

# NIGERIAN ELECTRICITY REGULATORY COMMISSION

# REGULATIONS ON FEED-IN TARIFF FOR RENEWABLE ENERGY SOURCED ELECTRICITY IN NIGERIA

### **NIGERIAN ELECTRICITY REGULATORY COMMISSION**

In exercise of the powers to make Regulations conferred by Section 32(1) and 96 of the Electric Power Sector Reform Act 2005 (Act No. 6 of 2005), the Nigerian Electricity Regulatory Commission makes the following Regulations on Feed- In Tariff for Renewable Energy sourced Electricity in Nigeria.

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# REGULATIONS ON FEED-IN TARIFF FOR RENEWABLE ENERGY SOURCED ELECTRICITY IN NIGERIA

#### **CHAPTER I**

#### **GENERAL**

#### 1. Short title and commencement

- (a) This Regulation may be cited as the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015
- (b) This Regulation shall come into force on the date on which it is approved by a resolution of the Commission.
- (c) This Regulation shall be signed by the Chairman who shall also cause the seal of the Commission to be affixed thereon.

#### 2. Definitions and Interpretation:

(a) In these REGULATIONS, unless the context otherwise requires:

"Act" means the Electric Power Sector Reform Act, 2005, as amended from time to time .

"Applicant" means a person who has applied to the Commission for licence under these REGULATIONS.

"Agreement" or "PPA": means power purchasing agreement between the Investor and the Off-taker together with any related agreement;

"Buyer": Off-taker or purchaser of electrical energy from Feed-in-Tariff power plant.

"Commission" means the Nigerian Electricity Regulatory Commission

"Commissioning": the conduct of tests necessary to put a Unit or the Plant (as the case may be) into operation and supply to the grid;

"Commissioning Date": the date on which the developed power plant commences the operation of supplying electricity to the grid;

"Connection Point": the point of common coupling at which the energy sent out (Net Electrical Output) from the Seller's Plant is delivered into Buyer's system or for the buyer;

"Deep connection": All reinforcement, extension or reconfiguration of the existing network beyond the point of connection and at higher voltage levels that is a direct consequence connecting the renewable energy generation unit

"Deep connection cost": the costs of reinforcement, extension or reconfiguration of the existing network beyond the point of connection and at higher voltage levels that is a direct consequence connecting the renewable energy generation unit.

"Eligible Renewable Energy Power sources" shall be defined as a new electricity generating project using the technologies specified in schedule 1. and of a capacity greater than 1 MW and equal or less than the maximum for that technology as in schedule 1.

"Grid" as defined in the Nigerian Electricity Supply Industry Grid Code.

"kW": abbreviation for kilowatt;

"kWh": abbreviation for kilowatt hour being three million six hundred thousand (3,600,000) Joules as defined in ISO 1000.1992(E);

"Levelised Cost of Energy (LCOE)": An (annual) annuity such that the present value of the annuity is equal to the per-kilowatt hour cost of building and operating a power plant

"Licensee" means any person who holds a licence issued under Part IV of the Act.

"Long Run Marginal Cost (LRMC)": the incremental cost of producing additional unit of electricity when all inputs are changed by a unit.

"Month" means a calendar month.

MW": abbreviation for megawatt being one thousand (1,000) kW;

"NBET": means Nigeria Bulk Electricity Trading Company Limited licensed under S68(2) EPSR Act 2005;

"Off-Taker": the Buyer of electrical energy for the purpose of selling the electricity to customers connected to the national grid or off-grid (mini-grid) systems.

"Plant": Seller's electrical energy generating power plant;

"Prior agreement": Agreement between the parties in which one of the parties undertakes all the necessary grid extension and upgrade so that the other party refunds at a later date, the cost relating to its own part of the upgrade.

"Seller": Investor/Developer of Feed-in-Tariff power plant

"Shallow connection": All installations of cables, poles and the coupling facilities(e. g. switchgear, transformer and meters) required to deliver power at the connection point excluding any grid upgrade beyond the common point of coupling

"Shallow connection cost": Connection costs associated with the installation of cables or lines and the coupling facilities(e. g. switchgear, transformer and meters) at the connection point excluding any grid upgrade beyond the point of common couplings.

"Year" means a period of twelve (12) calendar months.

(b) Any term that is defined in the Act, Rules and Codes of the Commission and used, but not defined in these regulations has the same meaning as that in the Act, Rules and Codes.

#### 3. Objective of the Regulation

The following are the objectives of the Regulation on Feed-In tariff for renewable Energy:

- a. To boost power supply in the country.
- b. Enhance the attainment of the national targets on renewable energy sourced electricity.
- c. Encourage greater private sector participation in power generation from renewable energy technologies, by providing investment security and market stability for investors.
- d. To develop, promote and harness the Renewable Energy (RE) resources of the country and incorporate all viable ones into the national energy mix.
- e. Encourage private investors to operate their power plants prudently and efficiently so as to maximize returns.
- f. Establish a guaranteed price for electricity generated from renewables for a fixed period that provides a stable income stream and an adequate return on investment;
- g. Provide priority access to the grid for renewable energy based electricity
- h. Establish an obligation to purchase power generated from qualifying renewable energy sources;
- Establish a level playing field for renewable and conventional electricity generation;
- j. Attract private sector investment to support the establishment of a self-sustaining renewable market.

# 4. Application and Scope of the Regulation

i. Application:

- a. The programme cap for the REFIT program shall be 2000MW or such other capacity as the Commission may from time to time determine.
- b. This feed-in tariff regulation shall apply only to technologies and capacities stated therein. Lower capacity shall be procured by net-metering and larger capacities shall be by competitive procurement after the coming into effect of the applicable regulations at a later date.
- ii. Scope: Subject to the capacity limits contained in Schedule 1 for each renewable energy technology, the provisions of these Regulations shall apply to:
- a) All qualifying renewable energy sourced electricity of capacity above 1MW and up to the capacity cap indicated for such resource in Schedule 1 at a site that is connected to the transmission grid or the distribution networks.
- b) The renewable components of a hybrid installation where such component meet the requisite size conditions as stated in (a) above.

### Chapter II

#### 5. Purchase Obligations of the Off-Taker

- (a) The Off-taker shall connect to accredited plants generating electricity from eligible renewable energy sources, subject to the costs being met by the developer.
- (b) The Off-taker shall treat as 'must buy' all electricity supplied by such renewable energy projects within the capacity limits defined in this regulation.
- (c) There shall be no obligation to purchase capacities outside these limits and such procurement may be done through other complementary mechanisms, with separate PPAs.
- (d) The Feed-in-Tariffs values set in this regulation shall include a standardised allowance for interconnection costs.
- (e) The costs of connection, including the costs of construction, upgrading of transmission/distribution lines, substations, and associated equipment shall be borne by the developer.
- (f) The NBET or its successor shall as a matter of priority, purchase 50% of the renewable energy electricity capacity limit established by this regulation, while the Distribution licensees shall take up the remaining 50% of the capacity.
- (g) The Distribution Licensees shall be obliged to provide access and connect licensed embedded renewable energy electricity generation plants accredited under the

scheme to the distribution network in their areas of operation where technically and economically feasible.

- (h) The Renewable Energy Power Generators shall be responsible for all shallow connection costs required to take the power to the point of connection to the grid/distribution networks. Such cost shall be considered part of the generation cost to be recovered through the tariff.
- (i) The Off-taker, with prior agreement, may at a reasonable economic expense as approved by the Commission, fund the interconnection and recover the associated costs from the Seller through the Feed-in-Tariff.
- (j) Any costs for reinforcements of the network (deep connection cost) shall be borne by either the Transmission System Provider or the Licensed Distributors, whichever is applicable.

# 6. Application for Renewable Energy (RE) Licence

## Qualifying Renewable Energy Generators -

- (a) Renewable energy projects above the Maximum Installed Project Capacity shall be developed through the existing power procurement guidelines/regulation and negotiation with the Bulk Trader, Distribution licensees or individual buyers.
- (b) Off-grid projects shall not be included in the REFIT arrangement.
- (c) NERC shall work in close consultation and collaboration with the Rural Electrification Agency to develop the technical and operational modalities for offgrid projects.
- (d) Applications to qualify as a Renewable Energy (RE) Generator shall be made together with the application for licence to generate electricity which shall state the specific REFIT technology and capacity size.
- (e) The terms and conditions of the Generation licence shall define the approval of qualification for the REFIT, specify the technology, the tariff approved, duration of the REFIT and other specific licensing conditions.
- (f) Application forms for a Generation Licence are provided on the NERC website. Details on the application process are as provided in the NERC regulation for application for licences.

# 7 Tariff Computation Method

- (a) The tariff schedule for the period starting from 2015 will be based on long range marginal cost.
- (b) These tariffs, where awarded to Licensees shall last for the duration of the PPA.

- (c) The Commission shall monitor uptake, taking into account the impact of each REFIT in an annual tariff review. The resulting tariffs shall only be applicable to new projects.
- (d) New Generators shall be required to negotiate tariffs under market conditions applicable at the time, which shall be applicable till the end of the contracted REFIT tariff.

### 8 Project Capacity Cap

- (a) The maximum total installed renewable energy project capacity is based on the draft National Energy Master Plan (NEMP) which envisaged that by the end of the 2020, 10% of the national energy supply shall be from renewables.
- (b) In line with NEMP, every viable renewable resource shall be included in the energy mix for the purpose of energy security and regional spread.
- (c) The additional power generation costs resulting from the REFIT will be covered through 'Burden sharing' by electricity consumers in the interim, pending the setting up of a special fund to cover incremental cost.
- (e) The Commission shall apply capacity limits to all REFIT technologies, specifically limiting the uptake of certain high-cost technologies based on the least cost optimization model.
- (f) A total of 2,000 MW of RE power shall be admissible into the grid (1,000 MW by the end of 2018 and 2,000 MW by the end of 2020) while the total grid capacity is anticipated to be within 10,000 MW to 20000 MW by 2020.
- (g) The following technology limits is hereby established, based on a total cost optimization study using the proportions in the Renewable master plan report for the short and medium term targets.
- (h) The NBET or its successor shall procure 50% of the requirement and the Discos shall procure 50%. The guidelines for NBET or its successor and Discos in respect of technologies shall be as stated in Schedule 2.
- (i) To prevent over subscription of REFIT, and minimize the resulting increase tariff, the Commission shall limit specific technologies for each DisCo in line with the potential of the renewable energy resources in its jurisdiction as stated in schedule 3.
- (j) A capacity cap for any resource may be exceeded if such additional capacity is at the price of next cheaper technology; provided that the resulting increase in tariff does not exceed 5%.

## 9. Tariff Methodology

- i. The Long Run Marginal Cost (LRMC) and Levelised Cost of Energy (LCOE) shall be the methodology used to set the Feed-In Tariffs (REFITs) for the qualifying REFIT technologies.
- ii. The methodology shall allow the cost of capital and the operating cost of the project to be recovered over the term of the Power Purchase Agreement (PPA) based on reasonable level of output/capacity.

# 10. Feed-in tariff Assumptions

REFIT assumptions and values for small renewable projects are provided in tables 1,2 and 4 to this Regulation.

The following policy assumptions underlie the calculation of these REFIT values:

- i. REFIT values are calculated on a technology-specific basis using the principle of LRMC which incorporate a reasonable investor return;
- ii. REFIT values shall not exceed the Long Run Marginal Costs (LRMC) of generation;
- iii. The REFIT shall be denominated in US dollars or the equivalent for other currencies converted at the naira Exchange Rate on the date of commercial operation published by Central Bank of Nigeria, however payments shall be done in Nigerian currency;
- iv. The REFIT applicable at the time a PPA is signed shall be the fixed value which shall apply over the Twenty (20) year life of the PPA.

#### 11. Term of Tariff

(a) The REFIT shall be reviewed every three (3) years and the resulting tariffs shall apply only to new projects.

#### CHAPTER III

# 12. REFIT Governance Structure

- (a) NERC shall be fully responsible for the regulation of the feed-in tariffs, in accordance with its mandate under the Electricity Power Sector Reform Act of 2005. Such responsibilities shall include:
- i. Review of the tariff structure for priority renewable energy technologies;
  - ii. Development and review of the REFIT guidelines;
  - iii. Monitoring licensed renewable energy generators and verifying electricity production;
  - iv. Establishing and reviewing technology specific capacity limits to prevent oversubscription of the REFIT;
  - v. Reviewing and updating the REFIT tariff model in line with the monitoring exercise.
- (b) A standard technology-specific PPA shall be used for REFIT projects and the Commission shall approve the PPA.
  - (c) NERC as the regulator, shall:
    - i. issue out the design of the REFIT program;
    - ii. develop eligibility guidelines and screening criteria to determine whether applications received from RE developers qualify for the program;
    - iii. build and maintain the REFIT data base;
    - iv. evaluate applications submitted by project developers; and;
    - v. Manage the project queue in tandem with the buyers.
  - (d) The Commission shall designate a REFIT program administrator through whom all issues relating the REFIT shall be resolved.
  - (e) RE developers shall be required to submit, application to buyer who shall evaluate the applications for compliance with pre-established eligibility criteria.
  - (f) The Buyer shall place applicants into a two-tier queue: the active queue for projects that are determined to be eligible for the REFIT program within the quantity cap; and the reserve queue for qualifying projects that are eligible to advance into the active queue if space opens up.
  - (g) The REFIT queue shall be evaluated on a first come, first served basis.
  - (h) All submitted applications shall be time stamped and reviewed in that order.
  - (i) Only applications with the entire mandatory requirement shall be accepted into the queue.
  - (j) Eligible projects that apply for the REFIT after the active queue has filled up shall be placed in the reserve queue.

- (k) Applicants who have not met the set milestones shall be notified and moved from the active queue to the reserve queue to make space for others to prevent capacity hoarding (whereby capacity targets are reserved for non-performing licensees).
- The Buyer (NBET or DisCos)— shall serve as the counterparty for PPAs with RE project developers; and shall be responsible for payment and settlement of seller's invoices.
- (m) The Seller's costs in this respect shall be pass-through to consumers via the tariffs which shall be a weighted average of the costs of energy from renewable and fossil fuel sources.

#### 13. Standard Form RE PPA

- (a) The PPA shall be a must-take contract.
- (b) All energy supplied by the RE developer to the buyer shall be purchased by the buyer subject only to such necessary directions and protocols as may be issued by the buyer (or the System Operator) for the protection of its system.
- (c) The pricing in the PPA shall be based on the REFIT tariff which shall be calculated to cover the technology-specific cost of renewable energy.
- (d) The tariff levels may change from time to time, due to review by NERC or annual tariff degression; however, the prevailing tariff at the time a PPA is signed shall be fixed for the term of that agreement.
- (e) The PPA shall have a term of 20 years, commencing from the Commercial Operation Date.
- (f) PPA contracts shall be essentially for energy delivered and no capacity payment and capacity testing shall be required.

# 14 Licensing conditions, procedures and evaluation criteria for license applications

- (a) All applicants for generation license under the REFIT shall be obliged to fulfil all the requirements and obligations for licensing sent out by NERC pursuant to the EPSR Act, 2005 and relevant regulations as may be amended from time to time. The application must meet the mandatory requirement as contained in the applicable guidelines of NERC.
- (b) For capacities larger than the limits set in this regulation, a competitive bidding process shall be put in place whereby the buyers shall solicit bids, short list them on the basis of qualifications and competencies, spinoff economic and social benefits.
- (c) At the full proposal stage, the short listed candidates shall compete for the lowest levelised price in line with extant power procurement regulation issued by the Commission.

## 15. Design of Feed-In-Tariffs

The REFIT levels shall be technology specific and shall depend on the underlisted as Electricity generation costs vary according to the Renewable Energy Sourced Electricity technology used:

- i. The investment costs for the plant (including the costs of feasibility studies, site survey etc)
- ii. Development, construction costs, and the costs of connecting to the transmission or distribution system including transmission lines, substations and associated equipment;
- iii. The Operations and Maintenance (O&M) Costs;
- iv. Fuel costs where applicable;
- v. Financing costs and a fair return on the invested capital;
- vi. Estimated lifetime of the power plant;
- vii. Amount of electricity to be generated.
- (b) REFITS shall also be based on the best estimates of different load factors of energy availability.
- (c) The assumed benchmark capital cost and technical parameters for each of the identified technologies shall be stated in Schedule 4.

#### 16 Feed- in- Tariff Order.

- (a) The feed-in wholesale prices shall be calculated as shown in Table 5 below through the LRMC of Wind, small hydro plants, PV solar power plants and biomass power plants for each year of the tariff period.
- (b) In line with the MYTO the prices shall be escalated with the Nigerian inflation for the operating cost and US inflation for the capital cost.
- (c) The various Feed in tariff shall be as shown in Schedule 5 of this Regulation.

## 17 Review of Feed-In-Tariffs

- (a) This Feed-in-Tariffs regulation shall be subject to review every three years to account for changes in technology from the date of publication. However, a review may be undertaken earlier than three years in exceptional cases.
- (b) Any changes made during such reviews shall only apply to Renewable energy sourced electricity power plants that shall be developed after the revised guidelines are published.
- (c) For the avoidance of doubt, REFIT values applicable to an executed PPA contracts will remain unchanged.

#### 18. Compliance with Technical, Legal and Regulatory Requirements

- (a) All projects implemented under the Feed-in-Tariff system shall comply with all relevant technical, legal and regulatory requirements of Nigeria.
- (b) Projects shall comply with the provision of all the relevant codes pursuant to the EPSRA 2005(Grid Code, Transmission Codes, Health and Safety Regulation).

## 19. Rights and Obligations of Qualified Renewable Energy Power Generators

- (a) The provisions of the Distribution Code shall apply to RE Generators connecting to a Distribution System (i.e. "Embedded Generators"), while the provisions of the Grid Code shall apply to all RE Generators connecting to the Transmission system.
- (b) The connection can be to either Transmission or Distribution voltage networks, as appropriate.
- (c) The cost of connecting to the grid at the appropriate voltage level, ie the shallow connection, shall be borne by the RE Generator in accordance with the Distribution/Transmission Tariff Code.
- (d) All RE Generators shall have the responsibility to ensure power production is from credible renewable energy sources. Failure to provide credible evidence on renewable energy power generation or evidence to prove that power was not produced from non-renewable sources shall lead to the termination of the Generation Licence.
- (e) The Buyer shall be obliged to enter into a PPA with RE Generators and make payment for renewable energy generated and supplied to the Distribution System and Transmission System under the REFIT.
- (f) Any wheeling charges incurred in purchasing power under the REFIT shall be at the cost of Buyer.
- (g) The Buyer shall be obliged to record the total annual cost of power purchased under REFIT including Wheeling Charges.
- (h) The Buyer shall have the right and obligation to inspect RE Generators to verify production of renewable energy.
- (i) For RE Generators with an installed capacity greater than 30MW, the capacity verification shall be carried out annually by Buyer.

# 20. Monitoring, Reporting and Review

- (a) The Commission shall act as the overall authority for verification of the electricity production from renewable energy sources, and maintain a database of qualifying renewable energy producers.
- (b) The Commission shall be responsible for overall monitoring and review of the REFIT programme.
- (c) Data on the energy purchased under RE FIT per technology band and the total cost of the RE FIT shall be gathered and maintained by the Commission through the Buyer.
- (d) The Commission shall liaise with Buyer and the System Operator to monitor dispatch issues arising from the connection and generation of power under REFIT.
- (e) The Commission shall annually publish a report on the progress achieved. This report shall include the following:
  - i. Progress on RE;
  - ii. Changes or additions in qualifying technologies;
  - iii. Cost of development resulting from the market expansion of the technologies.

# Chapter IV

#### 21. Offences

(a) It is the responsibility of the various distribution companies enumerated in Schedule 1,2 and 4 and the Nigerian Electricity Bulk trading company to meet their assigned targets.

- (b) The Nigerian Bulk Electricity Buyer and All distribution Operators/licences shall obtain performance guarantee of 5% of project estimated cost from RE contractors against delayed completion or as may be specified in the bidding documents and PPA.
- (c) Breach or failure to comply with any part or this Regulation will attract financial penalties as stated in Schedule 6.
- (d) The financial penalties stated in Schedule 6 shall not be passed to rate payers.
- (e) The System Operator shall by January each year submit to the Commission the renewable energy power connected to both grid and distribution network connections which shall indicate:
  - i. the location,
  - ii. parties to the connection (sellers and buyers) name plate capacity,
  - iii. Peak sent out over the last 12 months.

## 22. Penalties

The Commission may establish such penalties in line with the provisions of the Act or any of the Commission's regulations, to ensure the effective discharge of its duties, and to promote compliance with this Regulation.

GENERAL

PART V

23. Inherent Powers of the Commission

Nothing in this Regulation shall be deemed to limit or otherwise affect the inherent powers of the Commission to make Orders as may be necessary in furtherance of the objectives of this Regulation.

# 24. Proceedings before the Commission

Any proceedings before the Commission under these regulations shall be governed by the Business Rules of the Commission as may be amended from time to time.

#### 25. Amendment or repeal

The Commission may amend or repeal, in whole or in part, the provisions of these Regulations.

THE COMMON SEAL OF

NIGERIAN ELECTRICITY REGULATORY COMMISSION

Was affixed pursuant to the ORDER OF THE COMMISSION

Dr. Sam Amadi Chairman/CEO

Schedule 1:

# Bench Mark Capacities for Qualifying Technology

Technology	Minimum capacity (MW)	Maximum Capacity (MW)
Wind	1	10
Small hydro	1	30
Biomass(including municipal solid waste)	1	10
Solar Photovoltaic	1	5

Schedule 2:
Target Grid-Connected Renewable Generation Capacity by the year 2018

Technology	Capacity Limit (MW)
Solar	380
Wind	100
SHP	370
Biomass	150

Schedule 3:
Allocation of Renewable Energy Capacity by Buyers up to 2018

Biomass	Solar	small Hydro	Wind	Total

Abuja	8.6	17.3	17.3	14.4	57.5
Benin	15.8	9.0	13.5	6.8	45
Enugu	15.8	9.0	13.5	6.8	45
Ibadan	22.8	13.0	19.5	9.8	65
Jos	4.1	8.3	8.3	6.9	27.5
Kaduna	6.0	12.0	12.0	10.0	40
Kano	6.0	12.0	12.0	10.0	40
Eko	19.3	11.0	16.5	8.3	55
Ikeja	26.3	15.0	22	11.3	<b>7</b> 5
Port Harcourt	11.4	6.5	9.8	4.9	32.5
Yola	2.6	5.3	5.3	4.4	17.5
Total(Disco)	138.5	118.3	150.0	93.3	500.0
NBET	125	75	187.5	112.5	500.0
System Total	263.5	193.3	337.5	205.8	1000.0

Schedule 4
Assumptions for Renewable energy feed in Tariff Computation

	Solar	Small Hydro	Biomass	Wind

Capacity	MW	5	30	10	10
Capital Cost	\$/kW	1500	3100	2900	1760
Capacity Utilization factor	%	19%	45%	60%	32%
Fixed O&M	\$/kW/yr	30.00	23.00	53.50	18.50
Variable O&M	\$/MWh	0.06	0.25	0.95	1.48
Fuel Cost	\$/MWh	0	0	4.00	0
Aux. Power requirement	%	1	1	10	1
Decline rate of price	%	5	5	5	5
Construction time	Year	2	3	2	2
Exchange rate(N to \$)	Naira	200	200	200	200
Real WACC	%	11	11	11	11
Local Inflation	%	8.3	8.3	8.3	8.3

Schedule 5: Feed in Tariff for 2016 Base Year

Year	Description	Unit	Solar	Wind	SHP	Biomass
	Capital cost	Naira/MWh	35,370.05	24,791.55	30,887.43	22,400.51
FIT2016	0&M	Naira/MWh	29.49	302.73	55.92	8,541.11
(Naira)	Total	Naira/MWh	35,399.54	25,094.28	30,943.35	30,941.62
	Capital cost	\$/MWh	176.85	123.96	154.44	112.00
FIT2016	0&M	\$/MWh	0.15	1.51	0.28	42.71
(US\$)	Total	\$/MWh	177.00	125.47	154.72	154.71

Schedule 6
Penalty for non-compliance

1st six months of Non Compliance	\$15/MWh Naira equivalent or difference		
or partial compliance	between cost of renewable energy and average cost of the non renewable sourced electricity whichever is lower		
Following periods of Non Compliance or partial compliance	\$30/MWh Naira equivalent or difference between cost of renewable energy and average cost of the non renewable sourced electricity whichever is lower		