ARTICLE 6.	DISPUTE, TERMINATION AND ASSIGNMENT	45
ARTICLE 7.	MISCELLANEOUS	46
SCHEDULE A:	SPECIFICATION OF THE SELLER'S FACILITY	49
ANNEX D	: NETWORK CONNECTION AGREEMENT	52
ARTICLE 1.	DEFINITIONS AND RULES OF INTERPRETATION.....	52
ARTICLE 2.	CONNECTION.....	53
ARTICLE 3.	REQUIREMENTS	55
ARTICLE 4.	MISCELLANEOUS.....	56
SCHEDULE A:	ADDITIONAL REQUIREMENTS FOR MEDIUM VOLTAGE AND TRANSMISSION NETWORK CONNECTION	58
SCHEDULE B:	ADDITIONAL REQUIREMENTS FOR LOW VOLTAGE NETWORK CONNECTION	62
ANNEX E	: NET METERING AGREEMENT	64
SCHEDULE	65
ANNEX F	: ATTENDEES AT WORKSHOP AND SCHEDULE	67

ACRONYMS

CAPEX	Capital Expenditure
FIT	Feed In Tariff
GMD	Gambian Dalasi
HFO	Heavy Fuel Oil
IFI	International Financial Institutions
IRR	Internal Rate of Return
kV	Kilovolt, unit of potential difference, 1,000 volts
kW	Kilowatt, a unit of power (generation or demand capacity), 1,000 Watts
kWh	Kilowatt hour, a unit of electricity generated or electricity demand, 1,000 Watt hours
LFO	Light Fuel Oil
LRMC	Long Run Marginal Cost
MOE	Ministry of Energy

MW	Megawatt, a unit of power (generation or demand capacity), 1,000,000 Watts
MWh	Megawatt hour, a unit of electricity generated or electricity demand, 1,000,000 Watt hours
NAWEC	National Water And Electricity Company (responsible for transmission, distribution, generation and retail supply in the Gambia)
NEA	National Environment Agency
NGO	Non-Governmental Organisation
OMVG	Organisation pour la Mise en Valeur de la fleuve Gambia, or Gambia River Basin Development Organisation (planned regional hydro project)
OPEX	Operational expenditure
PPA	Power Purchase Agreement
PURA	Public Utilities Regulatory Authority (regulates power sector in the Gambia)
PV	Photovoltaic
ROE	Return on Equity
toe	Tonnes oil equivalent
WAPP	West Africa Power Pool

Exchange rates used:

US\$ 1 = 30 GMD

€ 1 = 40 GMD

LIST OF TABLES

Table 1: Setting the renewable support level	7
Table 2: International degression factors	13
Table 3: Technical parameters for tariff model	13
Table 4: Sensitivity analysis	18
Table 5: Role of Institutions	18
Table 6: Advantages and disadvantages of net metering	20
Table 7: Pros & Cons of complementary mechanisms to encourage producers (support producer directly)	25

LIST OF FIGURES

Figure 1: Illustration of FIT announcement process	11
Figure 2: Gambian inflation compared to Brent crude oil prices	12
Figure 3: Image on first page "Balanced scorecard" of model	15
Figure 4: Screen image of financial model	16
Figure 5: PURA summary of IPP application process (image taken from PURA documents)	23
Figure 6 – IFI funding to producers	27
Figure 7: Stakeholder workshop	32
Figure 8: Training session with NAWEC on the use of the tariff model	32

Disclaimer: This report was prepared by AF-Mercados EMI. Any views expressed in this paper are those of the authors only, and do not necessarily reflect the opinions of the EU, project sponsors or the wider AF group.

I. EXECUTIVE SUMMARY

This report sets out the main features of a Feed in Tariff (FIT) scheme to support renewable technologies in the Gambia, based on relevant international experience and the specific policy and market framework of the Gambia, where a number of relevant policy decisions had already been made.

1. FIT DESIGN

Our recommendations are as follows:

- The initial support level to be determined by the avoided cost methodology (based on policy objectives). The incentive will be for a period of 15 years from plant commissioning. After such period, power plants may sell the electricity through bilateral contracts with the NAWEC at freely negotiated rates.
- The following technologies are eligible to receive FIT: solar PV, wind biomass (biomass is limited to 1 MW total capacity until the biomass strategy required by the Renewable Energy Bill is complete) and biogas¹. PURA may review the technologies that are eligible and will announce eligible technologies in the annual authority announcement. Such review will not affect existing facilities.
- Facilities greater than 1.5 MW (or such level to be set by PURA) are not eligible for support under the FIT scheme and should negotiate a traditional PPA with the off-takers due to the risk for their power plant to have a detrimental impact on system security, and therefore a need for a more thorough assessment.
- Facilities lower than 100kW (or such level to be set by PURA) are eligible for support under the FIT scheme, though its payment will be based on longer billing periods to reduce the administrative burden.
- Facilities lower than 20kW (or such level to be set by PURA) and that are designed primarily to meet the customer's own demand may be offered a Net Metering Agreement. Within these parameters, NAWEC will make the decision on whether to offer a Net Metering Agreement, and PURA may review this decision.
- Completely off-grid facilities are not eligible for support under the FIT scheme, although systems connected to smaller grids operated by NAWEC will be eligible.
- Existing facilities constructed prior to the commencement of this scheme are not eligible for support under the FIT scheme.
- PURA shall recommend adjusted FITs for new facilities, which will be approved by the Minister. Existing facilities will have their payments adjusted only based on indexation.
- FIT values will be set in GMD and will be adjusted annually employing a simple benchmarking indexation formula linked to local inflation (for a deemed local component) and foreign exchange rate (Euro, for a deemed international component). In the near term, precedent suggests that the split between local and international components could be 50/50.
- PURA will publish tariffs every 3 years for the next three years to give certainty to project developers, and thereafter only adjusted annually based on indexation. In the event that there is no adjustment, existing tariffs will remain in force. The new tariff will apply for new projects only. Make clear that this is for new plants only, the tariff for existing plants will remain the same except for adjustment to inflation and changes in the forex rate.
- Since NAWEC is responsible for both retail supply and generation purchasing in the Gambia, the burden can be shared among the electricity consumers during normal retail tariff review process. The design of the tariff is such that the net effect should be minimal (the FIT is based on the avoided cost of traditional oil-fired generation). This process will be overseen by PURA as at present.
- The costs of connection to the grid should continue to be based on "shallow connection charging", which remains the most suitable approach for encouraging the promotion of renewable electricity production. Shallow charging means that renewable power producers only pay for the direct costs of the equipment needed to connect their plant physically to the nearest appropriate point of the distribution or transmission grid. Beyond that connection

¹ Biomass may be included once a strategy for its use is validated.

point, NAWEC meet the costs of required reinforcement or development of the wider grid – if any – of the grid.

2. MAIN RESPONSIBILITIES

PURA will be in charge of determining the feed in tariff for each renewable energy technology. Additionally, we recommend regular reporting by PURA to monitor progress towards targets and determine if any revisions to the FIT are necessary.

3. INITIAL FIT LEVELS

FIT value is defined using a model for the assessment of the avoided costs. The assessment is based on a financial model which uses CAPEX, OPEX, fuel costs, etc. The single FIT is calculated at 215 USD/MWh following the assumptions detailed in next sections, which is equivalent to around 7 GMD/kWh. The tariff is most sensitive to fuel costs.

4. REGULATORY FRAMEWORK

This report includes:

- The FIT Rules and related procedures for the deployment of the FIT policy.
- Standard PPA template (including connection agreements for medium and low voltage)

Firstly, renewable energy project developers will need to fulfil the administrative requirements prior to developing the facilities. Within these procedures are guidelines and the different stages a developer needs to accomplish, including permissions required, timelines for each step and the authorities entrusted to approve the suitability of these installations. The intention is that those facilities with an installed capacity below 100 kW should enjoy a simplified procedure to support development, which will be provided by the forthcoming Renewable Energy Law. In the same Law, the intention is for provision to be made for simplified procedures for offgrid systems below 200kW with supply through private wire networks (microgrids).

After permissions are obtained, the operation of the eligible renewable power plant will be regulated by the provisions stated in the FIT Rules. This document describes the rights and obligations for the developers, NAWEC and the authorities. The operation of these facilities, as set out in the FIT Rules involves signing two agreements. Firstly, developers shall enter into a Standard Power Purchase Agreement with the buyer (NAWEC) where the electricity produced will be fed, and linked to this agreement the developer has to satisfy the provisions of the corresponding connection agreement (Medium Voltage or Low Voltage) according to the grid where it will be connected to ensure the responsible behaviour of both renewable generators and NAWEC.

This project term of reference does not mention connection agreements. However, to facilitate development an outline and the key provisions to be fulfilled by renewable power plant developers is included in this document.

II. IMPLEMENTING FIT

1. DESIGNING THE FIT

1.1. SELECTED APPROACH

Table 1 summarises international experience of the main advantages and disadvantages of different approaches to support for renewable technologies.

Table 1: Setting the renewable support level

	ADVANTAGES	DISADVANTAGES
Private avoided cost	<ul style="list-style-type: none"> This is the simplest approach. This approach will not allocate extra cost in the end consumers, meeting a policy requirement in the Gambia. Encourages least cost renewable technologies to be developed. 	<ul style="list-style-type: none"> In developed countries, this is not recommended as an appropriate approach as it does not encourage the installation of some renewable technologies. Where renewable development is profitable at private avoided cost, but it is not developed may be because there are other non-price barriers that are blocking it. Other non-price aspects would need to be addressed. Private avoided cost does not take into consideration negative environmental impacts of other (traditional) technologies and dependence on imported fuel.
Social avoided cost	<ul style="list-style-type: none"> Other factors, such as CO₂ emissions, are taken into account as well as electricity generation costs. Encourages least cost renewable technologies to be developed, reducing burden on consumers. 	<ul style="list-style-type: none"> The tariff level settlement requires the assessment of externalities such as climate change, air quality, fuel dependency, etc., which are not easy to evaluate. As with private avoided cost, this approach does not allow technology-specific tariff levels. There is no CO₂ charge in the Gambia.
Renewable technology cost-based	<ul style="list-style-type: none"> Many countries in the EU apply FIT based on electricity generation costs to determine the tariff level. Allows FIT to be set by technology. Encourages a broader range of renewable technologies to be developed. 	<ul style="list-style-type: none"> Information asymmetry (the policy institution generally has less accurate information than the investor). Requires a lot of investigation by technology to ensure the tariff is set correctly. There are parameters that vary a lot by project even under the same methodology. Can result in higher cost of subsidy to consumers.
Renewable-conventional energy supply equilibrium (optimal penetration approach)	<ul style="list-style-type: none"> This type of analysis allows understanding the economics of the policy under a partial equilibrium approach. Therefore, even when this type of studies is not accurate due to the type of information and assumptions it requires, it generates the best quantitative bounds for policy making. It provides the optimal penetration for renewable considering all relevant issues including (environment, costs, location, congestion, intermittency, etc.) 	<ul style="list-style-type: none"> In case of the absence of a renewable potential assessment, it requires a huge amount of data to have defined the technical realisable potential of each renewable source.
Top-down	<ul style="list-style-type: none"> This is a simple approach based on the experience accumulated in many countries. 	<ul style="list-style-type: none"> The results obtained are highly dependent on the benchmark sample. There may be a relevant difference between renewable potentials in the benchmark countries and the country studied.

Choosing the correct policy approach is a balancing act between the cost to consumers and the desire to ensure significant renewable electricity generation.

In many countries, we would recommend **renewable technology cost-based approach**, resulting in technology-specific tariffs. This approach allows costs to be targeted to technologies, and results in the broadest range of technologies developed.

However, we see two clear disadvantages to using this approach in the Gambia:

- **Need for very close regulatory monitoring:** There is a requirement for high levels of regulatory scrutiny at both the initial tariff setting and regular (often annual) tariff reviews. It

is not clear that PURA will be able to resource these extra costs (technical studies etc.) at the level required for future tariff reviews.

- **Additional cost to consumers:** The cost to consumers may be higher because more expensive technologies (than traditional ones for example) are supported. The funds to support these technologies ultimately need to come from Government (therefore taxpayers), or more commonly from electricity consumers. The Ministry of Energy has clearly stated that the Government policy is not to allow any additional costs to consumers from renewable electricity.

Based on discussions with the Ministry of Energy about the renewable policy and their policy objectives, we recommend that the best alternative for the Gambia is a **private avoided costs methodology** (a single tariff for all renewable technologies, which represents the avoided cost of the alternative form of generation). In general, FITs based on private avoided cost might not be enough to foster the development of some renewable technologies. However, this approach offers a number of advantages in the Gambian context, which allow it to better deliver the policy objectives of the Ministry than other alternatives:

- **Simplest approach:** single tariff based on existing technologies is easier to estimate.
- **High cost of current generation means renewables compete more easily:** The very high cost of the current oil-fired generation mix means that renewables can compete more effectively.
- **Affordability:** This approach addresses the affordability issue which is currently the main concern of the government, avoiding the allocation of any surcharge from the development of renewable energy sources to Gambian electricity consumers.

Private avoided cost is estimated either based on electricity market prices (where possible), or through an estimation of the LPMC (long run marginal cost) of the system. Avoided costs can be defined as "incremental costs to an electric system of electric energy or capacity, or both, which, otherwise would generate itself or purchase from another source". The Gambia does not have an electricity market, so the incremental cost of a new unit of generation should be considered.

This incremental cost will need to be based on newly built generation, rather than existing generation. Already, there is frequent load shedding in the Gambia and peak demand cannot be met. Also, electricity demand should be expected to grow as currently unsupplied customers connect.

Therefore new generation capacity to meet demand should be considered. Criteria should be established with the purpose of determining the main characteristics of such future plants (type, capacity, required return etc.) as well as the expected commissioning date.

Therefore, it is proposed to design FIT program based upon an avoided cost model or the value of renewable energy generation. Based on the outputs from the modelling without regional integration, HFO and LFO are important, and even with regional interconnection they continue to play a role. All the regions outside the Banjul area are supplied with this fuel.

In this report, the avoided cost for the Gambia is estimated based on 2012 energy costs from the current energy mix (about 90% HFO and the remaining 10% LFO). Within the model, we have provided the flexibility to base tariffs on HFO, LFO or an HFO/LFO mix as an alternative.

1.2. ELIGIBILITY

1.2.1. TECHNOLOGY

The electricity strategy document reviewed in detail the potential candidate renewable electricity sources.

More developed renewable technologies provide a mechanism to reduce exposure to fossil fuel prices and to reduce carbon emissions. These include wind, solar PV, biomass, waste to energy and landfill gas. Of these,

- There is no apparent potential for hydro energy, apart from the development of the regional OMVG hydro project.
- Diverting waste biomass resources would be a concern because waste biomass is currently being used in a campaign to reduce deforestation by using groundnut briquettes for cooking. Therefore its eligibility will be constrained to no more than 1MW until an accurate biomass strategy is defined;
- Landfill gas is unlikely to be a strong possibility because landfill is not compacted, reducing the concentration of methane emissions;
- Waste to energy is currently expensive and technically complex compared to alternatives; and
- Biogas power generation is also quite complex technology, and presents a challenge in gathering sufficient quantities of appropriate waste.
- Various emerging technologies have been proposed for the Gambia. These include wave and tidal power, and concentrated solar power (CSP). At present, these technologies remain their

costs and efficiency (or capacity factor) have not been adequately demonstrated. For example, World Bank is studying the costs of CSP technology for the Middle East and North Africa region to decide about the best method of supporting it (AF-Mercados EMI were engaged to carry out this assessment). The study demonstrates costs are still high, there is still no certainty on potential costs, and it is worth noting that insolation in Gambia may be less than in the Middle East and North Africa region. Therefore CSP, wave and tidal power are not considered appropriate for a small system in a developing country where both reliability and affordability are of major concern. If demonstration projects in developed countries show adequate reductions in costs and improvements in reliability in the future, these technologies could be reconsidered.

Therefore wind and solar PV are likely to remain the most appropriate renewable power options in the Gambia in the near term. We recommend that biogas is also eligible to allow these technologies to be developed where economic or if external grant funding is made available. Currently, most of the renewable energy facilities and pilot installations subject to evaluation are framed within these technologies.

The tariff eligibility should be restricted depending on scale.

1.2.2. SCALE

Moreover, framed in the eligibility of renewable projects, the capacity of the facilities which may be automatically be eligible for this policy shall be capped at **1.5 MW** for each renewable generation site.

This cap is designed to reflect the potential impact that these plants may have on grid stability. It is anticipated that the cap for individual sites should be reviewed as the grid stability is improved with regional interconnection and plants with greater inertia (such as steam turbines rather than engines).

Developers of planned installations with an installed capacity higher than 1.5MW may discuss with PURA and NAWEC the system implications of their project. Where NAWEC and PURA can agree that the project can be managed within the system, they can receive the FIT.

It should be recalled that the threshold for the capacity of the plants is independent of the policy target. Multiple plants of 1.5MW can be built, provided they are on separate sites.

The payment and administration of these sites will place an administrative burden on NAWEC and PURA. For this reason, the MOE prefers to set a different structure of payments depending on the plant size.

Bearing in mind this constraint, our proposal is that:

- Renewable generators **greater than 1.5 MW** require a specific technical study from NAWEC and approved by PURA before awarding FIT;
- Renewable generators **from 100kW to 1.5MW** are eligible and will be paid monthly;
- Renewable generators **below 100kW but greater than 20kW** are eligible, and will be paid three-monthly (to reduce the administrative burden); and
- Renewable generators **20kW or below are eligible** and will be paid annually or by net metering.

PURA should be ultimately responsible for decisions on the appropriate scale of plants. From time to time these levels should be reviewed in consultation with MOE, NAWEC and renewable developers.

1.2.3. OVERALL CAP

The Gambian system is currently not stable and suffers from frequency disturbances and load shedding. There is no central control system and all the power plants are engines, with low inertia (a low ability to help stabilise the system).

This means that the system is not well placed to integrate large volumes of variable renewable generation.

This can be improved with:

- Integration of steam turbines with higher levels of inertia (system support);
- Integration into a larger regional power pool (WAPP) with the ability to share reserves with a wider region;
- Better real time monitoring of the system;
- Adaptation of a grid code and power quality targets; and
- Addition of a control system and system for central control.

Until some of these measures are taken, it is recommended that the Gambia limits (caps) the overall installed capacity of renewable generation plants (in MW). The ultimate decision on the level of the

cap is for PURA to take, but initially a cap of 5.5 MW² can be used, until further technical studies are carried out on the capability of the system to absorb variable production from renewable energy.

Once some of the steps above are taken, this approach could be reviewed.

1.3. DETERMINATION OF TARIFFS

1.3.1. TECHNOLOGY BREAKDOWN

There is no proposed differentiation of tariffs by technology, which will incentivise the most efficient technologies to enter first.

1.3.2. DURATION OF THE INCENTIVE

Another very important feature of the incentive system is the duration of the incentive. In recommending the duration, we have considered international experience. Considering those countries that use FIT to promote renewable electricity, the average FIT PPA duration is around 15 years. We therefore recommend a fixed duration of 15 years for FITs, especially taking into account the current situation of the country and the impetuous requirement of a more sustainable energy sector. Maybe after some years of experience, the duration can be fine-tuned to consider a shorter period or conditioning this period to the full load number of hours or other issues.

Therefore, the duration of the PPA under the FIT incentive will be 15 years.

After the 15 year period stated in the FIT Rules, the power plant may still be operating, and arrangements will be required. The natural mechanism should be market based allowing the plant to enter into freely negotiated contracts or sell directly to the market. In the Gambia, due to the lack of electricity market structure the only option would be negotiated contracts between the generator and NAWEC. Therefore, after the initial 15 year PPA, the power offtake would be set according to bilateral agreements agreed with the utility.

Therefore, there are two alternatives, (1) a tariff based on actual average procurement cost or (2) a second stage FIT, as applied in some countries, which can be defined based on the remaining life of the plant (generally lower than the initial stage FIT). A floor could be set by PURA to ensure a balance between reasonable operation of the plant and value to consumers.

1.3.3. TIME OF USE (TOUs)

Time of use tariffs offer different payments for generation at different times of day. This can encourage generators with controllable output to generate more at certain times of day when their power is needed most.

In the Gambia, solar and wind are the main renewable sources with realizable potential to be developed. These technologies are only able to generate based on the resource (sunlight or wind) and so time of use tariffs are unnecessary. This mechanism is more suitable for technologies that can follow the dynamics of the demand such as hydro, biomass or geothermal.

Therefore, a one part FIT will be defined.

1.3.4. CURRENCY NOMINATION AND INDEXATION

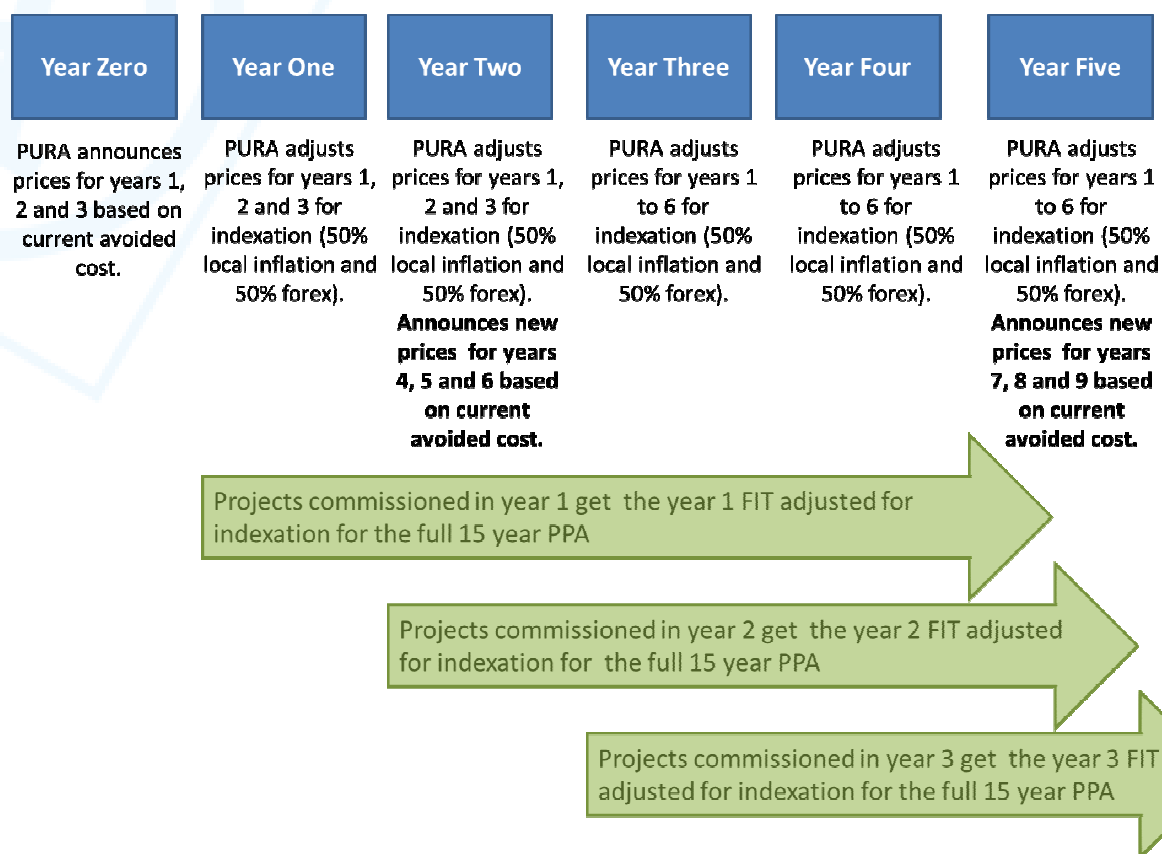
To give a level of certainty for potential new generators that are planning projects, PURA will announce the levels of FIT that will apply for the next three years. Once announced, these FIT will only be changed based on indexation.

Once the PPA is signed for a particular project, it is adjusted each year according to the indexation formula (see below). So projects built in a particular year will receive the same FIT payment as each other, but not necessarily the same FIT as a project built in a different year.

This process is illustrated in Figure 1.

² About 10% of total available capacity

Figure 1: Illustration of FIT announcement process



Most countries with FIT incorporate indexation based on local inflation. This allows project developers more certainty in the value of their future returns, avoiding inflation risk. Dissociation from inflation may undermine investor confidence.

The part of an investment which is local investment is covered by adjusting for local inflation, to ensure that the return that the **investor receives is fair and reasonable**. It also means that in **“real” terms the cost to consumers stays the same**.

Another consideration is that the investors’ costs will largely be on capital item and will be spent in a foreign currency (for example, wind turbines are often priced in Euros). The investor will therefore need to meet debt repayments and make a return measured against this foreign currency. For this reason, many (although not all) countries with FIT will link at least part of the revenue to a “hard” currency. This could be an index link to Euro based on the Gambia’s Central Bank exchange rates.

After discussions with the Ministry of Energy, we understand that a very high forex link is unlikely to be politically acceptable, as there is a desire to reduce forex exposure in the energy sector. However, a 50% deemed link to forex is more likely to be acceptable and has precedence in the existing wind farm project. This represents a compromise position between Government and investor expectations and seems reasonable. The forex linkage can then be reviewed based on the experience after a few years of the tariff scheme. The adjustment for exchange rate partially includes inflation.

FIT values will be set in GMD and will be adjusted annually employing a simple benchmarking indexation formula sharing between local inflation and foreign exchange rate variations.

The proposed formula will be based on

Where:

T_i Tariff for period “i”

$T_{(i-1)}$ Tariff in previous period (i-1)

Inf = Local inflation in percentage for the year (i.e. 5%)

LIL = Deemed Local Inflation Link (in percentage)

FL = Deemed Foreign Link (in percentage) (LIL + FLC = 1)

$ExRt_i$ = Exchange rate, GMD/Euro for period "i"

$ExRt_{(i-1)}$ = Exchange rate, GMD/Euro for previous period (i-1)

Should the Government wish to ensure only a 50% forex link for initial projects, based on precedent, they can ensure that PURA sets the LIL to 50%, at least initially. Once more detailed analysis has been carried out, PURA may choose to vary the deemed local and international links. Any variation should only apply to new projects – already commissioned projects should continue to be entitled to payment under the terms they signed up to.

For example, if $T_{(i-1)}$ is 8 GMD, Inf is 5%, $ExRt_{(i-1)}$ is 35 GMD/Euro and $ExRt_i$ is 40 GMD/Euro (so the exchange rate has moved by 14% over the year) and the LIL is deemed to be 50%, then:

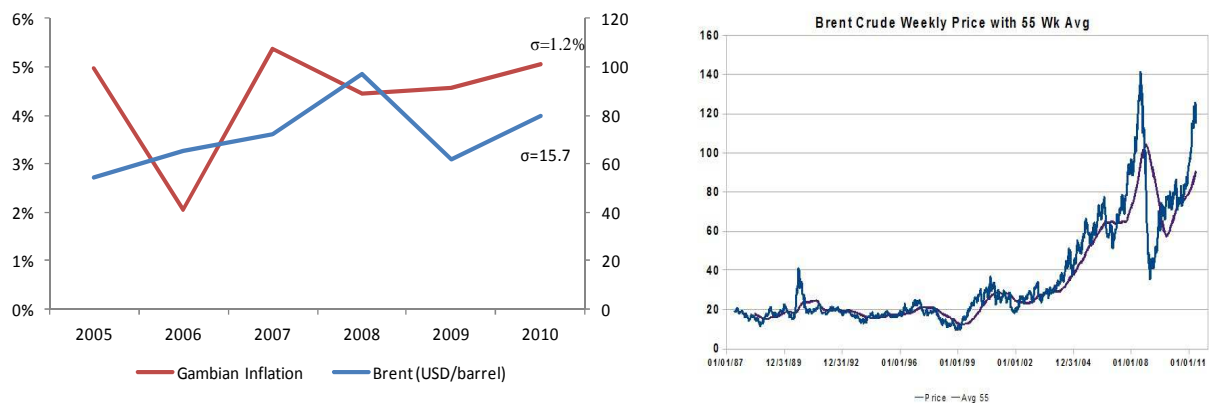
$$T_i = 8 \left[(105\%) \cdot 50\% + \left(\frac{40}{35} \right) \cdot 50\% \right] = 8 \cdot (52.5\% + 57.1\%) = 8.77 \text{ GMD}$$

PURA shall annually publish its adjusted FITs for the current year, which are approved by the Minister.

Even though with this indexation the end consumers are exposed to inflation and exchange rates, this mechanism provides more stability in electricity prices due to the lack of exposure to the volatility of fuel prices.

Gambian inflation and Brent in the last five years are depicted below, and in relative terms Brent quotations have been as volatile as Gambian inflation. However, as shown below, the overall trend of Brent prices is constantly rising, which will lead to a steady increase in electricity prices with the current generation mix.

Figure 2: Gambian inflation compared to Brent crude oil prices



1.3.5. DEGRESSION

Degression means to decrease by stages or steps. In FIT a degression provides two interesting advantages: (1) transferring the benefit of a potential decrease in the cost of technologies to customers, and (2) possibly encouraging investors in renewable projects to move quickly, which is very important in the initial stage as an extra incentive for rapid development.

Setting degression tariffs does not imply the addition of much complexity to the calculation.

To avoid misunderstanding, it should be clearly stated that the FIT that a plant will receive corresponds to the year when commercial operation starts.

There are a wide range of figures for the degression factor in countries with FIT policies. This adjustment parameter goes from 0% to values close to 10% in some cases. Table 2 shows the situation in some international countries.

Table 2: International degression factors

Country	Technology	Degression
France	Wind	2%
	Biogas	0%
	PV	0%
Germany	Wind	1%
	Biogas	1%
	PV	5-6.5%
Luxemburg	All	3%
California	Solar	5%
Switzerland	Wind	1.5%
	Solar	8%

To consider a very simple example, imagine a FIT of 10 GMD/kWh and a degression of 10% per year.

An eligible project ("A") built in year one will receive 10 GMD/kWh for the whole 15 year project life.

In year two, a new project ("B") is built. Project B will receive 9 GMD/kWh for the whole 15 year project life. Project A still receives 10 GMD/kWh, because that was the tariff that applied in the year that it was completed.

A degression factor should be applied solely to less mature technologies, where significant learning benefits are expected.

The degression factor is not proposed for the private avoided cost method. Instead, PURA will assess the avoided cost and fix the FIT according to it.

1.3.6. REVIEW FITS

Based on the monitoring activities for reviewing regularly the development of renewable energy technologies, the value of the tariff shall be reviewed every three (3) years. Additionally, the tariffs may be readjusted in the following cases:

- When the installation cap defined by PURA (see section 1.2.3) is achieved, and so new installations cannot be eligible;
- When there are significant changes to the costs of renewable energy technologies or when more accurate cost data become available; or
- Other similar circumstances justifying review and re-adjustment of the FITs.

1.3.7. FIT CALCULATION

For the private avoided cost method selected, it is important to estimate the expansion cost.

This requires assumptions about relevant parameters, such as the most suitable expansion technology, the expected return of new investments, fuel prices and capital cost of new plants.

It should be noted that renewable technologies will not necessarily replace the most expensive technology (the plant which marginalized the price), but the technology which is generating when renewable facilities are able to feed energy into the grid (wind and/or sun hours).

We have estimated the current generation mix as the most suitable approach to set out the expansion technology to reflect a reliable scenario and ensure the affordable development of RE technologies, but the avoided costs estimation model allows alternative approaches.

Technical Parameters

The basic assumptions used to calculate the cost of a LFO/HFO generator for each technology are presented below:

Table 3: Technical parameters for tariff model

Technology	Units	HFO	LFO
Capacity	MW	10	10
Net Thermal Efficiency	%	41	41
Internal consumption	%	3	3
Calorific value (fuel)	Tonne/MWh (fuel)	0.09	0.08
Scheduled Maintenance	days/yr	25	25
Forced Outage	%	10	10
CAPEX	USD/MW	1,400	1,100

Years under construction	yr	2	2
Investment throughout yr	%	45% (year 1)-55% (year 2)	45% (year 1)-55% (year 2)
Useful life	yr	25	25
O&M	USD/MWh	30	30
Fuel Costs	USD/tonne	776	812

The figures depicted above are taken from the national acceptable references used in the modelling, the assessment of the Energy Strategy and international estimations.

The figures above are given in USD, because those are the reported values for oil-fired plant. In fact, the tariffs will be in GMD, with an index to Euro. An exchange rate of US\$ 1 = 30GMD was used in the tariff calculation.**Financial Parameters**

The selected approach requires the definition of certain financial parameters which will influence the final results and thus the level of the avoided costs. The following parameters, assumptions and principles have been adopted for the calculation of the retribution level, though are expected to be updated by PURA for the estimation of the FIT. Therefore the pricing studies should consider:

- Project Finance considering 25 years (assumed useful life).
- Depreciation period: 20 years.
- Income tax: 0³
- VAT: 0%
- Debt-Equity structure: 50-50
- Loan features
 - Tenor 10 yr
 - Rate 6%⁴
- Three scenarios are included based on different IRR: 10%, 12%, 15%, implicitly considering different expected ROE

All these parameters may be adjusted and fine-tuned in the model from time to time when more reliable or updated information is gathered.

Even though our initial suggestion is to base the analysis on the current mix (90% HFO, 10% LFO), the model used in the calculations may be adapted to any other mixed portfolio based on HFO and LFO.

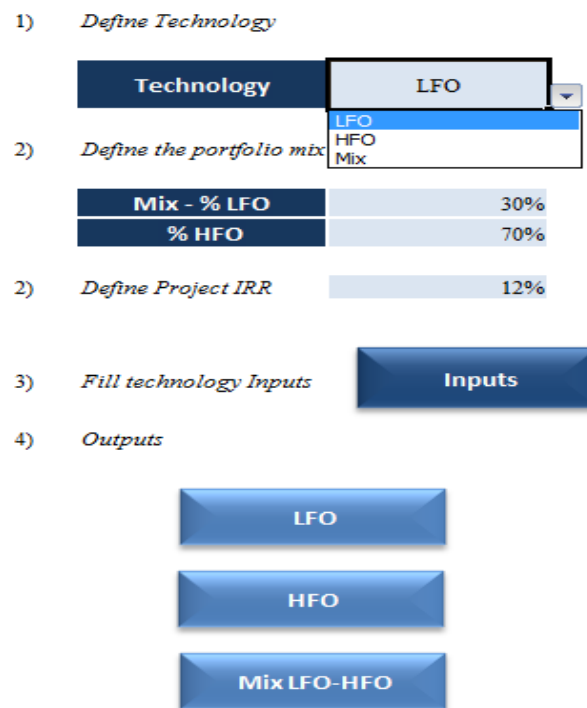
Calculation Using Model

The next figure shows the "Balanced scorecard" of the model.

³ The model allows the evaluation of tax holidays and the modification of income taxes.

⁴ Government borrows and on-lends to NAWEC.

Figure 3: Image on first page "Balanced scorecard" of model



The formula to determine the long-run marginal cost (LRMC) is:

Equation 1: Calculating LMRC

Present value of costs = Present value of incomes

$$\text{Investment Cost} + \sum_n \frac{\text{Fuel Costs}_n + \text{O \& M}_n}{(1+i)^n} = \sum_n \frac{\text{LRMC} \times \text{Production}_n}{(1+i)^n}$$

$$\text{LRMC}_{(\text{€}/\text{MWh})} = \frac{\text{Investment Cost} + \sum_n \frac{\text{Fuel Costs}_n + \text{O \& M}_n}{(1+i)^n}}{\sum_n \frac{\text{Production}_n}{(1+i)^n}}$$

The base case for the estimation of the avoided costs considers LFO as the expansion technology and an IRR of 12%. Under these assumptions, initial single FIT stands at 232 USD/MWh or 7.7 GMD/kWh.

Figure 4: Screen image of financial model

Country: The Gambia
LONG TERM MARGINAL COST (LTMC)
HFO 10 MW

Balanced scorecard

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
MARKET PRICES & DISPATCH	Project Year #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
FUEL PRICE @PLANT VARIAB [¢USD/tonne_HFO]		77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00	77600.00
ENERGY PRICE (VAR)	[USD/MWh]	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43
CAPACITY																			
Nominal Gross Capacity	[MW]	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Accumulative Degradation Factor	[%]	100.0%	98.8%	98.2%	97.6%	97.0%	96.5%	100.0%	98.8%	98.2%	97.6%	97.0%	96.5%	100.0%	98.8%	98.2%	97.6%	97.0%	96.5%
Effective Gross Capacity	[MW]	10.0	9.9	9.8	9.8	9.7	9.6	10.0	9.9	9.8	9.8	9.7	9.6	10.0	9.9	9.8	9.8	9.7	9.6
Internal consumption	[%]	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Effective Net Capacity	[MW]	9.7	9.6	9.5	9.5	9.4	9.4	9.7	9.6	9.5	9.5	9.4	9.4	9.7	9.6	9.5	9.5	9.4	9.4
Forced outage	[%]	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Expected Fuel Supply Constrains	[%]	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Available Net Capacity	[MW]	8.7	8.6	8.6	8.5	8.5	8.4	8.7	8.6	8.6	8.5	8.5	8.4	8.7	8.6	8.6	8.5	8.5	8.4
Scheduled Maintenance	[%]	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
Avg. Net Available Capacity	[MW]	8.1	8.0	8.0	7.9	7.9	7.8	8.1	8.0	8.0	7.9	7.9	7.8	8.1	8.0	8.0	7.9	7.9	7.8
Reduction Factor for Firm Capacity	[%]	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Capacity for remuneration	[MW]	8.7	8.6	8.6	8.5	8.5	8.4	8.7	8.6	8.6	8.5	8.5	8.4	8.7	8.6	8.6	8.5	8.5	8.4
DISPATCH																			
Energy production (gross)	[GWh]	73.4	72.6	72.1	71.7	71.3	70.8	73.4	72.6	72.1	71.7	71.3	70.8	73.4	72.6	72.1	71.7	71.3	70.8
Energy production (net)	[GWh]	71.2	70.4	70.0	69.5	69.1	68.7	71.2	70.4	70.0	69.5	69.1	68.7	71.2	70.4	70.0	69.5	69.1	68.7
HEAT RATE (Year average)	Tonne/MWh (plant)	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
FUEL CONSUMPTION	Ton HFO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
INCOMES	Project Year #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Energy	[10 ⁶ USD]	16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04
TOTAL INCOMES	[10⁶ USD]	16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04
Monomic selling price	[\$/MWh]	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43	233.43
EXPENDITURES	Project Year #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Investment (Equity)	[10 ⁶ USD]																		
Investment (Interests-Loan)	[10 ⁶ USD]	0.62	0.38	0.34	0.29	0.25	0.21	0.17	0.13	0.08	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Investment (Capital-Loan)	[10 ⁶ USD]	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transmission Losses	[10 ⁶ USD]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fuel (Fixed)	[10 ⁶ USD]	1.23	1.23	1.23	1.23	1.23	1.23	1.24	1.23	1.23	1.23	1.23	1.20	1.25	1.24	1.24	1.24	1.20	1.20
Fuel (Variable)	[10 ⁶ USD]	11.03	11.03	11.03	11.03	11.03	11.03	11.16	11.09	11.09	11.09	11.09	10.76	11.23	11.16	11.16	11.16	10.83	10.83
Other Costs	[10 ⁶ USD]	2.20	2.18	2.16	2.15	2.14	2.12	2.20	2.18	2.16	2.15	2.14	2.12	2.20	2.18	2.16	2.15	2.14	2.12
Total EXPENDITURES	[10⁶ USD]	15.78	15.51	15.45	15.40	15.34	15.29	15.47	15.33	15.27	15.22	14.46	14.09	14.68	14.58	14.56	14.55	14.17	14.16

CASH FLOW [50% EQTY]		Project Year #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
TOTAL INCOMES	[10 ⁶ USD]		16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04
TOTAL EXPENDITURES	[10 ⁶ USD]		15.78	15.51	15.45	15.40	15.34	15.29	15.47	15.33	15.27	15.22	14.46	14.09	14.68	14.58	14.56	14.55	14.17	14.16
CASH FLOW BEFORE TAXES	[10 ⁶ USD]		0.85	0.92	0.88	0.84	0.79	0.75	1.16	1.10	1.06	1.02	1.67	1.95	1.95	1.85	1.77	1.68	1.96	1.88
TAXES	[10 ⁶ USD]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH FLOW [50% EQTY]	[10⁶ USD]		0.85	0.92	0.88	0.84	0.79	0.75	1.16	1.10	1.06	1.02	1.67	1.95	1.95	1.85	1.77	1.68	1.96	1.88
CASH FLOW FOR PRIVATE FUNDS		Project Year #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
TOTAL INCOMES	[10 ⁶ USD]		16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04
TOTAL EXPENDITURES	[10 ⁶ USD]		14.46	14.43	14.42	14.40	14.39	14.38	14.60	14.50	14.49	14.48	14.46	14.09	14.68	14.58	14.56	14.55	14.17	14.16
CASH FLOW BEFORE TAXES	[10 ⁶ USD]		2.17	2.00	1.92	1.83	1.75	1.66	2.02	1.93	1.84	1.76	1.67	1.95	1.95	1.85	1.77	1.68	1.96	1.88
TAXES	[10 ⁶ USD]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH FLOW [PRIVATE]	[10⁶ USD]		2.17	2.00	1.92	1.83	1.75	1.66	2.02	1.93	1.84	1.76	1.67	1.95	1.95	1.85	1.77	1.68	1.96	1.88
CASH FLOW FOR IRR		Project Year #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
TOTAL INCOMES	[10 ⁶ USD]		16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04	16.63	16.43	16.33	16.23	16.14	16.04
TOTAL EXPENDITURES	[10 ⁶ USD]		14.46	14.43	14.42	14.40	14.39	14.38	14.60	14.50	14.49	14.48	14.46	14.09	14.68	14.58	14.56	14.55	14.17	14.16
CASH FLOW BEFORE TAXES	[10 ⁶ USD]		2.17	2.00	1.92	1.83	1.75	1.66	2.02	1.93	1.84	1.76	1.67	1.95	1.95	1.85	1.77	1.68	1.96	1.88
TAXES	[10 ⁶ USD]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NET CASH FLOW [100% EQTY]	[10⁶ USD]		2.17	2.00	1.92	1.83	1.75	1.66	2.02	1.93	1.84	1.76	1.67	1.95	1.95	1.85	1.77	1.68	1.96	1.88
ROE	14.6%																			
PROJECT IRR	12.1%																			

Different sensitivities are provided to assess the impact which may have the expected IRR, the fuel prices or the CAPEX in the avoided costs.

Table 4: Sensitivity analysis

		CAPEX LFO USD/kW		
		900	1100	1300
HFO USD/kW	IRR=12%	228.7	229.1	229.5
	1200	232.5	233.0	233.3
	1400	235.7	236.2	236.5

		Fuel cost LFO USD/tonne		
		650	812	974
HFO USD/tonne	IRR=12%	198.6	201.9	205.5
	621	227.7	233.0	236.5
	776	259.2	262.7	266.2

As shown in the tables above the avoided cost is rather sensitive to fuel prices, whereas CAPEX deviations do not impact significantly. In fact, while the correlation between fuel prices variations and the avoided costs is almost linear, a 10% increase in CAPEX seldom impacts over 1% in the avoided costs.

2. REGULATION OF FIT

2.1. LICENSING

Licenses for generating plant (including renewable energy technologies) should be issued by the Minister following PURA recommendations, in accordance with the Electricity Act 2005.

2.2. ROLES OF INSTITUTIONS

The main official organisms and energy agents shall undertake the following responsibilities:

Table 5: Role of Institutions

Institution	Main role in renewable development
Government	Implement the legal framework to support renewable energy: <ul style="list-style-type: none"> Renewable energy law: establishing the framework for FIT and setting principles for support Enabling land use framework, allowing projects to be built Complementary policies on energy efficiency and use of biomass
Ministry of Energy	Supports Government to ensure the correct framework to support renewable energy is put in place. Monitors PURA and NAWEC to ensure that the policies set by Government are implemented within regulation and in the day-to-day operation of the power system. Raise awareness among potential investors.
PURA	Implement the regulatory framework to support renewable energy: <ul style="list-style-type: none"> Within the legal framework set by Government, PURA defines the rules for pricing renewable electricity, including the methodologies for setting FIT levels, adjustments and other relevant implementation issues Calculates FIT each year, including announcing the level of existing PPAs adjusted for indexation.

Institution	Main role in renewable development
	<ul style="list-style-type: none"> Ensures NAWEC implement the rules in practice Check that claiming generators are really renewable (random audits, checking that actual output is reasonable etc.) Monitors progress to ensure (1) costs to consumers are within acceptable levels and (2) investment framework is sufficiently attractive to ensure progress towards targets Advises the Minister to issue generation licences. Dispute resolution between NAWEC and generator. Checks that the overall cap on the level of renewable generators who benefit with FIT has not been reached. Once the cap is reached announces that no more generation will be eligible for FIT.
NAWEC	<ul style="list-style-type: none"> Offers PPAs to renewable generators based on the FIT Rules. Pays renewable generators for their output according to levels set by PURA. Report to PURA on scheme. Highlight any unexpected generator performance to PURA, so it can be checked. In the event of a dispute with generator, go to PURA for dispute resolution.

2.3. MANDATORY POWER PURCHASE AND PRIORITY DISPATCH

NAWEC should be the off-taker of the power output from renewable sources. It should be mandatory for NAWEC as the sole electricity supplier and grid owner to enter into a PPA contract with any renewable generator that meets the requirements of the scheme. NAWEC should purchase the entire power output delivered to them by renewable producers (with certain exceptions, like system security).

Based on other experiences, guaranteed interconnection to the grid may be a critical issue for the developers of this type of facilities. All eligible renewable plants shall enjoy priority connection to the network, whenever it is possible within the requirements of system security. Furthermore the electricity from these plants should also be dispatched first, subject to system security limitations.

2.4. DISTRIBUTION OF THE COST

The implementation and assessment of a pure FIT incentive scheme requires an equal burden sharing of the cost of renewable plants across all electricity consumers. This scheme is designed not to have any additional costs to consumers, but over the life of a renewable plant fossil fuel prices could fluctuate, leading to some periods where renewables cost less than conventional alternatives and other periods where they cost more.

Under this scheme, an equal burden sharing by all consumers would be the most appropriate methodology, as the whole community could take advantage of a low emission economy and more secure power supply. Based on the international experience, the most common method for funding the FIT involves sharing portion of the costs or benefits amongst end-users, obtaining as a result a small increase or decrease in the price per household. The avoided cost methodology aims to pass no additional costs through to consumers, but in reality due to increases and decreases in fuel costs there may be a net cost or a net benefit to consumers in a given year.

FIT should be, in other words, a total "pass through" in NAWEC's retail tariff.

2.5. FIT SETTLEMENT

The settlement of the FIT must be regulated. This process includes the determination of the monthly payments to each renewable producer and payment by NAWEC.

In this aspect, international experience is quite diverse; for instance, in Spain the regulator is the one who carries out the settlement of the feed in tariff based on information provided by the transmission system operator, however, Germany gives the responsibility of settlement to the transmission system operator.

There are three aspects of settlement:

1. Paying renewable generators for their output (monthly, three-monthly or annually, depending on their scale);

2. Dispersing these costs to consumers equitably; and
3. Auditing the scheme to ensure that it is being followed correctly.

In the case of Gambia, the payments would most sensibly come from NAWEC as the single grid company and electricity supplier. Renewable generators should invoice NAWEC monthly, quarterly or annually, depending on their scale. NAWEC should pay generators based on their invoices, after first checking that the invoices match their expectations of a site (matches metered generation and is feasible for a generator of that scale and type). The generator takes responsibility for meter ownership and maintenance. The generator is expected to read the meter and invoice based on meter reads. NAWEC have the right of access to the meter and to take reads.

NAWEC's retail tariffs are set annually by PURA. This annual tariff review may be the most suitable time for a reconciliation of the amount received from customers and the payment needed to cover costs of renewable generation. Information on payments will be based on meter readings and invoices from renewable generators.

Where generation from a particular plant seems unusual or fraud is suspected, PURA will have the right to audit the site and ensure that the generation is from the source claimed.

2.5.1. NET METERING

Three forms of net metering are worth mentioning:

- **“Slack” meters or retail price for export:** Some countries have used a form of net metering regime for smaller facilities where customers have meters that run backwards when the generator is exporting and run forwards when the customer is using electricity off the grid. For example, the United States policy allows small scale-producers to feed excess electricity into the grid by netting consumption at retail prices
- **Dual or bidirectional credit meter net invoicing:** Other countries have more sophisticated meters that separately record the import and export through a single bidirectional or two unidirectional meters. In this case, the sales to the grid can either be invoiced separately (as in a normal FIT process) or “netted off” against consumption invoices. This has the advantage over slack meters that separate tariffs can be applied to import and export. This has been the general approach in the EU, where renewable producers can purchase power supply directly from the grid at retail prices and sell the power produced from their own renewable plant to the grid at the stated FIT. All imports and exports by the customer are metered.
- **Bidirectional prepayment meter net metering:** Bidirectional prepayment meters can operate to apply the exported electricity as a credit to the meter (at a FIT tariff level) and to charge the imported electricity at national tariffs.

Net metering based on the US model or slack meters is not currently recommended for the Gambia.

The third option, based on the European model, seems most likely to be beneficial in the Gambia, as it reduces administrative requirements, but also allows the distinction to be made between the FIT and national tariffs.

Table 6: Advantages and disadvantages of net metering

Advantages	Disadvantages
Net metering policies and programs may serve as an incentive for consumer investments in renewable energy generation.	Net metering schemes based on “slack meters” (a single net meter that runs in reverse) or which credit the equivalent to the consumer tariff do not recover any social element of tariffs. For example, at present hotels pay a higher tariff, which helps to subsidise a lower tariff for smaller domestic consumers. This would mean that if hotels installed net meters, they would not be making their contribution to this social objective, and would effectively be receiving a higher revenue than a small domestic customer with an equivalent system.
Can reduce the administrative burden of two-way invoicing, particularly if bidirectional prepayment meters are used as proposed.	Where a single net meter that runs in reverse is used net metering schemes may make it impossible to record actual levels of generation and demand, so it is not clear what power is entering the grid and what is being taken off the grid. Power flows cannot be properly measured.
Where separate import and export tariffs are used, they recognise the network costs.	Slack meters or retail pricing don't recognise the fact that the electricity output is not necessarily worth the same at the point of demand, as demand tariffs include

Advantages	Disadvantages
	other costs like the network, losses and stability.
May encourage producers to connect to the network (using it as a "virtual battery") rather than operating as an isolated system with expensive battery storage.	Producers must either disconnect (isolate) or stop generating during power cuts for both grid security and safety reasons.
Small systems near demand at the low voltage level will reduce losses (the transmission network is not used at all and power is only transferred to nearby properties).	

A draft net metering agreement is included in Annex E. This agreement can be offered at NAWEC's own discretion. The net metering agreement is only suitable for consumer-generators where the generation is primarily sized to meet the consumer's own needs. No cash will be offered for any credit on the meter, and credit remaining on the meter for more than three months may be deleted.

It may take some time for NAWEC to identify and test bi-directional meters for compatibility with their network (in particular, compatibility with "cash power" prepayment systems). Therefore there may be a delay before this system comes into use. Earlier generators may have a standard PPA instead.

Generators may only choose between net metering and the standard PPA once at the start. There is no option to switch.

2.6. BENEFITS OF "EMBEDDED" GENERATION

We had a very good discussion at the workshop and at our separate meetings about the integration of small (sub-20kW) generation systems into the NAWEC grid. NAWEC were concerned about potential grid and administrative issues, but other participants wanted to make the feed in tariff available for these small sites.

One of the concerns that arose was about the impact of losses on the output of small generating stations. Normal international practice is for small systems to be "embedded" in the distribution system at low or medium voltage (not higher voltages).

Commonly, the generation would be used onsite first. This means the consumer avoids the cost of importing at the NAWEC retail tariff. It also brings a benefit to the network, because the consumer is no longer importing as much and so the demand is slightly reduced (and with it the network losses).

If the generation is higher than needed onsite, any excess will be exported to the low or medium voltage network that the consumer is connected to. This output from the site will flow to neighbouring consumers and not to the main transmission network. This is a benefit in terms of losses, as again it looks like a reduction in grid level demand. For this export, the customer should receive the normal feed in tariff.

Two reports that discuss this issue in more detail are:

- Enabling the European Consumer to Generate Power for Self-Consumption, Sun-Edison, 2011; and
- Distributed Renewable Energy Operating Impacts and Valuation Study, Arizona Public Service, 2009 (section 4 on grid impacts is most relevant).

The sub 20kW sites are small and will often use much of their generation onsite, so to reduce the administrative burden, the payment could be annual (quarterly for generators up to 100kW and monthly for larger generators). For all renewable generators under the FIT, we are suggesting that they should read their own meters to invoice NAWEC, to reduce the administrative burden. NAWEC would have the option to check the meters when they wish, either separately or as part of normal meter reading.

2.7. ALLOCATION OF NETWORK INVESTMENT COSTS

The allocation of grid connection costs is also important for project economics. The best approach is considered to be "shallow" connection charging. Under this framework, the renewable producer just pays for the direct connection cost to the grid, the cost of grid reinforcement or other additional charges is socialised through the grid operator.

This approach is the most favourable for producers, because it allows them to estimate their grid connection cost in advance and it is much more transparent.

In the other option "deep connection charging" the generator does not have much control on the grid reinforcements that he has to pay. He would basically have to "trust" NAWEC or be willing to enter in endless discussions on the reinforcements.

In the event that there is no distribution or transmission lines near the renewable generator the procedure for allocating the connection costs shall be as follows:

- PURA shall approve the site where the developer is planning to place the facility.
- NAWEC shall install the required grid reinforcements, and the generator shall be responsible for the shallow connection built to NAWEC's required standards (either through NAWEC, themselves or a third party approved by NAWEC).
- Investors may perceive risks under this provision, so a priority dispatch clause in the Purchase Agreement gives some reassurance.

3. DEVELOPER EXPERIENCES

A number of renewable electricity projects have been developed in the Gambia. Some others have feasibility studies and are proceeding through the permitting processes, with others at various earlier stages of preparation.

There are currently only three IPPs in the Gambia, of which two are renewable, and all are connected to the Greater Banjul Area network. These are the GEG Brikama IPP, the small wind project at Batokunku, and a larger Gamwind wind project near Tanji. As a result, some aspects of the investment framework are not yet firm, and are developing over time.

At present, when a potential investor is first interested in developing either a conventional or renewable energy project, they approach Ministry of Energy. If the President approves further negotiations, a task force is set up, including NAWEC, the Ministry of Energy, Ministry of Justice, Ministry of Finance and Ministry of Trade and Export. Each project negotiates its own PPA.

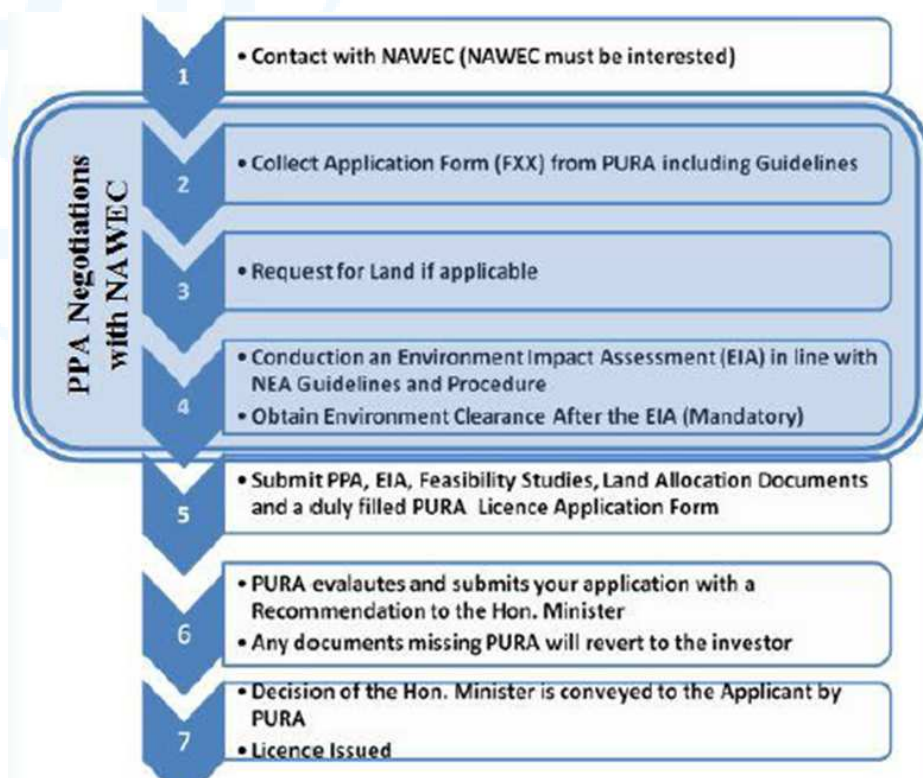
The seven step IPP process is summarised below and is currently equally applicable to renewables and conventional generation.

Government owns most land in the Gambia and offers permits for its use. The land use arrangements are reasonably favourable for investors: there is typically no charge for the use of the land for investment purposes and the duration for the defined use is not normally limited.

This flexible approach to land use can, however, also be a challenge. Generators need to prevent encroachment of homes onto their sites, and in the case of Batokunku, houses have subsequently been built closer to the project than would be advisable under safety requirements.

As well as land use, developers will also need environmental permits. To achieve an environmental permit, developers are expected to prepare an Environmental Impact Assessment according to terms prepared by NEA. NEA recognises the lower environmental impacts of solar PV (although they do expect water management plans for the cleaning of panels). For wind and biogas, safety and noise concerns are more important.

Figure 5: PURA summary of IPP application process (image taken from PURA documents)



Generation licences are issued by the Minister, following recommendations by PURA. If the generator wishes to supply neighbouring consumers, a distribution licence is also required.

The stage that seems to have caused most difficulty for renewable generators to date has been the long and complex tariff and PPA negotiations. In some cases for conventional plants, these discussions seem to have taken years without final conclusions. Projects have also had difficulty obtaining grant funding through the bureaucratic UN procurement process.

It is hoped that the developers will find the process much easier with the standard PPA and FIT. This will allow developers to quickly assess the viability of their projects, without the delay and uncertainty of long tariff negotiations. The wind farm at Batokunku also had the additional challenge of negotiating a distribution licence and associated retail tariff for supply to nearby consumers. A larger two turbine 900kW Gamwind project has since been developed near Tanji, which only provides power to the network (no onsite use).

Some small solar PV ongrid projects do not currently have PPAs but “spill” onto the grid. There is no formal provision for net metering of these projects, but we understand some older meters run in reverse when these projects generate. This is not a deliberate incentive system, and new prepayment meters will not run backwards. Therefore the new suggested feed in tariff approach will be more appropriate. One of these small projects has caused a serious safety incident by running when the grid was down, electrocuting a NAWEC engineer who was working on the line.

There are also many offgrid schemes supplying individual users. There are no records of how many of these schemes exist. One example is the M’Bolo project funded under the GEF-UNIDO project. This has solar PV and small wind systems supplying an educational centre. The biggest administrative hurdle cited for this project was obtaining the grant funding, although they did choose not to supply neighbouring users because they perceived an administrative challenge in obtaining the required distribution licence.

Figure: A small offgrid solar PV system



4. LEVERAGING FIT WITH MULTILATERAL FUNDING

4.1. RATIONALE

There are a number of challenges to deploying renewables in an immature market like the Gambia. These include:

- Difficulties in finding investors who are prepared to take on higher risks in a developing market;
- Difficulty for investors in accessing finance on reasonable terms;
- Perception of credit risk with the counterparty (NAWEC);
- The use of renewable technologies is inhibited financially by factors such as high initial cost, financial, technical and performance risks;
- Following the policy decision set out by Gambian authorities, the methodology used to set the FIT is the private avoided costs which aim is to ensure that renewable generation does not cause extra costs on consumers, but means the tariff is not linked to actual renewable technology costs; and
- Many consumers are struggling to meet the current cost of electricity.

For this reason, there is a need for complementary mechanisms to the FIT to encourage renewable development. The Ministry of Energy has indicated that the Government is unlikely to be able to fund such desirable schemes. We would therefore recommend that international financial institutions (IFIs) consider funding complementary mechanisms.

In the next sub-section we consider several alternatives and experiences that may provide a reasonable solution for complementary renewable energy support mechanisms.

4.2. POTENTIAL COMPLEMENTARY MECHANISMS

The main criteria for the use of IFI funds should be (1) transparency, (2) maximize leverage, (3) financial additionally and (4) sustainability. The objective of the funding would be to support renewable technologies and potential investors with policy reliability, efficiency, transparency and certainty, while increasing the affordability of consumers.

Most of the mechanisms described in this section are generally applicable when the overall framework for the development of renewable energy follows a cost based approach, rather than the avoided cost approach preferred in the Gambia. The overall goal of these instruments is to reduce the extra costs

of renewable technologies. Given the policy decision of setting the renewable tariffs based on a private avoided cost methodology, this approach should be fine-tuned to the realities and needs of Gambia.

There are two main issues to address,

- (1) Even though the avoided costs of the Gambia are high by international standards, not all renewable technologies will be feasible with the tariff alone; and
- (2) Affordability of electricity will remain a key issue.

Thus, it will be important to support development of renewable technologies in the country by using IFI funds.

The use of IFI funds can be centralized (channelled to the Government of Gambia) or decentralized. When decentralized, IFI will only provide additional funding if needed – not to overcrowd private funds is a key criterion of IFI funding. However, when the assistance is channelled through the Government and FITs are implemented, some issues arise.

4.2.1. SUPPORT TO PRODUCERS

Under this approach some complementary instruments and sources of funding, to cover the gap between the levelized cost of electricity (LCOE) of renewable energy and the actual cost of the service may be implemented. IFI funding can be used to support the development of information and regulatory instruments but also to provide innovative financing instruments to promote renewable investment.

The following table summarizes some of the advantages and disadvantages of the mechanisms that directly support renewable energy producers.

Table 7: Pros & Cons of complementary mechanisms to encourage producers (support producer directly)

	Definition	Pros	Cons
First Loss guarantee fund	A form of credit enhancement in which an investor can resort to a third party for a stated percentage of any obligation or a percentage of any losses.	<ul style="list-style-type: none"> • Strong risk mitigation for investor • Reduces the required absolute equity amount • Improves access to debt financing (lower risk) • Highly efficient and proven instrument for investments into broad portfolios of small to medium scale projects and to leverage investments initiated by the public sector. • Highest leverage of IFI funds 	<ul style="list-style-type: none"> • The fund would have substantial sector concentration risks unless is multi-sector • Complex to implement, because it would be difficult to have general applicability for a broad range of projects. • Resource intense and administratively difficult investment decision making process.
Concessional Financing	Lower cost loans for renewable projects	<ul style="list-style-type: none"> • No direct cost if concessional financing is granted at the lender's refinancing cost. • Reduced involvement of local banking sector, unless credit lines are channelled through them. • Increased availability of debt. • Potential to set up a revolving facility 	<ul style="list-style-type: none"> • Availability of substantial financing volume may be constrained by sector-specific concentration risk. • Moderate leverage
Up front grants	Initial grants for a proportion of the capital costs when the project is built. Effectively reduce required investment.	<ul style="list-style-type: none"> • Reduces high initial cost to investors. • Reduced equity and debt exposure • Reduced counterparty or regulatory risk 	<ul style="list-style-type: none"> • Less performance incentive, as paid up front. • Low leverage
Public-private co-investments	Joint projects between public and private sector. Both share exposure to risk.	<ul style="list-style-type: none"> • Strong risk mitigation effect • Reduces the required equity amount • Better access to debt financing. • Strong support in challenging times due to the power of public co-investor and its political network. 	<ul style="list-style-type: none"> • Complex to implement • Requires public resources, for finance and project assessment. • Moderate leverage

	Definition	Pros	Cons
		<ul style="list-style-type: none"> Private sector lead investor remains in the driving seat, reduced entrepreneurial activity required from the international partner. Potential to set up a revolving facility 	
Mezzanine financing	Between debt and equity. Mezzanine financing is debt where the lender has a right to convert to equity if the loan is not repaid. It is subordinate to debt from senior lenders such as banks. Little or no collateral is required.	<ul style="list-style-type: none"> Reduced amount of required debt and better access to debt financing. 	<ul style="list-style-type: none"> Resource intense and administratively difficult investment decision making process. Moderate leverage
Guarantees	Sovereign or other guarantees. Take on political or counterparty risks. For example, the Government (or other institution) takes on the risk that the counterparty (NAWEC) will not pay its contracts.	<ul style="list-style-type: none"> Higher credit rating of the issuing country/institution is leveraged with no direct costs. Strong risk mitigation effect. High Leverage 	<ul style="list-style-type: none"> It is not exactly an use of IFI funds Current limitations placed by the IMF on Gambian guarantees.
Operational Subsidies	Additional support based on generation (per kWh)	<ul style="list-style-type: none"> Straight forward mechanism. Transparent Payment on results encourages appropriate siting and maintenance 	<ul style="list-style-type: none"> Requires an estimation of future renewables penetration per year Monitoring requirements to ensure that funds are used to increase affordability

The GEF-UNIDO project currently underway in the Gambia provides a model for such involvement when the assistance is decentralized.

First loss guarantee fund, co-investments, or mezzanine financing can reduce the overall risk profile for equity investors and increase their confidence level.

As an example, First loss financial facilities substantially reduce the risk exposure of other equity investors allowing the highest leverage. As the name implies, as any losses are first allocated to the first loss tranche, which is subordinated to the remaining equity and the debt. First loss would be the suitable approach from the investors viewpoint. However, its implementation is complex, and the high risk exposure, the resources required and administration issues mean that we reject it as an option in the Gambia.

Grant funding (and possibly soft loans) are likely to be more appropriate in the near term.

4.2.2. ALLOCATING IFI FUNDING TO PRODUCERS: RECOMMENDED APPROACH

Taking into account the desire to reduce energy cost to consumers and to enable more renewables to be developed, we propose the following tender approach if costs are allocated to consumers.

IFI funding may be tendered out to producer as follows:

- Result of the tender?** Renewable project developers will be invited to tender on the basis of a discount on the Feed in Tariff. Developers would "bid" the discount on the FIT (an energy price - GMD/kWh - below the regulated FIT) that they would take on in return for the incentive.

- **What is tendered?** The winner of the tender will receive a financial incentive to offset this discount. Upfront grants (subsidies on the capital cost, e.g. 100 USD/kW) are considered the best approach with this model, although there are other alternatives⁵.

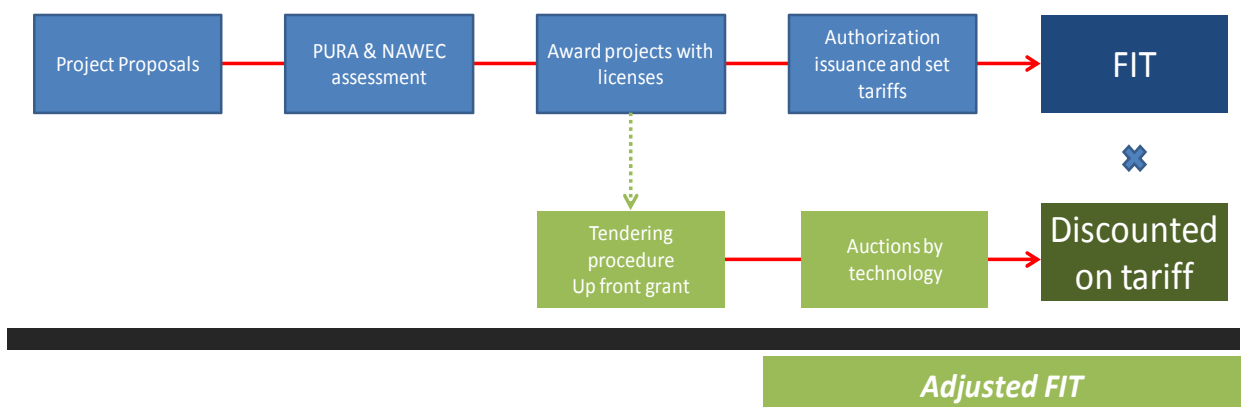
We believe that this mechanism provides a standard and transparent regulatory environment to investors to facilitate and encourage private sector development activity.

Under this methodology, subsidies are awarded based on lowest bid for each technology type. Producers will receive (1) capital subsidies selected based on the tender and (2) the discounted reference tariff.

- **What aspects should be defined?** -The definition of these tenders is not streamlined and requires the assessment of different aspects, including but not limited to:
 - Frequency of the tenders related to availability of funds;
 - Structure of the tender (marginal, pay as bid);
 - Maximum capacity per developer bid;
 - Schedule for awarding the financial incentive coming from the funds. Up front grants should be provided to the developer from the commissioning date. Meanwhile, the winner of the tender should be able to use the subsidy as collateral/guarantee to raise capital to develop the project. Up front subsidies are envisaged as a suitable approach due to the relatively low administrative burden which it will cause.

The proposed approach can be summarised as in the following figure.

Figure 6 – IFI funding to producers



Tender process:

- 1) Pre-procurement process to ensure suitability of bidders
- 2) Set up auction at a certain level of support per unit of capacity (e.g. 100 USD/kW)
- 3) Winners of the tender are entitled to receive the upfront subsidy from the commissioning date
- 4) Project developers use the incentive as collateral to secure interim funding from banks for the development.
- 5) Once the projects are in operation, developers receive the result of the tender and cancel a portion of the initial financing.
- 6) They are paid per kWh generated at the agreed discount to the FIT.

The process of tendering will be managed by PURA.

Pros	Cons
Fair revenue for investors	Requires some level of planning to establish quantities to bid.
Reduced equity and debt exposure	Transaction costs.

⁵ Soft loans (e.g. interest rate 2%, grace period 4 years) or even first loss guarantees may be tendered, though these approaches are significantly more complex.

Supports facilitates when raising financing	Do not foster technologies with costs beyond system avoided costs.
Upfront grants are simple for investors to understand	No incentive for efficient operation of power plants, not a performance-based incentive.
Competitive approach ensures best value for consumers	May restrict renewables development to auction rounds
	In competitive tenders, developers may sometimes bid at a cost not sufficient to proceed with projects, so deployment is lower than planned.
	Relatively complex to implement

There are both advantages and disadvantages to this approach (as summarised above). Overall, we feel this mechanism will contribute to both increasing affordability and providing a reasonable solution for the successful fostering of renewable development.

4.2.3. IFI FUNDING TO UTILITY

Alternatively, these funds may be used to provide an operational subsidy to the utility. The primary goal of this operational subsidy is to support the renewable energy by providing direct incentive to the utility to use renewable energy. This is aimed at relieving ratepayers of a large portion of electricity generation costs related to the exploitation of indigenous renewable sources.

This can be structured as green bonus to (GMD/kWh procured) allocated to the end consumers, reducing the electricity generation costs. The higher the share of renewable electricity purchased by NAWEC, the higher the bonus received by the utility.

The aim of this mechanism is to incentivise NAWEC to connect new facilities using renewable energy sources. This green bonus will be calculated annually and NAWEC will receive an amount of USD based on the actual generation from renewable producers fed into the grid. The incentive will be calculated as follows.

$$Incentive_n = \frac{Available\ Funds_n [GMD]}{Expected\ RE\ generation_n [MWh]}$$

In other words, PURA would calculate in advance an incentive rate (GMD/MWh) based on expected renewable generation. NAWEC would then be paid based on how much renewable generation they actually purchase. This means they have a real incentive to connect projects quickly and to allow them to dispatch whenever possible.

PURA would oversee this process and ensure that the funds are used appropriately by NAWEC to reduce costs to consumers.

The process has the following advantages and disadvantages:

Pros	Cons
Straightforward mechanism.	Requires an estimation of the future renewable energy penetration per year
Transparent	Monitoring requirements to ensure that funds are used to increase affordability

4.3. RECOMMENDED APPROACH

It should be noted that none of these mechanisms maximise the leverage of IFI funds, but they are transparent, relatively easy to implement and can effectively complement Feed in Tariffs.

Targeting the funding to the utility initially is the simplest solution. However, we prefer the route of funding to producers. It requires much closer management, but allows a wider range of renewables to be developed and also reduces costs to consumers. It also provides more demonstrable additionally than the utility targeted approach.

III. SUGGESTED REGULATION AND AGREEMENTS

In Annex A we summarise the proposals for a feed in tariff in the form of a draft legal regulation for FIT (the FIT Rules). The FIT Rules would be under the Renewable Energy Law, and would put in place the regulatory framework for how each participant in the electricity sector should behave, including how PURA should set tariffs, how a renewable generator should apply for them and how NAWEC should contract with them.

Annex B sets out a possible format for annual announcements by PURA under this framework.

In Annex to this report we suggest model contractual agreements for renewable electricity plants. These cover the payment for their renewable electricity under the Standard Power Purchase Agreement (Annex C) and network connection (Annex D).

There is also a very simple model net metering agreement in Annex E.

These draft agreements are based on a combination of our experience of standard international practice, the policy framework proposed for the Gambia and existing PPAs in the Gambia.

The objective of the overall framework (regulation and agreements) is to provide

- Revenue certainty, where investors can have certainty over future revenue streams once the project is built for a reasonable project life (15 years);
- Regulatory certainty, where the rules are set out clearly in advance and are not subject to renegotiation each year, just calculation based on an agreed formula;
- Governance and responsibilities clearly defined;
- Minimising any potential negative impacts on consumers, such as reduction in grid stability from large proportions of renewable generation or increase in costs if FIT were at a premium to existing generation;
- Maximising the potential benefits to consumers by allowing renewable generation with long term contracts, potentially with less price volatility than existing oil generators and less negative environmental impacts; and
- Putting in place a clear regulatory framework that should enable IFIs or NGOs to provide any additional support needed to renewable projects with confidence.

IV. WORKSHOP AND STAKEHOLDER FEEDBACK

These recommendations and the proposed regulatory framework were discussed at the stakeholder workshop and parallel stakeholder meetings

In particular, we invited views from potential renewable generators about whether the overall framework was likely to be satisfactory to investors. We recommended that the technical aspects of the network connection agreement in particular should be reviewed by NAWEC and approved by PURA to ensure that the results are appropriate and achievable in the Gambian context.

The stakeholder comments again showed a good level of engagement in the sector development. Some comments that were received are discussed below.

- **Concern that the initial tariffs were too high, and desire from PURA and NAWEC to reference a “grid mix” rather than LFO-only link**

We recognise this concern. The model inputs have been adjusted to take into account PURA figures, and the grid mix is now represented. This results in a lower tariff more comparable with the current PPA for Brikama.

- **Concern about affordability of forex and inflation link for consumers, desire from some investors for a greater forex link**

We have added some clarification in the report about the need for indexation to this report (section 1.3.4) to demonstrate that the impacts are likely to be lower for consumers than an oil price link, and stressing the importance for investors to have returns in “real” terms.

We understand the concern of investors about the limited forex link. In different markets, different percentages are used based on a balance between the need to attract investment and the desire from Governments to reduce as far as possible exposure to forex risk. Ultimately, it is about the level that is politically acceptable. The 50% share is based on a recommendation from the Ministry that this was the policy acceptable to Government, and was used in the Gamwind contract. We recommend that this should be kept under review.

- **Desire from some investors for a shorter period and quicker return**

In setting up a new FIT, it is essential to choose one mechanism (“avoided cost” or “return on investment”). In this case, the Ministry of Energy has advised that the Government policy is no additional cost to consumers, therefore the avoided cost methodology is recommended. The technology-specific return on investment FIT would not be consistent with this policy.

This policy is compatible with external grants or “soft loans”. So if an IFI were to introduce an incentive, this could support the ability for certain technologies to make a return.

- **Whether sovereign guarantees would still be required by investors**

Sovereign guarantees are not a long term solution for the power sector. Their use may also be restricted by loan conditions placed on the Government of the Gambia. Our view is that a strong regulatory framework, with its basis in Law and long term PPAs should provide sufficient comfort to investors. We therefore do not recommend the use of sovereign guarantees.

- **Level of detail in PPA and whether there should be multiple PPAs**

A 10-page PPA is not different from other emerging countries. It can be simplified. For example in Spain the renewable standard PPA has 4 pages but there is a full market and regulatory background which investors trust. In the Gambia, we feel that investors need a robust contract for comfort. Much of the boiler plate is very important, but the actual requirements are not very complex. We discussed it in simpler language in the workshop. In the absence of a solid and trusted regulatory framework, you need to use the concept of “regulation by contract” that has been widely implemented in developing countries when regulation or governance is not sufficient for investor comfort.

The Network Connection Agreement requirements are very low by international standards. In any case, a qualified engineer or experienced technician who is familiar with these requirements should be working on any renewable projects that are grid connected to ensure site safety. The safety issues already experienced with a grid connected solar PV unit demonstrate the need for these or similar Network requirements.

We have reviewed both and made some minor simplifications.

Normal practice is to have a single standard PPA for all renewable technologies. Often (although not in this case) the tariff structure will change by technology. A single standard PPA is simpler and easier to administrate.

The key feature that may mean a PPA needs to vary by technology, and is more complex for conventional plant, is generation controllability. The technologies that will be eligible for this FIT are reliant on the availability of resource (wind or the sun which are intermittent resources). When that resource is available, they will generate and the PPA has to reflect this⁶. Controllable conventional technologies may be paid differently at different times of day (based on demand) and may have an index to fuel prices.

- **Metering requirements**

The Gambian power sector does not have specific meter class approvals, and meter checks are carried out on a case by case basis. Our PPA reflects this fact.

- **NAWEC frequency and voltage standards**

As well as generators meeting certain requirements, NAWEC should also aim to operate their network in accordance with frequency constraints. Unfortunately, at the present time the grid is not able to be operated in as stable and secure a manner as either NAWEC or the generators would desire due to a lack of appropriate generation and monitoring and control equipment.

We have now ensured that the Network Connection Agreement recognises the fact that when NAWEC goes outside correct operating parameters, the generation plant may be forced to stop generating.

However, due to the intrinsic lack of stability in the grid at present, in our view it is not appropriate to introduce a compensation scheme for grid availability.

- **Declaration of expected capacity factors to support NAWEC planning**

The PPA requires the generator to give estimates of their generators in advance. These will support NAWEC in their planning but will not (and cannot due to the nature of the resource) be binding.

- **Offgrid schemes**

This is an important point, and we discussed it at the workshop and with the Ministry, NAWEC and PURA on this visit.

It cannot be covered by the FIT rules as they specifically relate to NAWEC paying for output. In the interests of fairness, they should only really pay for electricity going onto their grids, otherwise consumers on the grid are subsidising other developments that don't benefit them.

However, we see an important role for renewables in rural electrification. This is a matter for the more general Renewable Energy Law than for the FIT, since it will potentially affect other Laws, such as the Electricity Act 2005.

We hope that it may be possible to have simplified distribution licence eligibility for private wire networks below a certain level, say 200kW, which are off the main NAWEC grid and powered by renewables or renewable hybrid systems (e.g. solar and diesel hybrid). To reduce the administrative burden, we could say that they do not need a tariff negotiation in order to charge consumers up to the standard level of NAWEC tariffs. The NAWEC tariffs are high by international standards, making it potentially quite possible for projects to proceed, particularly if they obtain grant funding.

(Anything above that tariff level should be reviewed by PURA to ensure they are treating consumers fairly, but this could really reduce the negotiation process for smaller projects, currently a real barrier to entry.)

- **Addressing the wider permitting requirements, and a desire for a "One Stop Shop"**

Within the FIT rules, we set out specific timescales for FIT approvals. Separate legislation sets out requirements for environmental, land use, etc. permits. As in all countries, other permits (land use, construction, environmental) are required to build a generating unit. These are important, but can be time consuming. We are considering whether it may be possible to require the relevant authorities to meet time constraints. This would be part of the discussion on the wider Renewable Energy Law. Similarly, PURA could introduce simpler generation licence application processes for smaller projects.

It has to be recognised too that a law or regulation on renewable energies cannot solve all the problems. The legal framework of any country is complex and there are different areas that have to be coordinated and "trade-offs" are necessary.

⁶ It is worth mentioning that the concept of "intermittent" refers to a source of energy which is not reliable, does not provide firm capacity and can vary in the very short term (wind, solar). Hydro does not fall in this category.

- **Including other technologies**

CSP has been added to the list of eligible technologies. PURA can add other technologies to the list of eligible technologies in the annual announcements as they deem appropriate.

PURA also made a number of detailed suggestions for practical amendments to the tariff models, which have been implemented. These include changing the units to meet with their normal reporting units.

Figure 7: Stakeholder workshop



Figure 8: Training session with NAWEC on the use of the tariff model



The list of attendees and schedule of the workshop are given in Annex 5.

ANNEX A : DRAFT FEED IN TARIFF RULES & PROCEDURES

These rules will be part of a more comprehensive regulatory framework governed by the Renewable Energy Law which will be submitted in the next deliverable. These are a draft framework for the rules, and will be considered in more detail at the next stage, once the FIT principles have been confirmed.

Once the rules are promulgated and the FITs are defined, they shall be submitted for approval to the Cabinet in accordance with proper legal process.

PART I. PRELIMINARY

1. These Rules may be cited as the Feed In Tariff Rules 2012.
2. In these Rules, unless the context otherwise requires:

Generation Licence means a licence granted by the Minister to a licensee to connect specified generation facilities either to the transmission grid at a grid receiving point or to a distribution receiving point, as defined under the Electricity Act 2005.

Annual Authority Announcement shall have the meaning given to it in paragraph 2.2.

Authority means The Gambia Utilities Regulatory Authority established under The Gambia Public Utilities Regulatory Authority Act, 2001.

Consumer refers to any person or entity requiring the supply and delivery of electricity from the distribution or transmission network for its own use.

Commercial Operation refers to the state at which the Eligible Renewable Plant generated the first kilowatt-hour of energy after commissioning or testing, or two (2) months from the start of such commissioning or testing, whichever comes earlier.

Commercial Operation Date refers to the date when the Eligible renewable Plant starts Commercial Operations.

Declared Net Capacity in relation to a generating station, means the maximum capacity at which the station could be operated for a sustained period without causing damage to it (assuming the source of power used by it to generate electricity was available to it without interruption) less the amount of electricity that is consumed by the plant.

Deemed Foreign Link is the percentage of the tariff that is linked to foreign exchange, which is set by the Authority for the year that the Eligible Renewable Plant was commissioned, and is fixed for the duration of the Feed In Tariff, where the Deemed Foreign Link plus the Deemed Local Inflation Link are 100%.

Deemed Local Inflation Link is the percentage of the tariff that is linked to Inflation, which is set by the Authority for the year that the Eligible Renewable Plant was commissioned, and is fixed for the duration of the Feed In Tariff, where the Deemed Foreign Link plus the Deemed Local Inflation Link are 100%.

Department of State means the Department of State responsible for the electricity sub-sector.

Distribution System refers to a system composed of cables and aerial lines and any electric plant and its attachments, designed at named voltage of eleven (11) kilo volt or less for distributing electric energy from the connection points between the distribution system to the delivery points to the consumer.

Eligible Renewable Plant is as defined in Part II.

Eligible Renewable Technology is as defined in the Annual Authority Announcement.

Euro Exchange Rate shall be the most recently announced annual exchange rate between Gambian Dalasi and Euro published by the Central Bank of The Gambia.

Feed In Tariff refers to a renewable energy policy offering guaranteed payments on a fixed rate per kilowatt-hour for renewable energy generation, excluding any generation for own use.

Inflation shall be the most recently announced annual rate of inflation in The Gambia published by the Central Bank of The Gambia.

Installation Target refers to the megawatt capacity target by Renewable Technology set by the Minister in consultation with the Authority.

Ministry of Energy refers to the body entitled to draft the general rules and policies related with the energy sector in accordance with the Electricity Act 2005.

On-Grid refers to a connection to the electrical system composed of interconnected transmission and distribution lines, substations, and related facilities for the purpose of conveyance of bulk power to the grid.

Person means a natural or juristic person.

Rules mean these Feed-In Tariff Rules.

Registry refers to the database or files where all renewable facilities and their Commercial Operation date are inscribed.

Regulatory Authority Act means The Gambia Public Utilities Regulatory Authority Act, 2001.

Renewable Plant Connection Agreement is an agreement for connection to and use of the electricity network entered into between the generation facility and the Responsible Network Utility, which shall be of a form approved by the Authority.

Responsible Network Utility means the holder of a distribution licence or transmission licence (as applicable) granted by the Authority under the Electricity Act 2005 at the receiving point at which electric energy is delivered directly from an Eligible Renewable Plant, where distribution licence, transmission licence, grid receiving point and distribution receiving point have the meanings given to them in the Electricity Act 2005.

Minister means the Minister responsible for the electricity sub-sector.

Specified Maximum Capacity of eligible installations is the maximum Declared Net Capacity for Eligible Renewable Plant set in the Annual Authority Announcement.

Standard Renewable Power Purchase Agreement is a standard agreement for the sale of renewable electricity entered into between the generation facility and the Responsible Distribution Utility, which shall be of a form approved by the Authority.

Unless otherwise defined, all other terms shall have the meanings given to them in the Electricity Act 2005.

3. The objective of these Rules is to establish the Feed In Tariff system and to regulate the method of establishing and approving the Feed In Tariffs.

PART II. ELIGIBILITY

4. The Authority shall certify such plant that are Eligible Renewable Plant, and therefore eligible to receive the Feed In Tariffs.
5. Only generation facilities meeting all of the below criteria shall be an "Eligible Renewable Plant":
 - (a) The generation facility is based on an Eligible Renewable Technology;
 - (b) The generation facility is On-Grid;
 - (c) The generation facility is in The Gambia;
 - (d) The capacity of the facilities on each renewable generation site shall be no greater than the Specified Maximum Capacity stated in the Annual Authority Announcement, where the site of the Eligible Renewable Plant will be determined as part of the Authority's assessment of an application for Feed In Tariff accreditation;
 - (e) The generation facility enters into commercial operation after the date of effectiveness of the Feed In Tariffs, or such part of a facility built prior to the Feed In Tariff taking effect that has been substantially modified (including such part of the plant that is re-powered, modernized or an expansion) after the date of effectiveness of the Feed In Tariffs;
 - (f) The facility is operated in compliance with (i) the terms of these Rules, (ii) the Standard Power Purchase Agreement terms and conditions attached to it, (iii) the terms of its Generation Licence and (iv) in compliance with all pertinent laws of the Gambia;
 - (g) The facility does not increase the installed capacity on site above the Specified Maximum Capacity;
 - (h) The facility is eligible for connection to the grid under the provisions stated in the Renewable Plant Connection Agreement;

- (i) The individual persons or directors of the corporation who own the facility are responsible owners and do not have a poor record of performance, have no record of non-compliance with contracts or any work deficiencies, do not have overdue debts towards authorities of Gambia or their country of incorporation, and do not have a criminal record, and have never been suspended or blacklisted by the Authority or Responsible Network Utility, whether as an individual contractor or corporation; and
- (j) The facility complies with any special requirements which shall be imposed on Eligible Renewable Plants that the Authority may issue, and if necessary amend.

PART III. FEED IN TARIFF

6. Feed In Tariffs may be differentiated based on the size and by Eligible Renewable Technology.
7. The Feed In Tariff shall be set by the Authority.
8. The Feed In Tariffs to be calculated by the Authority shall be in accordance with the methodology set out by the Authority and approved by the Minister. The Authority may set out and the Minister may approve different methodologies for the calculation of the Feed In Tariff in following reviews.
9. The cost of such Feed In Tariffs shall be paid by electricity consumers through their normal electricity tariff payments as approved by the Authority. All electricity consumers who are supplied with electricity through the Network or are direct customers shall pay towards the costs of Feed In Tariff and shall receive a share of any benefits. The costs or benefits of Feed In Tariffs shall be included in tariff reviews for the Authority and shall be shared among consumers according to their tariff review methodology.
10. The Eligible Renewable Plant shall enter into a Standard Renewable Power Purchase Agreement or Net Metering Agreement with the Responsible Network Utility.
11. Only Eligible Renewable Plants below twenty kilowatts and that are sized primarily to offset part or all of Customer-generator's own electrical requirements will be suitable for a Net Metering Agreement. Within these parameters, the Responsible Network Utility may decide at its sole discretion whether such facility should be offered a Net Metering Agreement.
12. The Eligible Renewable Plants with a Net Metering Agreement shall receive credit through their meter based on the metered generation in kilowatt hours and the applicable Feed In Tariffs. The Responsible Network Utility shall not pay any cash value for this credit and the credit may only be redeemed against electricity consumption.
13. The Eligible Renewable Plants with a Standard Renewable Power Purchase Agreement shall invoice the Responsible Network Utility according to the timescales set out in the Standard Renewable Power Purchase Agreement based on the metered generation in kilowatt hours and the applicable Feed In Tariffs. The Responsible Network Utility shall pay in accordance with the terms set out in the Standard Power Purchase Agreement.
14. Feed In Tariff values will be set in Gambian Dalasi per kilowatt hour of delivered electricity.
15. Each year the Authority shall make an annual announcement (the "Annual Authority Announcement") of the matters required by these Rules. Such announcement shall be made no later than six (6) calendar months prior to the start of the first fiscal year to which it applies.
 - (a) The Authority shall annually approve and publish the adjusted Feed In Tariffs as part of the Authority Announcement;
 - (b) The Authority shall review the Feed In Tariffs for existing projects based only on an index to Inflation for the percentage of the Feed in Tariff that is the Deemed Local Inflation Link and an index to the Euro Exchange Rate for the percentage of the Feed in Tariff that is the Deemed Foreign Link, and not for any other reason; and
 - (c) The announcement of the Feed In Tariff levels for new projects will be made every three fiscal years following the announcement on a rolling basis, and once announced such Feed In Tariff levels shall only be subject to review based on indexation as outlined in (b) above.
16. The Feed In Tariffs to be established shall cover fifteen (15) years from the date of commissioning of a generation facility. After this period, should these renewable plants continue to operate, future tariffs may be freely negotiated with the distribution licensee or any other party, in compliance with such rules as the Authority may set from time to time.
17. The Authority may review the Feed In Tariffs for new projects in the following cases:

- (a) When the overall cap from the Annual Authority Announcement is achieved;
- (b) When there are significant changes to the costs or when more accurate cost data becomes available, as this will allow the Authority to calculate the Feed In Tariffs based on the methodology in force or better approaches; and
- (c) Other analogous circumstances that justify reviewing and re-adjusting the Feed In Tariffs.

PART IV. PRIORITY CONNECTION AND PURCHASE

- 18. All Eligible Renewable Plants shall enjoy priority connection to the transmission or distribution system, subject to the compliance with the relevant standards and the required Generation License.
- 19. Eligible Renewable Plants must apply to the Responsible Network Utility for a connection.
- 20. The Responsible Network Utility will study the implications of the connection and communicate the results to the Eligible Renewable Plant within two calendar months.
- 21. The Responsible Network Utility may only refuse connection to the grid to an Eligible Renewable Plant only on basis of technical considerations that would affect the Responsible Network Utility's ability to meet its obligation to supply consumers. In the event of a refusal to connect, the Responsible Network Utility must give a full explanation of the reasons for the decision and the Eligible Renewable Plant has the right to appeal to the Authority to review this decision.
- 22. Whenever generation from their plants is available, Eligible Renewable Plants shall enjoy priority to inject into the network the power output which shall be paid at the corresponding Feed In Tariffs based on their metered generation in kilowatt hours.

PART V. REPORTING

- 23. The Responsible Network Utility shall report to the Authority, and the Authority shall consolidate, the information on physical sales of all Eligible Renewable Plants and the renewable generation for the whole country and shall make this information available to relevant stakeholders.

PART VI. ADMINISTRATION OF FEED IN TARIFFS

- 24. The developer must submit an application to the Authority requesting formal recognition as an Eligible Renewable Plant. The initial proposal shall include at least the following information.
 - (a) Name and address of the persons or corporation developing the facility;
 - (b) Project background including an identification of the renewable resource, production capacity in kilowatts, the technical means by which the facility will produce electricity, the identified Responsible Network Utility, the expected monthly production in kilowatt hours, the availability and ownership of the land for the project, and the financial structure planned for the project; and
 - (c) Such other information as the Authority may reasonably require.
- 25. The Authority shall process such applications on a first come, first served basis.
- 26. PURA will have to make a decision on whether the plant is an Eligible Renewable Plant and to communicate the decision to the developer within two calendar months.
- 27. Prior to certifying that the plant is an Eligible Renewable Plant:
 - (a) The details of application shall be studied by the Authority for compliance with these Rules and other relevant regulation;
 - (b) The details of application shall be studied by Responsible Network Utility to identify conflicts, if any, with other ongoing activities or projects, as well as a tentative grid connection point at low or medium voltage level; and
 - (c) In this process, both the Authority and the Responsible Network Utility will state if the project is prima facie technically viable.
- 28. The Authority shall be authorized to perform the following for all renewable generation:

- (a) Collecting and publishing information for all renewable production in any distribution or mini-grid network across the Gambia;
 - (b) Auditing the metered production;
 - (c) Incorporating Feed In Tariffs in the tariff reviews for Responsible Network Utility(s) to ensure that the correct costs are recovered from consumers;
 - (d) The Authority shall create a Registry to track the deployment of renewable facilities and be aware of when is achieved the policy target in order to carry out policy reviews; and
 - (e) In case of dispute between or among electricity sector participants, the Authority shall adjudicate in the first instance.
29. The Responsible Network Utility shall be authorized to perform the following for all renewable generation:
- (a) Based on applicable Feed In Tariffs and Feed In Tariff duration, entering into an Standard Power Purchase Agreements with Eligible Renewable Plants;
 - (b) Receive and check invoices from Eligible Renewable Plants connected to their system based on the applicable Feed In Tariff and the actual production;
 - (c) Making payments based on checked invoices; and
 - (d) Reporting to the Authority on Eligible Renewable Plant facilities, production and payments.
30. For clarity, approval as an Eligible Renewable Plant does not affect the normal requirements under law for a generation plant or construction project, including but not limited to requirements for environmental approval, permission to use water resources, construction permits, permission for the installation of the required equipment, health and safety requirements, Generation License requirements, title to the land or permission to use the land.
31. Once the Eligible Renewable Plant has been approved by the Authority and received the relevant consents, it has one year to begin construction, and the application for such consents is not to be unreasonably delayed.

PART VII. FINAL PROVISIONS

32. The Authority may, with the approval of the Minister, make regulations for the better carrying out of the purposes of this Act.
33. The Gambia Public Utilities Regulatory Authority is vested with the power to administer the Bill in accordance with the provisions of the Bill and The Gambia Public Regulatory Authority Act, 2001.
34. Where good cause appears, the Authority may allow an exemption from any provision of these Rules, if such is found to be in the public interest and is not contrary to law or any other related rules and regulations.
35. If any provision or part of a provision of these Rules is declared invalid or unconstitutional by a court of competent jurisdiction, those provisions not affected thereby shall continue to be in full force and effect.
36. All prior rules and guidelines, or portions thereof, issued by the Authority not consistent with these Rules are hereby repealed or modified accordingly.
37. These Rules shall become effective when enacted by the President and the National Assembly.

ANNEX B: ANNUAL AUTHORITY ANNOUNCEMENT

The information below constitutes the 'Annual Authority Announcement' as defined in the FIT Rules 2012.

This announcement is for the next three fiscal years, starting from 1 July 2013.

Eligible Renewable Technology means:

- Solar PV Systems;
- Wind Energy Systems;
- Biomass Energy Systems; or
- Biogas Energy Systems.

Biomass Energy Systems shall be limited to no more than 1 MW in accordance with the Renewable Energy Act. Where:

- **Biogas Energy Systems** refer to energy systems which use biogas energy resources (including animal waste and landfill) to produce electricity through thermo-chemical, biochemical or physical-chemical processes, or through other technologies complying with the prescribed environmental standards.
- **Solar PV Systems** refers to energy systems that produce electricity from solar irradiation employing photovoltaic panels.
- **Wind Energy Systems** refers to systems that convert wind energy into useful electrical or mechanical energy.
- **Biomass Energy Systems** refers to energy systems which produce electricity using non-fossil, biodegradable organic material originating from naturally occurring or cultured plants, animals and micro-organisms, including products from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste.

Specified Maximum Capacity on a single site commissioned from 1 July 2013 shall be no greater than 1.5 megawatts.

	Deemed Foreign Link	Feed In Tariff level to be paid in fiscal year 1 July 2013 to 30 June 2014
Any Eligible Renewable Plant commissioned in fiscal year 1 July 2013 to 30 June 2014	50%	xxx Gambian Dalasi
Any Eligible Renewable Plant commissioned in fiscal year 1 July 2014 to 30 June 2015	50%	xxx Gambian Dalasi
Any Eligible Renewable Plant commissioned in fiscal year 1 July 2015 to 30 June 2016	50%	xxx Gambian Dalasi

Once announced, Feed In Tariff levels for plant commissioned in specific fiscal years will only be varied based on applicable indexation.

The overall cap for renewable technologies eligible for feed in tariffs is set at 5.5 megawatts.

ANNEX C: STANDARD POWER PURCHASE AGREEMENT

THIS AGREEMENT is made on..... day 20.....

BETWEEN

[] a company incorporated in [] with its registered office at [] (hereinafter, the "Seller" which expression shall where the context so admits includes its successors in title and permitted assigns); and

[], a company incorporated in [] with its registered office at [] (hereinafter, the "Buyer" which expression shall where the context so admits includes its successors in title and permitted assigns);

Each a "party" and together the "parties".

WHEREAS,

- (1) The Seller proposes to design, construct, install, operate, maintain and own a renewable power production facility in the Gambia, hereinafter referred to as the "Facility";
- (2) the Seller's Facility is an Eligible Renewable Plant under the Feed In Tariff Rules 2012;
- (3) The Buyer has the right to purchase electrical energy under the applicable laws and regulations of Gambia;
- (4) The Seller wishes to sell and to deliver, and the Buyer wishes to purchase and to accept delivery of, the electrical energy to be produced by the Facility; and
- (5) The parties desire to set forth in writing their respective rights and obligations with respect to the purchase and sale of such electric power.

NOW, THEREFORE, in consideration of the mutual promises and agreements contained herein, the Seller and the Buyer hereby agree to the following:

ARTICLE 1. DEFINITIONS AND RULES OF INTERPRETATION

1. DEFINITIONS

In this Agreement, unless the context otherwise requires, the following words and expressions shall have the following meanings:

"Agreement" shall mean this Agreement, including all appendices, exhibits, schedules and amendments, as may be amended from time to time;

"Authority" means The Gambia Utilities Regulatory Authority established under The Gambia Public Utilities Regulatory Authority Act, 2001;

"Best Efforts" shall mean a level of effort which, in the exercise of reasonable judgment in the light of facts known at the time a decision is made, can be expected to accomplish the desired result at a reasonable cost, consistent with prudent utility practice;

"Billing Period" shall mean the period defined in Schedule A, for the avoidance of doubt this may be monthly by calendar month, quarterly or annually;

"Buyer's Interconnection Facilities" shall mean all equipment and facilities on Buyer's side of the Point of Delivery for the purpose of interconnecting the Facility to Buyer's electrical transmission system;

"Connection Agreement" shall be the agreement of that name for the connection of the Facility to the Buyer's electrical system;

"Delivered Energy" shall mean the net actual amount of electric energy produced by the Facility and delivered to the Point of Delivery during the Billing Month in accordance with Buyer's dispatch instructions;

"Designated Representatives" shall mean the representatives designated by the Seller and Buyer;

"Energy Output" means the energy generated by the Facility, injected into the grid, and metered at the Point of Delivery;

"Event of Termination and Assignee" shall have the meaning specified in Article 6;

"Force Majeure" shall mean any cause beyond the reasonable control, and not due to the fault or negligence of the Party affected, and which could not have been avoided by such Party's due diligence and use of best reasonable efforts, including (to the extent they meet the foregoing requirements):

- (i) Drought, flood, earthquake, hurricane, storm or other unusual or extreme adverse weather, marine or environmental conditions or actions of the elements, meteorites or objects falling from aircraft or other aerial devices, fire, lightning, epidemic, famine, disease, pestilence or plague, and other acts of God;
- (ii) Acts of war (whether declared or undeclared), invasion, armed conflicts or acts of foreign enemy, blockade, embargo, revolution, riot, rebellion, civil disturbance, insurrection, sabotage, explosion, terrorism, or threat of any of the foregoing;
- (iii) strikes or labour disputes (except strikes or labour disputes by the employees of the Party affected which are not part of a general labour action involving others employers);
- (iv) other judgments, official actions of any governmental authority, the expropriation or nationalization of any assets, the absence, suspension, termination, interruption, denial or failure of renewal of any permit or authorization;
- (v) A total loss/breakdown of the Facility, upon which the Parties shall cease to have any obligations hereunder to each other, and shall be terminated without prejudice to any claims outstanding between them
- (vi) Any other cause, whether or not similar thereto, beyond the reasonable control of, and without the fault or negligence of, the party claiming Force Majeure.

"Forced Outage" shall mean an interruption of the Facility's generating capability that is not the result of:

- (i) A request by the Buyer;
- (ii) Scheduled Outage; or
- (iii) An event or occurrence of Force Majeure.

"Government" shall mean the Government of the Republic of The Gambia;

"IEC Standards" means the relevant standards published by International Electrotechnical Commission.

"Initial Delivery Date" shall mean the first date on which the Facility is commercially synchronized with Buyer's electrical transmission system and commences the regular delivery of electric power;

"Installed Capacity" means the maximum capacity at which the station could be operated for a sustained period without causing damage to it (assuming the source of power used by it to generate electricity was available to it without interruption);

"Must-Run Facility" means the Seller will be permitted to generate and dispatch electrical energy from the Facility whenever the resource is available, subject only to curtailment in emergencies and such directions as may be issued by the system operator for the protection of its electrical system;

"Operating Year" shall mean:

- (i) for the first such year, the period beginning with the Initial Delivery Date and ending on the date immediately preceding the first anniversary thereof every year, and
- (ii) thereafter for the term of this Agreement, the period beginning on each succeeding anniversary of Initial Delivery Date and ending on the date immediately preceding the following anniversary of such date;

"Point of Delivery" shall mean the point where the Facility is connected to Buyer's electrical system;

"Scheduled Outage" means an outage which is scheduled in advance;

"Seller's Interconnection Facilities" shall mean all equipment and facilities on Seller's side of the Point of Delivery for the purpose of interconnecting the Facility to Seller's production system;

"System Emergency" shall mean a condition on the Buyer's electrical system or at the Facility, which is likely to result in an imminent significant disruption of service to the Buyer's customers, or is imminently likely to endanger life or property;

"Term" shall mean the duration of this Agreement as determined under Article 2, including any extension; and

"Total Loss/Breakdown" shall mean when the Facility is not able to deliver electricity to the Point of Delivery due to a breakdown or fault beyond the control of the Seller.

2. RULES OF INTERPRETATION

2.1. Unless otherwise required by the context in which any term appears:

The singular shall include the plural and the masculine shall include the feminine and neuter, as the context requires;

The titles of the Articles and Schedules herein have been inserted as a matter of convenience of reference only, and shall not control or affect the meaning or construction of any of the terms or provisions;

The words "herein", "hereof" and "hereafter" shall refer to this Agreement as a whole and not to any particular Article or sub-Article of this Agreement, and the words, "includes" or "including" shall mean "including without limitation"; and all references herein to any agreements shall be to such agreement as amended and supplemented or modified to the date of reference;

Capitalised terms used in this Agreement shall have the meaning specified in this Article;

Unless otherwise defined, all other terms shall have the meanings given to them in the Electricity Act 2005 and the Feed In Tariff Rules 2012;

All references herein to any statute, law, ordinance, decree, rule or regulation of any governmental body shall include any amendment, repeal or replacement thereof.

ARTICLE 2. UNDERLYING PRINCIPLES

3. CO-OPERATION AND TERM

- 3.1. The Parties acknowledge that this Agreement will require their long-term co-operation and assistance to deliver a successful outcome. Each Party agrees to co-operate with, provide information and assistance to the other in a timely manner.
- 3.2. The Term shall commence on the date hereof for a period of fifteen (15) years with effect from the Initial Delivery Date unless terminated earlier in accordance with clause 14.
- 3.3. The Installed Capacity of the Facility shall be as defined in Schedule A. No increase or decrease to the Installed Capacity is permitted without the prior written agreement of both parties.
- 3.4. In the event of a change in law or standards or rules or new procedures that affects any part of this agreement, the parties agree to negotiate in good faith any required changes to this Agreement. The objective will be to achieve the same outcome and benefits to both parties as hold under this Agreement.

4. CONDITIONS PRECEDENT

- 4.1. This Agreement is subject to the fulfilment of each of the conditions listed below. In the event that any such conditions are not fulfilled by one of the Parties, the other Party may terminate this Agreement without further obligation in accordance with Article 6.
 - (i) The Seller and the Buyer are each a Gambian company, existing, and in compliance with all requirements of the Company's Act and all other applicable laws of The Gambia.
 - (ii) The Seller's execution, delivery and performance of this Agreement will not result in a breach or violation of, or constitute a default under, any agreement, lease, or instrument to which it is a party as of the date hereof, or by which it or its properties may be bound or affected as of the date hereof.
 - (iii) As of the date hereof, and except as disclosed before the execution of this Agreement, no suit, action or arbitration, or legal, administrative or other proceeding is pending or has been threatened against Seller that would affect the validity or enforceability of this Agreement or the ability of Seller to fulfil its commitments hereunder, or that could result in a material adverse change in the business or financial condition of the Seller.
 - (iv) The Seller is not in breach of, in default under, or in violation of, any applicable statute, law, ordinance, decree, rule, or regulation of any governmental body, or the provisions of any franchise or license, or in breach of, in default under, or in violation of, any provision of any promissory note, indenture or any evidence of indebtedness or security but not limited to, lease, contract, license or other agreement by which it is bound, if such breach, default or violation may result in a material adverse effect on the business or financial condition of Seller; and the execution and delivery of this Agreement and the performance of its obligation hereunder will not constitute or result in any such breach, default or violation.
 - (v) The Seller and the Seller each possess all requisite power and authority to enter into and perform this Agreement and to carry out the transactions contemplated herein.
 - (vi) The Seller has secured land for the Facility and assessed the suitability of the location for the Facility.

- (vii) The Seller has obtained all necessary permits and approvals from the relevant Government Authorities for the construction and operation of the Facility, on terms satisfactory to the Parties.

5. COMPLETION OF THE WORKS AND CERTIFICATION OF SERVICE COMMENCEMENT

- 5.1. The Seller shall issue as soon as reasonably practicable and in any case at least ten (10) working days' notice to the Buyer of the date and time when it considers the work to construct the Facility will be completed and will satisfy the test(s) on completion.
- 5.2. Following the receipt of the aforementioned notice, the Parties shall use their best endeavours to undertake the final inspection in order to allow the parties to sign the certificate of completion and availability for the Facility.

ARTICLE 3. THE SERVICES

6. POINT OF DELIVERY

- 6.1. The Point of Delivery shall be located at the location specified in Schedule A.
- 6.2. For the avoidance of doubt, all losses of electricity before the Point of Delivery shall be the responsibility of the Seller, and all losses beyond the Point of Delivery shall be the responsibility of the Buyer.

7. OPERATING LIMITS

- 7.1. Electric power supplied by the Seller shall be within the operating limits specified in Schedule A and the terms of the Connection Agreement.
- 7.2. Should the operating limits specified in 7.1 be exceeded, the Buyer shall have the right to not pay for the electric energy delivered at the Point of Delivery.

8. METERING

- 8.1. During the term of this Agreement, appropriate representatives of the Buyer shall be given access to read meters and to perform inspections whenever reasonably requested.
- 8.2. The Seller shall install, operate and maintain metering equipment sufficient to permit an accurate determination of the quality and time of delivery of electric power delivered to Buyer. Electric power delivered by Seller to Buyer hereunder shall be measured by an electric watt-hour meter ("Master Meter") located at the Point of Delivery. The metering devices shall be described in Schedule A to this Agreement specifying the manufacturer's serial number, counter reading and accuracy of the metering device.
- 8.3. . All meters used to determine the billing hereunder shall be sealed, and such seals shall be broken only when both Parties agree to do so and only when the meters are to be inspected, tested or adjusted.
- 8.4. Buyer may own, maintain and operate metering equipment (a "Check Meter") at its sole expense, provided that such equipment shall be operated and maintained in a manner that does not interfere with Seller's metering equipment. Should Buyer so elect and should any metering equipment installed by Seller fail to register during any period of time, Buyer's metering equipment shall be used to determine the amount of electric power so delivered in lieu of Seller's estimates thereof.
- 8.5. The meter installations shall be completed before the Facility Initial Delivery Date.
- 8.6. Prior to the installation of any metering system, if required by any Party, the Seller shall deliver to the Buyer and the Buyer shall deliver to the Seller, the manufacturer's original accuracy certificates and the scheme of the metering systems to be installed, including the specifications of the equipment for mutual acceptance and approval of both Parties.
- 8.7. All metering equipment shall be arranged so that none of the electric output of the Facility that is consumed on site shall be registered as having been supplied by the Seller to the Buyer.
- 8.8. The accuracy of any metering equipment may be tested and verified annually or at an interval which has been agreed upon between the Parties. If the meter proves to be accurate within one percent (1%), such test shall be at the requesting Party's expense. If errors greater than one percent (1%) are discovered, the test shall be at the expense of the Party responsible for maintaining the metering equipment.
- 8.9. If upon testing, any metering equipment is found to be in error by not more than one percent (1%), previous recordings of such equipment shall be considered accurate, but such equipment shall be promptly adjusted in a common exercise attended by both

Parties. If, upon testing, any metering equipment shall be found to be inaccurate by more than one percent (1%), such equipment shall be promptly adjusted in a common shall be made for (i) the actual period during which inaccurate measurements were made, if the period can be reasonably determined, or (ii) if the period cannot be reasonably determined, one half of the period from the date of the last previous test of the meter, but not to exceed six (6) months.

- 8.10. Each Party has the right to have a representative present at any time that the meters are to be read, tested or corrected.
- 8.11. All tests and calibration of meters, and any verification of meter accuracy, shall be performed pursuant to IEC Standards, by the Buyer or by a mutually agreed upon a qualified independent third party. Calibration shall occur before use of the meters. All meters shall be sealed and locked after calibration.

ARTICLE 4. RIGHTS AND OBLIGATIONS

9. SELLER'S OBLIGATIONS

- 9.1. The Seller shall notify the Buyer in writing at least 30 days prior to synchronising or operating the Seller's generators in parallel with the grid system, and co-ordinate such commencement of operation with the Buyer.
- 9.2. The Seller shall operate the Facility and all plant and equipment in a proper and skilful manner and in accordance with the manufacturer's instructions and recommendations.
- 9.3. The Seller shall provide the Buyer with access to the Facility at all reasonable times upon reasonable prior notice for the purpose of reading or inspecting meters, examining the operation of the Facility or other purposes reasonably related to its performance under the terms of this Agreement. Such access shall not interfere with the Seller's normal business operations.
- 9.4. The Seller shall allow the Buyer to conduct periodic tests of the Seller's facilities, with reasonable advanced notice, provided that the inspections do not disturb the normal operation of the Facility. The costs of such tests shall be borne by the Buyer.
- 9.5. The Seller shall maintain an operation log, which shall include all relevant information on the operation of the Facility. Monthly reports shall be established and submitted to the Buyer not later than fifteen (15) working days after the end of each calendar month.
- 9.6. Prior to the Initial Delivery Date and thereafter on at least thirty (30) days prior to the start of the subsequent year, the Seller shall furnish to the Buyer an annual forecast including the following aspects: estimated monthly generation availability, and Scheduled Outages for each year. The Seller shall have no liability to the Buyer and shall be subject to no penalty in the event that the actual amount or the times of electrical energy delivered differ from the amounts or times indicated in such annual forecast.
- 9.7. Any expected change to the notified Scheduled Outages given in the annual forecast specified in point 9.7 above should be notified by the Seller to the Buyer as soon as possible, including a non-binding estimate of expected length, and as far as reasonably possible co-ordinated for the mutual convenience of both parties. The Seller shall use its Best Efforts to avoid any unnecessary interruptions of the delivery or quality of the electric power delivered.
- 9.8. The Seller shall report any changes in the power of the Facility, which may have impacts in any of the clauses of this agreement.
- 9.9. The Seller is responsible for conducting periodic tests of the Facility and taking reasonable steps to protect the system from possible contingencies.
- 9.10. The Seller shall obtain all approval, authorities, Authorizations, licenses, leases, easements, rights-of-way, permits and franchises whether corporate, governmental or otherwise, necessary of the operation of the Facility .
- 9.11. The Seller shall obtain and comply with all Governmental provisions applicable to renewable facilities. This includes the required environmental approvals, licenses, certificates and permits for the operation of the facilities. All certificates and permissions shall be in force during the operation of the agreement.
- 9.12. The Seller, and all subcontractors performing any services in connection with the construction, operation or maintenance of the Facility, shall obtain and maintain in force comprehensive general liability insurance, public liability insurance, insurance for injuries to persons and property, automobile liability insurance and workman's compensation

insurance, all in amounts and under terms which are generally carried by owners and operators of projects similar to the Facility. In the event that any insured Party reasonably determines that such policy of insurance is no longer available at commercially reasonable rates, such insured Party shall not be obligated to continue to carry such insurance, and shall use its Best Efforts to obtain substitute insurance which is a nearly identical as possible to the policy of insurance which it is intended to replace. Such insured Party shall notify Buyer of any such substitution at least fifteen (15) days before it takes effect. Details of such insurance shall be made available to the Buyer on request.

- 9.13. The Seller shall designate one or more representatives (each a "Designated Representative") to maintain communications with Buyer's Designated Representatives, and to facilitate coordination between Buyer and Seller during the term of this Agreement.

10. BUYER'S OBLIGATIONS

- 10.1. The Buyer shall accept and pay for the energy delivered according to the terms set out in Article 5, except that the Buyer may reject such Energy Output where any of the following apply:
- (i) the specification of electric power operating limits in Schedule A are not substantially satisfied,
 - (ii) the Facility is not operated and maintained in a manner consistent with prudent operation practices, or
 - (iii) whenever the wider distribution or transmission system or the systems with which it is directly interconnected experience a System Emergency, or whenever it is necessary to aid in the restoration of service on the Buyer's system or on the systems with which it is directly or indirectly interconnected, the Buyer may, in its sole discretion, curtail or interrupt the taking of all or a portion of Energy Output, provided such curtailment or interruption shall continue only for so long as it is reasonably necessary under reasonable and prudent operating practices.
- 10.2. Because the Seller's Facility is a Must-Run Facility, the Buyer shall use its best efforts minimize any periods of interruption, reduction, refusal, or curtailment as provided for in this Article and as far as reasonably possible to coordinate such periods of interruption with the periods of previously Scheduled Outage at the Facility. The Buyer shall use its best efforts to provide information to the Seller about the interruption or refusal at least 12 hours in advance or as soon as the interruption becomes apparent, including the cause of the interruption and the estimated duration of the unexpected event.
- 10.3. The Buyer shall build, own, operate and maintain Buyer's Interconnection Facilities up to the Delivery Point at its own cost in compliance with all applicable governmental requirements and in accordance with prudent utility practice. The Buyer shall ensure that Buyer's Interconnection Facilities are complete and capable of accepting electric power from the Facility before the Initial Delivery Date.
- 10.4. The Buyer shall cooperate with and assist Seller in obtaining any approvals, authorities, authorizations, licenses, leases, easements, rights-of-way, permits and franchises, whether corporate, governmental or otherwise, necessary for the operation of the Facility.
- 10.5. The Buyer shall designate one or more representatives (each a "Designated Representative") to maintain communications with Seller's Designated Representative and to facilitate coordination between Buyer and Seller during the term of this Agreement.

11. SYSTEM EMERGENCY

- 11.1. Notwithstanding the obligation of the Buyer to accept the electric power produced by the Facility, the Buyer may, without penalty, temporarily curtail acceptance of electric power from the Facility whenever a System Emergency exists, and the acceptance of such output at such time would contribute to the System Emergency. As promptly as possible following such a discontinuance of acceptance of electric power, Buyer shall inform Seller that such a System Emergency has occurred.
- 11.2. Notwithstanding the obligation of the Seller to deliver electric power produced by the Facility to the Buyer, the Seller may, without penalty, temporarily curtail production or delivery of electric power from the Facility whenever there is no renewable resource or whenever a System Emergency exists, and the continued production or delivery of electric power at such time would contribute to the System Emergency or damage or otherwise threaten the Facility. As promptly as possible following such a temporary curtailment of electric power, the Seller shall inform the Buyer that such a System Emergency has occurred.

- 11.3. In the event of the curtailment of acceptance or delivery of electric power pursuant to this Article, the Parties shall use their Best Efforts to promptly correct the System Emergency, and to resume the delivery and acceptance of electric power from the Facility.

ARTICLE 5. SALE AND PURCHASE

12. PRICE, BILLING AND PAYMENT

- 12.1. Subject to the terms, conditions and exceptions set forth in this Agreement, from the Initial Delivery Date, Seller agrees to supply and Buyer agrees to purchase the entire output of the Facility measured at the Point of Delivery at the applicable price(s) indicated in the 'Annual Authority Announcement' as defined in the FIT Rules 2012.
- 12.2. Seller shall read its meters on at the start of the first day of the calendar month of each Billing Period at 00:00 hours (midnight). At its sole discretion, the Buyer may be present at the meter reading. The amount of electric power delivered to Buyer during the preceding Billing Period shall be determined from such readings.
- 12.3. Invoices shall be issued by Seller on or before the tenth (10th) day following a Billing Period and shall incorporate such information as may reasonably be necessary or desirable to determine the payments for electric power delivered during the Billing Period.
- 12.4. If Buyer disputes a portion of any invoice, Buyer shall render payment for the undisputed portion of such invoice.
- 12.5. All invoices shall be due and payable not later than thirty (30) days after receipt of the invoice.
- 12.6. Invoicing and payment shall be in Dalasi.
- 12.7. The Seller shall not be liable to the Buyer for any direct damages resulting from the Seller's inadvertent or accidental and non-negligent failure in delivering expected energy production. Without the Buyer's prior written approval, the said limitation of the Seller's liability shall not apply where the Seller deliberately reduces Energy Output for the purpose of selling or attempting to sell electrical energy to any third party, or for the purpose of producing any other form of energy capable of being produced at the Facility.

ARTICLE 6. DISPUTE, TERMINATION AND ASSIGNMENT

13. DISPUTE

- 13.1. In the event of dispute, the Parties shall make efforts in good faith to negotiate a resolution of any disputes before initiating arbitration.
- 13.2. The parties accept that the Authority may adjudicate on matters set out in this Agreement and in the event of a dispute.
- 13.3. For the avoidance of doubt, every dispute of any kind or nature between the Parties arising out of or in connection with this Agreement shall be settled in accordance with the existing laws prevailing in The Gambia.

14. CONDITIONS OF TERMINATION

- 14.1. Events of Default include each or any of the following events::
- (i) In the event that either party shall be in material default of its obligations under this contract for a period in excess of ninety (90) days, and such failure shall not be rectified or treated within sixty (60) days after written notice thereof from the non-defaulting Party;
 - (ii) Undue delay in the completion of the Facility for reasons solely imputable to the Seller shall entitle the Buyer to terminate this Agreement without prejudice to any outstanding payments and other rights, , and such failure shall not be rectified or treated within ninety (90) days after written notice thereof;
 - (iii) The Seller fails to install all the plant and equipment specified in Schedule A;
 - (iv) The occurrence of a Bankruptcy Event affecting either party
 - (v) If Force Majeure shall subsist for a period of three (3) months or more;
 - (vi) The failure of any party to make an undisputed payment when due and non-payment continues for more than 90 days;
 - (vii) Nationalisation of any assets or equity of the Seller by the Government; or
 - (viii) Either Party contests and denies the enforceability of this Agreement, in which case the Party contesting enforceability shall be deemed to be the Party in default hereunder.

- 14.2. Upon occurrence of an Event of Default, the non-defaulting Party may terminate the Agreement without liability upon giving 30 days written notice to the other Party but without prejudice to any right of action or remedy that either Party may have against the other in respect of any breaches prior to the termination.
- 14.3. On the insolvency, or bankruptcy of either Party being declared, this Agreement shall automatically be terminated but without prejudice to any right of action or remedy that either Party may have.

15. ASSIGNMENT

- 15.1. Except as provided, this Agreement may not be assigned by either Party without the written consent of the other Party, which consent shall not be unreasonably withheld, and the written agreement of the assignee whereby such assignee expressly assumes and agrees to perform each and every obligation of this Agreement, and any assignment in violation hereof shall be null and void; provided, however, that either Party may assign this Agreement to an Affiliate or to any purchaser or all or a substantial portion of its properties without such consent or such assumption and agreement, provided that the assigning Party remains obligated for the full performance of the assignor's obligation under this Agreement.
- 15.2. The Seller shall notify the Buyer at least sixty (60) days prior to any change of ownership or assignment of the Plant.
- 15.3. In the event of the termination of this Agreement as a result of an Event of Default by the Seller, the Buyer shall, in addition to providing the notice of default as required above, provide each assignee with written notice that this Agreement has been terminated, together with a statement of all sums which would at that time be due under this Agreement but for such termination or foreclosure, and of all other defaults, if any, then known to Buyer.
- 15.4. Provided that mutual discussions are successful, the Buyer agrees to enter into a new Agreement (the "New Agreement") with any such assignee or its designee for the remainder of the term of this Agreement effective as of the date of termination on the same terms and conditions as this Agreement.

16. BURDEN OF PROOF ON FORCE MAJEURE

- 16.1. The burden of proof as to whether a Force Majeure event has occurred shall be upon the Party claiming the Force Majeure.
- 16.2. Notwithstanding anything in this Article to the contrary, no payment obligation arising under this Agreement shall be excused by any event of Force Majeure

ARTICLE 7. MISCELLANEOUS

17. RISK OF LOSS

- 17.1. The Seller shall be responsible for and shall bear the full risk of loss -
- (i) with respect to any loss of or damage to Facility, Seller's Interconnection Equipment, or any other property on Seller's side of Point of Delivery; and
 - (ii) with respect to any personal injury or loss of or damage to any other property arising out of the use of the Facility, Seller's Interconnection Equipment, or any other property on Seller's side of the Point of Delivery;
 - (iii) except for any loss, damage, or injury arising out of the negligence or wilful misconduct of Buyer or Buyer's employees or agents.
- 17.2. The Buyer shall be responsible for and shall bear the full risk of loss -
- (i) with respect to any loss of or damage to Buyer's Interconnection Equipment, or any other property located on Buyer's side of the Point of Delivery; and
 - (ii) with respect to any personal injury or loss of or damage arising out of the use of the Facility, of Buyer's interconnection facility or any other property on Buyer's side of the Point of Delivery;
 - (iii) except for any loss damage, or injury arising out of the negligence or wilful misconduct of Seller or Seller's employees or agent.

18. INDEMNIFICATION

- 18.1. Seller shall protect, indemnify and hold harmless Buyer and directors, officers, employees, agents, affiliates and representative against and from any and all cost, expenses, damage, liability or loss, including costs and attorney's fees, for or on account of injury, bodily or otherwise, to, or death of, persons, or for damage to, or destruction of

property belonging to Buyer, Seller, or others, resulting from or attributable to the fault or the negligence of Seller.

18.2. Buyer shall protect, indemnify and hold harmless Seller and its directors, officers, employees, agents, affiliates and representative against and from any and all costs, expense, damage, liability or loss, including costs and attorneys' fees, for or on account of injury, bodily or otherwise, to or death of persons, or for damage to, or destruction of property belonging to Seller, Buyer or others, resulting from or attributable to the fault or the negligence of Buyer.

18.3. Notice and Participation: If any Party entitled to indemnification hereunder (the "Indemnified Party") intends to seek indemnification under this Article from any other Party (the "Indemnifying Party") with respect to any action or claim the Indemnified Party shall give the Indemnifying Party notice of such claim or action upon the receipt of actual knowledge or information by the Indemnified Party of any possible claim or of the commencement of such claim or action, which period shall in no event be later than the lesser of - fifteen (15) business days prior to the last day for responding to such claim or action or; one half of the period allowed for responding to such claim or action.

19. LIMITATION OF LIABILITY

19.1. Notwithstanding anything in this Agreement to the contrary, neither Seller nor its employees or agents shall be liable, whether arising out of contract, tort (including negligence), strict liability, or any other cause of or form of action whatsoever, for any indirect, incidental or consequential cost, expense or damage, including loss of revenue or profits, resulting from an interruption in Seller's delivery of electric power, however caused. The liability of Seller prior to the Initial Delivery Date shall be limited to using its Best Efforts to develop, license construct, own and operate the Facility.

20. APPLICABLE LAW

20.1. This Agreement is executed and is intended to be construed in accordance with the laws of The Gambia.

20.2. For the avoidance of doubt this agreement was signed subject to the provisions of any law, including provisions of relevant legislation in the electricity sector, including and not limited to the Electricity Act 2005 and Feed In Tariff Rules 2012.

21. NOTICE AND SERVICE

21.1. Any notice, demand, request, consent, approval, confirmation, communication, or statement which is required or permitted under this Agreement, shall be in writing, except as otherwise provided, and shall be given or delivered by personal service, email, fax, telecopy, telegram, overnight mail service, or by deposit in any post office, postage prepaid, by registered or certified mail, addressed to the Party at the address set forth in Schedule A. Changes in such address shall be made by notice similarly given.

21.2. Notices shall be deemed to have been received within ten (10) days of dispatch.

22. AMENDMENT

22.1. No amendment or modification of the terms of this Agreement shall be binding on either Buyer or Seller unless such amendment is in writing and signed by both Parties.

23. INFORMATION

23.1. Both Seller and Buyer shall keep a record of all invoices, receipts, charts, computer printouts, punch cards or magnetic tapes related to the volume or price of electric power sales made under this Agreement. Such records shall be made available for inspection by either Party upon reasonable notice at the principal place of business of the non-requesting Party during regular business hours. All such materials shall be kept on record for a minimum of five (5) years from the date of their preparation.

23.2. Any Proprietary Information of a Party or details of the Facility shall be considered as confidential information and shall not be disclosed, unless prior consent is given, to any Party outside of this Agreement.

23.3. Each Party shall make available to the other such other information relative to the Facility as may be reasonably required to carry out the terms of this Agreement.

23.4. This Agreement may be executed simultaneously in two (2) or more counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same instrument.

24. SEVERABILITY AND ASSURANCES

- 24.1. If any provision of this Agreement shall be determined to be unenforceable, void or otherwise contrary to law, such condition shall in no manner operate to render any other provision of this Agreement unenforceable, void or contrary to law, and this Agreement shall continue in force in accordance with the remaining terms and provisions hereof, unless such condition invalidates the purpose or intent of this Agreement.
- 24.2. In the event that any of the provisions, or portions or applications thereof, of this Agreement is held unenforceable or invalid by any Court of competent jurisdiction, the Seller and Buyer shall negotiate in good faith to attempt to implement an adjustment in the provisions of this Agreement with a view to maintain the same outcome and benefits to both parties as hold under this Agreement.
- 24.3. At the request of either Party, the other Party shall negotiate in good faith and execute such other definitive documents as may be necessary from time to time to reflect the matters set forth herein.
- 24.4. Except to the extent otherwise indicated herein, all the rights, benefits, duties, liabilities and obligations of the Parties hereto shall inure to the benefit of and be binding upon their respective successors and permitted assigns.
- 24.5. No waiver or failure to act during the length of this contract is permitted, except in writing signed on behalf of both parties by their duly authorised officers.

IN WITNESS WHEREOF, the Parties have caused the signatures of their authorised officers and their seals to be affixed as of the day and year first above written. This agreement has been established two (2) originals.

For and on behalf of [name of Buyer]

Represented by [name and position]

Witness [name]

For and on behalf of [name of Seller]

Represented by [name and position]

Witness [name]

SCHEDULE A: SPECIFICATION OF THE SELLER'S FACILITY

D1. ADDRESS FOR NOTICES FOR THE BUYER: [XX]

D2. ADDRESS FOR NOTICES FOR THE SELLER: [XX]

D3. NAME OF THE FACILITY: [XX]

D4. BILLING PERIOD: [monthly/three-monthly/annually dependent on scale]

D5. INSTALLED CAPACITY: [XX] kW

D6. POINT OF DELIVERY:

D7. ELECTRIC POWER OPERATING LIMITS:

This information is detailed in the Connection Agreement.

D8. ESTIMATED ENERGY OUTPUT:

a. Maximum estimated annual Energy Output

Month	kWh
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	
TOTAL	

b. Minimum estimated Energy Output

Month	kWh
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	
TOTAL	

- D9. LOCATION OF THE FACILITY: [XX]
- D10. TYPE OF FUEL/ENERGY SOURCE: [e.g. wind or solar]
- D11. TYPE OF POWER GENERATION TECHNOLOGY: [XX]
- D12. TYPE OF GENERATING UNITS: [XX]
- D13. NUMBER OF GENERATING UNITS: [XX]
- D14. OUTPUT VOLTAGE: [XX]
- D15. POWER RATING: [XX]
- D16. POWER FACTOR: [XX]
- D17. METHOD OF OUTPUT POWER CONTROL: [XX]
- D18. METHOD OF OUTPUT VOLTAGE CONTROL: [XX]
- D19. TRANSFORMER: [XX]
- D20. PROTECTION EQUIPMENT: [XX]

D21. GRID CONNECTION: [**LV CONNECTION/MV CONNECTION**]

D22. METERING EQUIPMENT for Master Meter: [manufacturer serial number and accuracy]

D23. METERING EQUIPMENT for Check Meter: [manufacturer serial number and accuracy]

D24. GENERAL APPLICABLE CODES AND STANDARDS:

The Plant shall comply with all legal requirements unless it is otherwise stated, including but not limited to:

- The connection specifications in the Connection Agreement.
- Health and safety in employment;
- Codes of practice and operating manuals for the design, safety, operation and maintenance of the equipment;
- Noise;
- Electricity regulations/codes of practice;
- Public works;
- Fire protection;
- Environmental protection.

Where appropriate legislation is not available, the latest version of national or international standards will define the minimum requirements. The mixing of various national and international standards shall only be permitted with the prior approval of Buyer.

ANNEX D : NETWORK CONNECTION AGREEMENT

THIS AGREEMENT is made on..... day 20..... (the "Start Date")

BETWEEN

[] a company incorporated in [] with its registered office at [] (hereinafter, the "Customer" which expression shall where the context so admits includes its successors in title and permitted assigns); and

[], a company incorporated in [] with its registered office at [] (hereinafter, the "Network Utility" which expression shall where the context so admits includes its successors in title and permitted assigns);

Each a "party" and together the "parties".

WHEREAS,

- (1) The Customer occupies the site at [] (hereinafter, the "Premises") to which the Network Utility provides a network connection;
- (2) The Customer wishes to connect a Generation System to the Network at the Premises;
- (3) The Network Utility is the holder of a distribution licence granted by the Authority under the Electricity Act 2005 at the distribution receiving point at which electric energy is delivered directly from a Generation System, where distribution licence and distribution receiving point have the meanings given to them in the Electricity Act 2005; and
- (4) This Agreement sets out the terms on which the Network Utility consents to the connection of the Generation System to its Network.

NOW, THEREFORE, in consideration of the mutual promises and agreements contained herein, the Customer and the Network Utility hereby agree to the following:

ARTICLE 1. DEFINITIONS AND RULES OF INTERPRETATION

1. DEFINITIONS

In this Agreement, unless the context otherwise requires, the following words and expressions shall have the following meanings:

"Agreement" shall mean this Agreement, including all appendices, exhibits, schedules and amendments, as may be amended from time to time;

"Authority" means The Gambia Utilities Regulatory Authority established under The Gambia Public Utilities Regulatory Authority Act, 2001;

"Network" means the power distribution network and transmission grid installed in the Gambia and subject to its Regulation and Rules, where transmission grid has the meaning given to it under the Electricity Act 2005.

"Generation System" or means an energy generation system and associated systems to be connected to the distribution network or the transmission network.

"Lowest Price Technically Compliant" means the solution which, being compliant with all the technical requirements that shall be verified, has the lowest implementation cost overall, taking into consideration the costs for both the Network Utility and the Customer.

"Point of Interconnection" means the point from time to time designated by the Network Utility as the point at which the Generation System may be connected to the Network Utility's Network. For the avoidance of doubt, this is the distribution receiving point or grid receiving point under the Electricity Act 2005.

"Regulation" means the regulatory rules for the Gambian electricity sector in force at the time of application.

"Rules" means the national laws which govern the operation of the Gambian electricity sector, in particular the Electricity Act 2005.

"Installed Capacity" means the maximum capacity at which the station could be operated for a sustained period without causing damage to it (assuming the source of power used by it to generate electricity was available to it without interruption);

"Islanding" or "Island" refers to any situation where the section of the network to which the Generation System is connected is un-energised by the main network supply and only the Generation System remains powering that section of the network (the "island").

"Supply" means the supply of electricity from the Network to the Premises under standard tariff conditions.

2. INTERPRETATION

2.1. In this Agreement, unless the contrary intention appears:

The singular shall include the plural and the masculine shall include the feminine and neuter, as the context requires;

The titles of the Articles and Schedules herein have been inserted as a matter of convenience of reference only, and shall not control or affect the meaning or construction of any of the terms or provisions;

The words "herein", "hereof" and "hereafter" shall refer to this Agreement as a whole and not to any particular Article or sub-Article of this Agreement, and the words, "includes" or "including" shall mean "including without limitation"; and all references herein to any agreements shall be to such agreement as amended and supplemented or modified to the date of reference;

Capitalised terms used in this Agreement shall have the meaning specified in this Article;

Unless otherwise defined, all other terms shall have the meanings given to them in the Electricity Act 2005;

All references herein to any statute, law, ordinance, decree, rule or regulation of any governmental body shall include any amendment, repeal or replacement thereof;

A reference to a party includes its executors, administrators, successors and permitted assigns.

3. TERM OF THE AGREEMENT

3.1. This Agreement begins on the Start Date and continues until the customer vacates the Premises or termination of the Agreement.

ARTICLE 2. CONNECTION

4. CONDITIONS PRECEDENT

4.1. The Network Utility's consent under this Agreement is at all times conditional upon the following conditions ("conditions precedent"):

- (i) The Customer engaging an installer accredited by the Network Utility or the Authority;
- (ii) The Customer and such accredited installer installing the Generation System in compliance with the related technical connection requirements and health and safety rules as stated in this Agreement or in the related Gambian regulation on power networks and generation;
- (iii) The Customer sending a certification of compliance of the Generation System facilities with the technical connection requirements and health and safety rules to the Authority for approval;
- (iv) The Customer complying with the applicable Schedule of this agreement;
- (v) The Customer complying with the technical standards in force in Gambia other than those included in this Agreement; and
- (vi) The Customer respecting the health and safety requirements approved by the Authority.

5. CONSENT TO CONNECTION

5.1. Subject to the conditions precedent being met, the Network Utility agrees to:

- (i) the installation of the Generation System at the Premises for interconnection to the Network; and
- (ii) the interconnection of the Generation System to the Network Utility's Network at the Point of Interconnection, on and subject to the terms of this Agreement.

5.2. The connection must comply with the requirements of the Authority and the requirements established in this Agreement. In case of inconsistency between the terms of these agreements on the particular connection and metering requirements, the national regulation, will prevail. The Authority will be in charge of giving approval to the connection after verifying the compliance with the Safety and Health Rules or any other applicable regulation.

6. CUSTOMER OBLIGATIONS

- 6.1. The Customer must:
- (i) coordinate planned maintenance works or disconnections with the Network Utility if the Generation System has a nameplate rating greater than 10 kW;
 - (ii) advise the Network Utility of any proposed material operational changes of the Generation System;
 - (iii) obtain the Network Utility's prior consent in writing to any material increase or decrease in capacity of the Generation System prior to any such increase or decrease; the Network Utility shall inform the Authority of any such change;
 - (iv) advise the Network Utility if the contracts for the connection or the sale of energy of the Premises are terminated or modified; and
 - (v) advise any subsequent occupant of the Premises of the existence of this Agreement and the requirement for the new occupant to enter into a new Network Connection Agreement with the Network Utility if the Generation System remains operational at the Premises.

7. CONNECTION COSTS

- 7.1. The Network Utility will normally be required to bear all costs associated with system reinforcement and modification and additional protection and control equipment as might be required to accommodate the Generation System.
- 7.2. For the avoidance of doubt, the Customer shall normally be expected to pay for the costs of the connection to the nearest appropriate connection point to the Network.
- 7.3. For Premises already connected to the Network, the Network Utility will decide whether or not the current Point of Interconnection is suitable to proceed with the installation of the Generation System and will determine the required modifications to be done to allow this connection.
- 7.4. For Premises not yet connected to the Network, the Network Utility will study the different candidate points of interconnection and select the Lowest Price Technically Compliant solution.

8. METERING

- 8.1. The Customer will be responsible for installing and maintaining appropriate metering.
- 8.2. The Customer acknowledges that the Network Utility will have the discretion to classify acceptable meter types for classes of Generation System and will select from within these types.
- 8.3. The Customer must arrange with their installer to ensure that the metering complies with the Network Utility's requirements.
- 8.4. Where reasonably practical, the Customer must ensure that the Generation System metering is located adjacent to the existing revenue metering for the Premises.
- 8.5. The Customer must arrange with the installer to ensure that the meter installation for the Generation System complies with the correspondent Schedule of this Agreement.
- 8.6. The Customer must supply the Network Utility with safe access to allow it to install, test, maintain or remove the meter installation of the Generation System.
- 8.7. The Customer consents to the Network Utility, its officers and agents entering the Premises for the purposes of testing the meter, such tests to be at the Network Utility's own expense.

9. DISCONNECTION

- 9.1. The Generation System may be taken off-line and disconnected from the Network by the Customer or the Network Utility for operational reasons or for planned maintenance. If the maintenance is in the network, the Network Utility will perform the disconnection after informing the Customer with enough anticipation. If the maintenance is for the Generation System, the Customer may perform the disconnection subject to the information and approval by the Network Utility. Subsequent reconnection will be subject to the same procedure.
- 9.2. The Network Utility may disconnect the Generation System
- (i) if connection would, in its reasonable opinion, breach technical or safety requirements under this Agreement.
 - (ii) if connection would, in its reasonable opinion, interfere with the connection or supply of electricity to other customers.
- 9.3. Should the Network be unable to accept energy generated by the Customer for any justified reason, no compensation will be payable by the Network Utility.

10. TESTING

- 10.1. Upon completion of the installation of the Generation System, the Network Utility must conduct a test of the Generation System equipment at a mutually agreed time and date between the Network Utility and the Customer for the purpose of establishing that the Generation System complies with this Agreement.
- 10.2. The test will consist of:
- (i) disconnection of the Premises from the Network;
 - (ii) reconnection of the Premises to the Network; and
 - (iii) inspection and test of the Generation System as the Network Utility considers it necessary for compliance with this Agreement.

ARTICLE 3. REQUIREMENTS**11. REQUIREMENTS BASED ON VOLTAGE LEVEL**

- 11.1. As the Generation System is connected to the [medium voltage distribution network/ low voltage distribution network/ transmission network], the terms and conditions referenced in [Schedule A/ Schedule B] shall apply and [Schedule B /Schedule A] shall not apply, where:
- (i) Schedule B covers Generation Systems connected to the low voltage distribution network up to a maximum of 30 kW of installed capacity for 3 phase connection or 10 kW of installed capacity for single phase connection that may be paralleled with the Network Utility 's supply regardless of the length of time that parallel operation would normally occur; and
 - (ii) Schedule A covers other Generation Systems.

12. PROTECTION

- 12.1. The Generation System must have provision for complete automatic separation from the Network or shutdown in the event of any irregularity or failure on any phase of the supply, or for a fault on the Generation System or its associated circuits.

13. COMPATIBILITY

- 13.1. Voltage and frequency must match that of the Network Utility's supply and any distortion of these parameters must be contained within acceptable limits in order that there is no interference with the quality of supply to other customers or risk of damage to apparatus belonging to other customers or the supply authority.

14. REGULATORY

- 14.1. The Generation System installation must comply with all relevant standards in force in Gambia regarding the installation of photovoltaic arrays, wind generation units and low-voltage switchgear and control gear – switches, disconnectors, switch disconnectors and fuse combination units as applicable. All other relevant codes and government and statutory requirements must also be respected.

15. TYPE OR CAPACITY CONSTRAINTS

- 15.1. At some locations, technical requirements may limit the type or capacity of machine that may be connected. Where required by the Network Utility, the Customer shall pay for any technical studies required to ensure the suitability of the machine's interaction under normal and fault conditions with the proposed system connection. These studies shall be undertaken to the Network Utility's satisfaction regarding technical content.
- 15.2. The requirements for machine stability will vary, depending on the location of the Generation System, the voltage level and the configuration of the interconnecting network. The Network Utility may be able to provide assistance in this regard.

16. SAFETY AND OPERATING PROCEDURES

- 16.1. It is essential that the parallel operation of Generation System with the Network Utility's system does not present a hazard to the Network Utility's operational staff, to the public or to the Customer. Consequently, it is necessary that a failure of supply or irregularity in any of the phases of the Network Utility's network result in the complete and automatic separation of the Generation System or disconnection (shut down) of the Generation System from the system. In addition, for certain faults on the Generation System itself it shall be automatically disconnected and, where appropriate, the prime mover automatically shut down.

- 16.2. To ensure that operation of the Generation System does not introduce hazards to the Network Utility or the Customer's operating staff, operating procedures (including communication arrangements) shall be submitted to the Network Utility and the Authority, and when agreed to, placed in writing with a copy held by both parties. Operating procedures may include mutually agreed real and reactive power limits during all operating conditions possibly including contingencies not covered by the design criteria. The aim is to ensure that these operating procedures are adhered to. Responsibility for the training of staff rests with the Customer. Any change to approved operating procedures must be agreed to by both parties and documented as above.
- 16.3. The Customer must:
- (iii) install and maintain the Generation System and associated equipment in safe working order at all times and in accordance with the requirements of this Agreement;
 - (iv) have a Generation System isolation procedure displayed prominently at the main switchboard and keep a copy of the Generation System operations manual in or near the main switchboard at all times; and
 - (v) comply with the reasonable directions of the Network Utility in order to secure the safety and stable parallel operation of the Network and the Generation System.

17. FAULT LEVEL CONTROL

- 17.1. Generation System's connected to the Network may not raise fault levels beyond the capacity of the Network Utility's interruption devices. Calculations of the actual contribution from the Customer's plant to the fault level at the Point of Interconnection will be necessary at the design stage to determine the need for measures to control fault levels. All details of such calculations shall be provided by the Customer.
- 17.2. It will be necessary for the Customer to bear any costs incurred by the Network Utility in respect of fault level control measures. Switchgear on the Customer's system must be capable of withstanding the combined fault current at the Point of Interconnection resulting from the combination of the new configuration of the Network Utility's system after inclusion of the Generation System.

ARTICLE 4. MISCELLANEOUS

18. INCONSISTENCY BETWEEN CLAUSES AND SCHEDULES

- 18.1. If there is any inconsistency between a clause of this Agreement and the Schedules to this Agreement, then the clause of the Agreement will prevail.

19. EFFECT OF THIS AGREEMENT

- 19.1. This Agreement covers the connection of the Generation System to the Network only and does not relieve the Customer of any obligations at law or the requirements of another authority regarding the installation, operation or maintenance of the Generation System.

20. JOINT AND SEVERAL LIABILITY

- 20.1. If the Customer is more than one person:
- (i) an obligation of those persons is joint and several;
 - (ii) a right of those persons is held by each of them severally.

21. LIABILITY FOR DAMAGE

- 21.1. The Customer acknowledges that the Network Utility will not be liable for any loss, damage or injury suffered or claimed by the Customer or any other person that may occur or be attributable to the installation and operation of the Generation System at the Premises, unless directly caused by the Network Utility's actions.
- 21.2. The parties acknowledge that the Customer is responsible for any insurance costs associated with their obligations or possible liability under this Agreement.

22. ASSIGNMENT

- 22.1. Neither party may assign its rights or obligations under this Agreement without the prior written consent of the other, which will not be unreasonably withheld.
- 22.2. Should the Customer vacate the Premises, the new occupier's retailer will contact the Network Utility to advise of the change of occupier and provide the related new data requirements requested by the Network Utility.

23. TERMINATION

- 23.1. The Network Utility may terminate this Agreement at any time in the event that the Customer fails to comply with the terms and conditions of this Agreement. However, prior to any such termination, the Network Utility will give three months' notice in writing of the Customer's failure to comply and of the Network Utility's intention to terminate the Agreement. The Network Utility may then terminate this Agreement at the end of the three month period unless the Customer takes measures necessary to eliminate, to the Network Utility's satisfaction, the matters identified by the Network Utility.
- 23.2. The Parties may terminate this Agreement at any time by mutual written agreement.
- 23.3. The Network Utility may terminate this Agreement by giving notice if the Customer terminates their contracts for sale of energy, including but not limited to vacating the Premises.
- 23.4. The Network Utility may disconnect the Generation System at any time as permitted by law or this Agreement in which case this Agreement will terminate upon disconnection.

IN WITNESS WHEREOF, the Parties have caused the signatures of their authorised officers and their seals to be affixed as of the day and year first above written. This agreement has been established two (2) originals.

For and on behalf of [name of Buyer]

Represented by [name and position]

Witness [name]

For and on behalf of [name of Seller]

Represented by [name and position]

Witness [name]

SCHEDULE A: ADDITIONAL REQUIREMENTS FOR MEDIUM VOLTAGE AND TRANSMISSION NETWORK CONNECTION

1. COMPATIBILITY WITH SYSTEM

It is important that any proposed connection of the Generation System to the network is investigated in depth to ensure that parallel operation does not degrade the quality of supply to the Network Utility's existing or future customers. The cost of any corrective measures found necessary after installation on the Premises up to the Point of Interconnection shall be borne by the Customer, and the cost of any corrective measures on the Network after the Point of Interconnection shall be borne by the Network Utility.

In any technical aspect not explicitly covered in the present Schedule, the national standards in force for the connection to power grids in Gambia shall be applied.

1.1. Response to voltage levels

The Generation System shall remain connected to the Network as long as the voltage level at the Point of Connection is within the range of 90% - 110% of the base voltage. The base voltage to be used is the nominal voltage between phases of the Network at the Point of Interconnection.

Where the voltage at the Point of Interconnection deviates from its standard value (base value) more than $\pm 10\%$ and less than $\pm 15\%$ for longer than 5 minutes, the Generation System shall disconnect from the Network.

Where the voltage at the Point of Interconnection deviates from its standard value (base value) more than $\pm 15\%$ for longer than 5 seconds, the Generation System shall disconnect from the Network.

1.2. Fault ride-through capability requirements

In completion of the previous point, in case of a voltage dip due to faults or other disturbances in the Network, the Generation System shall remain connected to the network in case of normal operation of the protection devices of the Network, unless otherwise specifically specified by the Network Utility.

Non-compliance with this requirement would result in important danger to the Network stability.

1.3. Response to frequency levels

The Generation System shall be capable of remaining connected to the Network as long as the frequency at the Point of Interconnection is within the range of 49 Hz – 51 Hz.

Where the frequency at the Point of Interconnection is higher than 52 Hz, the Generation System shall be disconnected in less than 0.16 seconds.

Where the frequency at the Point of Interconnection is lower than 48 Hz, the Generation System may disconnect from the Network.

1.4. Supervisory System Mains Signalling

In case the Network is used to transmit signals, the Network Utility may request the Customer to, and the Customer shall, ensure capacitors installed on their Premises are blocked to limit absorption of the Network Utility mains signals (for existing and future supervisory systems). The manufacturer should be consulted on necessary blocking requirements.

A Customer installing mains signalling or a communications system on their own electrical installation shall (when requested by the Network Utility) minimise penetration of signals beyond their terminals.

The use of the Network Utility mains for customer's signalling or communication purposes is not permitted because of the risk of interference between customer and the Network Utility existing or future mains signals.

1.5. Direct Current Component

Customers must ensure that their equipment and devices do not cause a direct current component in the Network Utility's mains to exceed the 0.5% of the nominal phase current.

1.6. Power Factor Requirements

Under normal operation, the Generation System customer must operate connected to the Network with a power factor as defined in the grid code.

Until such grid code is established, a grid code Network Utility may establish a figure, to be approved by the Authority.

If the power factor falls outside the agreed limits, the customer must take action to ensure compliance as soon as reasonably practicable.

Customers must ensure that eventual reactive power devices (such as capacitor banks) are designed to avoid attenuating audio-frequency signals used for load control or operations (if any).

1.7. Compliance with Limits

The Network Utility will advise the customer connection point, system fault level, and arrange for provision of supply system details necessary for a supply quality assessment.

To ensure compliance with these limits, the Network Utility may require a programme of tests be performed before and after the commissioning of the equipment. If, in the opinion of the Network Utility, the equipment does not comply with these limits, or causes, or is likely to cause, undue interference with the supply to other customers, the Network Utility may direct the customer to modify the equipment or its operation to avoid such interference. The customer is responsible for such modifications which are at its own expense.

Notwithstanding any of the requirements set out in this document, if the operation of any item of customer's equipment causes undue interference to a third party, the Network Utility may disconnect the offending equipment.

1.8. Islanding

The Generation System shall be immediately disconnected after formation of an Island.

The Generation System shall be capable of detecting the Island and disconnecting the Generation System within 2 seconds of the formation of the Island.

For fast detection of Islands, the Generation System shall be equipped with either rate of change of frequency relays or voltage vector shift relays, or both.

2. PROTECTION

There must be proper coordination between the protection systems of the generating equipment and the Network Utility's network in order to ensure correct operation of protection systems. The areas requiring the installation of protection equipment are:

- (i) the Customer's private generating plant,
- (ii) the Network, and
- (iii) the connection system between generating plant and supply network.

2.1. Supply Network

Each private generating plant installation will require investigation to determine the extent of any system modifications required on the supply network to allow parallel operation. The modifications may be as minor as the application of a new protection setting, safety signs, or as complex as the installation of new switchgear and associated protection and control schemes. Where the Network is subject to auto-reclose then this function shall, where practicable, be encompassed in any protection and control scheme, and not inhibited.

2.2. Interface protection

Each generator unit in the Generation System of the Customer shall have interface protection. This protection shall include at least the following elements:

- (i) Over frequency
- (ii) Under frequency
- (iii) Over voltage
- (iv) Under voltage
- (v) Loss of mains
- (vi) Directional overcurrent (unless otherwise approved by the Network Utility for each particular case, in particular for smaller Generation System)
- (vii) Earth fault (unless otherwise approved by the Network Utility for each particular case)

Relays must ensure fail-safe operation which will result in the tripping of the generator main incomer circuit breaker if relay develops a fault.

Relays must prevent re-closure of generator or main incomer circuit breaker until all relays have reset correctly.

Relays shall monitor the installation at the Network Utility connection voltage unless otherwise agreed between the Network Utility and the Customer.

2.3. Interconnecting System

The protection installed at the Customer's end of the connection system shall provide discrimination for faults on the supply network.

The Customer will be required to install control equipment to ensure that the level of Generation System imported or exported is restricted to any mutually agreed power transfer limit.

2.4. Interlocking

Manual closing of either the generator circuit breaker or the main incoming circuit breakers shall be disabled when either the Network Utility or the generator source is live.

In the exceptional circumstances of loss of the supply source or the generator control system, manual closing may be re-enabled, paying special attention to unsynchronised paralleling.

Interlocking shall prevent closure of interconnecting switchgear when both the generator and the Network Utility sources of supply are dead. It shall only be possible to close onto a dead busbar when either the Network Utility or generator source of supply is isolated.

It shall not be possible for the generator circuit breaker or the main incoming circuit breaker to close or remain closed unless all three phases of the mains supply are normal.

2.5. Loss of Mains protection

In case of loss of supply from the Network Utility network, the loss of mains protection shall ensure that the Generation System ceases to energise the Network Utility network until all the Network Utility's protection operation have been finished and the normal operation and supply of the network affecting the Generation System's connection point have been re-established.

The protection in charge of this task, regardless of the technique employed (rate of change of frequency, vector shift or similar), shall ensure that the energy supply is stopped within 0.5 seconds for a change in the Point of Interconnection greater than 0.4 Hz/second for rate of change of frequency protection or greater than 6 degrees for vector shift protection.

2.6. Earth fault protection

The earth fault protection will disconnect the generator in case of islanding, acting as a backup for the other protections. The earth fault protection shall trip the generator in less than 30 seconds if the effective neutral displacement is higher than 30%.

2.7. Overvoltage and Undervoltage protection

The overvoltage protection shall monitor the three phases of the supply network at the interconnection interface and shall monitor the nominal voltage at the Point of Interconnection.

The undervoltage protection shall monitor the three phases of the supply network at the interconnection interface and shall monitor the nominal voltage at the Point of Interconnection.

2.8. Overfrequency and Underfrequency protection

The overfrequency protection shall monitor one phase of the supply network at the interconnection interface and shall monitor nominal frequency at the Point of Interconnection (50 Hz).

The underfrequency protection shall monitor one phase of the supply network at the interconnection interface and shall monitor nominal frequency at the Point of Interconnection (50 Hz).

3. CONTROL

3.1. Synchronising

The connection of the Generation System to the Network shall only take place when the waveform generated by the Generation System and the waveform of the Network at the Point of Interconnection are synchronized.

Synchronisation shall be fully automatic.

The closing operation of switchgear that may parallel unsynchronised generation to the Network Utility network shall be prevented by checking the synchronising equipment or by means of an interlocking system.

The equipment used for synchronising must be approved by the Network Utility.

SCHEDULE B: ADDITIONAL REQUIREMENTS FOR LOW VOLTAGE NETWORK CONNECTION

1. COMPATIBILITY WITH SYSTEM

It is important that any proposed connection of a Generation System to the supply network is investigated in depth to ensure that parallel operation does not degrade the quality of supply to the Network Utility's existing or future customers. The cost of any corrective measures found necessary after installation on the Premises up to the Point of Interconnection shall be borne by the Customer, and the cost of any corrective measures on the Network after the Point of Interconnection shall be borne by the Network Utility.

In any technical aspect not explicitly covered in the present Schedule, the national standards in force for the connection to power grids in Gambia shall be applied.

1.1. Supervisory System Mains Signalling

In case the Network is used to transmit signals, the Network Utility may request the Customer to, and the Customer shall, ensure capacitors installed on their Premises are blocked to limit absorption of the Network Utility mains signals (for existing and future supervisory systems). The manufacturer should be consulted on necessary blocking requirements.

A Customer installing mains signalling or a communications system on their own electrical installation shall (when requested by the Network Utility) minimise penetration of signals beyond their terminals.

Because of the risk of interference between customer and the Network Utility existing or future mains signals, use of the Network Utility mains for customer's signalling or communication purposes is not permitted.

1.2. Direct Current Component

Customers must ensure that their equipment and devices do not cause a direct current component in the Network Utility's mains (neutral) to exceed the following limits:

- (i) 5 mA for continuous operation, or
- (ii) 120 mA per operating hour for non-continuous operation

The maximum value of direct current permitted in the neutral is 1.5 amps per equipment with an assessed daily operating time of 5 minutes or less.

1.3. Power Factor Requirements

Under normal operation, the Generation System customer must operate connected to the Network with a power factor as defined in the grid code.

Until such grid code is established, a grid code Network Utility may establish a figure, to be approved by the Authority.

This may be achieved by installing an additional reactive plant or by reaching a commercial agreement with the Network Utility to install, operate and maintain equivalent reactive plant as part of the connection assets.

Customers must ensure that capacitor installations are designed to avoid attenuating audio-frequency signals used for load control or operations (if any).

1.4. Loss of Mains protection

In case of loss of supply from the Network Utility's network, the Loss of Mains protection shall ensure that the Generation System ceases to energise the Network Utility's network until all the Network Utility's protection operation have been finished and the normal operation and supply of the network affecting the Generation System's connection point have been re-established.

The protection in charge of this task, regardless of the technique employed (rate of change of frequency, vector shift or similar), shall ensure that the energy supply is stopped within 0.5 seconds for a change in load at the Generation System terminals in excess of $\pm 25\%$ of maximum rated power.

1.5. Compliance with Limits

The Network Utility will advise the customer connection point, system fault level, and arrange for provision of supply system details necessary for a supply quality assessment.

To ensure compliance with these limits, the Network Utility may require a programme of tests to be performed before and after the commissioning of the equipment, at the Network Utility's expense. If, in the opinion of the Network Utility, the equipment does not comply with these limits, or causes, or is likely to cause, undue interference with the supply to other customers, the Network Utility may direct the customer to modify the equipment or its operation to avoid such interference. The customer is responsible for such modifications at its own expense.

Notwithstanding any of the requirements set out in this document, if the operation of any item of customer's equipment causes undue interference to a third party, the Network Utility may disconnect the offending equipment.

2. PROTECTION

There must be proper coordination between the protection systems of the generating equipment and the Network Utility's network in order to ensure correct operation of protection systems. The areas requiring the installation of protection equipment are:

- (i) the Customer's private generating plant,
- (ii) the Network, and
- (iii) the connection system between generating plant and supply network.

2.1. Interface protection

Each generator unit in the Generation System of the Customer shall have interface protection. This protection shall include the following elements:

- (i) Over frequency
- (ii) Under frequency
- (iii) Over voltage
- (iv) Under voltage
- (v) Loss of mains

2.2. Private Generating Plant

The Network Utility will require details of the proposed protection scheme to be submitted for consideration and reserves the right to require modification where this is in the interest of safe operation.

2.3. Supply Network

Each Generation System will require investigation to determine the extent of any system modifications required on the supply network to allow parallel operation. Modifications may be as minor as the application of a new protection setting, safety signs, or as complex as the installation of new switchgear and associated protection and control schemes. Where the Network is subject to auto-reclose then this function shall, where practicable, be encompassed in any protection and control scheme, and not inhibited.

2.4. Interconnecting System

The protection installed at the Customer's end of the connection system shall provide discrimination for faults on the supply network.

The Customer will be required to install control equipment to ensure that the level of imported or exported energy from the Generation System is restricted to any mutually agreed power transfer limit.

3. CONTROL

3.1. Synchronising

Where relevant, provision shall be made by the Customer for accurate manual or automatic synchronising of its supply to the Network Utility's supply. If manual synchronising is chosen then "check sync" relays may be required. Automatic synchronising is preferred. In either case, the synchronising process must be carried out in a logical and sequential order. The equipment used for synchronising must be approved by the Network Utility.

ANNEX E: NET METERING AGREEMENT

THIS AGREEMENT is made on..... day 20.....

BETWEEN National Electricity and Water Company (“NAWEC”) and [*Name of customer-generator*] (“Customer-generator”) at [*address*].

Whereas Customer-generator wishes to sell and NAWEC wishes to purchase energy produced by the approved net metering facility:

The parties agree to the following:

1. Approval: Customer-generator shall not commence construction of the net-metering facility until NAWEC has issued written approval for its installation.
2. Net-metering Facility: Customer-generator’s net-metering facility shall mean the generating facility described in Annex A. This facility shall employ solar, wind or hydroelectric power generation with a maximum output capacity of twenty kilowatts. This facility shall be located on the Customer-generator’s premises and will interconnect and operate in parallel with NAWEC’s electric power supply system. The operation of the net metering facility is intended primarily to offset part or all of Customer-generator’s own electrical requirements. Customer-generator shall be responsible for the design, installation and operation of the net metering facility and shall obtain and maintain all required permits and approvals. This agreement is applicable only to the net-metering facility described in the Schedule. Any modifications to the net metering facility can only be made following the written approval of NAWEC.
3. Term: This agreement shall commence on the date established above and terminate after 15 years, with any change in ownership of the net-metering facility or by written agreement, signed by both parties. Further, if Customer-generator is in default under this Agreement, NAWEC shall have the right to terminate this Agreement if Customer-generator fails to cure its default within 10 days of the date NAWEC notifies Customer-generator of the default.
4. Definition: Net energy is the difference between electrical energy consumed by the Customer-generator from NAWEC’s electrical supply system and the electrical energy generated by the Customer-generator and fed back into NAWEC’s electrical supply system.
5. Measurement of Net Energy: Bi-directional metering equipment shall be installed to measure the flow of electrical energy in each direction. This equipment shall be installed at the Customer-generator’s expense and in compliance with NAWEC’s specifications.
6. Price and Payment Methodology: All service shall be billed pursuant to NAWEC’s appropriate tariff. Credits for the net energy flow into NAWEC’s electrical supply system shall be apportioned according to the Feed In Tariff Rules.
7. Interconnection: Customer-generator shall provide the electrical interconnection on their side of the meter. At Customer-generator’s expense, NAWEC shall make reasonable modifications to NAWEC’s system necessary to accommodate the net metering facility. The cost for such modifications shall be determined on a case by case basis and must be paid in advance of installation. The net-metering facility shall include, at Customer-generator’s expense, all equipment necessary to meet applicable safety, power quality, and interconnection requirements established by NAWEC’s policies.
8. Disconnection: Customer-generator shall furnish and install, on their side of the meter, a disconnecting device capable of fully disconnecting and isolating the net metering facility from NAWEC’s electric supply system. The disconnecting device shall be located adjacent to NAWEC’s bi-directional metering equipment and shall be of the visible break type in a metal enclosure that can be secured by a padlock. The disconnecting device shall be accessible to NAWEC’s personnel at all times. NAWEC shall have the right to disconnect the net metering facility from NAWEC’s electric supply system when necessary to maintain safe and reliable electrical operating conditions. NAWEC shall have the right to disconnect the net-metering facility if, in NAWEC’s sole judgment, the operation of the net-metering facility at any time adversely affects the operation of NAWEC’s electrical system or the quality and reliability of NAWEC’s electrical service to other customers. The net-metering facility shall remain disconnected until such time as NAWEC is satisfied, in its sole judgment, that condition(s) causing the disconnection have ended or have been corrected. In the event of any disagreement between the Customer-generator and NAWEC about actions carried out under this clause, either party may request a review by The Gambia Utilities Regulatory Authority established under The Gambia Public Utilities Regulatory Authority Act, 2001 (“PURA”).
9. Operational Standards: Customer-generator shall furnish, install, operate and maintain in good order and repair, all without cost to NAWEC, all equipment required for the safe operation of the net metering facility operating in parallel with NAWEC’s electrical supply system. This shall include, but not be limited to, equipment necessary to (1) establish and maintain automatic synchronism with NAWEC’s electric supply system and (2) automatically disconnect the net-metering facility from NAWEC’s electrical supply system in the event of overload or outage of NAWEC’s electrical supply

system. The net metering facility shall be designed to operate within allowable operating standards for NAWEC's electrical supply system. The net-metering facility shall not cause any adverse effects upon the quality or reliability of service provided to NAWEC's other customers.

10. Installation and Maintenance: all equipment on Customer-generator's side of the delivery point, including the bi-directional metering equipment and the required disconnecting switch, shall be provided and maintained in satisfactory operating condition by Customer-generator, and shall remain the property and responsibility of the Customer-generator. NAWEC shall bear no liability for Customer-generator's equipment or for the consequences of its operation.

11. Indemnity and Liability: Each Party as shall defend, hold harmless, and indemnify the other Party and the directors, officers, employees, and agents of the other Party against and from any and all loss, liability, damage, claim, cost, charge, demand, or expense (including any direct, indirect or consequential loss, liability, damage, claim, cost, charge, demand, or expense, including attorney's fees) for injury or death to persons, including employees of either Party, and damage to property, including property of either Party, arising out of or in connection with (a) the engineering, design, construction, maintenance, repair, operation, supervision, inspection, testing, protection or ownership of the facilities, or (b) the making of replacements, additions, betterments to, or reconstruction of the facilities, provided, however, Customer-generator's duty to indemnify NAWEC hereunder shall not extend to loss, liability, damage, claim, cost charge, demand, or expense resulting from interruptions in electrical service to NAWEC's customers other than Customer-generator. This indemnity shall apply notwithstanding active or passive negligence. However, neither Party shall be indemnified hereunder for its loss, liability, damage, claim, cost, charge, demand, or expense resulting from its sole negligence or willful misconduct.

12. Pre-Operation Inspection: Prior to interconnection and operation, the net-metering facility and associated interconnection and disconnection equipment shall be inspected and approved by NAWEC.

13. Access: Authorized NAWEC employees shall have the right to enter the Customer-generator's property at any time for the purpose of inspecting and/or testing the disconnecting device and bi-directional metering equipment in order to insure proper operations and compliance with applicable regulations.

14. No cash value: NAWEC shall not pay for credit recorded on the bi-directional metering equipment and the credit may only be redeemed against electricity consumption. IN WITNESS WHEREOF, the parties hereto have caused two originals of this Agreement to be executed by their duly authorized representatives. This Agreement is effective as of the latter of the two dates set forth below.

CUSTOMER-GENERATOR

NAME (PRINT) _____

SIGNATURE _____

DATE _____

NAWEC

NAME (PRINT) _____

POSITION _____

SIGNATURE _____

DATE _____

SCHEDULE

Customer-generator Information

Name _____

Correspondence Address _____

Address of generator _____

Phone _____

NAWEC Customer Account Number: _____

Net-metering Facility Information

Generator Size (kW AC) _____

Inverter Manufacturer _____

Inverter Model # _____

Inverter Location _____

PV Module Brand & Model No. (if applicable) _____

Installing electrician Information

Licensed A.C, Electrician Name Permit # _____

Electrician's Business Name _____

Electrician's Address _____

Electrician's Daytime Phone _____

Certification(s)

(If an inverter is used) The net metering facility's inverter meets the requirements of IEEE 929, "Recommended Practice for Utility Interface of Photovoltaic (PV) Systems" and Underwriters Laboratories (UL) Subject 1741, "Standard for Static Inverters and Charge Controllers for Use in Photovoltaic Power Systems".

Signature (Vendor or Installer) _____

Date _____

Name (Printed) Company _____

Address _____

NAWEC Inspection

1. By-directional meter installed. Serial number _____
2. System disconnect installed. Type: _____
3. Operational test complete: Pull meter or operate disconnect, check voltage output to service.

4. Net meter generation plant security and safety. (Check conduits, switch covers, exposed wire).

NAWEC Representative Signed: _____

Title: _____

Date: _____

ANNEX F: ATTENDEES AT WORKSHOP AND SCHEDULE

Invitees

Solicitor General and Legal Secretary, AG Chambers and Ministry of Justice

Permanent Secretary, Ministry of Finance and Economic Affairs

Permanent Secretary, Ministry of Forestry and Environment

Permanent Secretary, Ministry of Trade, Industry, Regional Integration & Employment

Permanent Secretary, Ministry of Agriculture

Charge D'Affaires, EU Delegation in the Gambia

Managing Director, National Water and Electricity Company

Executive Director, National Environment Agency

Director General, Public Utilities Regulatory Authority

Director, National Agricultural Research Institute

Vice Chancellor, University of the Gambia

Chairman, REAGAM

Managing Director, Global Electric Group

CEO, Gambia Chamber of Commerce and Industry

President, Gambia Hotel Association

President, Association of Gambian Manufacturers

Managing Director, Guaranty Trust Bank

Managing Director, Skye Bank

Managing Director, EcoBank

Managing Director, Zenith Bank

Managing Director, Sahel Bank

Managing Director, Gamcel

Managing Director, Africell

Managing Director, QCell

Managing Director, Comium

Managing Director, GAMTEL

Manager, Gamwind

Manager, Mbolo,

Manager, Gamsolar

Program Schedule

Feed in Tariff and Power Purchase Agreement Workshop for the EUEI-PDF project:

Thursday 20 September 2012 at Paradise Suites Hotel

Time	Activities
09:00 - 09:30	Registration of participants
09:30 - 10:00	PART A: OPENING CEREMONY – Chairman: Mr. Abdou Jobe, Director General, Public Utilities Regulatory Authority
	Statement by Mr. Mod A.K. Secka, Permanent Secretary, Ministry of Finance and Economic Affairs
	Statement by the Representative of European Union Delegation to the Gambia
	Opening Remarks by Ms. Ada Gaye, Permanent Secretary, Ministry of Energy
10:00 – 10:30	Coffee/Tea Break
10:30 – 13:30	PART B: WORKING SESSION – Chairman: Mr. Ebrima Sanyang, Managing Director, National Water and Electricity Company
	Brief overview of project objectives and progress to date by Alice Waltham, AF-Mercados
	Regulatory framework, Leonardo Lupano, AF-Mercados
	Draft FIT rules, José María, AF Mercados
	Power Purchase Agreements, Alice Waltham
	Discussion – Questions and debate, led by Ebrima Sanyang
	Closing Remarks by Kemo K. Ceesay, Director of Energy, Ministry of Energy
13:30	Close and lunch



Ministry of Energy



DATE: 20th September, 2012

NO	NAME	INSTITUTION	TEL	AMOUNT	SIGNATURE
1	Abduluce Hydas	RECPT	9962904	D400	[Signature]
2	Fahissa Ken	MOE	9826331	D400	[Signature]
3	Uchman Farooq	MOE	9154700	D400	[Signature]
4	Madan Munde	MOE	9835172	D400	[Signature]
5	Mama Mwangi	MOE	9062231	D400	[Signature]
6	Danda Mwangi	MOE	9976093	D400	[Signature]
7	Chris Dora	RECPT	9788853	D400	[Signature]
8	Kocuo Mwangi	CITATI	8821536	D400	[Signature]
9	Bobacanda Saka	COAST	3955061	D400	[Signature]
10	Tanaka Mwangi	THE VOICE	3029110	D400	[Signature]
10	Mam Mwangi Saka	Today Newspaper	7640553	D400	[Signature]
11	SHIRIFF SAIDHANI	TV	3947967	D400	[Signature]
12	Abdul Nyolach	The Point	7478780	D400	[Signature]
13	Kwamba Saka	The Standard Daily	6865420	D400	[Signature]
14	Kadidi Saka	Transtar The Point	7431717	D400	[Signature]
15	Bursum James	PHDA	9961692	D400	[Signature]



Ministry of Energy



Africa-EU Energy Partnership



energy for development

DATE: 20th September, 2012

NO	NAME	INSTITUTION	TEL.	AMOUNT	SIGNATURE
16	Mustapha Mbye	CRIS - Radio	3655506	D400	Mbye
17	Yusufu Joff	PURA	8778777	D400	Joff
18	Amadou Bah	GRIS Radio	3655596	D400	Bah
19	Amourou Samel	PURA	9961759	D400	Samel
20	7000 Colley	MOE	9816773	D400	Colley
21	Sheuff Barry	Daily Observer	748068	D400	Barry
22	Henri Diatta	CRIS	748068	D400	Diatta
23	Matar Toure	PURA	7011013	D400	Toure
24	Lamin Diassouly	G.I.T.I	7816942	D400	Diassouly
25	Lamin Njie	MOE	7994799	D400	Njie
26	Ebrima Barry	MOE	7065445	D400	Barry
27	Adama Grassama	MOE	6953317	D400	Grassama
28	Nyale Nyaly	MOE	9834001	D400	Nyaly
29	Georg Leme Nibe	SDC	7192781	D400	Nibe
30	Lamin Jaman	MOE	9927977	D400	Jaman
31	Moua Njie	MOE	9981566	D400	Njie



Ministry of Energy



DATE: 20th September, 2012

NO	NAME	INSTITUTION	TEL.	AMOUNT	SIGNATURE
32	Messia Sidi Jalla	MOE	7775588	D400	[Signature]
33	Sungu Gela	PURAT	9917010	D400	[Signature]
34	Dugh Sugi	MOE	9909686	D400	[Signature]
35	Quamey Minteh	MOE	7015515	D400	[Signature]
36	Fatem Fofanis	General Engineering	9936567	D400	[Signature]
37	Quzman Singen	Sue-Cam Co. Ltd.	9902671	D400	[Signature]
38	Kamig Akoun	Ministry of Justice	9801814	D400	[Signature]
39	Sally Tamad	MOE	9390246	D400	[Signature]
40	Roses Gampbell	PURA	9933057	D400	[Signature]
41	Monaden Jah	NAWEC	9963226	D400	[Signature]
42)	Lana Sabally	NAWEC	9964075	D400	[Signature]
43)	Dambor Jally	NAWEC	9962609	D400	[Signature]
44	Remador Saho	NEE	7790615	D400	[Signature]
45	Tamba Njoso	MOE	7634521	D400	[Signature]
46	ALBERT HACKETT-GONEX	OCCELL	3100108	D400	[Signature]
47	Kemo K. Ceesay	MOE	7990070	D400	[Signature]



Ministry of Energy



DATE: 20th September, 2012

NO	NAME	INSTITUTION	TEL	AMOUNT	SIGNATURE
48	HANS NOSTERBOER	GAM-SOLAR ENERGY	9956320	400.	<i>[Signature]</i>
49	Ada Gaye	M. O. E	9965100		
50	Kumbag Konate	M. O. E	9965733		<i>[Signature]</i>
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	
				D400	