REGULATION OF RENEWABLE ENERGY TARIFF IN THE NIGERIAN ELECTRICITY SUPPLY INDUSTRY

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CERTIFICATION

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DEDICATION

To Almighty God, and to my late father and mother; Moses Obenurhe Akpodiete and Gladys Oteriyovwe Azagba.

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ABSTRACT

Nigeria depends on fossil fuel-based source of electricity. Despite abundant renewable energy resources endowment, it has failed to harness and deploy that into the national grid for boosting electricity generation and the country achieving the target energy-mix in the power sector. The Nigerian Electricity Regulatory Commission (NERC) issued Regulations on Feed-In Tariff (REFIT) for Renewable Energy Sourced Electricity in 2015, pursuant to which 13 Power Purchase Agreements (PPA) were executed in 2016. Notwithstanding the intendment of the government policies, the REFIT and the PPAs have not materialised. Existing studies on the REFIT 2015 have not examined the legal issues responsible for the non-implementation of the 13 PPAs. This study therefore, examined the legal and contractual framework for REFIT in Nigeria.

Public Interest Theory provided the framework, while doctrinal and qualitative methods were adopted. Primary data were obtained from the Constitution of the Federal Republic of Nigeria 1999 (Sections 12, 14 and 16), Electric Power Sector Reform Act (EPSRA) 2005, REFIT Regulation 2015, NERC Multi Year Tariff Order 2008 and 2012 and the PPAs. Key informant interviews were conducted with two of officials of NERC (Manager Legal and Licencing Unit), and one each of Nigerian Bulk Electricity Trading Company (General Counsel) and the Independent Power Producers (IPPs) (Legal Officer, Anjeen Solar). Legal analyses were drawn from the Constitution and the EPSRA, while a narrative approach based on the thematic area of renewable electricity was used to analyse the qualitative data. Data were subjected to content and jurisprudential analysis.

The Nigerian Electricity Regulatory Commission made the REFIT 2015 pursuant to Sections 32 and 96 EPSRA, which set out a renewable energy on-grid electricity target of 2000MW by 2020. However, the legal issues in the execution and implementation of the policy, regulatory and contractual framework have affected the deployment of renewable energy technology for on-grid electricity. Although 13 PPAs were executed by NBET and the IPPs for the development of 13 solar power plants, Clause 1 of the PPAs enjoined parties to execute necessary financial documents, such as Put-Call-Options Agreements (PCOAs) and Partial Risk Guarantee Agreements (PRGA) and required approvals obtained before the PPAs could be enforced. The Federal Government refused to execute the PCOAs with the IPPs, due to disputes regarding the applicable tariff. The PCOAs were later signed for two PPAs, but the requisite approval was not obtained from the Attorney General of the Federation. International Financial Institutions also reneged on executing the PRGA due to the liquidity crisis in the power sector. The foregoing prevented the PPAs from reaching financial closure. As a result, investors were discouraged from investing in renewable electricity technology in Nigeria.

The efforts of Nigerian government to boost electricity generation and achieve the target energy-mix and tariff structure have not been realised due to the regulatory impediments that have made it impossible to implement the 13 PPAs. Government agencies should honour contractual obligation and comply with established regulations.

Keywords: Regulations on Feed-In Tariff, Nigerian Electricity Regulatory Commission, Power purchase agreement, On-grid electricity

Word count: 476

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United Nations, The Future We Want; General Assembly Resolution 66/288. [July 27th, 2012] para 125

LIST OF ABBREVIATIONS

AEDC	Abuja Electricity Distribution Company
BEDC	Benin Electricity Distribution Company
BPE	Bureau for Public Enterprises
CBN	Central Bank of Nigeria
CCGT	Combined-Cycle Gas-Turbine
CH_4	Methane
CO_2	Carbon dioxide
COP 26	The 26^{th} Conference of the Parties i.e. the countries that are signatories to the United Nations Framework Convention on Climate Change (UNFCCC) a treaty signed that came into force in 1994
CSP	Concentrated Solar Power
DFI	Development Financial Institution
DISCOs	Distribution Companies
EC	Eligible Customer
ECN	Electricity Corporation of Nigeria
ECN	Energy Commission of Nigeria
EKEDC	Eko Electricity Distribution Company
ENEDC	Enugu Electricity Distribution Company
EPIC	Electric Power Implementation Committee
EPSRA	Electric Power Sector Reform Act
ERGP	Economic Recovery Growth Plan
ESTs	Environmentally Sound Technologies
FGN	Federal Government of Nigeria
FHC	Federal High Court
FIT	Feed-In Tariff
GEF-P	Green Energy Fund Programme
GENCOs	Generation Companies

GHGS	Greenhouse Gases
H_2	Hydrogen
H_2S	Hydrogen Sulphide
IAEA	International Atomic Energy Agency
IBEDC	Ibadan Electricity Distribution Company
ICC	International Chamber of Commerce
IKEDC	Ikeja Electricity Distribution Company
IPO	Initial Public Offer
IPP	Independent Power Producer
IPPs	Integrated Power Producers
JEDC	Jos Electricity Distribution Company
KdEDC	Kaduna Electricity Distribution Company
KnEDC	Kano Electricity Distribution Company
LC	Letter of Credit
LRMC	Long Run Marginal Cost
MAPs	Meter Asset Providers
MOU	Memorandum of Understanding
MTEF	Medium-Term Expenditure Framework
MW	Mega Watt
MYTO	Multi-Year Tariff Order
NBET	Nigerian Bulk Electricity Trader
NBPI	Nigerian Biofuel Policy and Incentives
NCP	National Council on Privatisation
NDA	Niger Dams Authority
NEP	National Energy Policy
NEPA	Nigerian Electric Power Authority
NEPP	National Electric Power Policy
NERC	Nigerian Electricity Regulatory Commission

NERFUND	National Economic Reconstruction Fund
NESCO	Nigeria Electricity Supply Company
NESI	Nigerian Electricity Supply Industry
NESREA	National Environmental Standards and Regulations Enforcement Agency
NGEU	Nigerian Government Electricity Undertaking
NGMP	Nigerian Gas Master Plan
NIPP	National Integrated Power Project
NNPC	Nigerian National Petroleum Corporation
NREEEP	National Renewable Energy and Energy Efficiency Policy
PAG	Payment Assurance Guarantee
PCOAs	Put Call Options Agreements
PEPCA	Public Enterprises Privatization and Commercialization Act
PHCN	Power Holding Company of Nigeria
PHEDC	Port-Harcourt Electricity Distribution Company
PPAs	Power Purchase Agreements
PRGA	Partial Risk Guarantees Agreement
PSRP	Power Sector Recovery Programme
PV	Photovoltaic
PWD	Public Works Department
QIPP	Qua Iboe Power Plant
RE	Renewable Energy
REAN	Renewable Energy Association of Nigeria
REAP	Renewable Electricity Action Programme
REFIT	Renewable Energy Feed-in-Tariff
REMP	Renewable Energy Master Plan
REPG	Renewable Electricity Policy Guidelines
RESIP	Rural Electrification Strategy and Implementation Plan
SCPR	Structure, Conduct, Performance and Regulation

SDGs	Sustainable Development Goals
SE4ALL	Sustainable Energy for All
SEFA	Sustainable Energy Fund for Africa
SHP	Small Hydropower
TCN	Transmission Company of Nigeria
TEM	Transitional Electricity Market
UN	United Nations
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
USADF	United States African Development Foundation
WCED	World Commission on Environment and Development
YEDC	Yola Electricity Distribution Company

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The necessity for uninterrupted electricity power supply in the Nigerian Electricity Supply Industry (NESI) cannot be overrated. A vibrant economy depends on a sustainably developed power sector: before now, the importance of electricity especially in development has been acknowledged, as broad access to electricity has in no small measures led to economic growth and lower poverty rates.[1] The Brundtland report of the World Commission on Environment and Development (WCED) 1987[2] noted that, the state of energy services in a country is a direct index to its state of economic development.[3] Based on the foregoing, effective electricity services goes beyond the frontiers of economic development, to equally support social development and sustainable environment. The provision of electricity services in a sustainably structured and managed manner thus becomes even more critical to the overall development of a nation state. This fact was noted by the Federal Government of Nigeria (FGN) in its Economic and Recovery Growth Plan (ERGP) 2017-2020, which outlined the mid-term structural reforms as means to diversify the country's economy and expansion of power sector infrastructure being one of the major concerns. Till date, the high gas dependent nature of the Nigeria electricity sector has resulted in a dicey situation of epileptic power supply, low access to power supply and attendant energy poverty within the country due to vandalisation of gas pipelines, issues with prices of gas and unwillingness of gas suppliers to sell at the domestic market.

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[1]Omorogbe, Y. 2002. Why We Have No Energy. University of Ibadan, Inaugural Lecture. University of Ibadan Press.

[2]World Commission on Environment and Development. 1987. Our Common Future. Brundtland Report UN Doc A/42/427.

[3]"Future development crucially depends on its (energy) long-term availability increasing quantities". *ibid*. 119.

The Nigerian power sector currently depends on gas and hydro as the primary energy source for the present power producing plants in Nigeria. Due to nearness to gas source, the fossil fuel plants are concentrated in the Niger Delta region; while the hydro fueled power plants are located in the middle-belt region of Nigeria. The supply point for the national grid, on which the electricity generation companies (GENCOs) supply electricity is connected across the country but has its Control Centre in Osogbo in Western region of Nigeria. There are constraints with gas supply to power plants in Nigeria. A similar challenge applies to water supply to hydro power plants due to seasonal and environmental constraints.[4]

Over the years, the electricity dispatched to the national grid is on the average of 4,000 MWH/Hour – 5,000 MWH/Hour due to constraints from insufficient gas and water supply.[5] This explains the recurrent power outage and rolling blackout in Nigeria. In this situation, the target for industrial revolution in Nigeria would continue to be a mirage as it is in reality a wishful thinking. This thesis seeks to reveal the weaknesses associated with over dependence on gas and hydro fuel as the primary power sources for the electricity sector in Nigeria, which is yet to lead to intendment of policies and legal framework so far enunciated and enacted by the Nigerian Government.

Renewable energy is obtained from renewable resources, which are replenishable by nature. It includes: wind, sunlight, rain, geothermal heat, and tidal waves.[6] Some scholars still include biomass into the category of renewable energy. However, its carbon neutrality is still subject to debate.[7] Renewable energy sources unlike fossil fuel sources are not easily exhaustible but are generated and regenerated by natural course of events.

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[4]Daily Power Briefing under Advisory Power Team, State House, Aso Rock Villa, Abuja, Nigeria-mailchimp.com

[5]*ibid*.

[6]Ellaban, O. Abu-Rub, H. & Blaabjerg, F. 2014. Renewable energy resources: Current status, future prospects and their enabling technology. *Renewable and Sustainable Energy Reviews* 39. 748-764, 748.

[7]See the works of the following author: Harvey, C. and Heikkinen, N. 2018. Congress says biomass is carbon neutral but scientists disagree - Using wood as fuel source could actually increase CO^2 emissions. Scientific American. Retrieved 22 February, 2021 from https://www.scientificamerica.com/article/congress-says-biomass-is-carbon-neutral-but-scientists-disagree/; Timperley, J. 2017. Biomass subsidies 'not fit for purpose', says Chatham House. Carbon Brief Retrieved 22 February, 2021 from https://www.google.com/amp/s/www.carbonbrief.org/biomass-subsidies-not-fit-for-purpose-says-chatham-house/amp

It is worthy of note that, Nigeria is endowed with sufficient renewable energy resources that could be harnessed and deployed to fuel power plants. Among these energy resources are: solar, biomass, wind, small hydro, etc. Apart from harnessing renewable energy to increase the electricity generation, it would ensure electricity security. Renewable energy has the capacity to resolve the current energy irregularities in Nigeria. Solar projects are simply accessible with opportunity to distribute more units in no time. This can be possible with suitable policy directives and motivations; with this, NESI will no doubt witness notable growth in years to come with prospects in job creation and manufacturing. Another important reason for renewable energy to be harnessed and deployed for electricity supply is its friendly disposition to the environment. The world is fast moving towards clean energy. Across the globe, societies are making a transition towards low carbon economies. Governments can drive this with the aid of domestic and international statutory instruments. The Nigerian government has signed some international instruments- treaties, such as: United Nations Framework Convention on Climate Change (UNFCCC) 1992, Kyoto Protocol to UNFCCC 1997, Sustainable Development Goals (SDG), Paris Agreement, etc. Every responsible government or state across the world is expected to wake up to its obligation and responsibility under international instruments[8] to protect the environment against climate change and greenhouse gas emission.

There are various legal instruments which lend support to renewable energy development in Nigeria. The Constitution of the Federal Government of Nigeria 1999 as amended primarily mandate the Nigerian government to direct its policy towards promoting the welfare and happiness of its citizens.[9] Section 76 the Electric Power Sector Reform Act (EPSRA) 2005 vest power on NERC to fix tariff for electricity marketing. This also accommodate renewable energy-based electricity provided NERC issues operational license for such electricity business. The policy drive of the Nigerian government is that by the year 2030 not less than 30% of her total electricity generation would be derived from renewable energy sourced electricity. This policy was further advanced by NERC launch of the Regulations on Feed-in-Tariff for Renewable Energy Sourced Electricity in Nigeria hereinafter in this thesis referred to as REFIT, 2015. The REFIT 2015 is supposed

[8] *Pacta sunct servanda*. Parties to an agreement must keep to the terms of an agreement.
[9]Sections 14 (2) (b) and 16 (1) (b), Constitution of the Federal Republic of Nigeria 1999 (as amended).

to act as the legal framework that regulates the renewable energy tariff and stimulate investment in that regard.

The REFIT 2015 is the legal framework upon which the Nigerian Bulk Electricity Trader (NBET) ratified Power Purchase Agreements (PPAs) with 14 renewable energy companies. Consequently, NERC issued operating licenses to the renewable energy companies. These companies include: Nigerian Solar Capital Partners to develop 100MW renewable electricity in Bauchi State, MotirDusable Limited (100MW) in Nasarawa State, Pan Africa Solar, involved in the development of 75MW solar power plant in Katsina State; and Afrinergia Power Limited (50MW) in Nasarawa State. Others includes, Kvk Power Limited (100MW) in Sokoto State, Middle Band Solar One Limited (100MW) in Kogi State; Nova Solar 5 Farm Limited (100MW) in Katsina State; Nova Scotia Power Development Limited (80MW) in Jigawa State, and LR Aaron Power Limited (100MW) in the FCT. In addition are Quaint Abiba Power Limited (50MW) in Kaduna State; En Africa (50MW) in Kaduna State, CT Cosmos (70MW) in Plateau State; Anjeed Innova Group (100MW) in Kaduna State, and Oriental Renewable Solutions (50MW) in Jigawa State.[10] The aforementioned companies are to implement on-grid solar power generation and are to adhere to the agreed tariff of US$ 11.5[11] per kilowatt hour contained in their respective PPAs.

However, more than four years thereafter, these PPAs are yet to be translated into reality. It is surprising to note that up until now, Nigeria is yet to generate or supply watts of power from solar energy sources to the national electricity grid. This informs one of the reasons for this research, to consider the strength of the REFIT 2015, as well as other regulatory and legal frameworks aimed at achieving the 2030 objective set for the country. Going forward, to be able to effectively and efficiently determine the viability of these projects; this work intends to consider the current contractual arrangement put in place which is expected to help in providing incentives for new investments in capital equipment and reduction in technical and commercial losses; retrieval of operation,

[10]Solar power development investors commit 2.5bn on 14 projects. Retrieved 28 November, 2021 from http://www.vanguardngr.com/2016/07/solar-power-devt-investors-commit-2-5bn-14-projects/

[11]The prevailing exchange rate declared by the Central Bank of Nigeria, see clause 1 of the NBET draft/precedent PPA for solar power. Clause 1 to Schedule 6 of the NBET draft defines 'Energy charge rate" to mean USD $0.172/Kwh.

maintenance and overhead costs, rational return on invested capital, devaluation (and replacement); while at the same time optimizing benefits in form of consistent, available and affordable power supply.

1.2 Statement of Problem

Electricity power consumed in Nigeria is 80% sourced from thermal power generating plants powered by natural gas. The other 20% are sourced from hydro power generating plants. Since the country is yet to generate adequate power to meet up with the required energy supply of her population, a survey of 2013 reveals that, about 80% of Nigerians make use of other sources of power supply; examples which include, electric generating sets, solar inverters and rechargeable batteries. By estimation, about 8-14 GW decentralised diesel generator set is presently in use in Nigeria. About 86% of establishments in Nigeria possess or jointly use a generator set; while around 48% of their power supply needs is realised by these personal generator sets.[12] The heavy reliance on fossil fuel as primary energy sourced electricity is fraught with various challenges such as insufficient gas supply which is partly cause by uncompleted gas infrastructure lines for power, vandalisation of existing gas pipelines by militant youths and other forms of economic sabotage. NESI, which heavily depends on fossil fuel power plants as its major energy source for electricity generation and supply to the grid, has not succeeded in ensuring energy security to push towards the developmental intendments of the power policies and laws in Nigeria.

The Government pointed out that shortage of gas is the main barrier to achieving the pre-planned electricity generation. The shortage has been attributed to domestic consumption, particularly, gas-fueled independent power projects (IPP) due to low domestic gas rates in comparison to a more profitable export at the gas market. Other challenges which plague the industry include: poor dispatch/delivery and planning systems, operation and maintenance difficulties, and also, underfunding and liquidity challenges. Consequently, there have been various instances of rolling nationwide black-outs and several system collapses. For instance, the national grid completely collapsed sixteen times and five

[12]Deutsche Gesellschaft für Internationale Zusammenarbeit. 2015. Survey of power demand and energy consumption in the industrial sector in Nigeria.

partial collapses were recorded within the first six months of 2016. In the whole of 2014 and 2015, the grid totally collapsed ten and thirteen times respectively, with four partial collapses each.[13]

Meanwhile, Nigeria is blessed with both renewable and exhaustible primary sources of energy spread across all the regions of the country. However, inefficient utilization of these resources has been part of the problem that has necessitated the abysmal results recorded in the power sector. It is evidently clear that something must be done urgently to arrest the challenges and failures currently facing the Nigerian energy sector. Hence, as a matter of urgency, the government must think of diversification, with the view to harness and deploy her renewable energy resources as one of the possible way out.

As of now, the Nigerian government has recognized that policies, laws, regulations and various institutions can be used as mechanisms for achieving the desired result.[14] Hence, in 2016, 14 renewable power plants developers for on - grid, signed PPAs with NBET in accordance with the REFIT 2015. The REFIT 2015 regulates the tariff regime for renewable electricity in Nigeria. The REFIT places a statutory peg on the tariff plan for renewable energy pricing, which must not be exceeded in a PPA signed between contracting parties. Despite this clear cut statutory provision, disputes relating to pricing still arose between NBET and the 14 renewable energy investors. Till date, no watt of electricity has been generated and supplied into the national grid after the 14 PPAs were signed with NBET. Twelve of the renewable energy developers have reportedly pulled out of the PPAs due to the unilateral reduction of the agreed price in the PPA from US$0.115/KWh to US$0.75/KWh.[15]. This renege to honour agreement underscores Nigerian government's gross disregard to contractual and statutory obligations as enjoin by international law and contract law principle of *pacta sunt servanda*.[16] The REFIT 2015

[13]Federal Republic of Nigeria. 2018. Power Sector Recovery Programme: 2017-2021. 16. Retrieved 1 December, 2020 from https://documents1.worldbank.org/curated/en/991581593223433078/pdf/Nigeria-Power-Sector-Recovery-Operation.pdf

[14]The latest in this series of policy intervention is the Power Sector Recovery Program 2017 – 2021 ("PSRP" or the Program) which was designed on this basis of the ERGP 2017 – 2020.

[15]Adeniyi, F. 2019. Overcoming Market Constraints to On-grid Renewable Energy Investments in Nigeria. Oxford Institute for Energy Studies Paper EL 37. 37. Retrieved 1 December, 2020 from https://doi.org/10.26889/9781784671495

[16]This principle is a Latin expression to the effect that agreements must be respected.

did not provide a remedy for parties who suffer losses due to other party's breach of terms of the PPA. Also, NERC which functions as regulatory institution for the sector has not been able to impose sanctions on defaulting parties. This would suggest a weakness in the exercise of regulatory powers. In a situation such as this, where operators in the sector are more powerful than the regulators, the end result is weak enforcement mechanism.

Existing studies on the REFIT 2015 have not examined the legal issues responsible for the non-implementation of the 13 PPAs. This research therefore, considered the implication in the unilateral U-turn by NBET on the legal framework with the view to identifying the gaps and recommend appropriate legal and statutory solutions for consideration by policy and law makers, regulatory institutions, investors, legal practitioners and researchers.

1.3 Research Questions

The study provided answers to the following research questions.

1. Are there justifications for the framework on tariff regulation for national grid connected RE sourced electricity projects in Nigeria?
2. Can the current contractual framework accommodate tariff regulation to support national grid connected RE sourced electricity projects in Nigeria?
3. What are the legal and contractual issues that are likely to arise in the approach to tariff regulation for national grid connected RE sourced electricity project in Nigeria?

1.4 Aim and Objectives of the Study

This study examined the contractual and legal framework in Nigeria. The specific objectives are to:

1. Examine the justifications for the framework on tariff regulation for national grid connected RE sourced electricity projects in Nigeria;
2. Interrogate the capacity of the existing contractual framework to accommodate tariff regulation to support national grid connected RE sourced electricity projects in Nigeria

3. Evaluate the legal and contractual issues that are likely arise in the approach to tariff regulation for national grid connected RE sourced electricity project in Nigeria.

1.5 Justification for the Study

Nigerian has a high population, currently estimated to be 180 million people with the potential of becoming 230 million within the next 20 years. The rule of thumb for electricity energy consumption is that there must be at least 1MW of electricity to service the energy needs of one thousand persons.[17] It therefore, means that based on the current population figure of Nigeria, the country should be generating at least 180,000MW electricity. However, the annual aggregate electricity consumption rate is 18.05TWhr at a unit rate of 8.1MWhr/head.[18] This is a far cry from the required standard. To compound this situation is the challenges of occasional total blackouts across the country as a result of gas and water constraints which has often lead to national grid collapse and ultimately a slowdown of the economy due to non-availability of electric power to drive manufacturing, industrial and economic processes.[19]

The distribution of renewable power resources, particularly for on-grid power undertaking purpose, will diversify the energy mix and give a massive boost to the capacity of Nigeria to adequate power generation. This is in view of Nigeria's huge natural endowment and potentials in diver's renewable energy resources with the capacity to sustainably generate on-grid renewable power of about 60GW.[20] It further buttresses the need for energy mix diversification in her power generation, while harnessing the resources of the country's most valuable sector to create more viable and value-added undertakings for the local economy. A credible tariff system is the commercial foundation upon which power supply contracts are built, and indeed, could serve as a legal instrument to attract prospective

[17]PriceWaterCoopers. 2013. Privatisation in the power sector: Navigating the transition. 3. Retrieved 17 July, 2020 from *https://www.pwc.com/ng/en/assets/pdf/pwc-round-table-post-privatisation.pdf*
[18]National Bureau of Statistics 2012.
[19]Fashola, B. R. 2016. Foreword. The Nigerian Power Sector Investment Opportunities and Guidelines,. Federal Ministry of Power, Works and Housing, Abuja.
[20]IIbid..

investors. This research considered why the REFIT, 2015 has not led to the desired outcomes.

Nigeria has mainly relied on the petroleum sector as the source of her economy, which has ordinarily made it convenient to depend on gas as a source of power generation. Consequently, upon the uncertainties and external factors which usually affect the petroleum sector, the Nigerian economy has worsened because of her overly dependence on that sector for sustenance. The power sector which is also largely thermal based has also been buffeted with similar fate by extension. The preponderance of expert opinion is that Nigeria should diversify her economy as a way out of its economic woes. Hence, to harness renewable energy resources is one means of making less resort to the oil and gas industry, thereby slowly putting the nation into the track of economic diversification.

The abundance and availability of renewable power resources in Nigeria also made it necessary to consider relevant policies, laws and regulations in the research. Apart from the fact that renewable electricity is friendly to the environment, the global trend in the energy sector is towards development of clean energy. In this regard, every member state of the international community, including Nigeria, is expected to honour its obligations under international legal instruments[21], for example, the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement (COP 21), SDGs, etc. There are benefits which Nigeria can derive from compliance with its international obligations to resort to clean energy.

1.6 Scope of the Study

Although, tariff is essentially an economic concept, this study focused on the regulatory and legal frameworks applicable to renewable energy tariffs in Nigeria, with particular emphasis on solar power projects for on-grid power in the NESI. Notwithstanding that Nigeria is the geographical area in consideration, references was also made to other countries. In summary, the upshot of the research is targeted at producing a legal and

[21]Wehberg, H. Pacta sunt servanda. 1959. *The American Journal of International Law* 53.4: 775-786.*Pacta Sunt Servanda* – Latin basic principle of international law which means 'agreements must be kept by parties'.

policy framework for renewable energy electricity that would ensure realization of the intendments of the energy policies and laws in Nigeria.

1.7 Structure of the Thesis

The thesis is divided into six chapters. Chapter one addressed preliminary issues which set out the basis upon which the study is embarked upon. It captured the background of studies, statement of problem, objectives and justification for the study. Chapter two contains the literature review and theoretical framework for the study. The methodology is contained in chapter three. It essentially entails the approach, tools and sources which the study used to address the research questions and achieved the set-out objectives of the study. Chapter four discussed the legal and regulatory framework for renewable energy regulation. These comprises of the relevant statutes, regulations, policies and role of the regulatory bodies responsible for the regulation of the renewable energy sector. The imperative of Antitrust Law or Competition Law in the emerging electricity markets in the various states was discussed. However, the amended provisions of the constitution on the electricity industry and new electricity law that came into force in March and June, 2023 were also discussed. Chapter five is the penultimate chapter, which addresses the contractual framework, majorly comprising of PPA, for the regulation of renewable energy. It delved into the intricacies that led to the failure of the 13 PPAs which were signed by NBET and the 13 private power developers for the development of renewable energy for the electricity industry. Reference was made to existing grid connected solar power plants in Nigeria and other jurisdictions. Chapter six is the last chapter. It comprised of the summary of the study, conclusion and recommendations. It highlighted contribution of the study to knowledge.

CHAPTER TWO

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Literature Review

This section examined several existing literature that are relevant to the subject matter. Essentially, the review sought to understudy the scholarly contributions of other authors to the subject matter or connected matter. The extent to which the theme of study has been addressed was ascertained in course of the review. The identified gaps made the subject very worthy for this further investigation. Since research undertakings are like building blocks, the present research took off from where other existing authors stopped or from the gaps that where not addressed in previous studies. Ultimately, valuable contribution to knowledge was made at the end of the study.

Oke[22] made a comparative discussion of renewable energy law and policy of Nigeria and other countries such as China, Germany, Spain and the European Union. He examined the impact of renewable energy towards a sustainable power sector. Renewable energy was given the recognition as an alternative energy source which would enable low cost energy supplies if adopted in Nigeria. Hence, the author reviewed the policy, statutory and regulatory mechanism which has been put in place to facilitate renewable energy utilization in Nigeria. Useful examples were culled from China, Germany, Spain and the European Union on how this can be achieved. The author concluded that Nigeria needs to emulate these systems by establishing effective legal and institutional framework to give reality to deployment of renewable energy resources in Nigeria.[23]

[22]The author's discussion on renewable energy is contained in Chapter 2 (pages 628-648) of his book. Oke, Y. 2019. Nigerian energy resources law and practice: Oil and gas law (practice, cases & theories). Lagos: Princeton.
[23]*ibid*. 648.

Tasie[24]analysed the EPSRA 2005 in order to determine its conformity to the principles of sustainable development. The study discovered that the country's electricity industry has given preference to fossil fuels sourced energy ahead of renewable energy. The level of international attention which climate change has warranted demands that Nigeria should give serious attention to environmental consideration in settling for its choice of energy sources. The suitability of renewable energy in this light means it would feature as a prominent source of energy for Nigeria, in view of the countries' endowment with abundant sources of renewable energy. Recent trends of fossil energy usage, as it were does not give room for expanded electricity access to promote power sector sustainability.

Daramola[25] advocated for renewable energy sourced off-grid solution for back-country communities which are yet to get national grid coverage. Thus, foreign direct investors should be encouraged to direct their investment towards this end, particularly through the use of mini-hydro and solar systems. The study set out the legal prerequisite to satisfy before going in into this form of undertaking. However, his work fell short of identifying the challenges an investor would be confronted with should this investment pathway be considered in Nigeria.

Oniemola had made extensive studies on the legal perspective of renewable energy law both from a Nigerian, international and comparative perspective.[26] The climax of his study is evident from his PhD thesis where he sought to create a legal framework towards the stimulation of support schemes for renewable energy investment into the power electricity

[24]Tasie, O. C. 2014. Expanding Access to Electricity for Sustainable Development in Nigeria: An Analysis of the Electric Power Sector Reform Act 2005. PhD Thesis: University of Aberdeen xii+339.

[25]Daramola, O. 2012,. Renewable Energy Market Analysis in Nigeria, BSc Thesis: Laurea University of Applied Sciences 110.

[26]See the following works of the author: Oniemola, P. K. 2011. Integrating Renewable Energy into the Nigerian Energy Mix through the Law : Lessons from Germany. *Renewable Energy Law and Policy* 2.1: 29-38; Oniemola, P. K. 2011. The Status of the International Renewable Energy Agency (IRENA): A Road Set for the Promotion of Renewable Energy *International Energy Law Review* 3. 72-75; Oniemola, P. K. 2013. International Law on Renewable Energy: The Need for a Worldwide Treaty. *German Yearbook of International Law* 239–272; Oniemola, P. K. 2014., The UK Commitment for the Renewable Energy Investment under the EU 2009 Renewable Energy Directive and the Challenges of Regulating Risks. *International Company & Commercial Law Review* 5. 186-191; Oniemola, P. K. 2015. Powering Nigeria through the Renewable Electricity Investments : Legal framework for progressive realisation. *Afe Babalola University Journal of Sustainable Development Law* 6.1: 86-108; Oniemola, P. K. 2017-2018. Charting a New Course for Renewable Energy Law in Nigeria through the Quota-based Scheme. *Nigerian Current Law Review* 163-193.

industry of Nigeria.[27] The study highlighted certain designs and regulatory challenges such as: preference for non-renewable energy sources, lack of access to grid connections and financing, amongst others. Relying on the Chinese and German experiences, the learned scholar recommended the feed in tariff approach to renewable energy investment which contemplates a stable tariff design for a definite period, unique rate, obligation to procure, preferential consideration, sure national grid access, and efficient administrative mechanism. Renewable energy creditworthiness challenge and consumers' inability to bear the cost, made the author to advocate for the government to establish a special oil revenue fund and financing guarantees from international financial institutions.

An inquisitive mind would wonder why it is necessary for Nigeria, which is highly endowed with oil and gas natural resources to give consideration to renewable energy. This imbalance in this logic agitated the mind of Oniemola, thereby causing his inquiry towards a justification for that position.[28] The author started off by acknowledging the natural gas dominance of the power sector. But it was also pointed out that Nigeria has ample repository of untapped renewable energy. If this treasure is harnessed, the question of energy poverty, energy security, environmental concerns and economic difficulties of the electricity power sector in Nigerian would be solved, the author contended. Although the environmental challenges of renewable energy were pointed out, it is very minimal compared to a fossil dominated power sector. The foregoing made the author to suggest that a law should be created to support renewable energy while dismantling the barriers which existing laws must have placed against this.[29]

Oni's[30] text on the electricity power sector is written from the perspective of a practitioner. The learned author advocated for resort to super grid for power transmission network, given its capacity to harbor massive volumes of energy obtained from a potpourri of

[27]Oniemola, P. K. 2014. Developing Legal Framework for Promoting Investment in Renewable Energy in the Nigerian Power Sector: An Analysis of the Design and Implementation Challenges. Ph.D Thesis: University of Aberdeen, xiv+308.
[28]See, Oniemola, P. K. 2016. Why should the Oil Rich Nigeria Make a Law for the Promotion of Renewable Energy in thePpower Sector? *Journal of African Law* 60.1: 29-55.
[29]*ibid*.
[30]Oni, A. 2013. *The Nigeria electric power sector: Policy, Law, Negotiation, strategy, business.* Lagos: CI Plus Limited.

renewable energy sources.[31] The author further embarked on an overview of the relevant provisions of the Nigerian constitution that confers such powers on the various tiers of government. However, the author situated the scope of the text outside the practical implication of the constitutional provision in issue.[32]

Ole[33] was more concerned about power project financing. Hence, she examined the relevant international conventions concerned about climate change, including: Paris Agreement on Climate Change 2015 and UNFCCC 1992, Kyoto Protocol to the UNFCCC 1997. These Conventions require developed countries who are parties to the Conventions to make financing available for developing countries that are signatory states, to enable them set up environmentally sound technologies (ESTs). The author, thus, urged Nigeria to avail itself of the opportunities under these Conventions to finance capital intensive renewable energy projects in Nigeria. However, it was pointed out that, the financing obligations under the Conventions are not mandatory but recommendatory.

Neighboring African countries such as Ghana had long caught the foresight of the vast benefits inherent in renewable energy utilization to their power sector. A study by Boateng[34] discussed how Ghana had used legal and policy reforms to establish appropriate mechanisms to address the challenge of electricity spread to hinterlands across the Islands of the Volta Region. The combined efforts of the Renewable Energy Act (832), which was passed in 2011 as well as the launch of the Ghana Energy Development and Access Project Policy saw a major drive towards 10% solar photovoltaic sourced renewable energy input towards the energy mix of Ghana by 2020. This has made the Island communities to enjoy access to power supply which has resulted into improved economic, social and environmental living standards for the peoples.

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[31]*ibid*. 235.
[32]*ibid*. 25.
[33]Ole, N. 2017. Combating Electricity Poverty in Nigeria through Off Grid Renewable Electricity: The Role of Financial Support under the International Climate Change Regime. *International Journal of Innovative Studies in Sociology and Humanities* 2.1: 1-16.
[34]Boateng, E. 2016. The Potential Socio-Economic and Environmental Impacts of Solar PV Mini-grid Deployment on Local Communities: A case Study of Rural Island Communities on the Volta Lake, Ghana. MSc Thesis: University of Jyväskylä 106.

The study of Etukudor and others[35] is an eye-opener to the abundant residue of renewable energy resources which Nigeria can leverage on to address its energy needs. Despite the little success that is obtainable in the power industry since the advent of new electricity industry regime in Nigeria, the power sector is still a far cry away from attaining efficiency due to the underutilization of varied electricity sources in the power industry of Nigeria. This occurred during the early part of wear and tear of electricity facilities, shortage of gas supply. These challenges require urgent reaction from government in order to have these sorted out.

Adeniyi[36] used the framework of Structure, Conduct, Performance and Regulation (SCPR) to demonstrate how the structure influences the conduct of industry players and its consequential effect on the low output of Nigeria's power industry. The author also added the regulatory failure into these dynamics. The interconnection of these three loops has ensured a liquidity crisis in the power sector which has placed constraints to introduction of renewable energy investments in the on-grid dynamics of Nigerian power industry as exemplified by failure of renewable energy PPA between NBET and the 14 renewable energy development companies. While the study is well researched, the author did not view the regulatory failures from the legal perspective and institutional failure. Hence, the present study seeks to explore the regulation as a way of dealing with glitches which the author identified.

Talking of renewable energy in the power industry, the various literatures under review here, have made valuable contributions and provided useful insights on the subject. They have offered a good foundation upon which the present study would find its footing. However, they have not offered comprehensive examination of relevant issues on this subject. For instance, majority of these studies did not address the regulatory aspect of the subject matter and indeed, contractual issues on the extant PPAs. Most of the studies preceded the establishment of the NERC Regulation for Feed-in-Tariff on Renewable

[35]Etukudor, C., Abdulkareem, A. & Ayo, O. 2015. The daunting challenges of the Nigerian electricity supply industry. *Journal of Energy Technologies and Policy* 5.9: 25-32.
[36]Adeniyi, F. 2019. Overcoming the Market Constraints to On - Grid Renewable Energy Investments in Nigeria. Oxford Institute for Energy Studies Paper EL 37. 37. Retrieved 1 December, 2020 from https://doi.org/10.26889/9781784671495

Energy Sourced Electricity in Nigeria, (REFIT) 2015. This research is necessitated by these shortcomings and in conclusion, the identified gaps in the research were addressed.

2.2 Theoretical Framework

This research is based on the public interest and regulatory theories which are mainly about the welfare and wellbeing of the society. It contends that the activities and conduct of regulatory institutions should be guided by the underlining principle of public interest. In other words, public interest is generally used to safeguard group interest and not individual interest. Thomas Aquinas posited that the purpose of government and the law was to serve the "common good" (*bonum commune*), i.e. the public interest[37]. This implies that regulatory institutions should guard against conducts of industry operators that are not in tandem with public interest. This is the intendment of the fundamental, objectives and directive principles of state policy under Chapter two of the Constitution of Federal Republic of Nigeria, 1999 as amended[38].

Administrative regulatory methods will also come to play by the establishment of systems and institutions which shall regulate the activities of industry operators. The aim of administrative regulation is to ensure compliance by the operators and services providers in a manner that would guarantee even distribution of limited resources. This approach entails the creation of regulatory agencies which are tasked with the function of setting out, communicating `and enforcing compliance with industry standards from operators. Specifically, this may be achieved by licensing, monitoring, evaluation, reprimand, suspension, license revocation, disqualifications, administrative proceedings and prosecutions for the imposition of penal sanction in the worst-case scenario. There are characters which can be associated with this method. It is essentially preventive in nature; government or its agencies enforce the standards at its own initiative; regulatory

[37] Mark Dimmock and Andrew Fisher; "Aquina's Natural Law Theory", Ethics for A QA Philosophy and QCR Religious Studies (1st Edition) . Open Book Publishers, 55 - 57, ISBN : 978 - 1 - 78374 -388 - 9 https:/.www.openbookpublishers.com /product/639. Retrieved 2023 - 4 - 28.

[38] Sections 14 (2)(b) and Sections 174 (3) of the Constitution of the Federal Republic of Nigeria 1999 as amended.

Despite its enormous merits, the approach of allowing free markets to determine industrial order of event has unwittingly culminated into market inefficiencies such as abuses of dominant position, economic instability, environmental and safety hazards, and other forms of system failures. This has necessitated the need for regulatory responses in order to prevent and correct these depravities.[39]

The modern conception of market regulation does not translate to mean absence of state presence but demonstrates the intent of the State to identify most suitable means of exercising its influence over the markets and operators in order to ensure the attainment of socially acceptable deliverables.[40] The essence is not to limit economic freedoms, but to ensure a steady balance of flexible elements along the leanings of market institutional preservation and eventual attainment of market function.[41]

Beyond the creation of statutory provisions, public bodies, official and economic processes, other concerns of administrative regulation extend to the province of social order, so as to ensure an enabling environment for material resources to be put to use.[42] Applying this to the specific instance of renewable energy, regulation can be applied towards ensuring an enabling environment wherein renewable energy can be harnessed into efficient electricity supply to the grid in Nigeria.

The public interest theory of regulation implies that regulation is essential in order to safeguard the interest of the people.[43] Mitnick opines that "regulation is the public administrative policing of a private activity with respect to a rule prescribed in public interest".[44] This suggests that regulation is targeted at private activities; administrative control on the basis of laid down rules; the rules and their implementation thereof are

[39]Stewart, R. B. 2003. Administrative Law in the Twenty - First Century. *New York University Law Review* 78.2: 437-460, 437-8.
[40]Daintith, T. 1997. Regulations. *International Encyclopedia of Comparative Law.* Netherland: Martinus Nijhoff, 17.
[41]Jovanic, T. 2010. The Concept of Rgulation in Administrative and Economic Law and the Emergence of the Law of Market Regulation. 30. Retrieved 21 November, 2020 from www.regulation.upf.edu_du731.pdf
[42]Marx, F. M. 1961. Administrative Regulations in Comparative Perspective .; *Law and Contemporary Problems*. 26.2: 297, 307-328, 311.
[43]Shleifer, A. 2005. Understanding Regulations ; *European Financial Management.* 11.4: 439-451, 440.
[44]Mitnick, B. M. 1980. *The Political Economy of Regulation*s New York: Columbia University Press 7.

fashioned towards protecting the interest of the public.[45] The Public Interest Theory on regulation takes off on two major premises, which are: the recognition that market failures could give rise to monopolies that would not allow for efficient service delivery, hence, the need for regulation; and the government is in a position to correct these anomalies. The desire of regulators is that industries of public utility status should be managed to attain socially desirable outcomes or objectives.[46]

The public interest theory is in tandem with the welfare economics explanation for regulation.[47] Public good and utilities are usually in the hands and control of very powerful entities which have the tendency to having it manipulated towards individual interest at the expense of the members of the public who are the real owners.[48] In an industry with the tendency for natural monopoly, and possible abuses, government intervention is needed to guarantee a stable system and realization of the intendments of renewable energy policies and laws.[49]

Regulators are deemed to be conferred with necessary data and enforcement authority to protect public interest. They are also deemed to be altruistic enough to project and protect public interest.[50] While this should be the ideal situation, it is not always the case in every system. Institutional void can give rise to regulatory failure. Hence, this study is set out to make exposition on the possible institutional void that has affected the regulatory duties of regulatory agencies concerned with renewable energy investment in the Nigerian power industry, which has otherwise, made it impossible for renewable energy investment to have a smooth take off in the power sector. The essence is to suggest possible means of addressing these institutional voids in order to fast-track renewable energy infusion into the power sector. This is in view of the public interest consideration of renewable energy

[45]Christensen, J. G. 2010. Public interest regulation considered: From capture to credible commitment. Regulation at the Age of Crisis ECPR 3rd Biennial Conference, University of Dublin, held on 17-19 June, 2010. 3.
[46]Djankov, S., Glaeser, E., La Porta, R., Lopez-de-Silanes, F. & Shleifer, A. 2003. The new comparative economics. *Journal of Comparative Economics* 31. 739-792.
[47]Hantke-Domas, M. 2003. The Public Interest Theory of Regulation: Non-Existence or Misinterpretation? European Journal of Law and Economics. 15.2: 165-194, 195.
[48]Reza Tajalou, B. G. B. 2017. The Role of Transparency in Tenders in Order to Maintain the Public Interest and the Rghts of Suppliers. *International Journal of Scientific & Technology Research* 6.9: 50-52, 50.
[49]Shleifer, A. 2005. Understanding Regulation. *European Financial Management.* 11.4: 439-451, 440.
[50]Hertog, J. D. 2010. Review of economic theories of regulation. Tjalling C. Koopman Research Institute Discussion Paper Series 10-18, Utrecht School of Economics 2.

being a clean and relatively environmental hazard free form of energy that is far less harmful to public health of citizens and the environment, in relation to fossil fuel based thermal power sources.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

The adopted research design method for this study is the Doctrinal Method to Legal Research. This is a traditional methodology of legal research which entails an inquisition into what the law is and how it is applied in specific situations. Its major focus is directed towards analyzing extant legal doctrines, their development and application. The analysis is not limited to statutes alone but extends to judicial decisions and other recognized legal sources. While it does not seek to query the validity of law, it regards law as a body of principles in written form which is better understood with the sole aid of legal sources (primary in this work; Constitution of Federal Republic, EPSRA, REFIT, Climate change Act, 2021, UNFCCC, Judiciary cases and secondary; policies on RE, published books and articles). Hence, research materials were mainly sourced from real and virtual libraries, which are either classified into primary or secondary sources of law. Also, it is imperative to say that this study is library or desk-top based. The research also adopted the qualitative method of research to get data about on-grid renewable power projects in Nigeria and the reality of practices and standards prevalent within the NESI. Information was elicited from very relevant industry players engaged in the regulation and operations of going concerns in the power sector especially legal officers of some of the IIPs/Investors that signed PPAs with NBET in 2016 for development of 13 solar power plants to be connected to national grid in Nigeria.

3.2 Types of Data

Desk top literature data were collected through the doctrinal legal research. Unstructured interview of key stakeholders in the power sector was conducted.

3.3 Data Source

The data comprises of sources of law classified into primary and secondary sources. The primay sources include: statutes, treaties, regulation and judicial decisions of Nigerian and foreign courts. The specific legislations applicable to the study include: Constitution of the Federal Republic of Nigeria 1999 as amended, Niger Dams Act 1962, NERC REFIT 2015; EPSRA 2005, Electricity Act, 2023, Climate Change Act, 2021, NERC Multi Year Tariff Order 2008 and 2012; Nigerian Domestic Gas Supply & Pricing Regulations, 2008 as well as other relevant delegated legislations made by NERC.

Specific government policies targeted at the advancement of renewable energy for the electric power sector in the country are secondary sources of law featured in this study. These policies include: Renewable Electricity Policy Guidelines (REPG), National Electric Power Policy (NEPP) 2001; 2006; Renewable Energy Master Plan (REMP) 2005 and 2012; National Renewable Energy and Energy Efficiency Policy (NREEEP) 2014, National Energy Policy (NEP) 2003, 2006 and 2013; Renewable Electricity Action Programme (REAP) 2006; Nigerian Biofuel Policy and Incentives (NBPI) 2007; Implementation Plan (RESIP) 2014 and Draft Rural Electrification Strategy, etc.

Other secondary sources which this study made recourse to consist of litany of relevant literatures, such as textbooks, journal articles, reports, policy documents and other online source. These sources were made to undergo critical content and contextual legal analysis. This study was comparative in approach. Consequently, intermittent reference was made to countries which have established advanced regulatory and legal framework in support of renewable energy for their power sector. The essence is for the country to draw upon useful lessons from these countries that can be applicable to Nigeria as far as local circumstances can permit. Also, there are prescriptive dimensions to this study, as it offered appropriate recommendations suitable to resolving the identified challenges cum gaps following the critical legal appraisal of the subject matter.

Information was sourced from regulatory bodies in the industry, such as: Federal Ministry of Power, Officers of NERC, NBET, Energy Commission of Nigeria (ECN), etc. by means of unstructured interview to obtained useful information. Particular attention was given to power generating companies, IPPs/investor companies, etc. However, the Nigerian Electricity Regulatory Commission (NERC) made available, statistics on power plants which are connected to the transmission grid. Therefore, other data sources apart from NERC statistics was taken into account for generation options. Overall, there is no commonly and all-inclusive accepted database of power records, hence the use of data from local and international sources. Despite the fact that all efforts were geared towards validation and harmonization of data, some deviations across the data became inevitable.

3.4 Sampling Techniques

This study adopted purposive sampling technique. Two officials of NERC (Manager Legal and Licensing Unit), and one each of Nigerian Bulk Electricity Trading Company (General Counsel) and the Independent Power Producers (IPPs) (Legal Officer, Anjeen Solar) were purposively selected for unstructured interviews.

3.5 Inclusion and Exclusion Criteria

The primary and secondary sources were relevant and related to renewable energy sourced electricity.

3.6 Method of Data Analysis

Classification of the information sourced from the field into different themes was carried out and contents were analysed.

CHAPTER FOUR
THE STRUCTURE OF THE REGULATORY AND LEGAL FRAMEWORK FOR RENEWABLE ELECTRICITY IN NIGERIA'S POWER SECTOR

4.1 Electricity Undertakings in Nigeria

For a very long time, many countries have placed heavy reliance on non-renewable energy sources. However, there has been a renaissance for the 21st Century drive for the use of renewable energy. In developed climes, most of them have resorted to a combined application of renewable and non-renewable energy sources. Countries like Germany are on the pathway towards total energy transition to renewable energy in the nearest future.[51] America has set a definite date of 2035 to totally phases off carbon emissions in its power sector.[52]

Fossil fuel based non-renewable energy is the main stay of Nigeria's energy source. Her energy needs are still largely founded on crude oil and its bye products given its abundant availability. Almost every vehicle in use in Nigeria runs on petroleum products for their engine power. Electricity generating sets which are of high usage in Nigeria to supplement the unstable power supply, have engines which depend on petrol and diesel. Power generating stations put heavy reliance on gas in order to generate electricity. This is so as the Nigerian power sector is 80% reliant on thermal-fueled power stations while 20% is

[51]Hargreaves, B. 2019. Energiewende: Germany's Quest to Achieve a 100% Renewable Energy Future. Energy Intelligence & efficiency. Retrieved 16 September, 2021 from https://www.wartsila.com/twentyfour7/energy/energiewende-germany-s-quest-to-achieve-a-100-percent-renewable-energy-future

[52]Munnings, C. 2020. Memo to President-elect Biden and Congress: Wind, Solar, and Gas: Managing the Risks of America's Clean Energy Transition. Progressive Policy Institute. Retrieved 14 September, 2021 from https://www.progressivepolicy.org/wp-content/uploads/2020/12/PPI-WindSolarGas.pdf

obtained from hydro power plants.[53] This makes the function of the petroleum downstream sector very critical to the power sector.

The heavy reliance on thermal power sources are not without consequences for the Nigerian power sector. The gas used for thermal plants is usually conveyed by haulage vehicles or gas pipeline. The laying of pipelines in unsecured areas exposes them to vandalism and sabotage.[54] Where this kind of acts to persist, there is the tendency for a loss in generation capacity of power plants and consequently, resulting into epileptic electricity supply.[55] Such incidence occurred sometime in 2016. About twenty-two and nine total and partial system breakdowns respectively were recorded within the said period.[56] Within the same year, there was an occasion where the transmission lines raced down to zero megawatt for close to three hours.[57] This is not forgetting moments of abnormal voltage fluctuations as a result of insufficient gas supply. Part of the energy resources that can be easily sourced within Nigeria include: geothermal, tidal and wave energy.

Nigeria had long engaged in electricity undertakings before the country attained independence. The earliest time Nigeria engaged in electricity generation was in 1896. This was carried out by the Nigerian Electricity Supply Corporation (NESCO), which is a private commercial entity created for the purpose of power generation and distribution.[58] NESCO started operations sometime in 1929, after hydro power facility in Kura, Plateau State, was constructed.[59] From thence until 1950, Nigerian electricity generation was based on unit/personal facilities with not so much plans being done by the Department of

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[53] United States Agency for International Development. 2014. Power Africa: Nigeria FactSsheet. Retrieved 6 September, 2021 from https://www.usaid.gov/powerafrica/nigeria.

[54]Adesanya, O. 2015. Beyond Power Mourning. *Nigerian Association of Energy Economist Energy Forum* 3. 14-16, 14.

[55]Banwo & Ighodalo, The Nigerian Power Sector Reforms: Overcoming Post-Privatization Challenges. Retrieved 6 July 2021 from www.banwoighodalo.com/assets/grey.../1c9335c3bfcc05ceff009c17beed5f7d.pdf

[56]Federal Republic of Nigeria, 2018. Power sector recovery programme: 2017-2021. Retrieved 6 July, 2021 from https://mypower.ng/wp-content/.../2018/02/PSRP-Master-Document-January-2018.pdf

[57]*ibid.*

[58]Naibbi, A. I. and Tukur, Y. M. 2017. Ensuring optimal electricity generation and supply: The paradox of Nigeria's situation. *International Research Journal of Environmental Sciences and Studies* 2.1: 1-14, 2.

[59]Usman, A.2013. Determinants of Electricity Consumers Satisfaction in Selected Electricity Distribution Zones in Nigeria: Implications for Regulatory Activities. *Journal of Asian Business Strategy* 3.6: 103-124, 105.

Public Works of the government at that time; others were carried out by the various local native authorities and regional municipal authorities.[60] Other independent power facilities under colonial management and administration of Native Authorities existed. The Native Authorities were in charge of funding and servicing of the power terminals; while the Nigerian Government Electricity Undertaking (NGEU) was a body created to coordinate the operations of power stations.[61]

The colonial authority assumed responsibility of the power sector in 1946 and to that end the Public Works Department (PWD) was created to perform the task of guaranteeing the supply of power to Lagos. The Electricity Corporation of Nigeria (ECN) was established by the Electricity Corporation Ordinance, No. 15 1950, as the focal body in charge of electricity supply. The ECN was established in order to merge the fast-paced electricity power sector and make it more effective. This led to the control of the electricity department and every other power activity in the country by one state body. This gave way for a wave of growths and expansion in the industry.

Upon Nigeria's independence in 1960, the Ordinance translated to Electricity Corporation Act. The operations of the ECN spanned across the country with the aid of captive and embedded power generation schemes.[62] ECN achieved a ground breaking milestone in 1956 at Oji River in Enugu State following its formation of a 30MW coal fired power station.[63] In 1962, ECN also actualized the premier 132 kilo volt transmission cable which connected Ijora electricity plant, to Lagos as well as the power base in Ibadan, spanning over 60km in distance.[64] This initialized the movement towards centralized electricity governance in Nigeria.

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[60]Ighodalo, A. 2006. Reform and Revolution: The New Nigeria Electric Power Supply Industry (ESI). Retrieved 6 January 2022 from https://www.banwo-ighodalo.com/assets/resources/a6fe7aa55db61f55df68a0085c8a9eb4.pdf

[61]Ogunduyile, O. 2017. Bridging Electrical Power Gap in Nigeria: The Way Forward;. *The Consulting Engineer* 4.1: 40-43, 40.

[62]Ogunleye, E. K. 2016. Political Economy of Nigerian Power Sector Reform. United Nations University (UNU), World Institute for Development Economics Research Working Paper 9. 3. Retrieved on August 10, 2021 from https://www.econstor.eu/bitstream/10419/146201/1/852459440.pdf

[63]*ibid*.

[64]Makanjuola, N. T., Shoewu, O., Akinyemi, L. A. & Ajose, Y. 2015. Investigating the Problems of Prepaid Metering Systems in Nigeria. *The Pacific Journal of Science and Technology* 16.2. 22-31, 23.

The Niger Dams Act, enacted in 1962, established the Niger Dams Authority (NDA), which was created to expand the hydropower capabilities of Nigeria. Pursuant to the Act, the NDA was authorized to construct and manage hydropower dams, discover more power generation sources and be involved in the running of the transmission grid. In 1968, the NDA succeeded in completing the erection of Kainji hydropower station and commenced its operations.[65] During the reins of NDA, between 1961 through 1972, the national power generation capacity rose to 3,000 MW, with an equivalent grid power transmission capacity.[66] Efforts to link up various parts of the country yielded more positive result. A link was established between Lagos and Kainji while Kaduna and Kainji were connected to Kano and Zaria; Oshogbo, Benin and Ughelli linked up with Benin, Onitsha and Afam.[67] The power transmission grid continually expanded in leaps and bounds across the country.

The Nigerian Electric Power Authority Act was passed in 1972; The Nigerian Electric Power Authority (NEPA) was created by this Act. By reason of this, beginning from 1st June, 1972, NEPA assumed full responsibility for all kinds of electricity activities across the country.[68] NEPA operations became of practical take off from 6th January, 1973, after its pioneer general manager was appointed.[69] The law conferred wide powers on NEPA to "generate, convey, modify, circulate, and market electricity; whether to individual consumers or in bulk to any part of Nigeria".[70] NEPA was statutorily conferred the role of establishing and upholding an effective, well-organised and cost-effective system of electricity supply in Nigeria. They were also to perform any other form of electricity activities deemed necessary.[71] NEPA was formed out of the merger of ECN and NDA. The Act also contained transitional provisions which conferred on NEPA, all assets,

[65]Etukudor, C., Abdulkareem A. & Ayo,O. 2015. The Daunting Challenges of the Nigerian Electricity SupplyIindustry.*Journal of Energy Technologies and Policy* 5.9: 25-32, 26.
[66]Ogunleye, 2016. *op. cit.*
[67]Awosope, C. A. 2014. Nigeria Electricity Industry: Issues, Challenges and Solutions. *Covenant University Public Lecture Series* 3.2: 7.
[68]See, Section 1 and 44 (2) NEPA Act.
[69]Oluwatoyin, K. K., Oluwasegun, A. M. & Alabi, A. O. 2015. Issues and Challenges of Ownership and Privatization of fPower Stations in Nigeria. *Journal of Scientific Research & Reports* 8.3: 1-8, 3.
[70] Section 7 (2) (a) NEPA Act.
[71] Section 7 (1) (a) NEPA Act.

liabilities, rights and obligations which formally inhered in NDA and ECN.[72] Although NEPA had utmost control of all profit-oriented electricity supply in Nigeria, however, this did not impede individuals who desired to own thermal plants for private/domestic use from having their ways.[73] The Act conferred great powers on the Minister for Power and Steel. For example, the Minister's express authorisation was obtained before any major action or decision could be carried out.[74]

The heavy government presence in the power sector gave it a welfare outlook. Power sector was perceived as a public utility that should be directed towards the delivery of public good to the people who are the true owners of the industry. Government perceived itself as a trustee which was equipped to manage the industry for the ultimate good of the people. Towards this end, government imposed very low tariffs in order to obtain political allegiance and reception from the people (given their unconstitutional means of emergence into political powers as military government). The implication is that the tariff was not cost reflective.

The introduction of commercialisation and privatisation took root in the Nigerian political economy from 1986. The attempts to commercialise NEPA in 1988 gave way for the increment in tariffs plan for electricity consumers.[75] Cases of high inefficiency and lack of competence resulted in mismanagement, corruption and bureaucratic red-tapism which affected the fortunes of NEPA.[76] This compelled the government to amend the NEPA Act in 1998. The object was to remove the monopolistic powers of NEPA and encourage involvement of investors from private sector.[77]

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[72]Section 5 NEPA Act. The Act referred to NDA and ECN as the 'body to whom this Act applies'. See Section 44 (1) (a) and (b) where these bodies were defined to mean NDA and ECN.

[73]Adenikinju, A. 2005. Analysis of the Cost of Infrastructure Failures in a Developing Economy: The Case of the Electricity Sector in Nigeria. African Economic Research Consortium Paper 148 . Nairaobi: The Regal Press

[74] See Section 16 NEPA Act for the general powers of the Minister.

[75]Isola, W. A. 2012. An Analysis of Electricity Market Structure and its Implications for Energy Sector Reform and Management in Nigeria . *Global Advanced Research Journal of Management and Business Studies* 1.5: 141-149, 1944.

[76]Nwocha, M. E. 2010. An Appraisal of Economic Liberalization and Sustainable Development in Nigeria . *Abuja Journal of Public and International Law* 1.1: 42-56, 50.

[77]Emodi, N. V. 2016. *Energy Policies for Sustainable Development Strategies: The case of Nigeria*. Springer: Singapore 10.

There are certain limitations that can be observed in the NEPA regime. Power generation plants that were in operation were not more than 19. On the average 1,750MW was generated on a daily basis; between 1991 and1999. There was not any record of electric power infrastructure being constructed; the last transmission network was facilitated in 1987, while the last power plant was constructed in 1990 prior to the reform; close to 90 million persons who lived in the country lacked opportunity to the grid; the lack of cost reflective tariffs was responsible for the 50% deficit in the industry.[78] This and a list of other weaknesses led to the underperformance of NEPA. These limiting factors included the following:

i. the reduction of electric supply was at par with existing demands from consumers;[79]

ii. Large incidence of consumer avoidance and evasion of electricity bills payment;[80]

iii. Constant loss of power generated due to wear and tear of the system, outdated systems and under management of electric facilities;[81]

iv. Reducing water levels and insufficient supply of gas for powering hydro and thermal plants;[82]

v. high cost of operation and maintenance of surviving power stations and facilities;[83]

vi. Foreign exchange deficit to allow procurement and replacement of warn out facilities;[84]

vii. Regular demolition of power facilities as a result of malice and sabotage.[85]

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[78]Dikki, B. E. 2014. Update –Privatization Issues: A Presentation at the 1st National Council on Power Conference (NACOP) 3. Retrieved on the February 21, 2018 from www.power.gov.ng/.../UPDATE%20ON%20%20PRIVATISATION%20ISSUES.pdf

[79]Banwo and Ighodalo. The Nigerian Power Sector Reforms: Overcoming Post-Privatization Challenges. p. 2 Retrieved on 21 May, 2021 from www.banwo-ighodalo.com/assets/grey.../1c9335c3bfcc05ceff009c17beed5f7d.pdf

[80]*ibid.*

[81]*ibid.*

[82]*ibid.*

[83]*ibid.*

[84]*ibid.*

The great displeasure that trailed the inefficient service delivery by NEPA gave rise to wide calls for government to create a viable environment for private sector investments in the electricity industry. This move for privatisation in the Nigerian economy regained a popular toll on Nigeria economic policy from 1999, when the country returned to democracy. The Public Enterprises Privatization and Commercialization Act (PEPCA), 1999 was enacted solely for this reason. It was under this Act that the Bureau for Public Enterprises (BPE)[86] was established. It was saddled with the task of ensuring the privatization[87] and commercialization[88] of FGN owned companies.[89] The electricity sector was one of the public enterprises earmarked for partial privatization. Under the Act, the National Council on Privatization was created.[90] Amongst other things, it was to exercise supervisory duties and keep a watchful eye on the commercialization and privatization process.[91]

4.2 Power Sector Reforms in Nigeria

In Nigeria, reforms in the power sector began during President Olusegun Obasanjo administration- a democratically elected president after several years under military rule. The FGN in 2001 launched a widespread reform in the power sector with the establishment of the Electric Power Implementation Committee, (EPIC). EPIC was in charge of formulating National Electric Power Policy (NEPP) draft. The policy articulated the intention of the FGN to begin the electricity reform process with regards to the structure of ownership, administration and control of the power sector.[92] The goal was to conceive a means of power sector deregulation, so as to attract investors into the power sector.[93]

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[85]*ibid.*
[86] Section 12 PEPCA.
[87] Section 13 PEPCA.
[88] Section 14 PEPCA.
[89] The list of public institutions is contained in Part I and II of the Second Schedule to the Act.
[90]Section 9 PEPCA.
[91]Section 11 PEPCA.
[92]Energy Support Programme. 2015. Energy, Energy Efficiency and Rural Electrification in Nigerian: An Overview with a Special Emphasis on Renewable Energy. 2nd Ed. 29. Retrieved July 21, 2021 from https://powerlibrary.nigeriaelectricityhub.com/wp-content/plugins/download-attachments/includes/download.php?id=428
[93]Eberhard, A. Gratwick, K. Morella, E. & Antmann, P. 2016. Independent Power Projects in Sub-saharan Africa: Lessons from Five Key Countries. World Bank- Directions in Development Energy and Mining129.

The NEPP went on to dissect the reform process with set goals apportioned according to diverse dispensations. The original intention of the restructuring envisioned four (4) phases of development, which was intended to ultimately result into a competitive, efficient, private sector driven power sector under the regulatory control of NERC, whilst, the Ministry in charge of Power offers broad policy supervision.[94] The implementation was to be carried out in four phases, i.e. the temporary stage, the intermediate power market, the medium-term power market as well as the ultimate market. The interim stage began in November 2003 and it consisted of cash allocation for deficits in the sector amongst the participants in the electricity market before tariff is expected to be reviewed. At the intermediate electricity market stage, the NBET would engage in active bulk electricity purchase from Generation Companies and also from IPPs and merchandise same to Distribution Companies. At the medium-term stage of the electricity market, NBET would have outlived its purpose and existing contracts and the power purchase contracts with power generation establishments would be taken over by GENCOs and Distribution Companies. The fourth and final stage of the market would see to a bilateral contract directly entered into by electricity purchasers and retailers at all phases, while a vital mechanism would ensure via the establishment of a spot electricity market.

As recommended by NEEP, the reform culminated into the legislation known as EPSRA 2005. The EPSRA set out a new regulatory and legal framework to govern the Nigerian power sector. The EPSRA 2005 enabled the commercialisation and privatisation of the electricity industry. The ultimate objective was to introduce a competitive market for the electricity industry, boost rural electrification, ensure buyer rights protection and also, increase the standard of performance in the power sector. As a revolutionary piece of legislation, Section 99 EPSRA repealed the NEPA Act (as amended) and the Electricity Act. It is the legal instrument that heralded the privatisation of the Nigerian electricity industry. Ultimately, the disconnection and denationalisation of electricity generation as well as distribution companies would eventually gain effect in 2013.

Retrieved July 19, 2021 from https://openknowledge.worldbank.org/bitstream/handle/10986/.../9781464808005.pdf

[94]Adeniji, O. and Osisiogu, O. 2014. Overview of the Nigerian Power Sector Reform. Stillwaters Law Firm. Retrieved 28 August, 2021 from https://www.iflr1000.com/NewsAndAnalysis/Overview-of-the-Nigerian-power-sector-reform/Index/1017

The National Integrated Power Project (NIPP) commenced in 2004 in order to improve the supply of electricity through launching of gas operated stations. The National Electric Power Policy (NEPP) of 2001 brought about the EPSRA which led to the creation of NERC. The EPSRA established the legal base for the denationalisation of the electricity industry. A vital progress in this strategy was the structure of the Power Holding Company of Nigeria, (PHCN); a special-purpose vehicle,[95] which was subsequently unbundled into eighteen (18) other enterprises. The execution of the plan for the August 2010 power sector reform, gave rise to the denationalisation of the electricity industry on November 1st, 2013 with the official transfer of the beneficiary firms to private shareholders replicated in six Generation Companies (GENCOs) and eleven Distribution Companies (DISCOs), as well as the establishment of the Transmission Company of Nigeria (TCN).

EPSRA removed the industry regulatory powers once exercised by the Minister under the NEPA Act. It went on to establish NERC as an autonomous agency statutorily empowered with regulatory duties for the sector. NERC can issue licenses to private investors who wish to undertake commercial ventures in the electricity industry, provided they act in compliance with electricity industry market rules. The transitional rule as contained in the EPSRA directed the National Council on Privatization (NCP) to incorporate initial holding companies within six months from the time the EPSRA was enacted, so that they can take up the disbanded NEPA's assets and liabilities.[96] The Ministry of Finance and Bureau for Public Enterprise were to act as directors holding share for the interest of the FGN.[97] In furtherance of section 2 of the EPSRA, the PHCN was established. PHCN was to take over from NEPA with respect to its functions, employees, assets and liabilities.[98] It also held control of the tripartite subsector of electricity generation, transmission and distribution from the period of 2007 to September 2013. This is notwithstanding the requirement of section 8 EPSRA 2005, which mandated the NCP to ensure that PHCN be succeeded by private investors within eight months following the incorporation of PHCN.

[95]Saredau, D. P. 2021. Law and Nigeria's Development: How to Strengthen the Efficacy of Law for Development in Nigeria. *African Journal of International and Comparative Law* 29.4: 551-573, 555.
[96]Section 1 EPSRA.
[97]Section 2 EPSRA.
[98]Oluwatoyin, K. K., Oluwasegun, A. M. & Alabi, A. O. 2015, Issues and Challenges of Ownership and Privatization of Power Stations in Nigeria. *Journal of Scientific Research & Reports* 8.3: 1-8, 4.

The NCP eventually allowed eighteen private companies to succeed the PHCN in November, 2013.[99] This was followed by NERC issuing licenses to six Power Generation Companies, (GENCOs).[100] TCN was established to exercise monopoly over electricity transmission in Nigeria. Electricity distribution licenses were also granted to eleven electricity distribution companies (DISCOs).[101]Presently NERC has issued 58 on-grid generating licenses which is expected to supply 26,423.2MW of power to the grid – this being the overall installed volume when totally accomplished and integrated. An additional 3 licences for fixed generation outside the circulation network at a fixed capacity to generate up to 133MW and 19 off-grid licenses totaling 312.5MW capacity installed.[102] The country's transmission grid system comprises of 72 330kV circuits, while government-owned exclusively is put at 185 132kV circuits having a joint capacity of 19,427.5MVA, 27 330kV substations and 114 132kV substations (Transmission Company of Nigeria, 2014).[103] It is organized and controlled by the National Control Centre, based in Oshogbo— a distinct state-owned structure operator. While the country's circulation network is being controlled by 14 (fourteen) power distribution enterprises which are directly in charge of the provision and dispensing of electrical power to the final users.

The overall mounted size of the current producing plants as at September 2021 was 26,503 MW, but the available capacity wheeled to the DISCOs is about 243,769 MW, while only 2519 MW is successfully wheeled to the final consumers.[104] Seven (7) out of the 14 (fourteen) producing sites are more than two-decades old and the daily average

[99]Banwo and Ighodalo. The Nigerian Power Sector Reforms: Overcoming Post-Privatization Challenges. p. 1 Retrieved July 21, 2021 from www.banwo-ighodalo.com/assets/grey.../1c9335c3bfcc05ceff009c17beed5f7d.pdf

[100]The generating companies are Egbin Electricity Generating Company (EEGC), Sapele, Ughelli, Afam, Shiroro and Kainji.

[101]In alphabetical order, the eleven distribution companies are: Abuja Electricity Distribution Company (AEDC), Benin Electricity Distribution Company (BEDC), Eko Electricity Distribution Company (EkEDC), Enugu Electricity Distribution Company (EnEDC), Ibadan Electricity Distribution Company (IbEDC), Ikeja Electricity Distribution Company (IkEDC), Jos Electricity Distribution Company (JEDC), Kaduna Electricity Distribution Company (KdEDC), Kano Electricity Distribution Company (KnEDC), Port-Harcourt Electricity Distribution Company (PHEDC) and Yola Electricity Distribution Company (YEDC)

[102] Nigerian Electricity Regulatory Commission. 2011. NERC- licensees. Retrieved 28 August from http://www.nercng.org/index.php?option=com_contact&catid=41&Itemid=67

[103]Nigerian Electricity Regulatory Commission. 2011. NERC- licensees. Retrieved 28 August 2021 from http://www.nercng.org/index.php?option=com_contact&catid=41&Itemid=67

[104]Ofikhennua, J. NERC: 26,503,900mw Injected into Grid in Nine Months. *The Nation* 31 December 2021. Retrieved 6 January 2022 from https://thenationonlineng.net/ nerc26503900mw-injected-into-grid-in-nine-months/

electricity generation is lower than 2,700MW, far lesser to the maximum capacity prediction of 8,900MW for prevailing obtainable structure. Due to this, the country experiences huge capacity shedding.[105]

In the estimation of Bacon, a complete reform of the power sector would ordinarily contemplate certain criteria. These criteria include the requirement for the power sector to be operated in line with commercial ideals.[106] A competitive system is to be created to jack up performance so as to ensure efficiency, consumer friendliness, innovation, sustainability, arrangement of the value chain in the power sector to make room for competition in the system. Inclusion of private ownership in the structure of electricity generation undertakings for the purpose of creating competition in the industry enables market forces to entrench transparency in the system bereft of undue influence from government officials, agencies, operators or even consumers, permit free participation of companies and private investors as system operators while the government is expected to only perform the role of market regulator and policy formulator.[107]

The term 'reform' suggests the assumptions that the system is not performing at optimal functionality as expected; the system and sub-systems are inefficient, system functions at a sub-standard rate in difference to generally acceptable standard requiring drastic and methodical adjustment or overhaul of the system as a last resort. It also implies that with regards to system functionality, there is nonconformity with set out model and values of its constitution.[108] Reform would increase or speed up the compelling need to cause an alteration of redundant and obsolete practices and structures in order to align or acclimatise with the evolution of the prevailing time.[109] It is to be noted that merely undertaking system reforms without taking cognisance of necessary factors such as the content and context specification of the subject matter would likely defeat the purpose,

[105]Okoro, O. I. and Madueme, T. C. 2006. Solar Energy : A Necessary Investments in a Developing Economy. *International Journal of Sustainable Energy* 25.1: 23-31.
[106]Bacon, R. W. and Besant-Jones, J. 2001. Global Electric Power Reforms, Privatization, Liberalization of the Electricity Industry in Developing Countries. *Annual Reviews Energy and Environment* 26. 331-359.
[107]*ibid*.
[108]Lawan, M., Kaugama, M. M. & Bello, M. 2017/2018. The Case for Prison Reforms in Nigeria: Case Study of Kano Central Prison. *Nigerian Current Law Review* 1-40, 2.
[109]Ayoola, E. O. 1990. Rationale, Objectives and Scope of Law Reform. Law, Development and Administration in Nigeria. Eds. Y. Osinbajo, and A. U. Kalu, Lagos: Ministry of Justice. 6-7, 6-7.

interests, and timeline which the reform process is set to undergo. This would eventually lead to failure in achieving the ultimate goal of reform as conceived from inception.[110]

Despite the power sector reform stages and timelines as formulated by the FGN, the sector is yet to meet up with the timeline. As at February 2015 when transition electricity market stage was declared, not all the predetermined indices had been attained. The implication is that the power sector reform are still at the transition electricity market stage, while commercial operations is yet to be totally executed. The country has 13,400MW of mounted electricity producing strength, however 8,000MW is perfunctorily accessible. Nevertheless, due to constraints in electricity transmission and gas supply, less than 4,000 MW has been sent out on the whole in the last two (2) years.[111] The absence of regular power supply has changed the willingness of end users to pay electricity bills and it has also given way to an intrinsic shortage in charges and the accumulated industry cash shortfall. As a result, the industry is faced with quite a number of challenges in connection to structure, liquidness, and authority that demands precise and vital responsiveness. Recently, the FGN inaugurated the Nigerian Power Sector Recovery Program 2017-2021, mapping out strategies to increase the monetary capability of the NBET and also expand the feasibility of the circulation enterprises in Nigeria.[112] This has seriously queried the essence of the electricity industry reform. Indeed, the reform which ultimate goal was to address the challenge of poor and epileptic power supply in Nigeria is yet to be realised over fifteen years after embarking on the reform journey.[113]

4.3 Forms of Electricity Generation in Nigeria

Inside the country's electricity system, four major electricity generation alternatives are distinguishable. The electricity producing options comprise:

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[110]Okpanachi, E. and Obutte, P. C. 2015. Neoliberal Reforms in An Emerging Democracy: The Case of the Privatization of Public Enterprises in Nigeria, 1999–2014. *Journal of Social Security Income, Aid and Welfare* 7.3: 253-276, 264.

[111]Adeyanju, G. C., Osobajo, O. A., Otitoju, A. & Ajide, O. 2020. Exploring the Potentials, Barriers and Option for Support in the Nigeria Renewable Energy Industry. *Discover Sustainability* 1.7: 1, 5.

[112]Adeniji, O. and Osisiogu, O. 2014. Overview of the Nigerian Power Sector Reform. Stillwaters Law Firm. Retrieved 28 August, 2021 from https://www.iflr1000.com/NewsAndAnalysis/Overview-of-the-Nigerian-power-sector-reform/Index/1017

[113]Nwachukwu, C. Energy Sector Reforms Stagnated – Experts. *Vanguard*, 17 April, 2013. http://www.vanguardngr.com/2013/04/energysector- reforms-stagnated-experts/

i) Electricity generation dependent on on-grid transmission;

ii) Embedded generation;

iii) Off-grid generation and

iv) Captive generation.[114]

All standing procedures only disturb electricity generation installation capacity higher than 1 MW. Captive generation means that electrical power is totally used up by the producer itself (PPA not mandatory), for example, companies or households, that use their own diesel generator sets. Therefore, captive generation is strictly off-grid, which means, it is not dispatched to the local grid or circulation grid. Electricity generation founded on an off-grid authorisation is apparently also off-grid generation, in addition, demands visible off-takers, which in most cases are families within a distant rural community, public amenities (for example, health stations, school), and businesses also. This kind of power generation may also require a distribution license. In contrast, electricity generated via immerse generation is moved by means of a distribution structure of an outward distribution firm. Therefore, embedded generators are generally linked to the supply grid. On a final note, on-grid generation authorisations are essential for every power plant that transmits electricity through local transmission network.[115]

4.3.1 Grid-Connected Power Generation

According to NERC, in 2014, authorisation for on-grid operated power plants was put at 19,407 MW. Accordingly, off-grid authorisations cater for only 305 MW, while the capacity of fixed generation represents 49 MW. At this juncture, it is pertinent to mention that, electrical energy from captive source is quite greater than that which is supplied by power plants with off-grid authorisation and implanted sources. Figure 4.1 demonstrates how the authorisations for grid-linked generation capability (selections I and II) are joined. The dark blue denotes ‘existing capacity’ while the light blue represents ‘outdated fixed capacity’. The installed capacity worth 13,308 MW is ascribed to the core energy plant

[114] Though various form of authorisation are required to undertake operations in options (i) and (ii), option (iv) only requires NERC’s permit.

[115]Adeoba, I. 2017. Opportunities for off-grid solutions in the Nigerian power sector. Detail Commercial Solicitors Newsletter. Retrieved 19 July, 2021 from www.detailsolicitors.com/.../1IfedayoAdeoba_PowerAfricaPresentation_09.10.17.pdf.

convoy while the remaining (authorized capacity worth 31% of licensed) is yet to be built or is behindhand. The National Integrated Power Project thermal energy plants (40%) and also, the previous PHCN's thermal energy plants (34%), are pitching in the largest installed volume within the current power plant convoy. According to data from NERC, 80% of the initial capacity produced in 2015 (Table 4.1)) came from gas-centered energy plants, while others came from hydro electrical power plants. The ratio for installed capacity is 84% from gas while 16% is from hydro.

The current convoy of electricity plants are a combination of plants constructed before the 1990s as well as plants constructed (or being constructed) in the mid-1990s. Ever since the previous thermal electricity stations suffered much from lack of proper maintenance, the obtainable producing capacity in 2012 was below 6,200 MW. However, in 2015, it rose to 6840 MW. On the other hand, water shortages, unavailability of gas, grid and breakdowns rigorously restricted the functioning of the electricity plant, meaning, in spite of growth in the existing capacity installed in years past,[116] about 3000 MW to 4500 MW are in reality being produced (the maximum produced so far in Nigeria was placed at 4,517.6 MW on December 23rd, 2012) (Figure 2). Close to 2700 MW of electricity generation proficiencies are frequently lost because of gas shortage; close to 500 MW get lost as a result of water management constraints, while quite a lot of megawatts are frequently mislaid owing to line restraints. The inadequate functioning of the electricity plants has in no small measures led to critical unavailability of power supply throughout the nation with daily power shortages for quite a number of hours.

[116]See Table 4.1.

TABLE 4.1: Electricity Generation Profile, Source: NERC Archive

Year	Ave. Gen. availability (MW)	Maximum peak generation (MW)	Maximum daily energy generated (MWh)	Total energy generated (MWh)	Total energy sent out (MWh)	Per Capita Energy Supply (kWh)
2007	3,781.3	3,599.6	77,322.3	22,519,330.5	21,546,192.2	155,3
2008	3,917.8	3,595.9	86,564.9	18,058,894.9	17,545,382.5	120,4
2009	4,401.8	3,710.0	82,652.3	18,904,588.9	18,342,034.7	122,0
2010	4,030.5	4,333.0	85,457.5	24,556,331.5	23,939,898.9	153.5
2011	4,435.8	4,089.3	90,315.3	27,521,772.5	26,786,992.0	165.8
2012	5,251.6	4,517.6	97,781.0	29,240,239.2	28,699,300.8	176.4
2013	5,150.6	4,458.2	98,619.0	29,537,539.4	28,837,199.8	181.4
2014	6,158.4	4,395.2	98,893.8	29,697,360.1	29,013,501.0	167.6

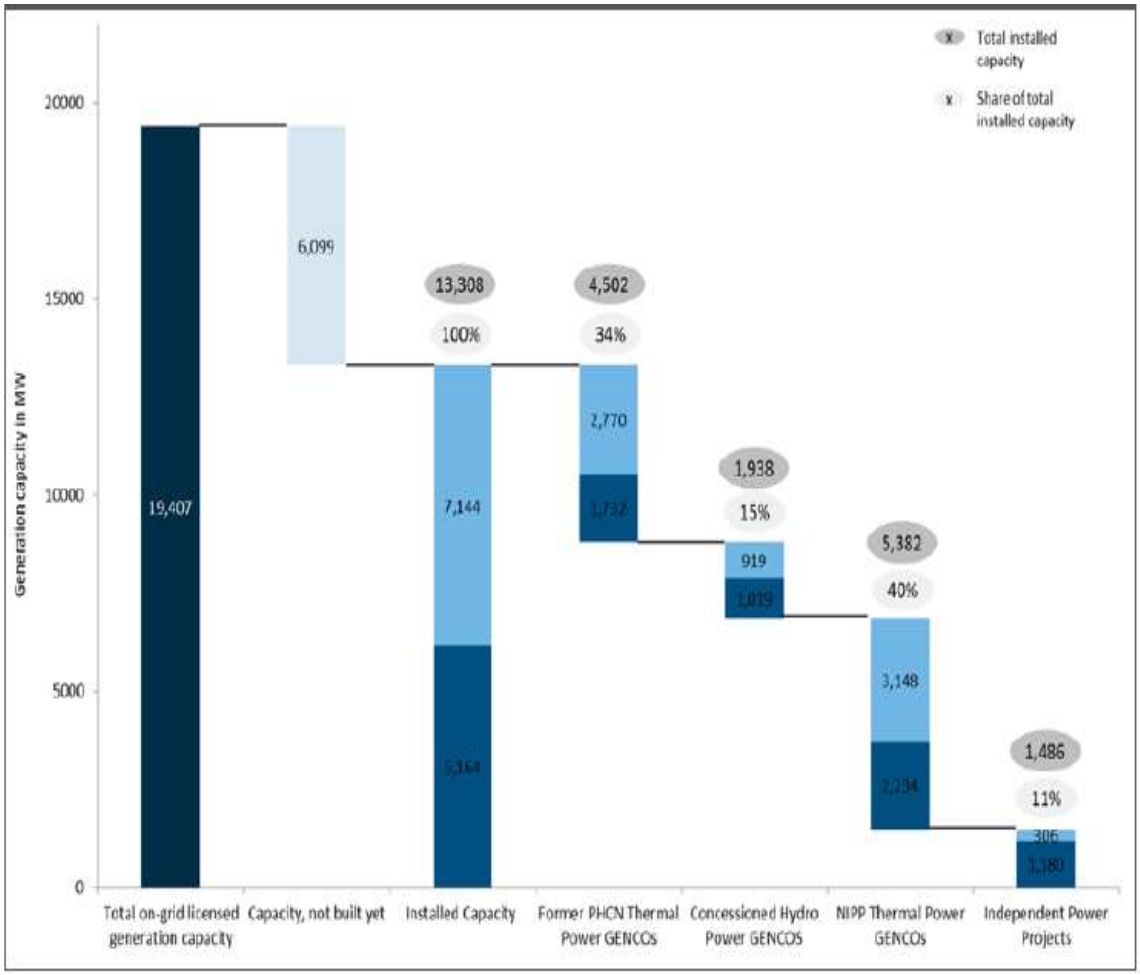

Figure 4.1 shows the break-down of on-grid authorised electricity generation in the country.[117]

[117]GOPA-International Energy Consultants, 2012.

There are current plans to develop two new gas thermal power plants. One is the 459 MW capacity Independent Power Producer (IPP) open-cycle gas electricity plant scheme situated in Azura, within the City of Benin. This is already operational. The other is the 533 MW combined-cycle gas-turbine (CCGT) Qua Iboe power plant (QIPP), to be built in the city of Ibeno town of Akwa Ibom State. The main hydropower manufacturing plant that is presently under construction is the 700 MW capacity Zungeru factory situated in Niger State, Nigeria. The 40 MW capacity Kashimbilla plant in Taraba State and the 30 MW Gurara hydropower station located in Kaduna State are two additional developments being highlighted by the FGN. Strategies to construct the 3,050 MW capacity Mambilla hydropower station in Taraba State are yet to be tangible ever since the dialogues with the Chinese Exim Bank commenced.

In the area of commercial-scale solar energy schemes, there are lots of solar smallholdings that have newly acquired licenses or are currently undergoing the licensing acquisition process. They comprise a 100 MW machinery (Bauchi State), 120 MW Katsina State), and many others located in Nassarawa, Ekiti, and Kaduna States. The Ministry of Power possesses a 10 MW aviator wind factory in Katsina, targeted for commissioning in no distant time. Moreover, the next phase of the National Integrated Power Project is dedicated to constructing hydro electricity generation factories which are projected to increase Nigeria's generation profile by 4000 MW. Lastly, strategies are in progress to utilise local coal reserves in Kogi and Enugu State for electricity production aims; and in recent times, a private firm has acquired an authorisation to build a 1200 MW power station.

4.3.2 Off-grid Power Generation

As established in previous chapters, off-grid licenses include a manufacturing strength of merely 305 MW, whereas authorised embedded generation capability amounts up to 49 MW. Though, a greater number of private stakeholders that are engaged in captive production generally do so for the purpose of ensuring viable and steady electricity supply for their industrial facilities. The figures above do not in any way justify the producing capacity of the already stated privately managed diesel or gas producers. A survey in 2013 states that, approximately 80% of Nigerians make use of alternative power supply sources which includes solar inverters or generators. An estimate proposed that about 8 and 14 GW of circulated generator sets run with diesel capacity

are presently installed in Nigeria. Close to 86% of firms in the country share or own a generator set while not less than 48% of their entire electricity power need is taken care of by these self-owned generator sets.[118] Given the millions of self-owned installed Diesel generator sets, Nigeria is ranked first in Africa as generator sets shipper and is equally acknowledged as one of the greatest importers globally, with the yearly numbers of generators imported amounting to US$ 207.99 million in the year 2018.[119] Captive production provides some distinctive merits within the country's electricity system; to begin with, industrial end users can produce the needed power for their operational needs. Furthermore, the demand for an authorisation for captive production includes the slightest hurdles in relation to funding and monitoring risks. Also, captive production signifies the optimum utilisation of electrical energy, since there are supposedly no practical (broadcast) or profitable damages to grapple with, nevertheless, there exist some shortcomings. The usage of decentralised diesel generator sets is environmentally and economically questionable. Another shortcoming is that license for captive production does not agree to offer exterior off-takers. There is a surplus of personal-generation capability within the industrial sector. Therefore, exchange between energy negative firms and energy surplus would be helpful for both, however, combined with the procurement of embedded generator license or an off-grid and the management of related regulatory concerns.[120]

It appears the procurement of an embedded generator licence looks more beneficial, since electrical power can be dispatched via the current circulation grid, enabling the procurement of a dissemination permit pointless. Moreover, embedded generation really does not only proffer benefits for manufacturing customers, but also for local and state governments, which possibly can accomplish electricity supply objectives across their boundaries with no constitutional restrictions. Though, the broadcast of

[118]Deutsche Gesellschaft für Internationale Zusammenarbeit. 2015. The Nigerian energy sector: An overview with a special emphasis on renewable energy, energy efficiency and rural electrification. 51. Retrieved 10 August, 2021 from https://www.giz.de/en/downloads/giz2015-en-nigerian-energy-sector.pdf

[119]Aduloju, B. Nigerians spends huge importing electricity generators bad for the environment. Africa Oil and Gas Report 13 May, 2021. Retrieved 6 January, 2022 from https://africaoilgasreport.com/2021/05/power-deficit-nigerians-spends-huge-importing-electric-generators-bad-for-the-environment/

[120]*ibid*.

fixed generation is hindered by the absent of fluidity of circulation enterprises, which impedes them to draw off electricity from prospective fixed generators.[121]

4.3.3 Electricity Consumption and Demand

Existing statistics on Nigeria for power consumption according to sector unveils that – generally, in comparison to power consumption– the local sector consumes most of the power. As illustrated in figure 4.3, a contrast between the aforementioned distinct peer states and Nigeria; Grounded on facts from the International Energy Agency (IEA), national usage measures up to 58% of the last power consumption in the country. Similarly, it remains the national sector (homes) where the growth over a decade is most pronounced.

[121]Adeoba, I. 2017. Opportunities for Off-grid Solutions in the Nigerian Power Sector. Detail Commercial Solicitors Newsletter. Retrieved 19 July, 2021 from www.detailsolicitors.com/.../1IfedayoAdeoba_PowerAfricaPresentation_09.10.17.pdf.

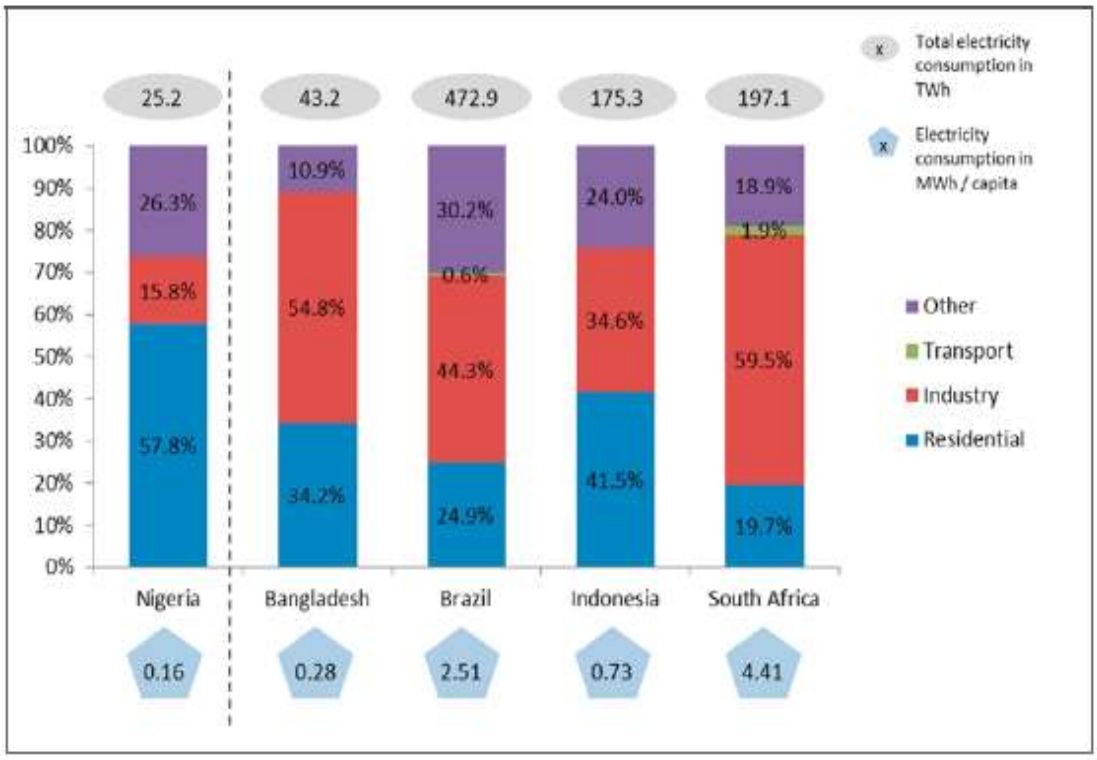

Figure 4.2: Total Electricity Consumption by Economic Sectors and Consumption Per Capita for Nigeria and Peer Countries.[122]

[122] International Energy Agency and World Bank. 2017. Sustainable energy for all: 2017- Progress toward sustainable energy. Retrieved on 16 July, 2021 from www.worldbank.org/en/topic/energy/publication/global-tracking-framework-2017

Altogether, grid generation capacity still appears delayed, particularly when contemplating the proof that complete consumption per unit is the smallest of all states as seen in Figure 4.3. Also, Bangladesh tries to upturn its power usage from 0.05 MWh per unit to 0.28 MWh concurrently, while facing similar residents' growth. Despite the fact that population constantly increased between 1990 and 2010, power consumption per unit plummeted till 2000 – mainly as a result of lack of latest generation capability – only then was there slight increase. Given the rapid population and commercial growth, power demand is anticipated to rise in the nearest future. Figure 4.3 below shows the World Bank's prediction response.

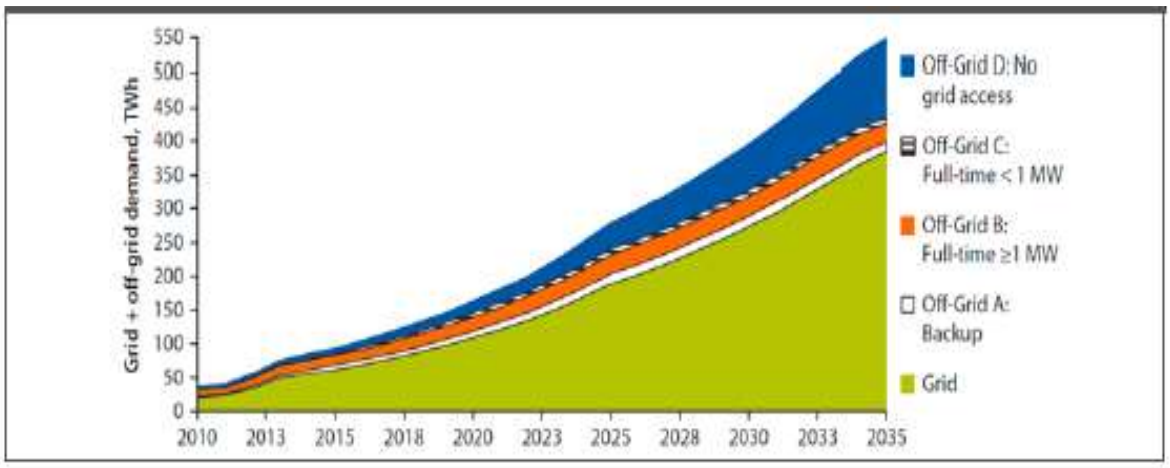

Figure 4.3: Projected Grid and Off-Grid Electricity Demand in TWh.[123]

[123] This calculation was made based on Federal Ministry of Power and Power Holding Company of Nigeria data and United Nations 2010 rural/urban population data. World Bank.

Figure 4.3 illustrates a sharp rise in the annual power request, mostly motivated by on-grid request, from 2020 going wards – in the same vein, from off-grid request (no grid access, blue sea area). As noted by the World Bank's prediction, power demand is expected to increase by a component of more than 5 till 2035 reaching about 530 TWh. This request could be catered for by generator set that has 83 GW the capacity which would consistently work the year round at optimum output. Seeing that 100% performance of all electricity plants is not realistic and transmittal losses along with optimum power request are yet to be taken into account, in fact, more generation volume is crucial to enable more than enough supply, that's if the World Bank's scenario remains true. It should be taken into accounts that PTFP predictions are founded on already existing basic structure, taking ongoing as well as planned projects into consideration. Other estimates are established on scenario presumptions concerning GDP, population, and structural modifications in the economy, more reason the various projections for utmost electricity demand confirms a great spread. Whilst Agusto & Co. proposes that by the end of 2015, utmost demand will increase to about 41,133 MW and 88,282 MW at the end of year 2020. In 2007, Tractebel Engineering performed an independent request investigation, and derived huge amount of electricity demand of 11,433 MW in 2020 and 24,208 MW by 2030.[124] REMP offers the most comprehensive request forecasts and estimates spike in electricity demand by 2020, about 45,490 MW, which lies between the aforementioned figures. In most cases, generation capability has to be significantly improved, while vast modifications show the significance of an appropriate demand projection.[125]

[124]PHCN. 2007.
[125]ECN. 2012.

Table 4.2: List of Power Stations in Nigeria[126]

Stations	Capacity	Year Completed/ Commissioned	Location
Kainji Hydro Power	760MW	1968	Niger State
Jebba Hydro Power	576.8MW	1985	Niger State
Shiroro Hydro Power	600MW	1990	Niger State
Egbin Thermal Power	1320MW	1986	Lagos State
Sapele Gas-Fired Steam Turbine	1020MW	1981	Delta State
Afam Power Station	977MW	2002	River State
Transcorp-Ughelli Gas Turbine	972MW	1990	Delta State
Geregu Gas Turbine	414MW	2007	Kogi State
Papalanto Gas Turbine	335MW	2007	Ogun State
Omotosho Gas Turbine	335MW	2006	Ondo State
Kwale Okpai Gas Turbine (ipp)	480MW	2005	Delta State
Afam vi Power Station (ipp)	642MW	2010	Rivers State
Ibom Gas Turbine (ipp)	190MW	2009	Akwa Ibom State
Aes Barge Gas Turbine (ipp)	270MW	2001	Lagos State
Omoku Gas Turbine (ipp)	136MW	2005	Rivers State
Aba Gas Turbine (ipp)	140MW	2012	Abia State
Geregu ii Gas Turbine (nipp)	434MW	2012	Kogi State
Sapele Gas Turbine	450MW	2012	Delta State
Alaoji Gas Turbine	1074MW	2015	Abia State
Calabar Gas Turbine (nipp)	561MW		Rivers State
Gbarain Power Station (nipp)	225MW		Bayelsa State
Egbema Gas Turbine (nipp)	338MW	2013	Imo State
Ihovbor Gas Turbine (nipp)	450MW	2013	Benin State
Omoku ii Gas Turbine (nipp)	225MW		Rivers State
Omotosho ii Gas Turbine (nipp)	450MW	2012	Ondo State
Olorunsogo ii Gas Turbine (nipp)	675MW		Ogun State

[126]Utuk, M. 2017. 38 Power Stations in Nigeria, Locations and their Capacity. Retrieved 28 August, 2021 from https://infoguidenigeria.com/power-stationsnigeria

4.4 Energy Situation in Nigerian Power Sector

Nigeria is presumed to be Africa's power giant and the foremost petroleum producing country alongside Libya, which are both responsible for about two-thirds of the continent's crude oil stocks. Nigeria is ranked as the country with the highest deposit of natural gas reserve.[127] Most of Africa's bitumen and lignite are deposits of Nigerian soil. With regards to total conventional energy reserve, no African country ranks above Nigeria. Hence, it is no news that energy exploration sustains the Nigerian economy. In the same vein, there are abundant primary power resources in the country's industrial natural resources endowment. Numerous energy reserves are abundantly present in Nigeria. The country is said to possess the sixth largest crude oil reserve in the world. It is estimated that, Nigeria has 36.2 billion barrels of oil reserves. It is gradually becoming a vital gas province with valid reserves of up to 5,000 billion m^3. Petroleum reserves are majorly located and discovered along the Gulf of Guinea, around the Bight of Bonny and within the Niger Delta. Major exploration enterprise is directed towards deep and very deep offshore zones with organised actions in the Northeast and Chad basin. Lignite and coal reserves are evaluated at 2.7 billion tons, whilst that of tar sand is put at 31 billion barrels. Mapped out hydroelectricity sites has an assessed volume of close to 14,250 MW. Nigeria as a nation has reasonable amount of biomass resources to address either traditional or modern energy uses, including electricity generation.[128] Table 4.3 depicts energy reserves and potentials of Nigeria. There is obvious demand and supply differences due to lack of developed and inefficient energy sector administration. The steady supply of electricity has continued to be a challenge in Nigeria.[129]

[127] Sambo, A. S. 2008. Matching Electricity Ssupply with Demand in Nigeria. *International Association of Energy Economics* 4. 32-37.

[128]Ighodaro, C. A. U. 2010. Co-Integration and Causality Relationship between Energy Consumption and Economic Growth: Further Empirical Evidence for Nigeria. *Journal of Business Economics and Management* 11.1: 97-111.

[129]Okafor, E. C. N. and Joe-Uzuegbu, C. K. A. 2010. Challenges to Development of Renewable Energy for Electric Power Sector in Nigeria. *International Journal of Academic Research* 2.2: 211-216.

Table 4.3: December 2005 record of Nigeria's energy reserves/capacity

Resource type	Reserves	Reserves (BTOE)[c]	Reserves ($\times 10^7$) TJ
Crude oil	36.2 billion barrels	4.896	20.499
Natural gas	166 trillion SCF[a]	4.465	18.694
Coal and lignite	2.7 billion tonnes	1.882	7.879
Tar sands	31 billion barrels of oil equivalent	4.216	17.652
Subtotal Fossil		15.459	64.724
Hydropower, large Scale	11,000 MW		0.0341/year
Hydropower, small Scale	3,250 MW		0.0101/year
Fuel wood	13,071,464 ha[b]		
Animal waste	61 million tonnes/year		
Crop residue	83 million tonnes/year		
Solar radiation	3.5 to 7.0 kW h/m^2/day		
Wind	2 to4 m/s (annual average) at 10 m in height		

aSCF, standard cubic feet; bforest land estimate for 1981; cBTOE, billion tonnes of oil equivalent.[130]

[130] Energy Commission of Nigeria. 2007. Draft National Energy Masterpan ; Energy Commission of Nigeria. 2005 Renewable Energy Master Plan.

The current state of things is that many people in rural communities rely completely on fuel wood for their energy sustenance. About 70% of residents of rural regions primarily utilise fuel wood. The annual wood fuel consumption in Nigeria exceeds 50 million tonnes of, at a consumption rate exceeding new supply rates as a result of a variety afforestation programs. One of the main factors responsible for erosion in southern Nigeria and change in geographical area in dry-zone states is obtaining wood fuel for common household and profiteering use.[131] Deforestation rate is approximately 350,000 ha/year, or 3.6% of the current woods and forests areas, while reforestation alone accounts for around 10% deforestation rate. With the power sector being transformed and the electricity sector being privatised, it becomes obvious and unavoidable that for logistical and social reasons, particularly in sector where privatisation prevail, areas which are far off the grid network and/or are susceptible to low consumption or limited ability to purchase power, will not scurry the interest of private investors. Those (landed) areas most likely will not be served for years ahead.[132]

4.5 Power Sector Challenges

The nation has not achieved it personnel and natural endowment into productive output to attain its economic growth and developmental potentials, with the particular goal to maintain its increasing population. Expatiating on this point, NERC explained that citizens expend about N769.4 billion per annual for fueling and maintenance of electricity generators. Out of the said amount, N540.9bn is used for buying diesel for diesel-powered generator, while N255.5 billion is spent for generator petrol purchase. NERC concluded that due to unstable power supply, N2 billion has been apportioned by the Presidency for the purpose of purchase of fuel and maintenance of the electricity generators supplied to the Presidential villa.[133] This risky state of the power sector is reflected in Nigeria topping the list of generator-importing countries for four concurrent years having transcended other African states on importation of generator. There has been a 20% increment in the value in the preceding years attributable to further depletion of power supply in Nigeria.[134]

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[131] Report of the Inter-Ministerial Committee on Combating Deforestation and Desertification 2000.
[132]Sambo, A. S. 2009. Strategic Developments in Renewable Energy in Nigeria. *International Association of Energy Economics* 4. 15-19.
[133]House of Reps Committee on Power. 2009.
[134]Akaeze, A. 2009. Counting their Losses. *Newswatch*, 16 March, 2009.

It has been claimed that in 2006 a sum of 750 corporations - about 30% of companies functioning in the nation – have either moved to Ghana or shut down their entire operation owing to power outages which for several years caused the country's GDP to fall from 8.2% as at 1990 to 4.2% in the year 2011.[135] In addition, the United Nations Development Programme (UNDP) estimates that Nigeria loses roughly N66 billion annually due to inconsistent electricity supply. The constraints imposed by insufficient power supply for small scale businesses to the extent that up to 20-30% capital allocation is squandered as primary expenditure on infrastructure bought to improve power supply, resulting in a major negative effect on production costs hence inhibiting the industrial sector.[136] Previous attempts have been made by analysts to point out the sector's difficulties and provide solutions. The Presidential Reform Committee identified shortage of power generation facilities, gas shortages, poor conservation culture, obsolete equipment, insufficient fund, poor network reach and substandard distribution channels as main challenges to improved power supply to consumers.[137] All of the problems which the Committee highlighted formed part of the initial hiccup of privatisation in the electricity reform process.

It was also observed by the Committee that bad pricing and poor customer relations posed a challenge to PHCN. For instance, PHCN realised only $4.06bn as revenue within its eight operational years.[138] There is also the illegal habit of PHCN personnel promptly suspending power punitively to wrench private reconnection bills. The electricity billing method has evolved into a channel for swindling unwary victims and rewarding both friends and collaborators through estimated bills. The payment of the electricity tariff was purposefully stalled by government officials and agencies, resulting in a bad debt pattern that harmed PHCN's financial and operational sustainability.[139] Furthermore, appointments in the sector provide a means of addressing political differences by employing stick and carrot strategies on friends and adversaries, respectively, at the expense of experts and/or members of the public, who are compelled to bear the cost implication for the government monopolistic

[135]ibid.
[136]Okpugie, G. 2009. Experts Advise on Efficient Use of Electricity Ahead of 6,000mw in December. *The Guardian*, 15 November, 2009.
[137]Ejumudo, T. F. and Ejumudo, K. B. O. 2014. The Operations of the Power Holding Company of Nigeria and Discriminatory Monopoly. *Journal of Energy Technologies and Policy* 4.6: 60-68.
[138]Lawal, Y. and Ebosele, Y. 2008. The New Vision for the Power Sector. Nigerian Muse. Retrieved 2 September, 2021 from https://www.nigerianmuse.com/20080723043741zg/nm-projects/energy-development-projects/a-new-vision-for-the-power-sector-by-yakubu-lawal-and-yetunde-ebosele/
[139]Ahiuma-Young, V. 2009. N96bn Government Debt Killing PHCN. *Vanguard*, 31 July, 2009.

enterprise's ruthless sharp practices. A study jointly carried out by the World Bank and UNDP tersely pointed out that, the national electric power has been misused and mismanaged for political patronage purposes in the course of personnel recruitment and recruitment policies, by unrealistic low tariffs and a means of huge, profitable construction contracts.[140]

Additionally, there are potential bureaucratic rifts and delays arising from bickering over overlap of role between the several agencies in the sector with respect to distribution of funds for executing the reform process in the sector. For instance, there is conflict brewing between NERC and the government ministry responsible for power over which of the bodies is entitled to oversee the N177.95 billion the FGN designated for the sector's revival is rather interesting.[141] The frantic bureaucratic activity reenacts the crucial issue of the sector's severe lack of funding. It has been discovered that Nigeria needs around $60 billion to revive the electricity sector and put an end to the nation's ongoing power outages due to a lack of vocational skills and infrastructural problems.[142]

Nigeria power plants should be set to full energy production capacity with an estimated N80 billion to solely address the nation's energy issues.[143] Shiroro power station required approximately N145 million for maintenance purposes in 2008 and supplementary N62 billion for the development plan within a five-years period; Delta power station required N8 billion to realise its development plan of five-year; Kainji power station needed N1.5 billion; Afam power station needed N1 billion; Egbin power station required N7.23 billion; and Jebba needed N398 million. The troubling trend has been that hydro power plant in Jebba generates 270mw out of its potential capacity of 578.4MW; Shiroro produced 300mw out of its potential 600mw capacity; Kainji produced 580mw out of its potential 760mw capacity; Afam thermal station produced 200mw as against its potential capacity 969mw; Delta station generated 400mw of it 900mw potential capacity; Geregu power plant generated 90mw instead of it projected 414mw capacity; Sapele power station generated 170mw when it was

[140]Ukpevo, G. 1993. Energy: Never Expect Power Always. *Newswatch*, 5 April 1993.
[141]Oloja, M. 2009. Tussle over N177.95bn Cripples Power Sector Revival. *The Guardian*, 1 March, 2009.
[142]Nicholis, 2007.
[143]Ogbodo, J. A. and Lawal, Y. 2008. Reps Probe $10b Spending on Power Projects. *The Guardian*, 1 February, 2008.

supposed to generate 1020mw.[144] However, it should be recognised that sufficient power generation, while the transmission issues remained unsolved will not provide a solution to the power sector issues. Tanimu Yakubu, President Yar'Adua's Chief Economic Adviser, noted that Nigeria cumulatively required N117 billion to set up three central processing stations for production of gas in Niger Delta or the purpose of upstream gas processing, extraction of liquefied natural gas and dry gas conveyance to local markets.[145]

Nigeria faces a lifecycle challenge for power stations and installations. This has caused a rise of negative ideas primarily amongst industrial and residential consumers of electricity, who are concerned about the Nigeria's ability to maintain adequate or abundant electricity generation from the 1,520mw levels before 1999, rather than guaranteeing enhanced, constant power supply. The agitation arose in response to the government's celebrated investment of several billions of naira on many power projects around the nation in order to increase systemic energy generation with the use of independent power schemes. The situation unavoidably resulted in a break with the fervent expectation and demands for development of individuals in a twenty-first century interconnected global society driven by knowledge and technology.

Notwithstanding the dreadful plan in the sector, in April 2007, the Minister of Power had informed Nigerians that electricity generation in the country had surged from 2,000mw to 3,300mw following the FGN's renewed prominence in the sector. This is also notwithstanding the then Minister of State for Petroleum's admission that shortage of gas supply to the Egbin thermal plant located in Ikorodu, due to Escravos-Lagos pipelines vandalisation, is responsible for the drastic drop in power supply across the Nation. Notwithstanding the worsening energy supply situation, the Minister stated that by May 29, 2007, the FGN would meet a target capacity 5,500mw, before transition of power to in-coming administration, which in turn was anticipated to attain up to 10,000mw of power output by 2010. It was assumed that the anticipated power generated from the projected power plants in addition to previous ones,[146] would have augmented energy generation and supply sufficient to meet the assumed or indicated objectives of 10,000mw by 2010. But, with its flamboyant aspirations, the government

[144]Igbikiowubo, H. 2007. Nigerians Contend with Darkness 8 Years After. Vanguard, 4 April, 2007.
[145]The Guardian, 21 July, 2008.
[146] These include the power plants located in Jebba, Shiroro, Egbin, Kainji, Geregu, Afam, Mambila, Okpai, Omoku, Omotosho, Papalanto, Alaoji, Gbaran, Ihovbor, Sapele, Egbema, Calabar, Ibom and the wind-project in Katsina.

did not agree with the declining power generation to the terrible designs of the power plants.

The present state of power generation in the country faces challenges of limited funds for power stations construction; insufficient generation availability; outdated equipment, apparatuses, safety equipment and vehicles for undertaking operations; insufficient facilities and delay in facility maintenance; limited and underused communication apparatuses; dearth of exploration activities to deploy all energy sources from available resources and little motivation to boost the morale of staff.

4.5.1 System Collapse

It had become a matter of common occurrence for the national grid network to display some kind of bleak supply of electricity with the attendant consequences of epileptic power supply or total unavailability of power. The implication is felt in the stunted growth of the Nigerian economy. The impact of unreliable and inadequate power supply is demonstrated in the growing poverty rate, increased unemployment and stunted growth of technological in the country.[147] It is on record that in 2016 there were 22 occurrence of total system collapse and nine partial system collapses.[148] A recent report has it that there have been four instances of system collapse within eight months in 2021.[149] Such system collapse of the national grid network usually imposes blackout all through the country. There is hardly any other option available to ensure power supply within that period until the system is restored.

Apart from Russia, Nigeria holds the record of the 7th higher gas flared in the world.[150] Her contribution to the total gas flared in Africa ranks up to 70%.[151] The bane of gas

[147]Ugwoke, T. I., Dike C. K. and Paul, O. E. 2016. Electricity Consumption and Industrial Production in Nigeria. *Journal of Policy and Development Studies* 10.2. 8-19, 8; Iliyasu, M. and Zakari, A. 2021. Impact of Electricity Supply on Unemployment in Nigeria (1986-2020). *International Journal of Intellectual Discourse* 4.4: 115-125, 115.

[148]Federal Republic of Nigeria. 2018. Power Sector Recovery Programme: 2017-2021. 16. Retrieved on June 6, 2021 from https://mypower.ng/wp-content/uploads/2018/20/PSRP-Master-Document-January-2018-sector.pdf

[149]Adebulu, T. 2021. Again, Electricity Grid Collapses – Fourth time in 8 Months. The Cable 23 August, 2021. Retrieved 26 August, 2021 from https://www.thecable.ng/again-electricity-grid-collapse-fourth-time-in-8-months. The Cable 23 August, 2021.

[150]David-West, A. 2014. Nigerian Power Sector: Value Investment Opportunity or Value Trap? CSL Power Sector In-depth Report 1. 2. Retrieved on July 17, 2021 from www.cslstockbrokers.com/csl/images/.../Power_Sector_IN_DEPTH_Report_part1.pdf

[151]Gerner, F., Svensson, B. & Djumena, S. 2004. Gas Flaring and Venting: A Regulatory Framework and Incentives for Gas Utilization. View Point. World Bank, Washington, DC. World Bank. Retrieved on August 17, 2021 from https://openknowledge.worldbank.org/handle/10986/11253

flaring is the high rise of environmental temperature above inhabitable level.[152] In addition to the human health and environmental dangers it occasions, there are economic implications to Nigeria.[153] According to Nigerian National Petroleum Corporation (NNPC), about 289.6 billion Standard Cubic Feet of gas translating to 11.47% of gas production in 2014 was flared into the atmosphere.[154] There is loss of potential foreign exchange earnings if the gas was captured and marketed. It would have served as a veritable source of power for electricity production plants.

The power sector reform roadmap formulated by the FGN in August, 2010 recognised the role of gas in the electricity industry and fixed a timeline of October 2010 to January 2011, within which to conclude gas supply agreements for the power sector.[155] The two-dimension action plan for the sustainable gas supply for the power sector is for the implementation of an industrial framework for harnessing domestic gas utilisation by reconsidering the pricing structure for gas with the intent of motivating investors and helping them secure credit worthy agreements.[156]

Although the electricity sector reform purports to commercialise the power sector, there are seeming indications of a monopolistic system. The dissatisfaction arising from the inefficiency which trailed the power sector was the major reason for the attempt to deregulate and privatise the power sector, in order to make room for the participation of private investors. However, beginning from the year 1999 when the process of sector reform began, the sector has not yet attracted strong private and commercial footing to encourage less government participation in the sector. The FGN still has to make several financial interventions to ensure the continuous buoyancy of the forum. According to reports, even though the FGN has ploughed in about US$16 billion into the sector from 2000 to 2007, little success has been attained. From the period of 2015 to 2018, an additional sum of N1.023 trillion was invested into the

[152]Oyedepo, S. O., Agbetuyi, A. F. and Odunfa, M. K. 2014. Transmission Network Enhancement with Renewable Energy. *Journal of Fundamentals of Renewable Energy and Applications* 5.1: 1-11, 4.
[153]Alphonsus, O. N. 2016. An Examination of the Challenges of Power Supply in Nigeria in Post-Privatization era, 2013—2016. *Asian Journal of Basic and Applied Sciences* 3.1: 34-44, 47.
[154]Nigerian National Petroleum Corporation. 2014. Annual statistical bulletin. Retrieved on August 17, 2021 from www.nnpcgroup.com/Portals/0/.../2014%20ASB%201st%20Edition%20(2).pdf
[155]Federal Republic of Nigeria. 2010. The Roadmap Power Sector Reform (A Customer-Driven Sector-Wide Plan to Achieve Stable Power Supply) 33. Retrieved on July 6, 2018 from http://www.nigeriaelectricityhub.com/download/roadmap-for-power-sector-reform-2010/.pdf
[156]Gbenga Biaboku & Co. 2010. Nigeria Launches Roadmap for Power Sector Reform. Newsletter August, 2010, 3. Retrieved on 6 June, 2021 from www.gbc-law.com/assets/.../ROADMAP-FOR-POWER-SECTOR-REFORM.pdf

sector without any significant result,[157] a large chuck of these funds have been alleged to have gone down the drain of corruption and mismanagement.[158] The management of these funds can hardly be accounted for, yet no official has been held accountable for it.

[157]FG's N1.02trn power bailout funds fail to impact sector. *Business Day* July 16, 2018. Retrieved on July 21, 2021 from http://energymixreport.com/fgs-n1-02trn-power-bailout-funds-fail-to-impact-sector/
[158]Nigeria: U.S. $16 billion power projects - SERAP asks Buhari to refer OBJ, Jonathan to EFCC, ICPC. Premium Times May 23, 2018 Retrieve on July 19, 2021 from https://allafrica.com/stories/201805230718.html; Power sector stinks. *Vanguard* 14 September, 2017. Retrieved on 19 July, 2021 from https://www.vanguardngr.com/2017/09/power-sector-stinks-labour/

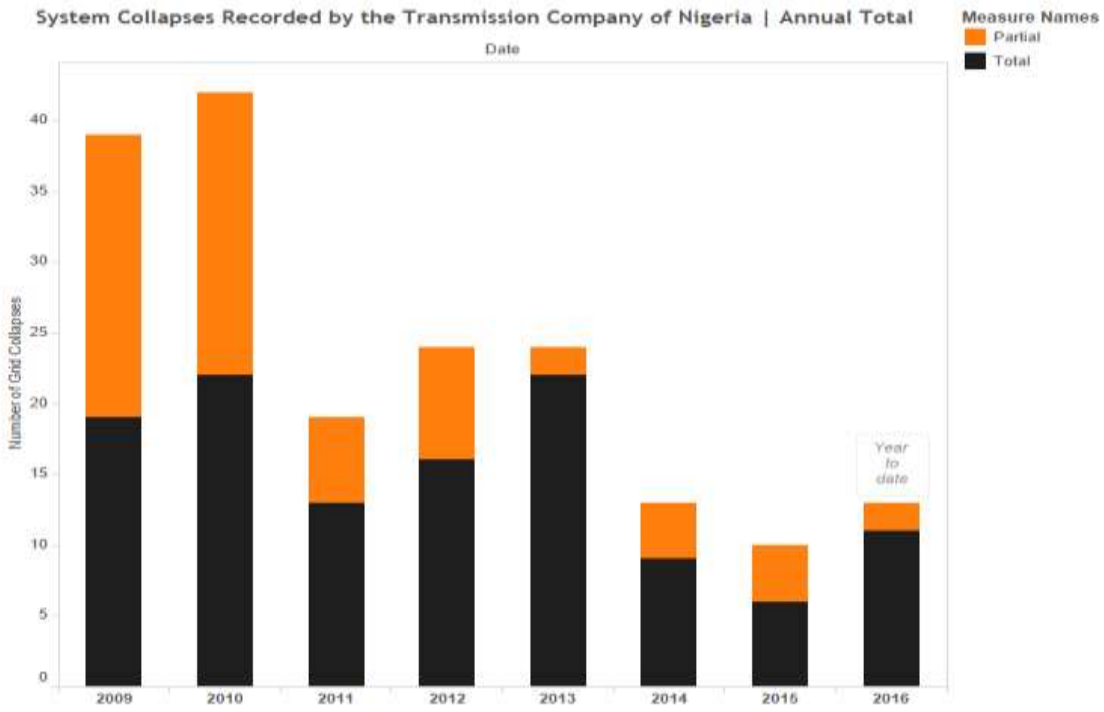

Fig 4.4: System Collapse 2009 – 2016[159]

[159] Transmission Company of Nigeria. 2014. Transmission System Expansion Plan (Development of Power System Master Plan for the Transmission Company of Nigeria) terms of reference.

4.5.2 Lack of Cost Reflective Tariffs

Some of the attraction for taking the privatisation pathway was the hope that electricity tariffs would follow the 'end-user tariff' route and recourse shall be made to tariff revisions throughout the course of the time. However, following June 2012 the multi-year tariff order (MYTO) revision, end user tariff is yet to attain cost reflective standard except for a brief interval. This has resulted in a massive financial deficit in the industry, thus eliminating any inducement for private investors to plough in more capital into the DISCOs in order to ensure increased efficiency.[160] The economic basis for privatisation is targeted at the attainment of the NEPP objectives and reforms roadmap of basically launching a structure of electricity market with enduring tenacity, which allows numerous operators to offer effective and competitive services that are wide enough to accommodate the participation of a wide range of players. However, the pathway to success appears farfetched with manifold seeming insurmountable obstacles.

One of the Vision 20:20 objectives of Nigeria was to create 40000MW. Given the issues that the privatized power sector is now facing, achieving this goal may be challenging. The economic reason for privatisation is to achieve the NEPP goals and the reform roadmap, notably the construction of a long-lasting energy market structure wherein several operators are allowed to provide competitive effective services across a broad range of clients. Although the path towards this achievement is lengthy, with high hurdles, the country's power sector has seen (although little) enhancement. For example, as at August 2014, electricity generation capacity of the country increased from 3,670MW as at January, up to 4,237MW towards the end of the same year.[161] The effort of the Nigerian Liquified Natural Gas Company to ensure that there was enhanced record of gas distribution to thermal gas stations was primarily responsible for this development.

Increased competition in the power sector would result in a tariff system as a result of market forces, efficacy gains from fair pricing and technical transfer obtained from European technological corporations into Nigeria. Hence, analysts concluded that, despite the backdrop of legal, regulatory, institutional or capital obstacles, the changes

[160]Adeniji, O. and Osisiogu, O. 2014, Overview of the Nigerian Power Sector Reform. Stillwaters Law Firm. Retrieved 28 August, 2021 from https://www.iflr1000.com/NewsAndAnalysis/Overview-of-the-Nigerian-power-sector-reform/Index/1017
[161]Ibid.

experienced in the Nigerian power sector are deemed to offer tremendous potential as a particular instance of unambiguous policy choice to promote social and economic growth.[162] It is agreed that the absence of political will to ensure a smooth sail of the reform process as a result of vested interests, has functioned as an instrument for the slow pace or retrogressive process; estrangement of concerned stakeholders from the reforms process, culminating into a struggle in implementation, with particular respect to privatisation, downstream deregulation, and the delay in the enactment of the Petroleum Industry Act enacted in 2021 after undergoing nearly two decades of legislative process; in-fighting within government agencies with contrasting interests functioning at cross purposes which undermines each other's interests. These are hints that the changes may not have the complete backing of those at the top of the administration. It caused policy inconsistency and interruptions in implementation timelines, resulting in integrity vacuum amongst investors, not meeting up with target and loss of assurance in the procedure; additionally, the shortage of sanctions for not meeting up with targets enabled unending policy flips and lack of commitment to place a targets result, despite the current administration's implementation of performance bonds.

4.5.3 Financial Shortfall

A well-executed reform will deal with most of the negative repercussions of foreign debt overhang as a restricting factor on infrastructural development in Nigeria, particularly in the power sector. For example, the FGN declared that it need an investment of approximately N300 billion into the power sector from 2001 to 2003. However, the increasing annual foreign debt settlement of N150 billion has continued to take its toll on the national budget which has caused a depleted N70 billion budgetary allocation for the Ministry of power and steel in 2001. The figure continues to face decline as the years go by. Hence, a lack of funds is a barrier to infrastructural development. Transparency and accountability, if employed in the administration of the power sector, would encourage private sector involvement and engagement, thereby reducing the tendency to resort to public sector loan. This is because each company participating in investment in the sector will massively deploy capital into the sector in a bid to outwit their competitors and have effective control of the market.

[162]Adenikinju, A. 2005. Analysis of the Cost of Infrastructure Failures in a Developing Economy: The Case of the Electricity Sector in Nigeria , African Economic Research Consortium Paper 148. Nairaobi: The Regal Press.

Due to competition in the sector, each company will be favourably positioned to deliver top-notch services that will establish their dominant position in the market predicted to spread into countryside, even unto the door post of small and medium-sized investors arising therefrom for profit making and continuation in business.

The absence of cost-reflective tariffs has resulted in large financial deficits through-out the industry. Based on the documentation for the power sector recovery programme of 2017-2021, as from February, 2015 to December of the following year, the deficit market of DISCOs indebtedness to other market operators is projected to amount to N473 billion, whereas shortage in tariff cumulative indebtedness of consumers to DISCOs, is assessed as N458 billion. The monetary issue is a major challenge. In reality, Nigerian commercial banks provided loans and equity funding of 70% out of the required N404 billion for purchase of power assets. The anticipated capital and rehabilitation expenditure of $4.28 billion may possibly be funded by Nigerian banks with assistance from foreign financial institutions.[163] Yet, many people are concerned that Nigerian banks would be unable to fund capital and rehabilitation projects due to the way their balance sheets are structured. As a result, continuing funding of projects from their current position may be more difficult than investors anticipated. To address the issue of finance, the government managed TCN has received some initiatives and certain loans from numerous organisations in order to address the financial barrier and enhance its transmission output.[164]

4.5.4 Challenge of Energy Sourcing

The country offers a wealth of energy resources that may be used to provide much-needed electricity for industrial activities while also promoting social infrastructure. These energy stations produce energy using thermal (gas and steam-(coal)), solar, and hydro sources. Among all of these energy sources, rivers and dams in Nigeria are intended for hydropower, but the cost of building and upkeep is enormous for a country that travels the world asking for economic help. Yet, there is abundant deposit of gas that due to their vulnerable nature erupt due to shortage of technical know-how and back seat given to gas exploration in the petroleum sector. On a cost-benefit assessment of each energy sources accessible to any nation, it is not out of place to

[163]Adeniji, O. and Osisiogu, O. 2014. Overview of the Nigerian Power Sector Reform. Stillwaters Law Firm. Retrieved 28 August, 2021 from https://www.iflr1000.com/NewsAndAnalysis/Overview-of-the-Nigerian-power-sector-reform/Index/1017
[164]*ibid*.

opine that Asian nations enjoy a greater share of cheap waste-to-energy sources. Also, in South Africa coal energy gets more than 80% of total energy consumption from coal. Power supply in Nigeria is essentially obtained from thermal and hydro sources, at a ratio of 1:3.[165]

Gas reserves in Nigeria have not been effectively exploited for profit electricity generation. In order to halt the disposal of natural endowments and strengthen the electricity sector, the government deregulation program for individual involvement and competition offers greater chances. There is the likelihood that as several private enterprises develope interest to make investment in finance, technical facilities and skill in various aspects of electricity generation in Nigeria, thereby broadening the operative range by generating different energy sources based on the relative advantage of each of them Nigeria revamped energy industry is projected to benefit from the country's abundant energy resources. Under this requirement, Nigeria would also halt gas flaring on 1,100 million scf losses per day and monetary losses of N5.8 billion, as it did from October 2006 to July 2008. Only gas flaring has the accompanying challenge of clean-up exercise, remediation of the environment and reintegration under the climate change regime, which suffered long standing neglect as a result of retrogressive technological ability of Nigeria and shortage of precedent interest from government and multinational petroleum firms carrying out operations in Nigeria. As a result, a portion of energy supply system will see to clean-up approach to ensure the conversion of gas towards profitable use in the creation of more power.

4.6 Need for Renewable Energy Sourced Electricity

Electricity is essential for the economic subsistence, growth, improvement and development of every nation, in addition to poverty alleviation and provision of security.[166] For most countries, uninterrupted electricity supply is critical. Imminent economic growth very much depends on long-range electricity supply from accessible, affordable and environmentally favorable means. Climate change, public health, and security are all inextricably linked to energy.[167] Due to the lack of on-grid power

[165]Ofoegbu, I., Challenges of Coal to Power and Prospects of Renewable Energy in Nigeria. Retrieved 28 August, 2021 from https://www.slideshare.net/ofoegbuikenna/challenges-of-coal-to-power-andprospects-of-renewable-energy-in-nigeria-76205475

[166]Ighodaro, C. A. U. 2010. Co-integration and Causality Relationship between Energy Consumption and Economic Growth: Further Empirical Evidence for Nigeria. *Journal of Business Economics and Management* 11.1: 97-111.

[167] Ramchandra, P. and Boucar, D. 2011. Green Energy and Technology. Heidelberg: Springer.

sources or unreliable grid power supply, users of various types have built up individual generation and distribution facilities. The bulk of these generators run on gasoline or diesel. Exchanging aging diesel generators with newly manufactured and more effective generators will help boost the sustainability of electricity supply while also lowering the costs of energy. According to empirical research, a generator's output decreases by 50% over a 30-year lifespan. As a result, the goal ought to focus on replacement of such generators with power facilities operated by renewable energy sourced fuel where practicable in the medium to long term.

Nigeria has been massively overwhelmed by energy crisis in recent years, which has greatly increased the poverty level in the country by impairing commercial and manufacturing activity within this period. The Council for Renewable Energy stated that power interruptions have made the country to lose N126 billion per annum.[168] Other than the massive economic losses, it has occasioned health challenges owing to human exposure to carbon emitted from frequent usage of generators in residential areas, as well as unemployment, business failures, and high living costs, resulting in worse living condition.

Additionally, according to official assessment by the Central Bank in 1985, Nigeria consumed 8,771,863 tonne of oil correspondence.[169] This equates to around 180,000 barrels of oil each day. Since then, Nigeria's oil consumption has quickly increased. The impact of this rise on an economy that is largely dependent on oil money is enormous. Moreover, the Department of Petroleum Resources had claimed that petroleum accounted for more than 78% of total energy consumption in Nigeria.[170] In the present state of the nation, it is evident that sole reliance on mineral fuels cannot sufficiently meet the energy needs of Nigeria. Southern Nigeria has vast endowment of renewable energy, including hydropower, biomass, tidal, solar and wind. Nevertheless, these energy sources have to be harnessed to create better energy fortunes for Nigeria. On that basis, government is saddled with the social responsibility of ensuring the availability, accessibility and affordability of renewable energy to its citizens.

[168] Council for Renewable Energy, Nigeria. 2009. Nigeria Electricity Crunch. Retrieved 28 August, 2021 from www.renewablenigeria.org
[169]Central Bank of Nigeria. 1985. Annual Reports and Statement of Account.
[170]Department of Petroleum Resources. 2007. Nigeria. Retrieved 28 August, 2021 from http://www.dpr.gov.ng

Numerous scholars have previously examined the extent to which renewable energy resources are available in Nigeria in order to determine the nation's potential. At a 5% device translation efficiency, solar energy has a technological potential of about 15.0 1014 kJ useable energy annually.[171] This equates to about 258.62 million oil barrels annually, which matches prevailing annual mineral fuel output. This also equates to about 4.2 105 GW/h yearly power yield, more than 26 times of prevailing electricity production in Nigeria at 16,000 GW/h per annum. Following an annual average roughly 5.25 kW h/m2/ daily radiation Nigeria can access sufficient productive magnitude for its energy needs.[172] Variety of 3.5 kW h/m2/day within the coastal region to 7 kWh/m2/ day around the north. On the average, the amount of sunlight emission hours across Nigeria is an estimate of 6.5 hours per day, granted that the annual solar energy concentration is 1,934.5 kWh/m2/year on the average. Hence, throughout the period of each year about 1,770 TW h/year of solar energy radiates over the geographical space of Nigeria on the average. This by far supersedes PHCN's entire yearly average electrical energy output by about 120,000 times. When measured by 10% conservative conversion efficiency, the prospective renewable energy resource derived from solar is nearly 23 times more than the whole energy consumption Nigeria can ever attain by 2030, according to the projection of the Energy Commission of Nigeria.[173] Therefore, to improve the growth trajectory of Nigeria, the present erratic state of electricity supply must be supplemented by a more sustainable means of power generation aided by solar technology.

By virtue of its status as an oil producing country, Nigeria is a heavy fossil fuel dependent economy. This is also reflected in her power sector which is largely dependent on gas for the purpose of electricity generation. This is part of the anthropogenic activities which are environmentally unsustainable and have been one of the forefront causes of universal climate variation. It is a case of serious concern to the global community. Hence, in an attempt to address these issues, some concerted trials were designed to develop cleaner modern ways and develop sustainable energy sources. The international community has also united as one to establish an international regime towards decreasing the anthropogenic activities that are not

[171]Onyebuchi, E. I. 1989. Alternative Energy Strategies for the Developing World's Domestic Use: A Case Study of Nigerian Household's Final Use Patterns and Preferences. *The Energy Journal* 10.3: 121-138.
[172]Chineke, T. C. and Igwiro, E. C. 2008. Urban and Rural Electrification: Enhancing the Energy Sector in Nigeria using Photovoltaic Technology. *African Journal of Science and Technology* 9.1: 102-108.
[173] Energy Commission of Nigeria. 2005. Renewable energy master plan.

environmentally friendly. The regime seeks to decrease fossil fuel usage and its consequential effect on the community. It also seeks to promote low carbon-based economy. In the alternative, these international regimes prescribe renewable energy to be a more sustainable avenue of energy sourcing given its environmentally friendly disposition.

The first international regime in this regard was the UNFCCC 1992. It has an end goal of coordinating activities that decreases carbon intensive activities. One of its key functions is to promote sustainable development through a controlled emission of greenhouse gases (GHGS) into the atmosphere. The Convention created policy guidelines for different countries to comprehend the consequences of expanding atmospheric presence of GHGS and adopt measures towards alleviating or assuaging the effect on environmentally sustainability and economic development. FGN has over the years shown a commendable understanding of the issues associated with climate change.[174] The country has a legal right to enter into several international conventions and protocols targeted at dealing with issues connected with climate change and the need to alleviate or mitigate impact of climate change.[175]

Kyoto Protocol to the UNFCCC 1997 was another legal instrument by the international community to bind obligations and commitments from member states to ensure the control of greenhouse gas emission to the atmosphere. The instrument extracted commitments from developed nations to ensure greenhouse gas reduction. Given the nascent economy of developing states, they are not put under similar obligations but are encouraged to take steps in adopting measures to reduce greenhouse gas emissions into the atmosphere. It also created the carbon development mechanism, wherein certificate is issued to states that could not exhaust their allowable emission. These states could trade these certificates to other states which have exceeded their allowable emission standards. Resort to renewable energy sources and less resort to fossil fuel-based technologies would make Nigeria to gain carbon credits that can be traded to other countries which have exceeded allowable carbon emission. There are also financing and technology transfer benefits which developing states can benefit from developed countries. This could be in the aspect of promoting renewable energy

[174]Yamin, F. Climate Change Negotiations : An Analysis of the Kyoto Protocol . 1998. *International Journal of Environmental Pollution* 10. 428.
[175]*Ibid.*

technologies given its reputation as a clean technology which reduces ozone layer depletion and impact of climate change.

Despite the uneasy pathway towards the negotiation of succeeding treaties, it was agreed between the committee of states for the development of a new legal instrument that projects the climate change agenda. This gave rise to the establishment of the Paris Agreement 2015. Although created in 2015, the Convention became effective in 2020. The goal of the agreement is to particularly decrease the amount of GHG released into the atmosphere, and generally reduce the overall impact of air pollution. These are to be achieved with the aid of mitigation techniques such as: increment in renewable energy usage and putting new technologies to use. The Paris Agreement envisions development of efficient technology and the transfer of technology for the sake of improving climate change resilience and reduction of GHG emissions. The Convention emphasized the relevance of investment educational and enlightenment campaign on climate change. This duty is conferred on signatory states to ensure the training, creation of public awareness to her citizens, massive citizen's participation through access to information to raise the level of citizens' knowledge and perception about climate change. It contains some significant provisions that are targeted towards the promotion of environmentally friendly resources that contemplate renewed power. Article 9 of the Paris Agreement mandates developed countries to offer financial assistance to developing state parties to the agreement on the aspect of reduction and modification mechanism in line with their extant rules contained in the Theory.

The UNFCCC is one of those international conventions on climate change which Nigeria has signed. It gave its assent and signed up the UNFCCC on June 13th, 1992 and then had it ratified in August 24, 1994. It eventually came into force in Nigeria on November 27, 1994. The Kyoto Protocol has also received the signature and accent of Nigeria since December 10, 2004, even though it came into force on March 10, 2005.[176] Having acceded to the Protocol, Nigeria is under obligation, based on the *pacta sunt servanda* principle of international law, to uphold and give effect to the provisions of the Protocol. Being a signatory party of the Paris Agreement, as the 146th country to ratify the Convention in 2017 wherein it has developing country status, Nigeria is eligible to partake of the financing mechanism provided under the convention. This could be of great assistance in the execution of renewable energy

[176]*ibid.*

projects. However, the nagging question for determination still remain whether Nigeria has strategically positioned itself internationally to advance the renewable electricity using the instrumentality of the Paris Agreement. This serves as a compelling reason why Nigeria should embrace and promote renewable energy usage in its power sector.

Promoting renewable energy in the Nigerian power sector will put Nigeria into alignment with the United Nations' (UN) SDG. SDG 7 which is aimed at guaranteeing access to cheap, dependable, sustainable and modern energy source for everyone. It has specific objectives such as: phasing out harmful energy sources; promoting energy development through clean renewable energy sources. The dominant energy sources currently in use have the pitfall of facilitating air pollution. This made resort to renewable power sources an imperative for the Nigerian energy sector. The aim of SDG 9 is to build elastic resources, promote inclusive and sustainable industry and cultivate technological innovation for industrial growth. Goal 11 is targeted at making cities and human settlements with features of inclusivity, safety, resilience and sustainability. SDG 13 sounded the urgent need to take action against the impact of climate change. Adopting renewable energy power sources are some of the avenues to achieving these goals and avoid the negative impact of environmental pollution. It therefore means that Nigeria would be one of the countries eligible for receiving financial support from development of institutions committed to offering assistance to countries in order to achieve their SDGs mandate.

A host of international organisations are committed to clean energy mechanisms. For instance, a UN General Assembly (UNGA) Resolution 66/288 had made far reaching imperatives towards promoting renewable energy projects for rural communities. In the aforesaid resolution, the UNGA expressed its recognition of the vital function of energy for state development processes; nexus between access to modern energy technology, on the one hand, and poverty extermination, preservation of lives, improves health conditions, contributing in meeting basic human needs, and social inclusion, on the other hand.[177] It was further resolved that, it is essential that concerted efforts be taken to ensure the alleviation of the energy poverty situation by engaging sufficient financial resources that would assure access to energy sources with proven

[177]United Nations , The Future We Want. General Assembly Resolution 66/288, United Nations Document A/RES/66/288, (July 27, 2012), para. 125.

reliability, affordability, with economic, social and environmental viability in developing countries.[178]

A lot of efforts have been put up by international cooperations which are committed to the promotion of renewable energy across the globe. In most cases, it has given impetus to the actualisation of renewable energy-based community support projects. The UN systems have largely taken a lead in this regard. Among which are the vassal organisations under the auspices of UN systems such as: UNDP, UN Environmental Programme, UN Industrial Development Organization, UN Conference on Trade and Development, and the World Bank Groups. These organisations have offered various supports in the promotion of renewable energy development which have been of tremendous benefit to communities that lack access to power supply.

Other international organisations that are not affiliated to the UN groups also offer some form of support for promoting renewable energy development at the rural level. One of such organisations is the International Renewable Energy Agency. It has been on the forefront of formulating a broad-based approach to renewable energy development by galvanising the interest of various countries in one platform or the other to project the use of renewable energy. An arm of the Organisation for Economic Co-operation and Development is committed to providing financial assistance to countries in order to boost their economic development.[179] Individual countries also have agencies which are committed to development assistance to other countries in the developing world. Their objective has been mostly expressed in the aspect of promoting renewable energy in the world through financial assistance, technology transfer, technical support and partnership. One of the biggest supporters in this regard is the United States Agency for International Development, which is committed to helping countries build solid energy sectors that can drive socio-economic development across the globe.[180] Conversely, there is a growing trend of developed countries divesting their investment away from fossil fuel intensive industries and

[178]*ibid*. para. 126.
[179]Organisation for Economic Co-operation and Development. Official Development Assistance. Retrieved 8 September, 2021 from https://www.oecd.org/dac/financing-sustainable-development/development- finance-standards/official-development-assistance.htm
[180]United States Agency for International Development. Energy. Retrieved 8 September, 2021 from https://www.usaid.gov/energy

withholding funding from future fossil fuel-based energy projects.[181] Hence, Nigeria cannot afford to be left behind.

Prior to enactment of legislation in Nigeria that specifically govern issues of climate change, the National Environmental Standards and Regulations Enforcement Agency (NESREA) stood in the gap due to its environmental regulatory mandate. Section 7 NESREA Act 2007 empowers NESREA to ensure that there is compliance with international instruments, conventions, protocols and other environment related treaties signed up by the country. These include the Conventions on Climate Change, herein discussed, and by necessary implication, renewable energy. The Act also sought to ensure statutes and guidelines bordering on sustainable ecosystem management, biodiversity, environmental protection and natural resources development are enforced. Since renewable energy is regarded as the surest means towards the attainment of environmental sustainability,[182] it has been argued that this confers on NESREA the responsibility to develop renewable electricity in Nigeria.[183] As commendable as this argument may seem, it is not plausible, as NESREA acted *ultra vires* their mandate by so doing, while encroaching on the statutory function of the ECN and other agencies.

The renowned position of international law on treaties is that state parties to international treaties must yield to such treaties and expressly give consent thereto before they can be held bound by its provisions. Treaties are not binding on signatory states per se. Hence, in most cases, parties to those treaties are expected to activate municipal instruments to activate their application within the domestic plane.[184] Therefore, to ensure compliance with such treaty provisions which Nigeria signed up to, NESREA has to push for the domestication of relevant treaties, in line with Section 12 1999 Constitution, before it could be said to have come into force. This explains the need to enact a specific domestic law to address these issues.

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[181] See, Hurst, L. 2021. Shell in Talks with Nigerian Government to Exit Onshore Oil Fields as Part of Green Push. World Oil. Retrieved 30 August, 2021 from https://www.worldoil.com/news/2021/5/18/shell-in-talks-with-nigerian-government-to-exit-onshore-oil-fields-as-part-of-green-push

[182]Dincer, I. 2000. Renewable Energy and Sustainable Development: A Crucial Review. *Renewable and Sustainable Development Reviews* 4. 157-169, 167.

[183]Ole, N. C. Dike, S. C. 2020. The Development of Renewable Electricity in Nigeria : An Appraisal of the Relevant Laws. *Journal of International Energy and Environmental Law* 4. 105-123, 121.

[184]Dada, J. A. 2012. Impediments to Human Rights Protection in Nigeria. Annual Survey of International & Comparative Law 18.1: 67-92, 71.

Hence, the Climate Change Act, 2021 was enacted by both Chambers of the National Assembly and assented to by the President on 17th November, 2021. It looks out to treat pertinent situations connected with change in climate and gives a legal and institutional framework for change in climate administration in the country. It is targeted at providing necessary guidelines and intellectual structures to tackle environmental and ecological issues in the nation. It is a legislation that the country needed to guarantee allegiance to universal agreements on climate change. The Act stipulated for the use of the plot, institutions and guidelines controlling the local and foreign reign on climatic change as stipulated in Paris Agreement, Kyoto Protocol and the Marrakesh Accords, which have all been approved by Nigeria but are yet to be adapted.[185] The Act created the National Council on Climatic Change, which is responsible for the coordination of matters relating to climatic change.[186]

4.7 Renewable Energy Sources

Renewable energy is an energy sourced from means that do not get exhausted in a short time. Generally, renewable power is defined as a kind of energy extracted from available materials which are replenished out of the time scale of humanity. These include: rain, tides, waves, sunlight, wind and geothermal heat. They constitute the power sources that are manufactured without hesitation, renewed or replenished at a high rate through non-artificial programs. Their accessibility is not affected by the rate of usage and therefore cannot finish in years to come. Although majority of these renewable resources could be reduced through human thoughtless usage, thereby reducing its regular flow. Part of this refined or regrown energy relevant to the economic environment that could be restrained forms the subject of discussion in this section.

Electricity is necessary for delivery of primary developmental amenities such as: health care, portable water, quality education and even telecommunications. There is a connection between adequate electricity supply and improvement of the quality of universal basic education programmes, and poverty eradication. Conversely, the absence of trusted energy supply leaves rural communities in a socially inconsequential state, with untapped economic noumenon. The energy which the

[185]Anzaki, M. B. International Affairs; Climate Change, the Legal Framework, The Lawyers Chronicle Retrieved on 16 August, 2021 from http://www.thelawyerschronicle.com/climate-change-the-legal-framework/
[186]*Ibid.*

nation can source from renewable energy is much in abundance. Nigeria has renewable energy potentials on all fronts, such as: biomass, solar, wind, and hydropower, etc. These renewable energy sources can be put to function by harnessing and deployment into the supply matrix of Nigeria.[187]

[187] Sambo, A. S. 2008. Matching Electricity Supply with Demand in Nigeria. *International Association of Energy Economics* 4. 32-36.

Table 4.4: Energy Potentials in Nigeria[188]

Resources	Potentials	Authors
Small Hydropower	3,500 MW	(Shaaban et al., 2014)
Large Hydropower	11,250 MW	(Shaaban et al., 2014)
	11,235 MW	(Aliyu et al., 2015)
Wind	2 - 4 m/s @ 10m height (main land)	(Shaaban et al., 2014)
Solar Radiation	3.5 – 7.0 or 7.5 kWh/m^2/day	(Shaaban et al., 2014)
Municipal Solid Waste	17451000 tonnes per day	(Scarlat 2015)
	7329000 tonnes per day	(Scarlat 2015)
Animal Waste	211 million assorted animals (285.065 million tons/yr of production)	(Aliyu et al., 2015)
	61 million tonnes/yr	
Energy crops and Agric Residue	28.2 (30% of total land) Million hectares of arable land	
Crop Residue	83 million tons/yr	(Aliyu et al., 2015)
Fuel Wood	11million hectares of forest and wood land	
Wave and tidal energy	150,000 TJ	(Aliyu et al., 2015)
	1759.6 toe/yr	(Aliyu et al., 2015)

[188] Sambo, A. S. 2008. Matching Electricity Supply with Demand in Nigeria. *International Association of Energy Economics* 4. 32-37.

4.7.1 Hydro

Hydro energy is a major form of renewable energy currently in use across the globe. It accounts for over four-fifth of global renewable electricity and is responsible for production of up to 16% electricity output across the world. More than 25 countries of the world depend on hydro-powered electricity to satisfy about 90% of their energy needs. A good example of such country is Norway, which is 99.3% dependent on hydro-powered electricity, whereas there are 12 other countries which have identified as having hit the 100%-mark reliance on hydro-power source.[189] Countries which fall within this enviable category include: Albania, Lesotho, Nepal and Paraguay.[190] Meanwhile, China, United States, Canada, Brazil and Russia respectively hold the record of the world five topmost generators of hydro-power.[191]

Nigeria is surrounded with streams, river and waterfalls; this explains the favourable disposition towards hydro as a source of power generation. The use of hydro power in Nigeria has a long history and continues to serve as the primary form of renewable energy generation in the country.[192] According to a report on a research conducted in 12 states and four river basins, Nigeria has around 278 small hydropower (SHP) sites lying idle with untapped potentials of about 734.3 MW. Based on an average estimated capacity of roughly 3,500 MW, SHP prospective sites are nearly everywhere in Nigeria. The amount of energy harvested for Kainji dam alone is 760MW at the least and a maximum of 960MW, as indicated in table 4.4. If the energy potential of 3,500MW could be harnessed, the country's power/electricity problem would be remedied.[193] Nigeria's overall hydroelectric power potential was projected at 8,824 MW, with yearly energy production capacity of over 36,000 GWh. This includes 8,000 MW of major hydropower technology and the left over 824 MW of small-scale hydroelectric technology. Currently, 4% and 24% of the country's small and big

[189]Ekpo, I. 2017. Design and Generation of Electrical Power from Dams. *The Consulting Engineer* 4.1: 44-49.
[190]Cassauwers, T. 2019. Four Nations Lead the World with 100 Percent Green Energy. But… OZY. Retrieved 8 September, 2021 from https://www.ozy.com/around-the-world-four-nations-lead-the-world-with-100-percent-green-energy-but/92891/
[191]NS Energy, 2018. Profiling the Top Five Hydropower Producing Countries in the World. Retrieved 8 September, 2021 from https://www.nsenergybusiness.com/news/top-hydropower-producing-countries/
[192]Akuru, U. B., Onukwube, I. E., Okoro, O. I., & Obe, E. S. 2017. Towards 100% Renewable Energy in Nigeria. *Renewable and Sustainable Energy Reviews* 71. 943-953.
[193]Adom, P. K. and Adams, S. 2017. Energy Savings in Nigeria: Is there a Way of Escape from Energy Inefficiency? *Renewable and Sustainable Energy Reviews* 81.2: 2421-2430.

hydropower potentials have respectively been put to use, while a larger percentage remain unexplored.[194]

Nigeria has huge natural potentials to facilitate the construction of small hydropower plants, given the massive presence of body of waters, such as: dams, streams, water falls, rivers, seas, ocean, etc. which could be applied towards the development of hydro-energy sources be it for grid or off-grid electricity platforms.[195] Nigeria recorded an increase in hydro-electricity development of about 360% counting from the year 1971 to 2005. This was an improvement from the 5% growth rate experienced between 1923 to 1964 period.[196] Of all the forms of renewable energy, at the rate of 20%, hydropower prides itself as the only renewable energy source that has received significant measure of utilisation in Nigerian grid powered energy mix.[197] Other renewable energy sources are yet to attain this height.

4.7.1.1 Small Hydro

It is worthy of note that in Nigeria, hydro generally does not qualify as renewable electricity. By virtue of the REFIT, 2015, it is only small-hydro that is classified as renewable energy. That is a hydro power plant that has quality of installed capacity that is not above 1MW-30MW, with grid connected renewable generation capacity not above 370MW by 2018.[198]

4.7.2 Solar

The radiation of energy emitted by sunlight is rated at close to 3.8 x 1023 kW per second. This places sunlight power in position of the most promising form of the renowned power sources, given its limitless potentials.[199] Solar technology is primarily categorised into two: photovoltaic (PV), constituting of panels commonly fixed on apex top of houses to absorb heat radiation from the sun. The other technique is the

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[194]Akinbami, J. F. K. 2001. Renewable Energy Resources and Technologies in Nigeria: Present Situation, Future Prospects and Policy Framework: *Mitigation and Adaptation Strategies for Global Change* 6. 155-181.

[195]Ohunakin, O. S., Ojolo, S. J. & Ajayi, O. O. 2011. Small Hydropower (SHP) Development in Nigeria: An Assessment. *Renewable and Sustainable Energy Reviews* 15. 2006-2013.

[196]*ibid*.

[197]Dalberg Global Development Advisors. 2017. Improving Access to Electricity through Decentralised Renewable Energy: Policy Analysis from India, Nigeria, Senegal and Uganda. 12. Retrieved June 6, 2018 from https://www.dalberg.com/system/files/2017-07/Dalberg-offgrid-policy.pdf

[198] See Schedule 1 and 2 REFIT Regulation 2015.

[199]Ohunakin, O. S., Adaramola, M. S., Oyewola, O. M., & Fagbenle, R. O. 2015. Solar Radiation variability in Nigeria based on multiyear RegCM3 simulations. *RenewableEnergy*74. 195-207.

concentrated solar power (CSP). CSP is a hybrid of solar and large number of bowed panels. Although it has similar appearance as PVs, it employs mirror systems to attract concentrated sunlight beams. It is also an indirect mode of solar utilization which entails concentrating sunlight on water to get it heating to the point of producing steam that is captured for electricity production.[200]

Solar PV is a form of renewable energy obtained through a means of converting radiation from the sun into electricity using the aid of solar cells to store the energy. It can be put to use in centralised or decentralised energy platforms such as main grid and off-grid networks respectively.[201] In Nigeria, it is mostly put to use in off-grid electricity platforms or electricity generated to be used for personal consumption and other domestic activities such as: lighting of dwelling houses pumping water, powering farm houses and other domestic energy function. The solar system is portable and does not involve the use of high or low-tension power transmission line. This suggests that it can be easily deployed and installed in any location, irrespective of the distance and within short timeline.[202]

The geographical location of Nigeria in the tropical region naturally endowed her with access to sunlight of profound quantity all year round. This further support why solar is classified under renewable energy source that has efficiency to be used for the satisfaction of the energy demands of Nigeria's ever-growing population. On a daily assessment, the average sunlight emission in Nigeria is about 6 hours 15 minutes; a range of 3 hours 30 minutes around the coastal region to up to 9 hours within the northern region, with an annual daily solar radiation of 5.25KW/m2 on the average per day around the coastline area and 7.0KW/m2 per day at the northern area.[203] The sun emits around 4.85×1012kwh of energy every day in Nigeria. The country is located inside a high sunlight belt and has substantial solar energy capacity. Reports have it

[200]Nadabo, S. L. 2010. Renewable Energy as a Solution to Nigerian Energy Crisis. B.Sc Thesis. Vaasa University of Applied Sciences 75, 14.
[201]Oji, J. O., Idusuyi, N., Aliu, T. O., Petinrin, M. O. Odejobi, O. A. & Adetunji, A. R. 2012. Utilization of Solar Energy for Power Generation in Nigeria. *International Journal of Energy Engineering* 2.2: 54-59, 58.
[202]Akinboro F. G., Adejumobi L. A. & Makinde. V. 2012. Solar Energy Installation in Nigeria: Observations, prospect, problems and solution. *Transnational Journal of Science and Technology* 2.4: 73-84, 75
[203]Osueke, C. O. and Ezugwu, C. A. K. 2011. Study of Nigeria Energy Resources and it Consumption *International Journal of Scientific & Engineering Research* 2.12: 2229-5518.

that, Nigeria enjoys solar radiation of about 19.8MJm-2day-1.[204] Sunlight hours are calculated to be 6 hours per day on average. The underutilization of this adequate electricity has placed the economic propelling force on reserve. Supposing this energy is channeled into either PVs or CSP whether for personal and commercial usage, the nation's dependency on fuel and hydro will decrease and further research programme will be implemented.[205]

[204]Sambo, A. S. 2009. Strategic Developmenst in Renewable Energy in Nigeria. *International Association of Energy Economics* 4. 15-19.

[205]Ohunakin, O. S., Adaramola, M. S., Oyewola, O. M., & Fagbenle, R. O. 2014. Solar Energy Applications and Development in Nigeria: Drivers and Barriers. *Renewable and Sustainable Energy Reviews* 32. 294-301.

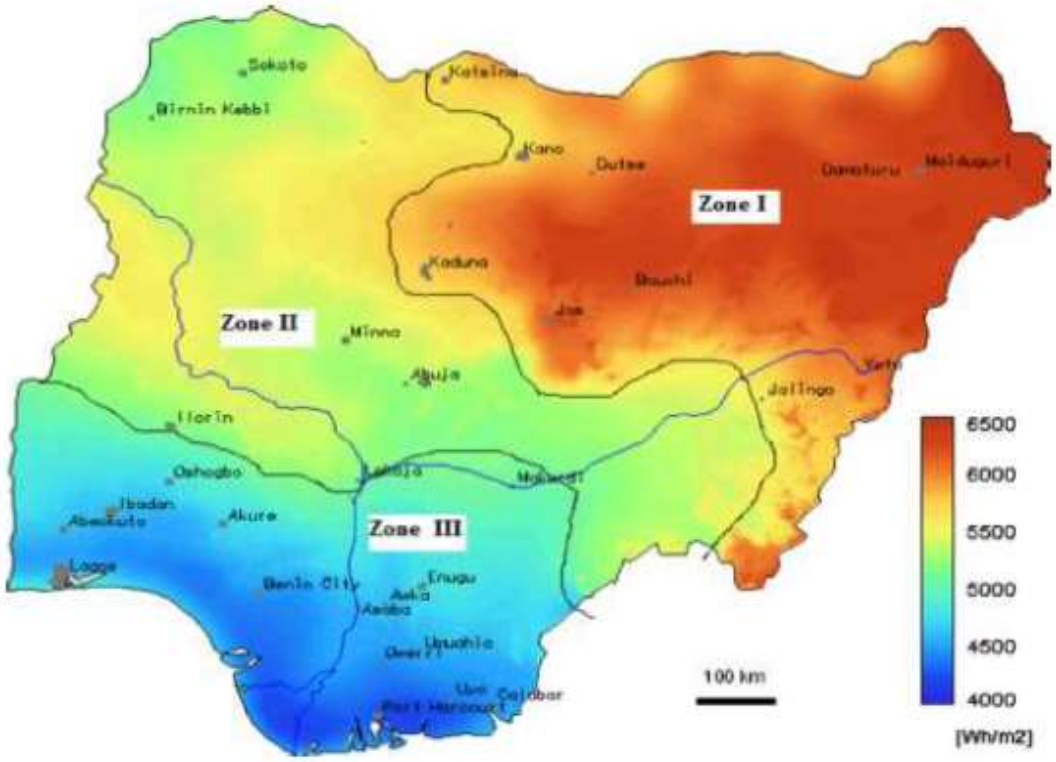

Figure 4.5: Nigerian Solar Map.[206]

[206]Adaramola M. S. 2014. Viability of Grid - Connected Solar PV Energy System in Jos , Nigeria. *International Journal of Electric Power Energy System* 61. 64-69. Figure 4.4 shows the solar intensity distribution in Nigeria with a conspicuous demarcation between areas of high intensity, medium and low intensity.

4.7.3 Wind

Wind is a veritable energy source for electricity generation. The barometric pressure variance as a result of incongruity in atmospheric conditions causes wind to blow. This step is accelerated by the sun, which gives odd heating effect on the planet surface at different temperature, periods and places. This unequal sharing of heat hence causes warm air emitted as wind which rose, while cooler air came low to fill the empty and produce wind that appears in air movement. The system of wind power has the ability to manages and deal with the power of the wind. This energy source is obtainable throughout the earth without limitations, either at sea or land.

According to Figure 4.5, there are certain states in Nigeria that have surplus of wind, while others have it in small measure. Based on the potentials of wind energy, the yearly wind velocity in Nigerian cities alternates between 2.32mis in Port Harcourt, up to 3.89mis for Sokoto state, with extreme provenance unit power for each unit area ranging between 4.51 to 21.97 watts per square meter respectively within the blade angle.[207] The energy for each unit area is computed as 168.63 and 1,556.35 kWh per square meter within the blade area whenever the speed of wind is above 3m/s of the duration time.[208]

The geographical space of Nigeria is within the temperate wind region. Although the southern part of the country does not get to experience huge wind supplies, the coastal areas enjoy the natural ambience of wind.[209] For a reason whereby there is an absence of the terrain to act as a breaker to the wind close to seashore, the sea wind energy is higher than that of land levels. Therefore, greater wind energy abilities are derived in riverine environment.[210] This is particularly the case with states in the south-south and Niger Delta regions. If wind farms are set up in these areas, it would yield positive outcomes, unless there are interferences from fishing and aquatic activities.[211]

Oyo and Lagos are two south-western states that possess great prospect of utilising wind power for energy generation. Ekiti, Ondo and Ogun, are not left out of the

[207]Shaaban, M. and Petinrin, J. O. 2014. Renewable Energy Potentials in Nigeria : Meeting Rural Energy Needs. *Renewable and Sustainable Energy Reviews* 29. 72-84.
[208]Sambo, A. S. 2008. Op.cit. 32-37.
[209]Oyedepo, S. O. 2014. Towards Achieving Energy for Sustainable Development in Nigeria. *Renewable and Sustainable Energy Reviews* 34. 255-272, 256.
[210]Idem, 2012. Energy and Sustainable Development in Nigeria: The Way Forward. *Energy, Sustainability and Society*, 2.1: 15.
[211]*ibid*.

equation given the number of mountainous plains that surround these states.[212] Given the topographic make-up and massive land mass of the northern region, wind farms are likely to flourish in this region. The north central region is also notable for its high hills which make wind energy an attractive option.[213] The massive space of land, coupled with the sparse population density and isolated settlements provides sufficient inducement to cite wind farms.[214] This advantage explains why the northern states have had incidence of more usage of wind energy compared to most other states of Nigeria.

Therefore, many indigenous scientists also examined wind energy accessibility in the country, with the intention to utilise them for consumption purposes. Data shows that the speed of wind of 30 power stations sited in Nigeria, considering the yearly mean of speed of wind and power flux masses, respectively oscillate between 1.5 to 4.1 m/s to 5.7 and then to 22.5 W/m^2.[215] This is according to wind data analysis spanning through the 10-year period of 1979 to 1988.[216] Another study carried out an applied measurement hypothesis to determine the wind energy generating potential in Maiduguri, capital of Borno State, based on Weibull distribution of wind data for a period of 10 year of 1995 to 2004.[217] Upon undertaking cost/benefit measurements of the conversion systems for wind energy to be supplied in the State towards generation of electric power, each report shows the endowment of the country with vast prospect for wind storage for power generation, principally at the heart of the northern state. The massive space within the eastern and central states, as well as the coastal areas, there is sufficiently availability of wind all year long. It is now left for the country to explore means to harnessing the resources to create a wind across regions and zones ascertained to possess potentials for wind storage for energy purpose.

There are vital factors which ascertain whether wind-powered energy will function effectively. These factors include: the fitness of the wind turbines; precise calculation

[212]Ajayi, O. O., Fagbenle, R. O., Katende, J., Ndambuki, J. M., Omole, D. O. & Badejo, A. A. 2014. Wind Energy Study and Energy Cost of Wind Electricity Generation in Nigeria: Past and Recent Results and a Case Study for South West Nigeria. *Energies* 7. 8508-8534, 8530.
[213]Oyedepo, S. O. 2014. Op. cit. P. 256.
[214]*ibid*.
[215]Adekoya, L. O., Adewale, A. A. 1992. Wind Energy Potential of Nigeria. *Renewable Energy* 2.1: 35-39.
[216]Fagbenle, R. O. and Karayiannis, T. G. 1994. On the Wind Energy Resources of Nigeria. *International Journal of Energy Research* 18.5: 493-508.
[217]Ngala, G. M., Alkali, B., Aji, M. A. 2007. Viability of Wind Energy as a Power Generation Source in Maiduguri, Borno state, Nigeria. *Renewable Energy* 32.13: 2242-2246.

of wind speed; the structure of its operation and application of the appropriate maintenance techniques on the turbines.[218] Another factor to contend with is temperature. Wind speed fluctuates in accordance with temperature, season or time.[219] In view of the result dissonance in the rate of wind flow, wind power system requires support from batteries which could be used to store energy. It then provides available energy whenever it is required. Wind energy resource is an unlimited energy source which has the capacity to serve contingency means of power generation for the country, by placing great interest and resources needed therein, particularly for underserved areas of the country. There are pertinent factors that have to be put into consideration in citing the location of a wind power system. The efficacy of a wind powered system is ascertained by the finite uniformity of the rate of wind flow. Consequently, there are some hindrances such as hills, trees or structure should be cleared off the environment.[220] These impediments inhibit the power system rotors thereby dipping their efficiency. It is advised that the rotors should be placed on towers top in order to address wind drag and harness the benefit of stronger wind availability.

Beginning from the 1960s, wind power plants had already been constructed in about five states of the north to power pumps that generate water. A 5kW wind-powered electricity facility was also constructed in a settlement in Sokoto State, known as Sayyan Gidan Gada.[221] This demonstrates that wind-powered energy systems have only been used at the off-grid level and to a lesser extent. If little success has been attained at this level, it shows that Nigeria is underutilizing her wind energy potentials. With proper planning and funding, the gift of natural and renewable wind can be put to use towards generating enough power that will be channeled into the national grid.

[218]Okundamiya, M. S. Emagbetere J. O. & Emmanuel A. O. 2014 ; Assessment of Renewable Energy Technology and a Case of Sustainable Energy in Mobile Telecommunication Sector. *Scientific World Journal* 1-13, 2.
[219]Osueke, C. O. and Ezugwu, C. A. K. 2011 ; Study of Nigeria Energy Resources and its Consumption *International Journal of Scientific & Engineering Research* 2.12: 2229-5518.
[220]Osunmuyiwa, O., and Kalfagianni, A. 2017. Transitions in Unlikely Places: Exploring the Conditions for Renewable Energy Adoption in Nigeria. *Environmental Innovation and Societal Transitions*22, 26-40.
[221]Charles, A. 2014. How is 100% Renewable Energy Possible for Nigeria ? Global Energy Network Institute Report. 14. Retrieved on July 13, 2021 from geni.org/globalenergy/.../renewable-energy...nigeria/100-percent-renewable-energy-Nigeria.pdf.

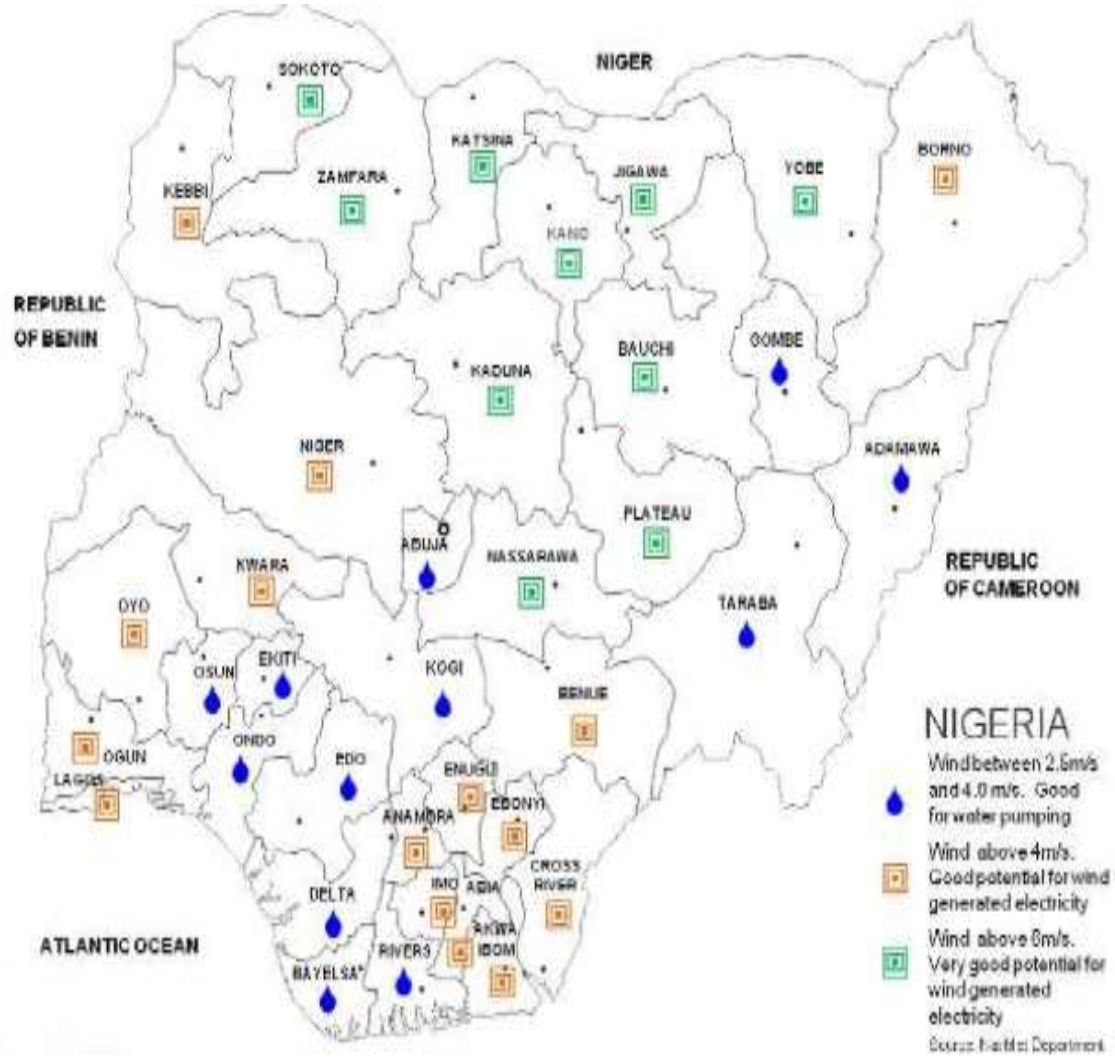

Figure 4.6: Wind Potential Mapping of Nigeria.[222]

[222] New Era Nigeria. Wind Energy. Retrieved 27 May, 2022 from http://www.neenigeria.com/html/wind_energy.html

4.7.4 Biomass

It can be counted as a form of renewable energy source in a coherent manner. Biomass comprises biological systems which include: shrubs, wood, forest residue, industrial, agricultural and marine wastes.[223] A typical instance is the biological resources extracted from various living substances, such as wood, human excretal, alcohol extract, etc. Wood, which is also a veritable source of biomass, is obtained from wood harvest and its waste product. Agricultural produce has lots of waste which can be collected from rice husk, maize husk, the shell of palm kernel, cassava peel, fiber from palm fronds, etc. Skillful appraisal indicates that feedstock underlay for an economically achievable biogas scheme in Nigeria comprises of water hyacinth, water lettuce, cassava vegetables, industrial solid waste, excrement, urban refuse, sewage, and agricultural residues.

The foregoing are genuine sources of energy which can be processed into biogas and renewable energy derived therefrom. Biogas can also be sourced from animal waste materials such as: cow dung, poultry droppings and slaughter slab wastes.[224] The volume of waste generated in urban areas has the ability to generate substantial electricity for persons living within those environs.[225] Nigeria is held to produce up to 227,500 tons of fresh wastes from animals on a daily basis. 1 kg size of fresh animal excretal is estimated to produce up to 0.03 m^3 gas. Hence, Nigeria is endowed with the potential to create up to 6.8 million m^3 of biogas per day.[226] Additionally, it has been estimated that Nigeria has an annual per capital municipal solid wastes generation of up to 20 kg.

This form of energy is also referred to as biogas or biofuel. Public waste, landfill gas and industrial waste oftentimes can be utilised for waste energy production. Ethanol or alcohol fuel is mostly derived gotten from corn. Biogas comprises of chemical compound of 23-38% carbon dioxide (CO_2), 2% hydrogen (H_2), 60-70% methane

[223]Oyedepo, S. O. 2014. Op. cit., 255–272.
[224]Saifuddin, N., Bello S., Fatihah, S. and Vigna, K. R. 2016. Improving Electricity Supply in Nigeria - Potential for Renewable Energy from Biomass. *International Journal of Applied Engineering Research* 11.14: 8322-8339, 8333.
[225]Simonyan, K. J. and Fasina, O. 2013 ; Biomass Resources and Bioenergy Potentials in Nigeria. *African Journal of Agricultural Research* 8.40: 4975-4989, 4983.
[226]Akinbami, J. F. K., Ilori, M. O., Oyebisi, T. O., Akinwumi, I. O. & Adeoti, O. 2001. Biogas Energy Use in Nigeria: Current Status, Future Prospects and Policy Implications. *Renewable and Sustainable Energy Review* 5. 97-112.

(CH_4), and small measure of hydrogen sulphide (H_2S).[227] This chemical compound also serves useful purposes of cuisine activities, lighting of houses, agricultural and industrial services.[228] Sometime in 2016, it was overheard that the government of Ogun State was interested in the conversion of biomass which seems like a positive move and a way to resolve inappropriate disposal of waste within the state. This energy source could be harnessed by all tiers of government.[229] It is therefore anticipated that private participation has the tendency to create energy sources that are environmentally friendly, which could be programmed and channeled into bio-fuels to effectively boost the agricultural sector. Nigeria has home grown grain-base for ethanol production. Crops such as sugar cane, wheat, soy beans, corn, cassava, etc. are veritable sources for bio-fuel generation, which are valuable for generation of carbon-free bio-fuels instead of reliance on fossil fuels such as petroleum and gas which promotes carbon-belching.

Despite the advantages of biomass as a renewable energy source, it still has certain challenges. This is with regards to food security challenge which it likely to pose. The development of biogas at very large-scale would mean diverting cereal crops that could be used for human and animal feeds for the purpose of biogas energy. Despite the short supply and high food demand by members of the public at the moment, foodstuff is in short supply in Nigeria given her increasing population. The demand for food can hardly be met' Much reliance is still placed on importation in order to supplement shortfall in local food production. Options available to the country would be to ensure increase in food production of cereal crops, cassava, soya beans, palm oil, sugarcane, etc. when there is food supply in excess, it therefore means that there would be enough food crops to meet food supply needs and there would still be more to spare to meet Nigeria's bio-fuel needs.[230]

[227]Bada, H. A. 2011 , Managing the Diffusion and Adoption of Renewable Energy Technologies in Nigeria. *World Renewable Energy Congress* Linkoping, Sweden 2642-2649, 2645.
[228]*ibid*.
[229]Emetere, M. E., Okoro, U., Etete, B., & Okunbor, G. 2016. Free Energy Option and its Relevance to Improve Domestic Energy Demands in Southern Nigeria. *Energy Reports* 2. 229-236.
[230]Mshelia, H. I. Energy Access for all: The Role of Clean Energy in Alleviating Energy Poverty. *Energy Access for All.* 33-43, 37.

4.7.5 Other Renewable Energy Sources

Before the advent of coal during the middle of the 19th century, almost every energy source utilised was renewable. The very first form of renewable energy used was the traditional biomass: it was used as fuel sources for fire, which dates over one million years back in time. Biomass usage as fuel for fire did no gain widespread acceptance until several hundreds of years thereafter. The next oldest renewable energy use was probably, the act of limiting wind so as to propel the navigation of ships across sea. The origin of this technique could be associated to the practice in the Persian Gulf and Nile River around 7000 years ago. Geothermal energy, obtained from hot springs, had served bathing purposes since the Paleolithic times and room heating purposes by Romans in ancient times. In the past, the principal means of traditional renewable energy included: grain crushing windmills, water power, animal power, wind, firewood and human labour, a traditional biomass.

Human beings and animal power provide major quantity of energy needed for agricultural output. Agricultural goods, including: cornstalks and processed waste of rice husk, kernel shell, corn husk, cassava peels, etc. are excellent sources of biofuel. Animal excrement, such as poultry droppings, bovine dung, and slaughterhouse waste, is also accessible at each authorised location.[231] The energy generated from these products has huge potential for reliable energy generated in Nigeria, primarily for the country's northern regions and, in recent times, within the southern and western regions. If each state can conceivably transition to this technique, it may also be utilized to prevent rubbish dumping on road sides, since an adequate way of capturing this waste for energy usage would be launched. The high population density in Nigeria serves as key factor responsible for poor waste management.[232] Most wastes are thrown into landfills, virgin areas, the sea, or burned due to inadequate and ineffective waste management system in the country.

Just as it is the primary purpose of states to secure lives and property, it is also the duty of the state to guarantee energy security in such a way that will boost the quality and

[231]Abila, N. 2014. Managing Municipal Wastes for Energy Generation in Nigeria. *Renewable Sustainable Energy Review* 37. 182-90.

[232]Suberu, M. Y., Bashir, N. and Mustafa, M. W. 2013, Biogenic Waste Methane Emissions and Methane Optimization for Bioelectricity in Nigeria. *Renewable Sustainable Energy Review* 25. 643-54; Ezeah, C. and Roberts, C. L. 2012. Analysis of Barriers and Success Factors Affecting the Adoption of Sustainable Management of Municipal Solid Waste in Nigeria. *Journal of Environmental Management* 103. 9-14.

living standard of citizens. Energy security contemplates: sufficient energy distribution to satisfy the state developmental needs; reliable flow of energy supply; citizens' accessibility to energy supply; and energy at an affordable cost to meet the consumer's demand. Different countries device various means to satisfy their energy needs. It can either be achieved with the use of renewable or non-renewable energy sources or a combination of both sources.

4.8 Government Policies for Renewable Electricity Generation in Nigeria

The FGN has expressed its intention to integrate renewable energy as part of the energy mix in the Nigerian power sector. These policies recognise the renewable energy opportunities of Nigeria hence they seek to explore the utilisation of the available resources by harnessing them to improve the power sector of the country. This section examined several policy frameworks on renewable energy utilisation in the electricity industry.

4.8.1 National Energy Policy - 2003, 2006 and 2013

There was no overarching energy strategy before FGN's approval of its NEP 2003. The ECN developed the energy policy, known as NEP. NEP outlines the FGN's strategy for production, distribution and energy usage, as well as its basic options and requirements. Its primary goal is to provide energy security by creating a well-rounded energy mix, which entails widening energy supply base and haulers on the basis of a custom energy economy which contemplate a contemporary approach of renewable energy increment in the ratio of energy usage and enables energy access across Nigeria at an affordable rate, thereby orchestrating stable development that supports environmental protection.[233]

NEP 2003 articulated the goal of delving the diverse energy sources within the disposal of Nigeria, inclusive of renewable energy sources. The policy did not suppress words in unambiguously referring to wind, biomass and solar as liable to incorporation into the energy mix of the nation.[234] It offers a national strategy for development which must consider renewable for off-grid sources while also playing a role in grid

[233] Energy Commission of Nigeria. National Energy Policy. 2006. Retrieved 6 August, 2021 from www.energy.gov.ng; Energy Commission of Nigeria. 2013. National Energy Policy Draft revised edition. Retrieved August 6, 2021 from www.energy.gov.ng

[234]Sadik, O. W. 2015. Energy Crisis in Nigeria : Sustainable Option Using Nanotechnology as the Way Forward. Redeemer's University Convocation Lecture 6. Retrieved on June 19, 2018 from https://run.edu.ng/media/6182273564112.pdf

expansion.[235] It was noted that Nigeria is endowed with sufficient storage of renewable energy sources capable of serving the energy needs of the country.[236] This becomes a more compelling action to take given the steady fall in the price of procuring wind and solar energy technologies. There would be need to set up legal mechanism that will grant support in form of government subsidies to encourage investment in this regard.[237]

4.8.2 Renewable Electricity Policy Guidelines 2006

The Renewable Electricity Policy Guidelines (REPG) is an FGN policy which was issued by the Ministry of Power and Steel in 2006. The Renewable Energy Policy Guidelines (REPG) mandated the Nigerian government to increase renewable power generation by not less than 5% of overall electricity generation and at least 5TWh electricity output in Nigeria. The policy paper outlines FGN's intentions, policies, plans and goals towards promoting renewable energy in the electricity industry.[238]

Under the REPG, the FGN had expressed recognition for off-grid renewable energy sources and the vital function which it has to perform with regards to electricity expansion in order to make it more accessible to persons who dwell in rural localities. The thrust of the policy specifically points out the intendment of the FGN to provide some form of support in order to enable the construction of stand-alone renewable electricity facilities in localities that are not within the connectivity span of the national electricity grid.[239] The goal is to ensure a boost of economic undertakings in those areas. The policy action is further inspired by the recognition of off-grid renewable electricity to be a cost-effective means of addressing the power needs of rural residents in quick succession.[240]

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[235]Omojolaibi, J. A. 2014. Reducing Energy Poverty in Africa: Barriers and the Way Forward. *International Association for Energy Economics* 2. 29-30, 29.
[236]Azodo, A. P. 2014. Electric Power Supply, Main Source and Backing: A Survey of Residential Utilization Features. *International Journal of Research Studies in Management*3.2: 87-102, 90.
[237]Heffron, R. J., Hussein, H. I., Yang, C. H. & Sun, N. 2017. The Global Future of Energy lLw: 2017 review. *International Energy Law Review* 291. 1-15,3.
[238]Federal Government of Nigeria. 2005. Electric Power Sector Reform Act (EPSRA). Retrieved July 6, 2015, from www.nercng.org/index.php/nerc-documents/func-startdown/35/.
[239]Federal Ministry of Power and Steel, Federal Republic of Nigeria. 2006. Renewable Electricity Policy Guidelines. 15. Retrieved on June 17, 2018 from iceednigeria.org/backup/workspace/uploads/dec.-2006.pdf
[240] See Policy No. 4. *ibid*. 16.

4.8.3 Renewable Electricity Action Programme (REAP) 2006

In 2006, the REAP issued by the FGN through its Ministry of Power and Steel in relation to the REPG, outlined a path for the REPG's implementation. The instrument provides an outline of the Nigerian power sector and its relationship to the growth of renewable energy. The policy documents also examine governmental goals and tactics toward the development of renewable energy, including creating a level playing field for producers of renewable energy, multi-sector alliances, demonstration ventures, supply chain activities, and so on. The program also includes funding renewable projects and an examination of the responsibilities of government ministries, department and agencies, followed by a risk monitoring, assessment and evaluation.[241]

4.8.4 Nigerian Biofuel Policy and Incentives 2007

The Nigerian Biofuels Policy and Incentives (NBPI) 2007 was given executive approval by the Nigerian Federal Executive Council in July 24, 2007. The policy goal was to create and encourage the development of the local ethanol fuel industry by the utilization of agricultural products. The main policy objective is targeted at promoting the development of ethanol fuel, which could be put to use for domestic and industrial agricultural activities. It is believed that the policy will lead to a surplus in the bio-fuel energy base of Nigeria. This accorded with FGN's August 2005 directives on Automotive Biomass Programme for Nigeria. The NNPC was given mandate to kick start the ethanol industry. In addition, the policy placed its focus on the gradual depletion of Nigeria's reliance on imported petrol, decrease in environmental degradation, as well as developing an economically worthwhile industry that generates viable employment opportunities. The advantage of the policy was the generation of more tax revenue sources, provide jobs opportunities that mitigates the poverty level, and give empowerment to rural dwellers, boost economic development, improve agrarian activities, boost energy generation and environmental advantage by depleting fossil fuel based GHGs generated in the transportation industry.[242]

[241] Renewable Electricity Action Program. Federal Ministry of Power and Steel (2006). Federal Republic of Nigeria. Retrieved August 6, 2015, from www.iceednigeria.org/backup/workspace/uploads/dec.-2006-2.pdf

[242] Nigerian National Petroleum Corporation (NNPC) Draft Nigerian Bio-Fuel Policy and Incentives. Nigerian National Petroleum Corporation, Abuja. 2007.

4.8.5 Renewable Energy Master Plan (REMP) of 2005 and 2012

In 2005, the ECN developed the REMP in partnership with the UNDP, which was later revised in 2012. Nigeria's vision for boosting renewable energy was well spelt out in the REMP. It also lays forth a strategy towards the attainment of sustainable development. The policy was based on the growing merger of standards, principles, and goals embodied in the National Economic Empowerment and Development Strategy, NEP, National Policy on Integrated Rural Development, Millennium Development Goals and International Conventions for poverty alleviation and reversal of climate change.[243]

REMP emphasised the essence of incorporating renewable energy sources into buildings, power grid, and off-grid electrical systems. The policy declaration further emphasised the importance of infusing solar power into the energy mix of the country. The blueprint for REMP is divided into two dispensations of 2005 and 2012. REMP underscores the requisite materials necessary for attainment of renewable energy integration for home usage, imputation to the grid and application for off-grid platforms. According to the policy, solar energy has great potentials that can be nurtured and infused into Nigerian energy mix. By REMP projections, Nigeria intends to expand the supply of renewable power from its 2015 record of 13% total electricity output to a record 23% by 2025 and a 13% increase to become 36% in 2030.[244] It therefore means that, by 2025, renewable power would have contributed additional 10% to total electricity usage in Nigeria. This would also mean that Nigeria would have realised a percentage beyond the ECOWAS Regional Renewable Energy Policy and Action Plan target of 22% and 25% in 2020 and 2030 respectively.[245]

4.8.6 National Renewable Energy and Energy Efficiency Policy (NREEEP) 2014

NREEEP outlines the global move, policies and mechanisms towards the promotion of renewable energy and energy efficiency. In 2014, the Ministry of Power enunciated the NREEEP and made its onward transmission for the approval and ratification of the

[243] Energy Commission of Nigeria. 2007. Draft National Energy Master Plan. 2005 Renewable Energy Master Plan. Retrieved August 6, 2021 from www.energy.gov.ng.
[244]Emodi, N. V. and Ebele, N. E. 2016. Policies Enhancing Renewable Energy Development and Implications for Nigeria. *Sustainable Energy* 4.1: 7-16, 9.
[245]Art 2 (2) Forty-Third Ordinary Session of the Authority of Heads of State and Government Abuja, 17-18 July, 2013 Supplementary Act A/Sa.3/07/13 on the ECOWAS Renewable Energy Policy

Federal Executive Council.[246] The purpose of the policy is to set the framework which will serve as a basis for affirmative action towards dealing with the challenge of infusion of modern and clean energy sources into Nigeria's energy mix. This is in recognition of the need to guarantee energy security and mitigate challenges of climate change. It recognised the significant role renewable electricity generation has to play in the improvement, processing, maintenance and advancing of existing and modern renewable energy technology in electricity generation.[247] The policy also set out state policy proclamations and strategies, which take note of important frameworks that attract private investment into renewable energy and other means of energy efficiency. By the projection of this policy by the year 2020, the country ought to have recorded some achievements in increasing the electricity generation capacity with renewable energy sources.

4.8.7 Draft Rural Electrification Strategy and Implementation Plan (RESIP) 2014

In 2006, the team responsible for the Nigerian power sector reform first set up the RESIP. Nevertheless, in 2014, another committee was also made to partake in the reform process by revising and redrafting RESIP. However, RESIP eventually got the consent of the FGN in July, 2016.[248] The expectation was that it would create a clear cut institutional arrangement for the sector and put up a going plan culminating into the development of a useful and accessible agenda for development of rural electrification in the country. RESIP's main goal is to enlarge electricity access in quick and cost-effective means.[249] This includes meeting electricity supply needs through the improvement of off-grid and national grid connectivity. The Plan set a clear-cut approach to reposition the institutional framework and plan that will fast track rural electricity development in Nigeria. Ultimately, RESIP's objective is to

[246]Energy Commission of Nigeria and Federal Ministry of Science and Technology, 2014. National Renewable Energy and Energy Efficiency Policy (NREEEP). Retrieved August 6, 2021, from www.energy.gov.ng.

[247] xi Retrieved August 6, 2021 http://admin.theguides.org-NREEE-POLICY-2015-FEC-APPROVED-COPY.pdf

[248]Emodi, N. V. and Ebele, N. E. 2016, Policies Enhancing Renewable Energy Development and Implications for Nigeria. *Sustainable Energy* 4.1: 7-16, 9.

[249] Rural Electrification Strategy and Implementation Plan (RESIP) (2014). Power Sector Reform Team. Retrieved August 6, 2015, from www.power.gov.ng/National%20Council%20on%20Power/Rural%20Electrification%20Committe%20Recommendation.pdf.

ensure a rise in the electricity access in rapid progression with the use of cost effective means to achieve this result.[250]

4.8.8 National Renewable Energy and Energy Efficiency Policy (NREEEP) 2015

The Federal Executive Council gave approval for the implementation of the policy document known as the NREEEP on the 20th day of April, 2015. This was the foremost drive towards the expansion and management of renewable energy source so as to enable Nigeria take progressive steps towards the attainment of energy efficiency. The policy identified the deficiency of the national grid making a wider spread to address the energy needs of Nigerians in interior areas. It also recognised the key role which renewable energy has to play towards the attainment of this result in quick time. The policy ascribed special obligation on the National Renewable Energy Action Plan and National Energy Efficiency Action Plan to set out timeline within which this policy should be implemented.[251]

4.8.9 Economic Recovery Growth Plan 2017 - 2020

The past decade has witnessed governmental efforts to devise and develop measures towards addressing the energy challenges of the country and provision of uninterrupted and affordable power supply for Nigerians. It is believed that this can be achieved by identifying means of encouraging sustainable power sector growth by the employment of diverse energy sources, with the aid of instruments such as laws, regulations, policies and various institutional framework players in the demand and supply chain of the power sector.[252] One of such initiatives is the ERGP 2017-2020, which is the initiative of the Buhari led FGN. The ERGP acknowledges power as a relevant factor to the development every other sector of Nigerian economy. The ERGP has a long-term goal of improvement in the power generation capacity in the country, by enhancement of its operational capacity, boosting small-scale renewable energy power projects and capacity building. In the mid-term, the ERGP is focus on ensuring not less than 10, 000 MW electricity in operational capacity by 2020. This is to be achieved by the means of current installed capacity available electricity generation, deal with issues affecting gas supply, such as vandalism and completing the construction of major gas

[250] *ibid*.
[251] Ojo, O. V. 2017. An Overview of the Legal and Regulatory Framework for Renewable Energy Projects in Nigeria: Challenges and Prospects. *Unilag Law Review* 1.1: 22-47, 35.
[252] The Latest in this Series of Policy Intervention is the Power Sector Recovery Program 2017 – 2021 ("PSRP", or, the Program) which was designed on this basis of the ERGP 2017 – 2020.

supply lines channeled towards power generation facilities. However, the ERGP has not yielded result towards its midterm and long-term goals. The gross energy generation and consumption of the country is yet to improve. The total energy generated and distributed is still at a dismally low and insufficient level. Many factors are responsible for this. They include: issues of vandalisation of gas pipelines which has resultant effect on the power generation unit of the high gas dependent NESI.[253]

4.8.10 Power Sector Recovery Programme

The Nigeria's Power Sector Recovery Programme, which covers the financial year period of 2017-2021, lay out some remedial steps that have to be adopted to reinstate the commercial feasibility of the power sector in Nigeria, increase transparency and service delivery, and redirect NESI towards the part of future growth.[254] It was supposed to be a five-year plan and include interventions in the following areas: financial interventions; governance, technical and debt recovery interventions; policy interventions; gas supply interventions; and interventions with regards to pricing and end user tariffs.

Financial Interventions: With regards to the financial interventions, the objective is to prevent historical and future fund deficits in the power sector. Hence, the FGN stated its commitment to make up for the future deficits that may accrue for the sector within the period of 2017 to 2021. The FGN also put plans in place to provide electricity market support in the meantime, until such a time when the electricity market becomes matured enough to operate at a cost regulated level. The financial respite from this intervention is to be sourced from the yearly budgetary allocation of the FGN and Medium-Term Expenditure Framework (MTEF).

Furthermore, the sector income shortfall must be resolved, as well as any ministry, departmental, and agency indebtedness.[255] These payments will be automated in the future. During the next five years, cost-reflective rates will need to be reinstated, and the tariff-setting system will need to be reassessed. Increases for non-residential users will be introduced as part of the tariff adjustment beginning in July 2017. A credit

[253]Gas constrains are usually reported by Daily Briefing of Advisory Power Team under the office of the Vice President.
[254]Adeniji, O. and Osisiogu, O. 2014. Overview of the Nigerian Power Sector Reform. Stillwaters Law Firm. Retrieved 28 August, 2021 from https://www.iflr1000.com/NewsAndAnalysis/Overview-of-the-Nigerian-power-sector-reform/Index/1017
[255]*ibid*.

value of $2.3 billion stands as offer to help satisfy NBET's payment obligations, relieving financial concerns. Lastly, the World Bank reiterated commitments to assist the FGN execute the recovery programme and backing from the International Financial Corporation and Multilateral Investment Guarantee Agency may release an additional $2.7 billion in private investment.

Governance Interventions, Technical interventions and Debt Recovery: Restoring and enhancing sector governance would entail ensuring that suitably competent board members are selected to assume public agencies, as well as skilled government representation appointed into the executive boards of different DISCOs. Increased sector openness, information-based decision taking and successful contract execution are critical, and ought to be backed by coherent communication plan centered on the electricity industry reform programme so as to adequately inform the public and important industry actors. An extra monitoring team will be formed to guarantee that the power sector reform initiative is properly coordinated and monitored.[256] To ensure grid stability, at least 4,000 MW/h necessarily has to be assured and supplied each day beginning from 2017. This will contribute to better functionality of DISCOs. Combined with ambitious efforts to address mechanical and non-mechanical wastage, DISCOs would be able to undertake financial rearrangement and recapitalisation through the adoption of a metering scheme.[257] Around $200 million is due to several FGN ministries, departments, and organisations throughout the industry. The issues have been exacerbated by a want of efficient governance and implementation of laws and procedures. The replacement of NERC commissioners with new ones around February 2017 was one of the FGN's planned corrective initiatives.[258]

Policy Interventions: There is a need to design and implement a foreign exchange policy, which includes a power sector foreign exchange rate and enable GENCOs and DISCOs accessibility to foreign exchange. An estimated 70% of the cost of operating the Nigeria power sector is attributed to foreign exchange expenditure. Because of the Naira's devaluation versus the American dollars, present tariffs cannot sufficiently cover electricity generation cost and distribution to customers.[259] Furthermore, to ensure continuous attraction of investments from the private sector, there is need for

[256] *ibid*.
[257] *ibid*.
[258] *ibid*.
[259] *ibid*.

lucidity in the conditions and circumstances of government assistance throughout the industry must be established. This should necessarily include a schedule for transition towards competitive generation as well as cost-reflective DISCO rates.

Gas Supply: The limited availability of gas to fuel the power generation systems is directly related to the financial issue. DISCOs have complained about GENCOs' inadequate capacity generation. The government is now considering diverting roughly 10-15% of the domestic market of Nigeria Liquefied Natural Gas to power stations with the control of GENCOs to address gas supply concerns. The Nigerian Gas Master Plan (NGMP) also creates a Strategic Gas Aggregator to address demand and supply issues of gas in the Strategic Domestic Sector, which includes electricity.[260] NIPP is a critical component of the FGN's goal to increase electricity generation. On the part of NERC, it has stipulated that Independent Power Projects (IPPs) must guarantee that they have access to gas before operating license can be granted to them. In August 2014, the FGN also granted a $1 billion loan to the Niger Delta Power Holding Company to increase the country's gas supply.

There is an FGN gas policy known as the NGMP 2008. The objective of the plan is to change the national gas policy from one which is export driven to an industry that is focused on domestic market. This is the policy underpinning the creation of the Nigerian Domestic Gas Supply and Pricing Regulations, 2008. Ordinarily, gas suppliers would prefer to export gas in view of the attraction of foreign exchange that accrues from such transactions. If this is allowed unchecked, most suppliers would engage in gas export to the detriment of the power sector and other domestic industries. Hence, to prevent this outcome, the regulation imposed a domestic gas supply obligation on gas suppliers in order to guarantee that abundance supply of gas to circulate and meets the needs of the power sector. The NGMP and the regulation also established the Gas Aggregation Company Nigeria (GACN) Ltd as a corporate entity with perpetual succession in 2010.[261] All these were actions which were targeted at providing optimal boost to gas supply efficiency for the power sector and allied industry which are gas reliant, in order to guarantee their effective and successful

[260] *ibid*.
[261] KPMG Nigerian Power Sector Guide 26. Retrieved on June 19, 2018 from https://assets.kpmg.com/content/dam/kpmg/.../pdf/.../a-guide-to-nigerian-power-sector.pdf

functionality.[262] The 7 Big Wins Initiative is another policy initiative by the FGN. This initiative which was launched in December, 2016, transformed into the 2017 National Gas Policy. It is on the basis of this instrument that the government expressed its commitment to fast track the gas revolution in Nigeria.[263] The policy further emphasised government thrust that gas has a prominent role in the electricity sector. It also marked a change of direction from price regulated gas regime supply to market forces determined gas sector. This is in place to guarantee a buildup and create a mutual trust between fuel suppliers and operators of the power sector.

To further show commitment to its policies on gas, the FGN declared 2021-2030 as the decade of gas. This declaration came on the 29th day of March, 2021. This is coming on the heels of the current attempt to reform the gas industry in order to reposition it for the global energy transition. The initiative came as a step-in furtherance of the declaration of 2020 as the year of gas. In the views of the president, "gas development and utilization are a national priority", hence there is need to industrialise Nigeria's use of gas.[264] The natural gas potential of the country had remained largely untapped due to several years of complacency in the national policies and regulations on gas. Such a way to show seriousness of the FGN this time, the National Assembly finally enacted the Petroleum Industry Act 2021 and it came into force upon its assent by Mr President on August 16th, 2021. The Petroleum Industry Act is the legal framework for gas utilisation in the country. It gives legal backing to the FGN's drive for the promotion of gas content development of the petroleum sector.

Pricing and End User Tariffs: by virtue of its position as an autonomous regulatory agency, NERC is legally authorised to assert supervisory control over the power sector, issue permits to industry operators and guarantee acting in line with industry rules and functional procedures. The primary purpose for its creation is for the development and implementation of regulations, in order to stimulate profitable pricing and operative and efficient competition amidst market operators and establish an investment enabling market. Subsequently, NERC periodically sets pricing index

[262]Shodipo, J. O. 2015. Gas to Power: Enhancing and Optimizing the Domestic Gas Supply Obligation for Improved Power Generation and Supply in Nigeria. LL.M Thesis: University of Manitoba. ix+133, 53.

[263]Templars. 2017. The National Gas Policy, 2017. 2. Retrieved on July 19, 2018 from https://www.templars-law.com/wp.../2017/.../THE-NATIONAL-GAS-POLICY2c-2017.pdf

[264] Buhari Announces Nigeria's 'Decade of Gas'. African Business 9th April, 2021. Retrieved 28 August, 2021 from https://african.business/2021/04/energy-resources/buhari-announces-nigerias-decade-of-gas/

for the industry using the MYTO model which it created. The MYTO-2 Financial Model of 2012 was established following an initial review of MYTO 2008, which was due to high tariffs complaints of individual and commercial consumers and high-powered consultation with trustees and other concerned stakeholders.[265] It entails three new Billing Orders on apportioning, out-sending and creation for the duration of 1st June, 2012 to 31st May, 2017. Addition to major review on five years interval, it acquaints a periodic minor assessment to provide susceptibility to factors such as: rates of foreign exchange, capital and operating cost, etc. The calculation for electricity consumption bill is created on the basis of revenue requirements in the entire country. Thereafter, the bill is fixed on monthly charges or based on energy consumption charges. The instrument earmarked 14 categories of billing and grouped consumers into categories of: personal residential, commercial residential and industrial advantage area. Government also supported by creating distribution tariff subsidy under MYTO 2, in order to facilitate implementation and effectiveness.[266]

4.9 Policy Failures

It appears that there are several policies which support utilisation of renewable in the Nigerian electricity sector. These policies are executive expressions of proposed plan of action regarding renewable energy utilisation. Policies are necessary for the smooth operation of every sector of the society. That is why governments make policies on different sectors of their economies. Policies can be gleaned from statement and actions of key officials of the executive arm of government. Policies are concretised by documentation in white papers, plans, blueprints, guidelines, etc. It is essential that appropriate policies are required to provide the proper incentives, blue print, standards and regulations which will enhance the application of renewable power sources. The different policies of the various sub-sectors should necessarily align with each other towards the attainment of the national development policy.

Since government policies are not legally binding, it is expected that they should crystalise into legislative enactments to give legal backing to the implementation of policy statements. In other words, government plan of action should not end in the realm of policy statements. The executive arm should further sponsor executive bills

[265]Adeniji, O. and Osisiogu, O. 2014. Overview of the Nigerian Power Sector Reform. Stillwaters Law Firm. Retrieved 28 August, 2021 from https://www.iflr1000.com/NewsAndAnalysis/Overview-of-the-Nigerian-power-sector-reform/Index/1017
[266]*ibid*.

through the legislative arm of government to convert policies into laws. Laws are essential for promoting policies. For instance, law can provide incentives, subsidies, regulatory support, waivers, speedy administrative processes, etc. which could stimulate certain actions in line with government policies. On the other hand, law can create obstacles which prevent the realisation of government policies. These obstacles can be in the form of cumbersome administrative processes, weighty fiscal regimes, prohibitive and penal provisions, etc.

After the law has been enacted, it would be incumbent on the government (executive) to set agencies or modalities in motion for the implementation of those policies turned law. In order for a government policy to gain expression in reality, there must of necessity be a nexus between policy, law and implementation.[267]

In the case of policies in the energy sector, Nigeria has churned out various policy objectives for the sector. This study has identified the several governments polices poised at promoting the utilisation of renewable energy in the sector. The numerous policies suggest the seriousness of government to give expression to these policies. However, this does not appear to be the case. These policies are quickly overlooked almost immediately they are made. This would explain the replication of policies with further policies on the same subject matter instead of advancing policies with legislative actions and implementation.

Also, energy policies incoherence has been observed in the sector, with principal regards to the utilisation of renewable energy. These policies do not only conflict with themselves, but conflict directly or indirectly with existing legal frameworks which turn out to be inadequate. Hence, the policies easily end as paper work and are hardly followed up with concrete legislative frameworks, which will give compelling legal basis for their implementation. Renewable energy policies purportedly provide backing for development of renewable energy. They express the intention of the FGN to ensure the application of renewables into Nigerian energy mix. With the same stroke, the FGN has gone ahead to express its intention to aggressively harness the gas potential of the country by declaration of the decade of gas and enactment of the Petroleum Industry Act 2021. Statements made by senior government officials have even suggested that Nigeria cannot abandon its untapped fossil fuel industry.

[267]Omorogbe, Y. 2008. *Why We Have No Energy.* Ibadan: University of Ibadan Press, 21.

The various government policies that intend to support renewable energy ought to crystallise into concrete legislative framework. This has hardly been the case with the Nigerian electricity industry. The first renewable energy policy is the NEPP, which was made in 2001 even prior to the 2005 reforms. The EPSRA only contains a negligible provision on renewable energy, which requires the Minister of Power to make periodic report to the FGN on actions carried out by the Rural Electrification Agency on renewable energy.[268] While there is no legislative enactment exclusively dedicated to renewable energy development, there is a delegated legislation on renewable energy borne out of an administrative law-making process by NERC. This is the REFIT, which was made in 2015.

One would wonder why the FGN, would not sponsor an executive bill before the federal legislature for the enactment of a law on renewable energy if the government was serious about it deployment into the country's energy mix. On the other hand, one would also query why a member of the National Assembly would not sponsor a bill in this regard. While the action or lack of action by any legislative member in this regard may be inexcusable, it is argued that sometimes, the legislature enacts laws based on the body language of the executive. It is pertinent to note that studies have revealed fruitlessness in passing bills that are not of interest to the executive as they often not see light of the day due to the executive withholding assent to such bills pursuant to the relevant constitutional provision.[269] While it may also be argued that the National Assembly is constitutionally empowered to override the presidential power to withhold assent,[270] this would require beginning the legislative making process from the stage of first reading, through the various stages, unto the eventual enactment of the law by 2/3 majority votes of the entire members present in the house. As history would have it in Nigeria, the National Assembly lacks the legislative will to thread this part, as they have only done this on one occasion when the president withheld his assent.

From the above, it is to be noted that gaps abound in the understudied energy policy, and several legislations, such as the EPSRA 2005, are even belated for review. It is needless to create an energy efficiency regulation; instead, focus should be placed on voluntary renewable energy and energy efficiency criteria. Apart from that, there is insufficient follow-up on all Nigerian energy policies, plans, targets and non-

[268] See Section 81 (9) (c) EPSRA 2005.
[269] See Section 58 (3) CFRN 1999 as amended.
[270] Section 59 (4) CFRN 1999 as amended.

commitment for development of renewable energy at the state and local government level. Certain intersections occur in the work of several ministries and government agencies, as well as replication of functions in different government ministries in Nigeria. The simultaneous utilization of renewable energy resources by different tiers of government, efficient energy usage and policy objectives on rural electrification, harmony amongst government agencies and effective coordination and implementation of renewable energy sourced electricity policies are all examples of policy alignment necessary in Nigeria. It would also be important to study renewable energy legislation to establish their viability for supporting the application of renewables in the Nigerian power sector.

4.10 Functions of Energy Commission in the Promotion of Renewable Energy in Nigeria

The ECN was established pursuant to the ECN Act[271] on the effective date of 14th September, 1979. The Act was amended pursuant to Decree No. 32 of 1988 and another amendment ensured the following year by virtue of Decree No. 19 of 1989. The combined effects of these amendments were the expansion of section 5 of the Act by including item (g) - (k) to the said section. By virtue of section 315 of the Constitution, every existing law made during the military regime automatically translates to Acts of the National Assembly and laws of the respective states under which the erstwhile decree and edicts were proclaimed. This principle equally applies to Decree No. 32 of 1988 and Decree No. 19 of 1989.

There is a technical arm of the commission of persons who represent various government agencies and professional bodies related to the energy and power sector.[272] Given its energy development mandate, the ECN is an affiliate arm of energy research centers in selected tertiary institutions such as Ahmadu Bello University, Obafemi Awolowo University, University of Nigeria and Usman Danfodio University.[273] As time goes on, other tertiary institutions may be appointed, for similar purpose.

By its affiliation and various collaborative efforts with these various energy research institutions, the ECN has in no small way advanced the course of local content

[271]Section 1 ECN Act, 1979.
[272]Section 3 (2) r. ECN Ac, 1979t mention NEPA. However, NERC would have to replace NEPA in view of the repeal of NEPA Act by EPSRA, 2005.
[273]Ibid.

infusion in the power sector. These research institutes have obtained research grants from the ECN in order to undertake studies towards the attainment of the development objectives of the commission. As a result of these collaboration the Sokoto Energy Research Centre of Usman Danfodio University, and the National Centre for Energy Research and Development of the University of Nigeria, have resorted to not less than 90% local raw materials utilisation in the creation of contemporary and proficient renewable energy technologies.[274] Part of the technologies that have been developed include solar powered water heater, battery charger for solar system; small-hydro power generation facility, power generator useful for small industrial building based on economic feasibility of such projects, etc.[275]

The ECN is one of the key FGN institutions saddled with the duty to help the government achieve its target for the electricity sector. They are involved with energy policy formulation, planning, implementation, renewable energy sourcing into Nigerian power sector energy mix. Hence, to that effect, the commission established National Energy Policies, Renewable Energy Master Plan.[276] Essentially, based on its general statutory mandate of strategic formulation and implementation of energy policies of the country, ECN is specifically tasked with the duty of ensuring collaborative interaction with energy-based agencies to a periodic creation of a stable and coherent Nigerian energy development master plans. It proffers recommendations on novel energy sources that could be harnessed to address imminent needs. It establishes plans for the specific kind of energy that may be deployed within a specific period in order to achieve specific result. The ECN proffers advice and guidance to the Government on the required amount of financing that needs to be ploughed into energy research, energy development, production of energy and supply of energy. The ECN also has the duty to interphase and network with various international institutions, including: International Atomic Energy Agency (IAEA), World Energy Conference, etc., which have special mandate on energy related matters.[277]

The ECN has actually been involved in some international collaboration arrangements with some international organisations. These efforts were geared towards ensuring that

[274] Umar, I. H. 2004. Nigeria Urban Poor Energy Needs and Sustainable Livelihoods. Being a Keynote Address at the Fote One-Day Workshop held on 23rd June, 2004 in Lagos. p. 4.
[275] *ibid.*
[276] Ayoade, M. A. 2020. Democratising the Governance of Energy in Nigeria- Flawed or Pragmatic? *Governance in Nigeria post-1999: Revisiting the Democratic 'New Dawn' of the Fourth Republic*. R. Adeola and A. O. Jegede, Eds. Pretoria: Pretoria University Law Press, 97-112, 106.
[277] Section 5 ECN Act.

some challenges that plagued the Nigeria power sector were addressed. One of such collaboration was with IAEA in the event of its regional programmes referred to as Sustainable Energy Development for Sub-Saharan Africa (RAF/0/016).[278] In another effort, the ECN had liaised with the UNDP to ensure the attainment of its sustainable energy goals by producing a draft script on Sustainable Energy for All (SE4ALL) towards a Rapid Assessment & Gap Analysis for Nigeria in 2013. With the same agency, the Sustainable Energy for All Action Agenda for Nigeria 2015 was also produced in draft.

The ECN played a very important function in the formulation of NEP 2003. The policy proposes that efforts should be directed towards the optimum utilisation of renewable power to energy mix of the nation. In the policy, it was pointed out that personal involvement in the energy corner is a sure pathway towards the realisation of sustainable national development. In the formation of the REMP 2007, the ECN played a critical function, as it assisted in establishing six constituent action plans for the implementation of the plan. These programmes were majorly targeted at renewable energy including conceptual structure Programme for Regrown Energy Promotion and other renewed energy related programmes such as: Nigerian Wind Programme; New Energy Research and Development Programme; Nigerian Solar Programme; Nigerian Biomass Programme; Nigerian Small Hydro Programme.[279] These schemes are mainly geared towards development of renewable energy. As have been explained previously, renewable energy sources are most suitable for off-grid electricity. On papers, these programmes have the potency to improve renewable development in Nigeria if properly implemented.

The challenge with the ECN is that it only saddled with energy policy formulation functions without a corresponding implementation power and capacity. They are thus faced with a situation where their lofty ideals which have been formulated only end up as draft documents and action plans that is not backed up by any executive or legislative action. Of all the action plans formulated towards the renewable energy development, a concrete action is yet to be put in place to bring them into reality. This makes the effort of the Commission to amount to exercise in futility.

[278]Sambo, A. S. 2008, Matching Electricity Supply with Demand in Nigeria. *International Association for Energy Economics* 4. 32-37, 32.
[279]Sesan, T. 2008, Status of Renewable Energy Policy and Implementation in Nigeria. 5. Retrieved on January 23, 2018 from https://pdfs.semanticscholar.org/e08f/7afa5b38f5825540d8d4326696023cd9ad0d.pdf

4.11 Objectives, Functions and Powers of Nigerian Electricity Regulatory Commission on Renewable Energy in Nigeria

As noted in the earlier part of this chapter, prior to the reforms, the power sector was under the management, operation and regulation of NEPA, which was a FGN entity. Under the EPSRA regime, these functions were separated and reposed in different bodies.[280] The PHCN was initially conferred with management and operational responsibilities before successor companies on the aspect of generation, transmission and distribution of electricity later assumed these functions.[281] The EPSRA created NERC to perform regulatory function in the sector. It is clothed with status of a statutory corporate body. Thus, it has the right to sue and be sued.[282] Part of the objective of the power sector reforms is to create a self-regulating power sector that is free from government interference and manipulations. Heralding less government interference into the sector implies that more private entities will be encouraged to plough their investment into the sector.

NERC mainly exercises executive powers by the administration and supervision of operators in the power sector. It also exercises legislative powers given its power to give out orders and make regulations for the power sector. It also performs judicial functions when it adjudicates over dispute arising between operators and customers. Pursuant to its executive powers, the specific functions of NERC include the following:[283]

i. Stimulate private sector contribution in the sector in accordance with its stipulated timelines and based on feasibility;
ii. Create or ratify suitable functional codes, safe, guarantee, consistency for operators in the sector;
iii. Stipulate the rights and obligations of consumer to the supply and usage of energy or electricity facilities;
iv. Issue out permits to applicant companies and control their engagement on various channel of the power sector such as: electricity generation and supply, transmission, power system operation, supply and trading services;
v. Establish market rules and approve amendments thereto;

[280]Section 99 (1) EPSRA
[281]Section 10 EPSRA
[282]Section 31 (1) EPSRA; see also, Ogbuanya, N. S. C. 2014. *Essentials o fCorporate law Practice*. Lagos: Novena Publishers, 5.
[283]Section 32 (2) EPSRA

vi. Monitor operations within the electricity market; and

vii. Assume other functions considered to be necessary for actualising the objectives of the commission as contained in Section 32 (1) EPSRA.

Although the essence of establishing NERC is to engender less presence of government in the power sector, NERC still grapples with the challenge of asserting its independence as the final authority in the sector. This can very much be felt with regards to certain dominant powers still exercised by the Minister of Power under the Act, which are capable of undermining the powers of NERC as the final authority in the sector and exposing its decisions to political influence. For instance, based on the provisions of section 33 (1) EPSRA, the Minister is empowered to give out directives on general policy and general system planning and co-ordination. NERC is expected to take cognisance of such directives in carrying out its regulatory functions. Even though NERC has the powers to determine the various contribution rates for the Power Consumer Assistance Fund, it must be supervised and controlled by the policy directions issued out by the Minister.[284] It is within the province of the Minister to issue 'directives'[285] to persons who come within the category of 'eligible customers'.[286] Whereas the Minister finds his initial directives to be unsatisfactory, he may give 'further directives'.[287] Another instance of ministerial dominance in the power sector is perceived in the aspect of subjecting the power of NERC to stipulate, collect and allocate competition transition charges to ministerial directives.[288] The provisions of Section 51 of the EPSRA subject the budgetary appropriation of NERC to ministerial approval and this could lead to conflict of power between the Minister and NERC. If the Minister withholds his approval of budget of the commission, it may frustrate NERC from functioning effectively or extracting undue patronage from the commissioners.

[284]Section 84(1), EPSRA , 2005
[285]Section 27 EPSRA., 2005
[286]The Minister made the policy direction on eligible customers. Based on the policy direction which became effective in May, 2017, NERC enacted the Eligible Customer Regulations, 2017. See, Olaniwun Ajayi. 2017. NERC Eligible Customer Regulations. *OALP Alert* November 9, 2017, 1. Retrieved on August 19, 2021 from NERC https://www.olaniwunajayi.net/wp.../11/The-NERC-Regulations-for-Mini-Grids.pdf
[287]Section 28 EPSRA., 2005
[288]Section 29 EPSRA, 2005

Perhaps, it was posited that the dominant powers exercised by the Minister in the power sector have put a blemish and question mark on the independence of NERC,[289] which could defeat the essence of the power sector reforms which purport to sever overbearing government influence in the power sector.[290] On certain occasions, there have been various incidences of altercations between the minister and operators in the power sector,[291] notwithstanding that the issues in question were within the province of NERC to address. For instance, the DISCOs had once raised concerns regarding the Minister's declaration of eligible customers and its potential depleting impact on their revenue.[292] In another occasion, there has been bickering between the Minister and DISCOs concerning the deplorable state of the power sector infrastructure and it nexus with the poor electricity supply in the country.[293] This kind of power exercised by the minister is a stark reminder of the NEPA regime.[294] This could signal a red flag to potential renewable energy investors in the sector. Investors are usually wary of a system that is not self-regulatory but susceptible to government interference at will.

Under the EPSRA, NERC has powers to perform legislative duties in the Nigerian power sector. The legislative powers of NERC are derived from the provisions of Section 45(2) and Section 96 (1) EPSRA. These provisions allow NERC to make regulations for the purpose of power sector governance. The regulations established pursuant to the Act will enable NERC perform its functions as a regulatory body. The aforementioned provisions in the enabling law allow it t to create subsidiary or delegated legislation. Like every other delegated legislation, NERC's regulations seek to fill up the lacuna which the EPSRA has not been able to address or did not

[289]Odiase-Alegimenlen, O. A. and Oriakhogba, D. O. 2011. Legal Regime for the Regulation of the Electricity Market in Nigeria: An appraisal. *Ahmadu Bello University Journal of Public and International Law* 1.5: 116-133, 133.

[290]Saidu, B. 2014. The 'Magic' of the Sun – Harnessing Solar Energy Technologies to Transform Nigeria's Electricity Supply Industry. *Akindelano Legal Practitioners Business Review – Energy* 36-38, 37.

[291]See, Power : Fashola Lambasts Discos, Calls Spokesperson an Interloper. Punch July 20, 2018 Retrieved on September 28, 2021 from https://punchng.com/power-fashola-lambasts-discos-calls-spokesperson-an-interloper/; Udo, B. Electricity Distributors Attack Fashola, says Minister More Interested in 'Over-priced Contracts' Premium Times July 31, 2018 Retrieved on September 28, 2021 from https://www.premiumtimesng.com/news/top-news/278477-electricity-distributors-attack-fashola-say-minister-more-interested-in-over-priced-contracts.html

[292]Aladeitan, O., Olaniyi, A. S. & Akuma, E. U. 2021, Declaration of Eligible Customers and its Impact on Electricity Distribution Companies and the Nigeria Companies and the Nigerian Electricity Supply Industry. *Ajayi Crowder University Law Journal* 3.1: 1-21.

[293] Olawoyin, O. Fashola Talk Toughs, Threatens to Sanction Electricity Distribution Companies. Premium Times May 9, 2017. Retrieved 21 August, 2023 from https://www.premiumtimesng.com/news/top-news/230747-fashola-talk-toughs-threatens-sanction-electricity-distribution-companies.html?tztc=1

[294]See, Section 16 (1) NEPA Act 1972 (repealed).

anticipate. Given the fast pace developmental dynamism of the power sector in the aspect of new technology and operators emerging in quick succession, there is need for a dynamic legal framework that will match the pace of events in the sector. In the time past, renewable energy was not a popular means of electricity generation. However, in recent times, renewable energy has blazed a pathway as a veritable energy source.[295] It therefore means that there is need for quicker strides to approach the peculiarities of regrown energy infusion in the sector.[296]

The time span of law making process in the National Assembly is usually longer. It is appreciated that the representatives of the various constituencies would take a lot of factors into consideration, particularly to ensure that such laws would not be counter-productive to the interest of their constituencies. Therefore, a proposed bill would have to undergo various legislative stages, including detailed consideration from both chambers of the National Assembly. The slow pace of law making process by the legislative arm of government would likely frustrate the commercial interests of investors that are usually time sensitive. The issue of technical competence and understanding of the operations of the power sector is another crucial consideration. NERC is a makeup of professionals in various key areas of competence in the power sector. Their technical knowhow make them well positioned to make relevant regulations for the sector. This is unlike elected legislators, who are politicians and do not necessarily have the technical knowledge to understand the workings of the power sector. Consequently, they are more likely to give premium to political considerations rather than technical considerations in the law-making process. The foregoing is the few amongst many other factors that informed the conferment of law making powers on NERC.

NERC must be guided by certain conditions in exercising its law-making powers. However, there are essential legal considerations with which an administrative body exercising legislative powers must be guided. Principal amongst these considerations is that the law-making powers of the administrative body must be exercised pursuant to an enabling law.[297] To that extent, such powers are limited to the extent of powers

[295]Painuly, J. P. 2001. Barriers to Renewable Energy Penetration; A Framework for Analysis. *Renewable Energy* 24. 73-89, 73.
[296]Herbert, E. B. 2014. Changing Trends in International Airspace Transportation: Prospect and Challenges for Nigeria. LL.B Thesis: University of Uyo. xvi+120, 3.
[297]Sections 32 (2) (e) EPSRA – NERC power to make market rules; Sections 76 (1) (a) EPSRA – NERC power to make regulations to prevent abuse of prices; Sections 76 (2) (3 - 10) EPSRA – NERC power to make regulation on tariff.

conferred on it by the statute. Any further action derogating from such limiting extent of the enabling statutes would make such act as an *ultra vires* action. In other words, where any provision of delegated legislation, whether by direct or indirect implication, conflicts with provisions of the parent legislation, the former is rendered null to the level of its inconsistency. Regulations are also subject to the power of the constitution, else it would be unconstitutional and rendered null and void as well.[298]

It is in furtherance of the law-making powers of NERC as contained in the EPSRA that it made several regulations towards the governance of the electricity sector. Example of these regulations include: The REFIT, 2015, NERC Meter Reading, Cash Collections and Billing Credit Management for Electricity Supplies Regulations 2007; NERC Application for Licence (Generation, Transmission, System Operations, Distribution & Trading) Regulation 2010, NERC Meter Asset Provider Regulations 2018, etc.

NERC is also conferred with the statutory powers to exercise quasi-judicial functions under the Act. NERC has jurisdiction to preside over and determine complaints that are brought before it.[299] Unlike the courts of records in the constitution, it is not compulsory for NERC to hold a public hearing over any matter unless such matter has public interest flavor.[300] Just like courts, which issue interim injunction in deserving cases in order to preserve the *res* of a case, in the course of determining a matter, NERC may make interim orders if it considers it necessary to do so based on the prevailing circumstances[301] NERC is required to put its decisions in writing; the chairman of the commission has to input his signature and make available to members of the public.[302]

NERC has powers under Section 71 EPSRA to issue licenses to all entities operating within the electric power sector. These licenses could be in respect of electric power creation, supplying and distribution. The energy source, irrespective of whether it is non-renewable energy or renewable fuel based is immaterial. To this end, renewable energy developers can apply for licence by virtue of the provision of Section 71 EPSRA. There are terms and conditions that licensees are required to comply with. Section 71 (2) provides that a licensee may be required to do the following:

[298]Section 1 (3) CFRN, 1999.
[299]Section 47 (1) EPSRA
[300]Section 47 (2) EPSRA
[301]Section 46 (5) EPSRA
[302]Section 46 (1), (2), (3) and (4) EPSRA

i. Proceed into deed on a particular term with another for the availability of or use of electric lines and related gadget operated by the licensee;
ii. Purchase energy and other resources in an economically and fair manner;
iii. Allude to disputes for panel, mediation, or determination by the Commission.

The authority which NERC has to issue a license is accompanied with the incidental powers to extend or renew such license. This power is contained under Section 71 (10) EPSRA. Renewal and extension of licenses are geared towards the attainment of the same purpose. The renewal or extension of a license shall not be more than the period of five years. In the case of license renewal, it is expected that such is to be done not later than 9 months before the time the licence is to expire.[303] On the other hand, whereas a licensee desires to apply for extensions of license, such extension shall be applicable through the early stage of 5 period within which at initial level of licence was granted.[304] This suggests that both terms materially lead to the same effect. Perhaps, the prominent difference between the concept of renewal and extension of licenses is the time frame within which the application is to be made to the Commission. The Commission reserves the power to place suspension,[305] cancellation[306] or withdrawal of a license[307] if the terms of a license are not complied with or if there are prevailing circumstances that compel it to so act. But in each situation, it is of necessity that the licensee should be notified of the Commission's intention, in order to enable the licensee, exercise its right to be heard. The duration of the hearing should ordinarily not exceed a period of sixty days.

NERC has permitted the utilisation of various sources of renewable energy for the purpose of encouraging embedded power generation and relieving the burden on electricity transmission network and reducing losses on distribution connection to network. NERC also supports electricity undertakings and induces innovation in specific or general type renewable energy technology. It also aids the reduction of GHGs emissions by reducing fossil fuels reliance.

[303] R. 14 (a.)
[304] R. 15 (b.)
[305] R. 16
[306] R. 17
[307] R. 18

The costs of electricity generation vary in accordance with renewable energy sources and technology that are put to use. Thus, the REFIT levels have to be technology-based, which depends on the following factors:

i. Estimated lifetime of power plant;
ii. The investment cost for the plant
iii. The O&M Costs;
iv. Financing cost and invested capital;
v. Fuel costs (where applicable);

Considering the exorbitant cost required for development of renewable energy-based power plants, NERC is duty bound to set up renewable energy sourced cap limits for a period of five years at the rate of 10% of the whole dispatched energy. The maximum limit is still subject to reconsideration as soon as the FGN establishes its policy on energy mix. Pursuant to this Order, NERC established REFIT basically for four major renewable energy sources comprising of: solar energy, wind energy, small hydro and energy sourced from biomass/biodiesel.

4.12 Role of Nigerian Bulk Electricity Trading Company in the Nigeria Power Sector

NBET is a company that was incorporated on the 29th July 2010 in accordance with the plan for the sector reform. The FGN has 100% stake in the company. Its board of directors is made up of nine persons, inaugurated by the president sometimes in August 2011.[308] Mr. Rumundaka Wonodi served as its managing director and chief executive officer. Three months thereafter, NERC issued it with an operating license. The initial lifespan of the license was limited to ten years. Upon the expiration of the initial term in November, NERC extended its license for another three years.[309]

NBET is saddled with the function and mandate of making bulk purchase of electricity and subsidiary services from IPPs and successor GENCOs on the basis of a contractual instrument known as PPA, while engaging in the re-sale of electricity to DISCOs and

[308] President Jonathan inaugurates Nigerian Bulk Electricity Trading board. Business News 23, August, 2011. Retrieved 5 February 2022 from http://businessnews.com.ng/2011/08/23/president-jonathan-inaugurates-nigerian-bulk-electricity-trading-board/

[309] Nnodim, O. NERC Renews NBET Licence for Three Years. Punch 24 November, 2021 Retrieved 5 February, 2022 from https://punchng-com.cdn.amproject.org/v/s/punchng.com/nerc-renews-nbets-licence-for-three-years/

eligible customers under vesting contracts. Vesting contracts is the legal instrument used in the resale of electricity to DISCOs. NBET was created to serve in the temporary or provisional market of the power sector so as to give confidence of power transmission to DISCOs, which are to make onward distribution of electricity to end users.

The operating license of NBET contains certain conditions which NBET is expected to comply with in the course of its operations. Amongst others, the significant conditions include: condition 2 (5) of the license provides that, NBET must always ensure that it has sufficient financial, technical and managerial capital and capacity which will enable it to creditably perform its functions of providing bulk trading undertaking. According to the 4th condition, NBET is to make full disclosure of its capital sufficiency and net worth amounting up to 7.5% of its yearly amount of electricity transacted in its currency rate value (kwh/year). The 5th condition is to the effect that at the end of each business year, NBET is obligated to prove its creditworthiness, as verified by an auditor and approved by NERC. Another interesting condition is contained in condition 6 of the license, which provides that trading transactions by NBET must be carried out via proper security payment instrument verified by NERC.[310]

4.13 Tariff Regulation in the Nigerian Electricity Supply Industry

Oke has defined tariffs in the context of the power sector to be requisite statutory imposition of charges and fees which become payable upon usage of public electricity supply.[311] The former power sector legal regime places matters pertaining to tariff regulation on the Minister in charge of electric power, who acted on behalf of the FGN.[312] The Minister had unalloyed discretion to determine the fixed tariff on this matter only subject to the review of the FGN. This was more so as it was the FGN that had absolute ownership and control of the powers sector, hence there was hardly any private interest that was considered in the determination of the appropriate tariff consumers were liable to pay. The issue of cost reflective tariff regime did not usually

[310]Omonfoman, O. 2021, Analysis of the Nigerian Bulk Electricity Trading Plc- (NBET) trading license. Business Day 17 September, Retrieved 5 February, 2022 from https://businessday-ng.cdn.amproject.org/v/s/businessday.ng/amp/opinion/article/an-analysis-of-the-nigerian-bulk-electricity-trading-plc-nbet-trading-license/

[311]Oke, Y. 2016, Challenges and Developments in the Nigerian Power Iindustry. *Essays on Nigerian Electricity Law*. Y. Oke, Lagos: Princeton & Associate Publishing Co. 114-121, 120.

[312] See S. 13 NEPA Act 1972 (repealed).

arise, as the government was not regarded as a profit-making venture. Since government was mostly concerned about political necessities and need to attain public welfare, the electricity tariffs exacted were extremely low when juxtaposed with the resources put in place to provide power supply for citizens. The resultant effect was that consumers were happy to paying lower tariffs, while the revenue generated from such services were nowhere near the cost of producing electricity. The impact it had was that the electricity supply services were poor and unviable, therefore leading to the decay of the power system.[313] Electricity supply could not be extended to most localities, particularly rural areas.

Following that the energy sector was privatized incidental to power sector reforms, the interest of private sector investors has to be factored in fixing of applicable tariff for power consumption. There is need for investors to recoup the fruit of their investment. Hence, the applicable tariff has to be cost reflective to enable investors realize the profit-making objectives of their enterprise. Then again, the function of tariff determination that was hitherto reposed on the minister has now been assumed by NERC. NERC is, amongst other things, tasked with the function of fixing and regulating electricity tariffs and quality control of services which licensees offer to electricity consumers.[314] A cost reflective tariff is also necessary to ensure improved quality in electricity service provision in the country.[315]

Under section 76 (1) EPSRA electricity generation, electricity trading transmission, electricity distribution and system operation, are part of the system service deliverables that are subject to the tariff regime of NERC. The aforesaid provision of the law went on to state that tariff regulation is essential in order to guard against the abuse of dominant market position considering the geographical monopoly exercised by certain licensees, especially the DISCOs. NERC is, thus, empowered to adopt a suitable tariff methodology for electricity price regulation. Whichever methodology that is adopted, it must contemplate certain essential concerns:

i. Enable licensees recoup the full costs of their occupational concerns, in addition to such reasonable return on capital investment;

[313]Ajumogobia & Okeke.2015. Nigerian Energy Sector : Legal & Regulatory Overview (2015) 12. Retrieved 21 February, 2018 from www.ajumogobiaokeke.com/assets/media/2b13946e4257859eb7988150d1c620a2.pdf
[314] See, S. 32 (1) d. (2) c. EPSRA
[315]Ajumogobia & Okeke.2015. Ibid.

ii. Offer incentives that would allow for continuous technical improvement and economic efficiency in the course of its services provision;
iii. Provide incentives to guarantee continuous improvement in the quality of services provided to consumers;
iv. enable consumers attain economic efficiency in the expenditure incurred for their consumption of power supply from licensee's services;
v. Refrain from unnecessary discrimination of consumers as a result of consumer categorization that would esteem certain consumers higher than others;[316] and
vi. Overhaul or progressively decrease subsidies to their barest minimum.[317]

However, by the authority of Section 76 (5) EPSRA and notwithstanding the provision of Section 76 (2) (e), NERC has the discretion to categorize consumers based on the numbers of energy used, duration of electricity consumption, also considering the amount of electricity load, power, voltage, locality within which certain consumers reside. Other factors which NERC consider necessary may also be factored in creating a disparity in consumption tariff between consumers. Certain consumers may also be privileged to access lifeline tariff from NERC. It is on the basis of this provision that NERC group electricity consumers into the residential, commercial, industrial and special categories under the MYTO 2 tariff regime.

In the performance of its duty to fix tariffs for electricity power consumers, NERC is enjoined to act independently, free from any external undue influence in determining appropriate tariff to fix. There are laid down procedures which must be complied with. Part of such procedure requires that NERC consults relevant stakeholders in the chain of electricity production and operations, which include GENCOs, TCN, DISCOs, power consumers, and other relevant stakeholders whose interest are likely to be affected by the increase or decrease in the tariff regime.[318] This is to ensure that varied interests are put into perspective in arriving at a balanced tariff. Section 76 (7) EPSRA makes it compulsory for NERC to, in arriving at a tariff methodology, to give various stakeholders such as, (prospective) licensees, consumers and their associations, eligible

[316]Section 76 (2) (e) EPSRA.
[317] Section 76 (2) EPSRA.
[318] Section 76 (7) EPSRA.

customers and their associations and other necessary or desirable parties the opportunity to make representations of their interest and position. Their views must be given serious consideration in arriving at a fixed tariff. NERC is also required to obtain data, evidence and advice from persons considered to hold expertise in issues of electricity billings and methodology. The position of the law is that whereas the law requires that an administrative body should consult and consider the views of any person or entities in the course of making a determination on any subject matter, it is a mandatory requirement. A default in this regard is fatal to the validity of such determination.[319] Consultations are necessary in order to enable stakeholders offer constructive criticisms, suggestions or advice.[320] Consultation of various stakeholders also confers legitimacy of the process, as it is deemed to have been reached on the basis of informed position.

It is on the basis of Section 76 EPSRA that NERC settled for the MYTO methodology tariff fixation. MYTO was drafted with the projected view of ensuring an efficient tariff system which assures of the consumer's right to access adequate electricity supply on the basis of a billing formula that assures of transparent process which encompasses the concerns of the investor to obtain reasonable returns from their massive capital invested in the energy generating sector.[321] Whereas a tariff system is held to be transparent and credible, it encourages and builds confidence in investors for further investment into the electricity sector.[322]

The MYTO regime is billed to serve a lifespan of fifteen-year tariff. It is however, liable to application of one minor or major review at least five years after following the implementation of the MYTO methodology. This is to give room for adjustments to be made on the tariff to bring it in accordance with the present realities of the market.[323] Feed-in tariffs are also sets out to secure explicit market rules to regulate the energy market in the interim.[324] The MYTO methodology was adopted and formulated on 1st

[319] See the case of *Agricultural, Horticultural and Forestry Industry Training Board v. Aylesbury Mushroom Ltd.* (1972) 1 All ER 280.
[320]*Rollo v. Minister of Town & Country Planning* (1948) 1 All ER 13 CA.
[321]Usman, Z. G. and Abbasoglu, S. 2014. An Overview of Power Sector Llaws, policies and reforms in Nigeria. Asian Transactions on Engineering 4.2: 9
[322]Ajumogobia & Okeke. *op. cit.*
[323]National Electricity Regulatory Commission. 2012. Multi--Year Tariff Order for the Determination of the Cost of Electricity Generation for the Period 1 June 2012 to 31 May 2017. 10. Retrieved 19 March, 2021 fromwww.ecowrex.org/system/files/.../2012_multiyear-tariff-order-transmission_nerc.pdf
[324]Bagu, T., Dietz, T., Hanekamp, E., Phil-Ebosie, A. and Soremekun, B. A. 2016. Captive Power in Nigeria: A Comprehensive Guide to Project Development. 45. Retrieved 21 November, 2021 from rean.com.ng/img/market_study_captive_power_nigeria_0.pdf.

July, 2008. The MYTO 2008 applies an efficient new entrant approach operated on the basis of Long Run Marginal Cost (LRMC) module for electricity pricing generation services. The LRMC system is based on realisation and actualisation of the cost of the complete tenure of the most important new participant power supply (generator) in consideration of prevailing power with other electricity generating instruments, profit on investment, cost of usage, service of power infrastructure, nuclear energy, etc.[325] On the other hand, the building blocks approach is applicable in the instance of tariff for transmission and distribution services.[326] This approach encompasses performance projections of a combination of positive attributes of return rate and price caps.[327] Based on the MYTO Order of 2008, there was an increment in the regular electricity tariff plan from N6 per Kwh to within the range of N9 and N11.50 per Kwh. N10 per Kwh served as the average tariff sum within the first five years interval.[328]

MYTO-2 was adopted a minor biannual review which was given effect in 2012.[329] It has a flexible wholesale generation pricing scheme, which is susceptible to essential variables which are capable of affecting tariff outcomes during the course of minor reviews. It was in this review process that power consumers were categorized into fourteen variants with various tariff rates applicable to their category.[330] The first broad categorisation is the residential category comprising of R1, R2 and R3. The second group is the commercial Category which is sub-divided into C1, C2 and C3. The industrial category comprises of D1, D2 and D3; while there is a final group known as Special Category which is sub-divided into S1 and S2.[331] Some of the conditions necessary in order to give effect to MYTO-2 are that DISCOs have to undertake extensive supply of meters to consumers.[332] This has continued to remain aspirational as many consumers still do not have access to electricity meters. Estimated billing seems to be the order of the day in the determination of electricity bills which

[325]Bello, S. L. 2013. Evaluating the Methodology of Setting Electricity Prices in Nigeria. *International Association for Energy Economics* 4th Quarter. 31-32, 31.
[326]*ibid.*
[327]Anosike, N. B., Dara, J. E., Ngwaka, U. C., & Enemuoh, F. O. 2017. Analysis of Nigerian Electricity Generation Multi-Year Tariff Order Pricing Model. *Energy and Power Engineering* 9. 541-554, 544.
[328]*ibid.*
[329]See, MJS Partner. Legal Issues in the Multi-Year Tariff Order (MYTO) 2012 and the Power Consumer Assistance Fund (PCAF). MJS Quarterly Newsletter of Nigerian Electricity Law and Regulation 1.2: 1. Cited in Oke, Y. *op. cit.*
[330]Bello, S. L. 2013, Evaluating the Methodology of Setting Electricity Prices in Nigeria. *International Association for Energy Economics* 4th Quarter. 31-32, 31.
[331]Nigerian Electricity Regulatory Commission. The Role of the Regulator in an Emerging Electricity Market. Memorandum for the First National Council of Power. p. 4. Retrieved on the 19th March, 2018 from www.power.gov.ng/.../NERC%20PRESENTATION.pdf
[332]Oke, Y. O*p. cit.*

customers are liable to pay.[333] DISCOs have continued to take undue advantage of the estimated billing system to impose excessive, arbitrary and exploitative electricity bills.

NERC issued the Amended MYTO 2.118 in January 2015. This amendment was based on a ten year tariff pathway spanning through the period of 2015-2024. The feed-in tariffs system was recommended for incoming investors in gas power generators, coal power plants operators, developers of solar power plants, wind power plants onshore mini hydroelectric plants.[334] It can be seen that this amendment was given effect in the same year when the REFIT Regulation was issued by NERC. This should proffer explanation for the prominent feature of renewable energy power sourced within the contemplation of the MYTO methodology regime. It was projected that the amended MYTO will lead to a 45% increment in on-grid electricity tariffs. In the views of NERC, this increment is necessary to ensure a boost the number of entrant of more private sector investors into the NESI. The implementation of the amended MYTO suffered a major glitch arising from the legal action that was instituted at the Federal High Court (FHC) against NERC. This was the case of *Toluwani Adebiyi v. NERC*,[335] where the plaintiff approached the FHC to obtain a restraining order against the defendant for illegal increment of tariff through means other than as set out by the relevant tariff laws and regulations. The outcome of that legal action was that the court delivered it ruling on 13 July, 2016 making a declaration to the effect that the amendment is illegal. The declaration was based on the view of the court that due process for the amendment of the MYTO regime was not complied with.[336] Amongst other things, the process smirked of lack of consultation of relevant stakeholders.

In line with its powers to issue licenses as contained in Section 67 (1) (b) EPSRA, NERC reserves the discretion to confer on electricity distribution companies' licensees with the right to make installation, maintenance read meters, issue and collect electricity bills for consumers. Section 41(6) of the Distribution License Terms and Conditions places a primary duty on DISCOs to gratuitously carry out meter

[333] S. 8 of the Nigerian Electricity Regulatory Commission's Meter Reading, Billing, Cash Collections and Credit Management for Electricity Supplies Regulations, 2007 provides that where a customer does not have meter for which electricity usage can be recorded, the DISCO shall apply the estimated billing method in calculating energy consumption.
[334]Bagu, T., Dietz, T., Hanekamp, E., Phil-Ebosie, A. & Soremekun, B. A. 2016. Captive Power in Nigeria: A Comprehensive Gguide to Pproject Development. 45. Retrieved 21 November, 2021 from*rean.com.ng/img/market_study_captive_power_nigeria_0.pdf*
[335] (Unreported) Suit No: FHC/L/CS/768/15
[336]*Ibid.* p. 41

installation for consumers. Up till present times, the DISCOs have not been able to meet up with this obligation, as this task seems not surmountable. As at the second quarter of 2020 59.73% of electricity consumers are yet to be supplied with prepaid meters. This translated to mean that out of a recorded 10,516,090 registered electricity consumers in Nigeria only 4,234,759 are charged under the prepaid meter billings. The other are still charged through estimated billing system.[337]

NERC had tried to resolve the constraint related with the supply of prepaid meters. This led to its establishment of a scheme wherefore credited up-front payment is accepted for metering implementation purposes. It launched a means for customers who are willing to obtain prepaid meters to satisfy the cost of procuring the meter by remitting fund into a specific bank account jointly managed by the various DISCOs and meter vendors and installers approved by NERC. Once the stipulated fee meter is satisfactorily defrayed by the customer, the meter vendor/installer would proceed to install the meter in not later than 45 days thence forth.[338] Irrespective of this seemingly straight forward arrangement, DISCOs are yet to uphold their own part of the bargain. NERC went as far as issuing an order requiring DISCOs to supply the meters which customers have already paid for since January 2011.[339] The DISCOs appear to be more comfortable with the fact that most of their customers are still unmetered because the estimated billing method appears to be more profitable for them amidst unreliable electricity supply.[340] This would amount to undermine the interest of electricity consumers, who are left with little or no remedial buffer from the existing inadequate consumer protection regime in the NERC and energy power sector being at the extreme. It has been suggested that NERC and DISCOs should reach an agreement as to a deadline for pre-paid meters already paid for to be supplied to electricity consumers else they should be insulated from payment of electricity bill and the DISCOs must refrain from disconnecting them from power supply.[341]

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[337]Akpan, U. 2021, Electricity: 60% of Electricity Consumers Lack Prepaid Meters – NERC. *Vanguard* 23 February, Retrieved 4 December, 2021 from https://www.vanguardngr.com/2021/02/electricity-60-of-electricity-consumers-lack-prepaid-meters-nerc/amp/

[338]Abubakar, M. Y. NERC: New Metering Scheme Kick Off Today, Orders Discos to Supply Meters Previously Paid for by Customers. Retrieved 4 December, 2021 http://www.nercng.org/index.php/media-library/press-releases/161-nerc-new-metering-scheme-kicks-off-today-orders-discos-to-supply-meters-previously-paid-for-by-customers

[339]*ibid.*

[340]Audu, E., Paul, S. O. & Ameh, E. 2017. Privitisation of Power Sector and Poverty of Power Supply in Nigeria: A Policy Analysis. *International Journal of Development and Sustainability* 6.10: 1218-1231, 1226.

[341]*ibid.* 1229.

When these measures appear not to be making a head way, NERC proceeded to establish the Meter Asset Provider Regulations 2018 which started operation on 3rd April, 2018. The regulations were designed to eradicate DISCOs from the scheme of things pertaining to meter supply obligation. It made room for licenses to be issued to Meter Asset Providers (MAPs) which are now tasked with the role of pre-paid meter supply to consumers. Consumers can now decide to opt for prepaid meter procurement from MAPs by making payment by installments within duration of 10 years.[342] DISCOs can also engage the services of MAPs to supply prepaid meters to consumers of DISCOs. The principal aim of the regulation is to enable an elimination of estimated billing practice; entice private investment into electricity prepaid meter supply venture in Nigeria; and closing the gap in insufficient meter supply to consumers through the rapid rollout of a meter scheme for electricity consumers.[343]

Issues had arisen as to the legal propriety or otherwise of the Regulation transferring prepaid meter supply roles from DISCOs to MAPS. This reasonable point to begin is to identify how DISCOs derived their powers to supply meters to electricity consumers. It has been pointed out that DISCOs derive this authority from the joint provisions of Section 67 (1) (b) EPSRA and the terms of their distribution license issued by NERC. Notwithstanding this position, the same Section 67 (1) (b) EPSRA from which they derive their powers, allows NERC to exercise its discretion in entrusting the function of meter supply to DISCOs in their distribution license. Since it is NERC that reserves the right to grant such powers to the DISCOs in the distribution, it may well exercise similar discretion to withdraw such duties from the DISCOs. This may be done pursuant to its regulatory powers to adjust, modify and amend the tenure and conditions contained in the operating license issued licensees base on the provision of Section 71 (7) EPSRA. The Minister of Power had strengthened the position by arguing that meter supply is not the core concern of DISCOs, but the distribution of electricity even though meters are needed to carry out this function effectively.[344] It

[342]Independent Energy Watch Initiative. New Law on Alternative Meter Provider to Fetch Nigeria N200m investment. Retrieved on the 19th March, 2018 from: http://iwin.org.ng/index.php/news/item/9152-new-law-on-alternative-meter-provider-to-fetch-nigeria-n200m-investment

[343] Independent Energy Watch Initiative. Power Distributors Go Silent Over New Meter Regulation. *op. cit.*

[344]New Regulation to Boost Electricity Meters Supplies Begins Next Month – Fashola. *Vanguard* 19 March, 2018. Retrieved 19November, 2021 from https://www.vanguardngr.com/2017/09/new-regulation-boost-electricity-meters-supplies-begins-next-month-fashola/

therefore means that, prepaid meter supply is only incidental to the electricity distribution function of DISCOs.

NERC is also saddled with the duty of making sure that electricity consumers obtain quality services from service providers, particularly the DISCOs which directly interphase with the end users. On the part of DISCOs and other category of service providers, it has been argued that the prevailing tariff cannot sufficiently sustain their smooth operations. They have not been able to satisfy their operational cost and other financial obligations which will enhance the availability of flawless performance to the satisfaction of consumers. Whereas the tariff regime is such that would not accommodate billing consumers such charges that would be sufficiently commensurate with the total cost of power supply, DISCOs would continue to formulate direct and indirect means of exacting charges[345] to make up for the difference, howbeit illegitimate. On the part of government, it has continued to use subsidies as a means of filling up the deficit arising from consumers who cannot pay for their electricity consumption. The subsidy regime adopted by the government to fill up the inadequate financial shortcomings has translated to an excruciating burden on government which has not made for a sustainable power sector for a developing country such as Nigeria.[346]

Regulatory intervention on prices affects the competitiveness of the electricity market. It is agreed that the post-reform electricity sector in Nigeria is still nascent,[347] hence the need to regulate the prices instead of leaving it to market forces. As at present, entrance to the electricity market is still restrictive, as distribution companies enjoy monopoly over their franchise areas. It is expected that as the market develops, the restriction will be lifted to allow more operators into the market. This will make for a competitive sector where the demand and supply are being controlled by the market forces

In 2008, NERC inaugurated a 15-year cost reflective tariff roadmap known as MYTO 1. It has two phases of 2008-2012 and 2012-2017, which were structured in a manner

[345]NERC Negotiated a Federal Government Subsidy for Electricity Tariffs to the Sum of N60 billion and N50 billion in 2012 and 2013 respectively. This implies that, the Cost of Electricity is yet to be Fully Covered at the Current Rate of Tariff. See, Wakil, M. Electricity Prices Are Rising – Why? 3. Retrieved on 19 November, 2021 from www.nercng.org/nercdocs/Electricity-Prices-Are-Rising.pdf
[346]Adoghe, A. U., Odigwe, I. A. & Igbinovia, S. O. *op. cit.* 36.
[347]See, Oniemola, P. K. 2017. Legal and Policy Issues in the Development of the Nigerian Nascent Electricity Market. *International Energy Law Review* 35.8: 314-323.

that would maintain relatively low electricity consumption prices, while effecting progressive price increment. The final rule is planned to give the essential benefits to power generators and investors to act and support electricity basic facilities.

Subsequently, NERC launch MYTO 2, having almost the same features with MYTO 1, but with minimal adjustments, which took off from June 1, 2012 to May 31, 2017. MYTO 2 has a retail tariff to be checked twice a year and if need be, for any changes that will be imposed on electricity generation at wholesale contract price, amended in response to inflation rates in Nigeria, foreign exchange rates, day-to-day generation capacity and complementary definite CAPEX and OPEX requirements different from calculation of regular electricity tariff or bills.[348]

It is understood that a Tariff Order as stated under Section 76 ESPRA 2005 is founded on a laid down directive programmed to make available tariffs that will enable the following standard:

i. Cost recovery potential/financial viability – individuals subject to regulation should be allowed to win over their "efficient" costs, in addition to reasonable equity.
ii. Signals for investment – motivate price efficiency phase and industry investment type.
iii. Certainty and stability – Presumption in a pricing context is germane factor for private investment.
iv. Risk allocation – the arrangements of pricing should distribute risks efficiently amongst entities that have the capacity to manage such risk.
v. Simplicity and cost-effective– tariff programme and statute should possess ease of comprehension and not too costly to practice (e.g., facilitation of metering and billing).
vi. Efficient network usage – this entails price efficiency depicting marginal system costs and the reduced cross-subsidies.
vii. Incentives for improved performance – the manner of price management and control should provide essential bonuses and incentives for operators, on order to increase the quality of service and cause reduction in cost.

[348]Emodi, N. V. and Yusuf, S. D. 2015. Improving Electricity Access in Nigeria : Obstacles and the way forward. International *Journal of Energy Economics and Policy* 5.1: 335-351.

viii. Transparency/fairness – prices ought not to prejudice and bleak transparent. It is essential that there should be open access to single networks as a precondition for effective competition in controversial sectors.

ix. Flexibility/robustness – there is need for the pricing structure to provide to balance unpredicted changes in conditions.

x. Political and economy objectives – pricing structure should be able to address the attainment of economic policy objectives like demand-side management, global access and affordability for user.

4.14 Tariff for Renewable Energy Sourced Electricity

In order to guarantee that a bridging of the gap of investors' return on investment, there is need for investors to have a guarantee that electric power sale is fixed at a market price that is of reasonable range. Feed-in tariffs serve as an instrument for the attainment of that objective. In the course of legislating on feed-in tariffs, lawmakers are essentially placing an obligation on applicable system operators of transmission networks to infuse the full measure of clean energy at prices set out by government administrative agencies.[349] The cost of capital procurement and generation costs for various regrown electricity origin varies accordingly. Sufficiency of provided bills would imply that the fixed tariffs should be set at a range over the prevailing market price in anticipation of such additional costs that may arise thereto. It could be the case that feed-in tariffs contemplate addition bonus over the market price. The idea is that feed-in tariffs should serve as reparation for detrimental costs of power generation.[350] For instance, the fee for generating offshore wind energy is exorbitant in comparison to regular fossil fuel sources. Reasonable strides can be attained in the application of subsidies to these various sources in a measure commensurate with the cost peculiarities of each source. Most nations of the world have support for the bills provided as the choice instrument for the promotion of regrown electricity production. Feed-in-tariffs have gained wide acceptance such that as at 2010 about 2/3 of countries that have renewable energy policies have opted for the feed-in tariffs option.[351] Feed-in tariffs have come to become a veritable instrument for balancing the positive return on investment rate across the globe. The disadvantage of the feed-in tariffs instrument is

[349]Ringel, M. 2006. Fostering the Use of Renewable Energy in the European Union : The Race between Feed-in Tariffs and Green Certificates. *Journal on Renewable Energy* 31.
[350]*ibid*.
[351] Del Rio, P. 2012. The Dynamic Efficiency of Feed-in Tariffs: The Impact of Different Design Elements. *Journal on Energy Policy* 41.

the prospective long-term payment required for it. This is, however, addressed upon the sale of power to make up for the capital costs. This scenario enables operators to obtain additional profit.

It was not until 2015, ten years after the EPSRA was enacted, that the NERC REFIT Regulation was made to cover up the electricity deficiency in the power sector. This was one of the NERC made regulations in furtherance to powers derived from Section 32 (1) and 96 (2) EPSRA 2005. The policy objective for the issuance of the REFIT 2015 was to ensure the following:

i. To increase electricity supply in Nigeria;
ii. Heighten the realisation of the nation's target on electricity sourcing from renewable energy resources;
iii. Stimulate more private investor involvement in renewable energy power generation ventures, by ensuring security of the interest of investor and stability of the market;
iv. Develop, encourage and advance renewable energy resources utilisation, while ensuring that viable renewable energy sources are infused into the energy mix of the country;
v. Inspire private investors to undertake pragmatic and efficient operation of their power plants in such a way as to ensure profit maximization;
vi. Place a fixed price from renewable energy sourced electricity generated for a specific period in order to provide stable stream of income and suitable return on investment;
vii. Ensure eminent access to the grid for renewable electricity-based energy
viii. Create a requirement to purchase power generated from qualifying renewable electricity points;
ix. Enact a fair playing ground for renewable and typical energy generation;
x. Allure the private sector investment in order to help the creation of a personal sustaining regrown energy even in the market

The purpose of the REFIT is to ensure that Nigeria has stable electricity pricing regime for renewable energy generated power within a fixed term, so as to ensure that

investors recoup their investment returns.[352] The overall target of the regulations is to harness and rebuild power investments in the nation's electricity sector to the extent of generating not less than 2,000MW of electricity by year 2020.[353] NERC may increase the REFIT programme cap beyond 2000MW from time to time as the occasion demands. It was projected that DISCOs would procure one half of the generated renewable energy electricity while the Nigerian Bulk Electricity Trading Company (NBET) would procure other half.[354] Electricity undertaking within the contemplation of this regulation is renewable energy plants with power generation capacity of 2 MW - 30MW. In the instance of renewable energy plants exceeding the aforementioned power generation capacity, other conditions outside those provided under the regulation would be applicable.[355] However, this scheme did not contemplate off-grid electricity service providers.[356]

Accordingly, the provisions of the PPA stipulates the period for commencement of operations. The PPA contract is provided essentially in terms of energy actually delivered and not about payment capacity, but capacity testing shall become applicable. By the combined provision of Section 13 (c) and Schedule 5 of REFIT 2015, any renewable energy based PPA signed between NBET and IPP, must necessarily comply with the prescribed pricing as stipulated in the REFIT.

[352]Saifuddin N., Bello S., Fatihah S. and Vigna K. R. 2016, Improving Electricity Supply in Nigeria-Potential for Renewable Energy from Biomass. *International Journal of Applied Engineering Research* 11.14: 8322-8339, 8332.
[353]Section 8 (f) NERC Regulation Feed-in-Tariff of Renewable Energy Sourced Electricity.
[354]Sections 5 and 8 (h) NERC Regulation Feed-in-Tariff of Renewable Energy Sourced Electricity.
[355]Latham & Watkins, 2016. Nigerian Power Sector: Opportunities and Challenges for Investment. Client Alert White Paper 1930. 12.
[356]Section 6 (b) NERC Regulation Feed-in-Tariff of Renewable Energy Sourced Electricity.

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
	O&M	Naira/MWh	29.49	302.73	55.92	8,541.11
FIT2016 (Naira)	Total	Naira/MWh	35,399.54	25,094.28	30,943.35	30,941.62
	Capitalcost	$/MWh	176.85	123.96	154.44	112.00
	O&M	$/MWh	0.15	1.51	0.28	42.71
FIT2016 (US$)	Total	$/MWh	177.00	125.47	154.72	154.71

Based on the preponderance of evidence that can be culled from the practice of countries wherein renewable energy policies have been successfully implemented, it has been established that the success of such policies would depend on creating regulations and establishing economic instruments which addresses the following:

i. Compulsory and purposive rebuild packaged standards that outline fractional power supplies which must be generated from renewable sources within a stipulated period;

ii. Progeny revealing prerequisites, which are now applicable in the instance of consumers exercising retail choice and express inclination towards renewable electricity;

iii. The tools of tax credit which are accessible to GENCOs which opt for renewable energy sourced electricity;

iv. Feed-in tariffs, which are to ordinarily serve as incentives for power producers, by presenting favourable tariff regimes for renewable energy-based electricity producers;

v. The approval of a public benefits fund, which would serve the purpose of ensuring that a stated portion of the tariff is set apart to render support for renewable energy projects both to be infused into grid and off-grid network.

vi. Open and public bidding rounds should be set out for the procurement process of national renewable energy acquisition by IPPs;

vii. Facilitation of grants for capital acquisition, tax incentives and exemptions, and other incentives to induce recourse to renewable energy projects;

viii. Framework for net metering.

Table 4.4: Bench Mark Capacities for Qualifying Technology to REFIT[357]

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

[357] *ibid*. Schedule 1.

Table 4.5: Target Grid-Connected Renewable Generation Capacity by the year 2018[358]

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

[358] *ibid.* Schedule 2.

4.15 Impact of the CFRN 1999 as amended (Fifth Alteration) (No.17) Act, 2023 and the Electricity Act 2023 on the Rights and Powers of States in the Nigerian Electricity Supply Industry

Although promotion of private sector participation and competition in the NESI are some of the intendments of the power sector reforms, the previous laws[359] expressly bar the states from exercising powers to make laws and regulate the electricity industry on areas where the national grid is covered[360].

The participation of state governments in the power sector was deepen by the recent amendments to the constitution; CFRN (Fifth Alteration) (No.17) Act, 2023 by vesting power to make laws on the State Houses of Assembly on every area or subject matters under the electricity industry within the states' territory. Consequently, a new regulatory regime that increased the role of state governments in the NESI commenced with the enactment of the Electricity Act, 2023.

It was shown that under the immediate past legal regime of the power sector, the electricity market had always been mainly operated and regulated at a national level with a very limited state government's participation in spite of the 'notion' that Nigeria operated a federal system.[361] This constituted a clog in the wheel of growth in the power sector as governance and regulation of the sector was conferred on the FGN, with one national grid transmission network serving the entire country[362]. However, the amendment to Paragraph 14(b) of Part II, under Second Schedule to the CFRN, 1999 as amended by the CFRN 1999 as amended (Fifth Alteration) (No. 17) Act, 2023, and the Electricity Act, 2023; the states now have unfettered powers and rights to participate in the areas covered by the national grid[363]

[359] Constitution of the Federal Republic of Nigeria (CFRN) ,1999 as amended; and Electricity Sector Reform Act (EPSRA), 2005 (Repealed)
[360] Second Schedule, Part II, Paragraph 14(b)CFRN, 1999: & Section 63 EPSRA, 2005 (Repealed)
[361] Section 2 (2) CFRN, 1999 as amended provides "Nigeria shall be a Federal consisting of states and a Federal Capital Teritory"
[362] Empowering State Governments : New Era of State Participation in the Nigeria Electricity Sector, 2023. Page 8. EMRCA, Abuja.
[363]CFRN 1999, as amended (Fifth Alteration)(No.17) ; Section 63, (1) Electricity Act 2023 which provides inter-alia; without prejudice to the right of the states to make laws and establish markets for the generation, transmission, system operation, distribution and supply of electricity within their respective territories, …

4.15.1 Advantages of Rights and Powers Vested on State Governments under the CFRN 1999 as amended (Fifth Alteration) (No. 17) Act, 2023, and the Electricity Act, 2023

The following potential outcomes highlight what the states can achieve by using the powers now vested on them to participate in power development across the electricity value chain on and off grid:

i. Improve Power Generation: The capacity of state governments to participate in power generation is a game changer for the Nigerian electricity industry. While the federal government will continue to oversee national power generation projects, state governments now have the opportunity to develop and implement their own generation initiatives. This enable states to harness local resources, such as renewable energy potential or other natural resources.

ii. **Expand investment opportunities:** State governments can create an enabling environment for private sector participation by offering incentives, tax exemptions, streamlining regulations, and providing necessary infrastructure support. This can unlock capital for the development of generation, transmission, and distribution infrastructure.

iii. **Incentivises Renewable Energy Deployment:** State governments are uniquely placed to capitalize on their local renewable energy resources. With the constitutional amendment, state governments can proactively drive the adoption of renewable energy solutions in their territories. Implementation of favorable policies, providing incentives, and streamlining regulatory processes, states can attract private sector investments to renewable energy technology such as solar, wind, and hydroelectricity projects. This decentralized approach will not only contribute to Nigeria's renewable energy targets but also foster economic development and job creation in the states.

4.16 Lessons from other Jurisdictions that allow Participation of Regional Governments in Electricity Industry

This section drew lessons from developed jurisdictions where regional governments are allowed to participate in the power sector. Notable case studies include the United

States and Australia where state participation has contributed to the robustness of their electricity industry.

United States of America

The electricity industry in the United States currently operates within dual systems of federal and state regulatory authorities. The Federal Energy Regulatory Commission (FERC) is responsible for regulating interstate electricity transmission, wholesale markets, and hydroelectric projects. At the state level, Public Utility Commissions (PUCs) or Public Service Commissions (PSCs) regulate retail electricity markets, set rates, and oversee utilities within their jurisdictions. State regulators in America are responsible for balancing the interests of consumers, utilities, and the broader public in the electricity industry. They aim to ensure reliable, affordable, and sustainable electricity services while promoting competition, protecting consumers, and advancing energy policy goals at the state level. Some of their key functions are;[364]

i. Rate regulation
ii. Utility Oversights
iii. Utility licensing
iv. Consumer Protection
v. Energy Policy and Planning
vi. Market Monitoring and Competition
vii. Renewable Energy & Environmental Regulations

Australia

The electricity industry operates under two regulatory levels for both federal and state authorities. At the federal level, the national government oversees national energy policies and sets broad guidelines through the Australian Energy Market Commission, the Australian energy market operator. At the state level, each state has its own regulatory authority responsible for implementing policies and regulating the power sector within their territories. Some of the state functions are; [365]

i. Setting Electricity Pricing
ii. Issuing Licensing
iii. Market monitoring and compliance

[364] Empowering State Government: A New Era of State Participation in the Nigeria Electricity Sector, 2023, Page:23: Energy Markets and Rates Consultants Limited
[365] Ibid 364

iv. Network regulation – Transmission and Distribution.
v. Consumer protection
vi. Renewable energy support
vii. Stakeholder engagement
viii. Market design
ix. Electricity industry codes

The Nigerian power sector is very similar to United States and Australia power sector regimes, with some slight differences.

Under the US the FERC regulates wholesale electricity market while the PUCs/PSCs regulate retail electricity markets. Whereas in Nigeria under the extant governing laws on the electricity industry, there is no dichotomy between wholesale and retail electricity market for both the Federal regulator (NERC) and state regulators (SERCs) except that the state are limited to their territories.

State regulators in the US and Australia enforce competition laws and consumer protection rights of consumers to electricity utility under state regulation. In Nigeria, the states are yet to have legal and institutional framework for antitrust laws or competition laws and consumer protection laws to protect interest of both electricity marketers and consumers.

4.17 The Imperative for State Antitrust laws/Competition Laws in Nigeria.

Following the commencement of the new legal regime in 2023366 which expanded the power of state governments to participate in the electricity industry, competition would necessarily be increased because of the opportunities available thereof. Therefore, it is imperative for the state governments that are embracing the power now vested on them by the extant laws to put in place framework for competition laws and institutions to regulate how electricity business should be competed to prevent distortions in the emerging electricity markets within their jurisdictions. Distortions in markets Include bid rigging, fixing of predatory prices and other unfair competition behaviors within the electricity industry[366].

[366] Dr. Nnandi Dimgba, Issues of Competition Law and Policy ;' Its absence in Nigeria and the Implication and Consequences thereof. Interview at the Policy Council, Lagos by Opayemi Agbaje , 16/1/2014

States' Competition Laws would also prevent abuse of power by Antitrust Law Regulatory institutions. For instance, a Canadian Court in August, 2023 ordered the Competition Bureau to pay $10 million Canadian dollars to Rogers Communications and Shaw Communications for litigation after it failed to block the telecom firms' merger. The Court in its ruling said the Commissioner of Competition, Matthew Boswell was "unreasonable'' in his approach. Rogers and Shaw insisted that Boswell was unnecessarily contentious all through the trial and this significantly raised their incurred cost. The argument of the Canadian antitrust regulator in support of it opposition to the Rogers – Shaw merger was that the merger deal would reduce competition in a country where wireless bills are already among the highest in the world. The Competition Tribunal and Canadian court did not accept the argument, and the effort to block the merger was rejected.[367]

[367] Canadian Competition Regulator and Tribunal . https//www.reuters/deals/canadas-copetition – bureau-ordered-pay-nearly-10-million-rogers-shaw-2023-08-30. Retrieved on 31th august, 2023

CHAPTER FIVE

CONTRACTUAL AND FISCAL ISSUES ON RENEWABLE ELECTRICITY DEVELOPMENT

This chapter discussed the contractual framework for the development of renewable energy sourced electricity projects. Essentially, the contractual framework considered in this chapter are PPAs signed between NBET and the 13 investors/renewable energy developers in July 2016. The analysis in this chapter revealed certain contractual terms and disagreements on terms by the contracting parties arising from fiscal and financial issues which accounted for the failure of the PPAs to reach financial close. Reference was made to existing grid connected solar power projects in other developing and developed countries.

5.1 Functions of the Nigerian Bulk Electricity Trading Company towards the Realisation of Government Policies and Laws on Renewable Electricity

Under Section 68 (1) EPSRA, NERC derives the power to issue permits and licenses to companies interested in undertaking sales of electricity as well as subsidiary activities from GENCOs and autonomous electricity producers and resale of same to DISCOs and eligible customers. It is on the basis of the foregoing provision that NBET became a licensee of NERC in order to carry out electricity bulk purchase services. NBET was established as a certified public limited liability company on the 29th day of July 2010. NBET is a special purpose vehicle power trading entity, which makes bulk purchase of electricity from power generation entities and resells same to DISCOs. Its operational trading license was obtained in November of the following year. Typical of most NERC licenses, the tenure of its lifespan is for a period of ten years. By November, 2021, its operating license have expired and NBET applied to NERC for the renewal of its operating license to enable it continue its operation as a bulk electricity power purchaser in Nigeria was duly granted by NERC.

The Nigerian government has total stake in the shareholding of NBET. As such, it could easily be described as a government owned company irrespective of its status as

a public limited liability company. Its establishment is part of the roadmap measures adopted by the FGN towards electricity sector reforms. Purchase of electricity is a capital-intensive venture. This is more so as electricity power generated has to be purchased in bulk in order to enable GENCOs recoup their electricity generation expenses and continue to stay in business. Hence, the creation and function of NBET primarily serves the objective of providing a power purchase guarantee to electricity generation companies and bankability of PPAs in the electricity sector. Its guarantee role is in two folds - to guarantee payment to GENCOs and guarantee electricity supply to DISCOs NBET was established, to play a major role towards addressing the nagging issue of payment backlogs on the part of DISCOs in order not to obstruct the smooth operations in the NESI. It is meant to dovetail the power sector into a competitive wholesale market.[368]It is anticipated that the operations of NBET would provide adequate buffers to allow the financial stability of DISCOs until such a time when they can muster sufficient strength to embark on direct power purchase from GENCOs.[369] It was designed to function as an interim or transitional measure during the post-privatisation stages of the electricity sector. As the DISCOs attain financial stability with time, they should have the capacity to make direct electricity purchase from GENCOs and IPPs. PPAs signed between NBET and IPPs can then be novated to DISCOs whenever they attain a stage of commercial viability and financial stability to undertake such capital-intensive task on their own accord.

The combination of proceeds of Egbin Power plant sales and $500 million Eurobond was to form part of the US$750 million part of the capitalization fund made available by FGN to NBET in the year 2013. In the same vein, NBET enjoyed a Partial Risk Guarantee (PRG) which it received from the prestigious World Bank group.[370]

The major instrument of NBET's operation is the use of long term PPAs, which were to be signed with IPPs, on the one hand, and DISCOs, on the other hand. One of its top priorities is to ensure that the electricity purchase market is operated on the contractual basis which ensures efficient spread of risks amongst contracting parties. NBET is also

[368]Oke, Y. 2016. The Pathway to Energy Lliberation in Nigeria: Lessons for Namibia. *Essays on Nigerian Electricity Law*. Y. Oke, Lagos: Princeton & Associate Publishing Co. 1-34, 23.
[369] President Jonathan inaugurated the Nigerian Bulk Electricity Trading Board. Business News 23 August, 2011. Retrieved 3 December, 2021 from http://businessnews.com.ng/2011/08/23/president-jonathan-inaugurate-nigerian-bulk-electricity-trading-board/
[370]Omonfoman, O. 2021, To renew or not?: Analysing the NBET Trading Licence. *Premium Times* 14 September, Retrieved 1st November, 2021 from https://www.premiumtimesng.com/opinion/484853-to-renew-or-not-analysing-the-nbet-trading-licence-by-odion-omonfoman.html

bent on ensuring a competitive market that proffers financial stability in the NESI such that power supply to the network is not hampered.[371]

NBET has also been given a prominent role of providing up to 50% guarantee for the purchase of renewable electricity generated pursuant to the provisions of the REFIT Regulation 2015. This according to NERC will provide a buffer for investors and help in stimulating investment most especially in renewable energy production in Nigeria. The REFIT Regulation was a follow up to the National Policy on Renewable Energy and Energy Efficiency which stimulated NERC to initiate and bring about effective economic mechanisms for minute hydro designs not more than 30MW, the entire biomass co-generation electricity plants, wind-based and solar power plants, regardless of their magnitudes. It is therefore hoped that certain tariff regimes created by NERC would be durable, in order to guarantee customers under a solidified contract and also provide realistic value of return. The incentives to be designed by NERC is expected to guarantee market by ensuring that DISCOs, NBET or any other known off taker would be stimulated to purchase the electric power tendered to the electric power market from the renewable energy derivatives at value fixed by the controller (NERC).[372] This was the basis for NBET reaching an agreement to PPAs in favor of the 14 electricity generation companies, which were to undertake the expansion of on-grid solar power projects with cumulative capacity exceeding 1000MW in 2016

5.2 NBET and the Power Sector Liquidity Crisis

The Transitional Electricity Market (TEM) heralds a dispensation that will give effect to industry agreements among the various market operators. Industry participants are expected to commence trading in full swing on the basis of agreements entered by parties. Defaulting parties would be subjected to sanctions for not adhering to contractual obligations voluntarily entered into with other operators. For example, pursuant to Gas Supply Agreement, gas operators that have contractual obligation to supply gas are expected to fulfill such obligations, else they would face sanctions from the regulatory body for failing to deliver as promised on their gas distribution mandate to Generating Companies. Similarly, the shortcoming of GENCOs to fulfill their

[371]Nigeria Bulk Electricity Trading Plc. What we do - NBET. Retrieved 3 December, 2021 from nbet.com.ng/about-us/

[372]Nigerian Electricity Regulatory Commission. FEC Approved National Policy on Renewable Energy and Energy Efficiency 2015. Retrieved 1 February, 2022 from https://nerc.gov.ng/index.php/component/repository/nerc-letters-presentations-reports-and-papers/national-policy-on-renewable-energy-and-energy-efficiency/?itemid+591

power generation obligation as contained in the PPAs which they signed with NBET, would attract certain consequences, including not receiving payment from NBET due to lack of energy supplied. On their own part, NBET would not receive payment from DISCOs in the event that they could not guarantee power supply to DISCOs for onward distribution to consumers. Eventually, this would affect the chances of DISCOs to raise their revenue intake, as increased power supply could make consumers pay more bills to DISCOs. It therefore means that this regime ensures strict compliance with agreements signed between parties and strict regulatory enforcement of market rules on operators. As the market is largely to be regulated by contractual obligations, it therefore means that the presence of government is to be less felt in the electricity supply market.

NBET was created to address the liquidity gap and make sure that payment assurances and guarantees are made available for the NESI to properly function. The NESI is plagued with a serious liquidity crisis which is threatening the long-term sustainability of the industry. GENCOs, Gas Suppliers and TCN cannot implement their long-term acquisition plans due to lack of payments and this suggests that there is an imminent threat to the long-term reliability of supply. This also portends a negative impact on investment decisions potential investors may want to make regarding investments into the NESI.

It has become more of a vicious cycle the indebtedness of one player in the industry affects their ability to meet up their financial obligations over other industry players. It is widely accepted that the shortfall of cash in NESI resulted from the deficit in tariff exacted from consumers within the Interim Period. The total revenue realised within this period is far below the expected revenues projected to sufficiently defray the operational expenses of DISCOs. Thus, following the capital deficit of DISCOs, they now possess limited ability to make full payment of their financial obligation to market operators such as GENCOs, TCN and NBET. This has created a chain reaction which has made it impossible for market operators to effectively satisfy their own financial obligations to GENCOs, who find it difficult to address their financial obligation to Gas Suppliers. The way to address this was for the Market Operator to split the

expected revenue amongst service providers and market participants who operated within the tentative period.[373]

NERC declared TEM in 2015. Many stakeholders agree that the pronouncement of TEM in February 2015 was too ambitious and premature. It would have been more appropriate if it was a pronouncement of a phased transition into TEM or at the minimum a test run of the market prior to full pronouncement of the TEM. It was anticipated that the declaration of TEM would instill more discipline into the NESI and also ensure that the liquidity issues will gradually phase out of the market. However, the liquidity situation has not improved and stakeholders believed that some of the conditions precedent required before NERC's declaration of TEM was not attained, which allowed trading to commence prematurely.

It is estimated that the total market shortfall is about 2 trillion naira with the tariff shortfalls which the FGN was supposed to make up for DISCOs, amounted up to N1.728 trillion;[374] while on the part of Ministries Departments and Agencies of government, debts accruing from power consumption stood at N98 billion both for the year 2020.[375] This is not to mention the revenue loss arising from electricity theft that cannot be accounted for. This explains why DISCOs and other operators in the industry may not be able to keep up with their financial responsibilities towards each other. Not surprising though, as it was reported that, at the close of year 2020, the total DISCOs indebtedness to NBET amounted to N930 billion.[376]

The Federal Executive Council (FEC) in March 2017 endorsed The Power Sector Recovery Program (PSRP). The PSRP is a set of well outlined policy, operational, regulatory, financial interventions and governance to be carried out by the Nigeria

[373]Detail Commercial Solicitor. 2018. The Declaration of Transitional Electricity Market (TEM) and Stakeholder Expectations for the Nigerian Electricity Supply Industry (NESI). 4. Retrieved 7 December, 2021 from https://rise.esmap.org/data/files/library/Energy/Supporting/Documentation/Nigeria_The_Declaration_of_Transitional_Electricity_Market_(TEM)_and_Stakeholder_Expectations_for_the_Nigerian_Electricity_Supply_Industry_(NESI).pdf

[374]Chima, O. and Uzoho, P. ANED ,: FG Owed DISCOs N1.728trn in Tariff Shortfalls as at December. *Thisday* 23 February 2020. Retrieved 13 November, 2021 from https://www.thisdaylive.comn/index.php/2020/02/23/aned-fg-owed-discos-n1-728trn-in-tariff-shortfalls-as-at-december/

[375]Odewale, T. MDAs owed DISCOs N98bn, NDPHC's 190bn unpaid – Senate. *Blueprint* 24 June, 2020. Retrieved 13 November, 2021 from https://www.blueprint.ng/mdas-owed-discos-n98bn-ndphcs-n190bn-unpaid-senate/

[376]Anyaogu, I. DISCOs Face Bleak Future Over N930 bn Debt in Unpaid Invoices Owed NBET. *Business Day* 23 June 2020. Retrieved 13 November, 2021 from https://businessday.ng/exclusives/article/discos-face-bleak-future-over-n930bn-debt-in-unpaid-invoices-owed-nbet/

apex authority within five years in order to improve the financial credibility of the country's electricity sector, enhance transparency and efficient delivery in service, resolve end user's complaints, minimize losses and power theft, and on the long run activate NESI for future growth. The PSRP contained a list of actions aimed at rejuvenating the industry's financial credibility and enhancing delivery of service which include:

i. **Set up viable and suitable power tariffs:** spell out tariff modification trajectory, to enable tariffs cater for income requirement of proficient service delivery come 2021. Inaugurate the income prerequisite of Distribution Companies and Transmission, and unswervingly apply charge regulations in relation to the specified charge trajectory with spontaneous amendments in line with improvements in service delivery.

ii. **Proportion and commitment to fully-funded anticipated sector debits as a result of tariff deficit from 2017 to 2021:** come up with a Funding Plan to totally-fund the deficit (the dissimilarity between industry's income prerequisite and income under operational charges based on a specified rate trajectory) till charges reach cost retrieval levels to support industry fluidity.

iii. **Distinct past shortfalls as a result of charge deficit included in the Funding Plan**: Enclose in the Funding Plan the financing of past shortfall owing to charge shortfall (NGN 420 billion deficit within January 2015 till December of 2016).

iv. **Safe funding bases:** Recognise national and international funding bases to make up for the overall cash prerequisites in the Funding Plan spanning to 2021.

v. **Clear past MDA arrears and systematize impending payments**: Make sure MDA past arrears are cleared and carry out a payment method for subsequent power bills

vi. **World Bank financing**: The World Bank Group has voiced its readiness to support the FGN in formulating and assisting The Power Sector Recovery

Program. The World Bank has showed reasonable backing amounting to for US$ 2.6 billion, for the Plan.[377]

In 2017 and 2019 the Federal Executive Council approved the sum of NGN 701 billion and NGN 600 billion, as NBET Payment Assurance Facility (NBET-PAF) and NBET Payment Assurance Facility Expansion (NBET-PAF-XP). The sources of financing recognised by the Funding Plan are the Payment Assurance facility financed by the Central Bank of Nigeria (CBN) and supervised by the Nigerian Bulk Electricity Trading, in addition FGN's budgetary input, as well as World Bank Performance Based Loan (PBL) form sources of funds available to NESI among the Power Sector Recovery Program Funding Plan.

The NBET payment assurance facility provided by CBN to NBET included the sum of NGN 701.9 billion facility to help it meet its payment responsibilities within production statements and simplify the fluidity threats. The Payment Assurance facility is a credit to the Nigerian Bulk Electricity Trading from CBN, assured by the Federal Ministry of Finance, to fund the Nigerian Bulk Electricity Trading's expenditures to Generating Companies and their allied gas traders. In order for the Payment Assurance plan to be successful, it is imperative not to view it as a rescue facility that merely assists the current market pattern but one that assists a reliable plan geared towards attaining a self-sustainable and efficient market. It is however expected that the market will progress on its expenses performance with decreasing spending from the facility, to tackle payment lapses over the next 2 years, through the execution of supports defined in the Policy as well as the Governance Constituents.

However, there were still outstanding issues and NBET still had issues settling its GENCO invoices even when it had fully disbursed the PAF. Thus, in May 2019, the FEC approved the NGN 600 Bn NBET Payment Assurance Facility Expansion (NBET-PAF-XP) loan to fund NBET expenses to the Generating Companies and their allied gas merchants.

Under the Power Sector Recovery Program, the Payment Assurance is often used as a conduit funding for 2017-2018, till other funding channels are discovered, beginning in 2018 (FGN's budgetary input and WBPBL). The terms of service of scheduled finance mediations is expected to put the long-term sustainability into consideration.

[377] PSRP Master Document January 2018

Excluding the prompt resolve of unsettled issues connected to efficient market behaviour and liquidity, payment of cash under this scheme will not accomplish the anticipated effect and results.[378]

5.3 Power Purchase Agreements

Obligations of operators in the NESI to ensure electricity supply to consumers are statutory. Thus, there are various statutory instruments which create and regulate power supply obligations. The Constitution, EPSRA, NERC Regulations and the system operations code are amongst the statutory instruments for electrical power supply in the industry. Apart from the various statutory instruments which regulate and place certain obligation of electricity supply in the power sector, the various operators in the sector also enter into one form of contractual obligations or the other which regulate the interrelations within the system. The contractual instruments are very important with respect to spelling out the details and technical peculiarities which are not captured in the statutory instruments. Also, while statutes contain generic expression and of general application, contractual instruments contain specific provisions which are only applicable to the contracting parties. The contractual instruments specifically applicable to the power sector are PPAs and vesting contracts. NBET usually enters into PPAs with GENCOs; while its commercial electricity supply transactions with DISCOs are reached through vesting contracts. This section considers the import and purport of PPA instruments, as employed by NBET in NESI.

The PPA is the crucial agreement for any autonomous power production project, particularly in evolving markets. The contract that oversees the transaction and acquisition of electricity is regarded as a PPA. The PPA is a contract between two parties— one who produces electricity for public consumption (the producer) as well as the one who tries to procure electricity (the buyer). PPA is only a mechanism projected to aid the trade and acquisition of electricity power. Thence, it only surfaces once the potential consumer (the buyer) has made chains of vital resolutions. These resolutions can contain the quest for electrical power, the obtainable sources of electricity, the consumer's economic capacity to electricity producing know-how desired and the base of the electricity plant. Sometimes, this agreement is called a "retake contract". This segment studies the background for the PPA and spells out vital concerns for conscripting and exchanging the PPA. It stands for the combined wisdom

[378] Approved PSRP Financing Plan 2017 culled from PSRP Master Document January 2018

of a wide cross-section of experts that have been involved in electricity projects growth across the world for years.

A joint research by four major agencies and departments of the United States of America defined a PPA as: "a bankable electricity acquisition contract. PPA is basically an extensive off- take contract implemented with a reliable off-taker and possessing adequate intention to facilitate refund of debit by making ample and predictable stream of income available".[379] PPA has also been defined as a contractual instrument entered between a buyer "off-taker" (of the one part) and a private electricity producer/seller (of the other part) wherein the off-taker, usually a public owned electricity utility, undertakes to provide assurance of expense stream for a build-own allocation, or a concessional power plan for an autonomous electricity project.[380]

Firstly, the off taker would need to be assured about the request for electricity. There is need to carry out a research in order to establish not only the current electricity demand, but also other predicted fluctuations in request over the period. After recognizing the need, the off taker must recognise possible sources of electricity. This resolve is subject to the estimated rate at which it can offer to acquire electricity, the energy source for fuel and equipment to be used, as well as where the electricity production plant should be situated. The resolve concerning the off-taker's financial plan will go simultaneously with the choice of electricity generating machinery. Some equipment are more costly than others, however, they may be necessary as a result of their capability to complement their energy bases when request is highest, or due to their seeming ecological benefits. Government plan on the overall suitable power combination for the nation may invariably affect the decision.

On a final note, the off-taker is expected to determine the location of the power source. The site is mostly ascertained based on which part of the country is in need of additional electricity. Possibly, the base will be close to transmission and sub-station lines which can efficiently transmit power to the consumers. The off taker and manufacturers will possibly desire to situate the power base close to a connective point

[379]Overseas Private Investment Corporation, Department of Commerce, United States of America, United States Agency for International Development & US Trade and Development Agency. Important Features of Bankable Power Purchase Agreements for Renewable Energy Power Projects. Retrieved 9 November, 2021 from https://ppp.worldbank.org/public-private-partnership/library/important-features-bankable-power-purchase-agreements-renewable-energy-power-projects

[380]World Bank. Retrieved 3 December 2021 from https://ppp.worldbank.org/public-private-partnership/sector/energy/energy-power-agreements/power-purchase-agreements

on the electricity grid to prevent the expenses and risks associated with building transmittal infrastructure and the dissemination line deficits. In the same vein, location is determined by: easy accessibility of petroleum source to the facility, the social and ecological effects of any electricity facility on local settlements, and whether low-cost reducing substances or productive are obtainable. A gas-fired power facility, for instance will be of minor use in a local community where there is no cost effective and productive gas sources. Indeed, renewable power resources like wind or solar may be better suited for local locations with additional privilege of not contributing to environmental pollution. The decision of electricity generating mechanism is an essential one for the buyer. It will have an express influence on the cost and credibility of electricity, and also on the social and environmental impacts of the scheme.

Equipped with insights gleaned from making these choices, the buyers are enabled to get across to market participants in order to appeal for interest and cost estimates. Generally, this can only be done in two ways - the best method is through a solicited tender which can come in form of a competitive acquisition process. Oftentimes, this may require a formal demand for proposals which will spot out, among other things, the quantity of electricity being demanded, the required production technology, as well as the domain where the electricity is required. Armed with this information, manufacturers will compete against each other in order to accentuate their qualifications, capacity to make payment for the advance cost of erecting the power facility and to give quality tariff possible. The buyers will juxtapose costs, financial ability as well as qualifications to ascertain that the choice proposal gets a source of electricity that will reliably function over time at a cost that is quite beneficial to the customer. This approach is mostly seen as yielding a more enterprising outcome than involving in direct bargaining with used and employed proposals. Unsolicited proposals are sometimes used as channels to quickly purchase electricity to deal with contingency situations, and accelerating electricity production in countries with vast electricity deficits. This procedure is also used in domains where there are no structures in place for cutthroat proposal schemes.

In Nigeria, there are existing legal frameworks which provide for the application of bidding scheme for power purchase transactions. Pursuant to its regulation-making powers under Section 96 (1) & (2) (c) & (d) EPSRA, NERC issued the Generation Procurement Regulations in 2012. The regulation makes it mandatory for solicitation

for generation procurement through calls for bids. Interested bidders are to send in their proposals from which qualified and successful bidders would emerge.[381] Even though the Regulation still contemplates unsolicited offers, it requires that those tenders be subjected to audit.[382] Transactions which are contemplated under the Regulation must be carried out under the regulatory supervision of NERC and in strict adherence with the stipulations of the established rules.[383] The essence of putting the above-mentioned regulatory measures in place is to infuse transparency, competition and integrity into the power procurement process.[384]

5.4 Application of Power Purchase Agreement in Nigeria

NBET is the government owned utility that is vested with bulk power purchase functions, which is to serve as enticement for IPPs to carry out power generation undertakings in the Nigeria power sector. Therefore, in the course of performing the purpose of its creation, NBET signs up PPAs with IPPs in Nigeria. This forms the contractual basis of their obligations to specific GENCOs. The role of PPAs entered into by NBET and GENCOs is significant due to the assurance that it gives to power investors within the Nigerian electricity industry. This assurance sound important, in view of the fact that the Nigerian electricity industry is still nascent and still very much regulated by the government. Government regulation of tariffs suggests that the industry has not matured to the point where it is regulated by market forces. Government regulation of electricity prices serves the purpose of mitigating the high financial burden of electricity on the end users. From the perspective of the government, this is a form of social responsibility function it performs for its citizens. On the other hand, there is need for government to consider the need for the IPPs to secure their investment capital as well as make profit from their investments. In order to balance this conflicting interest, NBET, which is the agent of the government, has to assume the power purchase obligation from the IPPs by signing an electricity purchase contract with the GENCOs.[385]

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[381] See, Chapter 2 Generation Procurement Regulations 2012.
[382]See, Chapter 3 Generation Procurement Regulations 2012.
[383]Section 5.2 Generation Procurement Regulations 2012.
[384]Section 4 Generation Procurement Regulations 2012. See also Oniemola, P. K. 2016, Commercialising Renewable Energy in Nigeria through Legal Framework for Competitive Bidding scheme. *The Nigerian Law Journal* 19.1: 135-158.
[385] Miller, L., Carriveau R., Harper, S & Singh, S. 2017, Evaluating the Link between LOCE and PPA Elements and Structure for Wind Energy. *Journal on Energy Strategy Reviews* 16. 33-42, 33.

PPAs primarily serve three purposes. The first one is that, they serve as a governance instrument for the electricity power sale and purchase. The purchase obligation is usually long term in nature so that it gives sufficient time for the power producer to accumulate sufficient revenue streams and consistent electricity flow to the off-taker. The time length is usually within the duration of 20-years, which is the estimated lifespan of a model power plant.[386] The lengthy period of time secures long-term revenues to satisfy the huge cost of developing the power plant. Hence, this mechanism in the PPA is designed to assuage costs and enable access to capital, which will eventually lead to the success of the projects.[387] The PPA also serve as guarantee for reliable power generation capacity at a very minimal cost possible. It is also an instrument that is created to effectively manage the risk associated with the agreement. It contains devices to avert disruptions in payments remissions.

In the context of Nigeria, as noted earlier, PPAs are undertaken by NBET in the stead of the government with independent power project developers and generation companies. The Ministry of Finance, serve dual functions as a representative of the FGN and head of NBET, has a privileged position that can verify the extent or capacity of financial obligations the government undertakes in the agreement.[388] The role of NBET helps to abridge the return on investment gap by providing a long-term partnership at fixed electricity set prices.[389]

The cardinal role a regulation has to play in consolidating agreement cannot be over-emphasised. This is where NERC comes in, in regulating the tariff terms in PPA. Its regulatory function in this regard is clearly spelt out in the EPSRA, as it is responsible for setting out rules for credible power operations.[390] The regulatory function is put to bear by the registration requirements which are exacted from applicants or licensees before they enter into a PPA with third parties. In the case of an IPP, which intends to

[386]Nigeria Electricity Regulatory Commission. Renewable energy. Retrieved 11 September, 2021 http://www.nercng.org/index.php/home/operators/renewable-energy
[387]Miller, L., Carriveau R., Harper, S. & Singh, S. 2017. Evaluating the link between LOCE and PPA elements and structure for wind energy. *Journal on Energy Strategy Reviews* 16. 33-42, 33.
[388]The views were expressed based on allegations of the termination of power purchase agreements by the Nigerian government Retrieved 11 September, 2021 from http://dailypost.ng/2018/03/16/finance-ministry-reacts-cancellation-power-purchase-agreements/
[389]Hoppe, A. How National Legislative Measures Affect the Return on Investment Gaps for Renewable Energy Investors. A Case Study of Development of Offshore Wind Energy in the Federal Republic of Germany. Bachelors Thesis: University of Twente iii+47, 8.
[390]Nigeria Electricity Regulatory Commission. Renewable Energy. Retrieved 11 September, 2021 http://www.nercng.org/index.php/home/operators/renewable-energy

sign a PPA with NBET, for instance, such IPP is required to supply the following information:

i. It is required to provide documentary proof of ownership or long-term lease of a proposed project site. These documents could be: certificate of occupancy, deed of assignment, land sale agreement or deed of gift, etc. depending on the form of proposed site acquisition;

ii. Indication of the fuel source to be used and tender fuel supply and transportation agreement for the supply of such fuel;

iii. The Ministry of Water Resource's license if the plant truly is a hydro-sourced fuel plant;

iv. The IPP has to receive a confirmation letter from TCN of its willingness and ability to evacuate proposed generated power from a connection point;

v. Letter of Intent or Memorandum of Understanding (MOU) which is to serve as evidence that discussion has commenced with partners who are to provide technical and financial support for the power project;

vi. It is expected that the company would have initiated a tender process and MOU towards the conclusion of an engineering, procurement and construction contract, which is expected to be an abiding service agreement or Operation & Maintenance agreement with NBET.[391]

On its part, NBET is to provide a PPA form to the IPP for review in preparation for contractual terms for negotiations. Upon reaching the tariff and other contractual terms, parties can then execute the PPA. NBET is to compulsorily exact due diligence compliance in four aspects from the IPP developers before initiating the PPA approval process. This feasibility study is to create certainties in the aspects of land documentations, environmental and social impact assessments, transmission line connection agreements and source of energy supply. Particularly in the case of renewable generation, NBET is expected to confirm that there is available resource,

[391]Resolution Law Firm. 2021. How to Obtain Power Generation License in Nigeria. Retrieved 3 December, 2021 from https://www.resolutionlawng.com/how-to-obtain-power-generation-license-in-nigeria/#:~:text=The%20prescribed%20generation%20licence%20fees,a%20licence%20fee%20of%20%242%2C500.00

reports and concluded studies in that regard.[392] If the IPP is not yet a NERC power generation licensee, the investor can then proceed to obtain electric power generation license from NERC pursuant to EPSRA. There are NERC requirements that are to be fulfilled before this generation license can be obtained. For instance, NERC would have to be sure of the professional competence of the technical and managerial staff.[393] Hence, certain records like: the résumé of the investors, the power plant location, one-decade business time agenda line for facility licensing etc. Upon submission of the application form and payment of applicable fees, not later than 30 days of NERC acknowledging application fees payment, the notice of interest is to be announced in a national daily press and a local newspaper circulating within the proposed area of operation. Twenty-one days have to be allowed after the newspaper publications to enable interested members of the public to raise objections (if any) against issuance of generation license. NERC is then left to make a final decision whether to issue the license or not based on a holistic consideration of the application, documents tendered and possible letter(s) of objection, if any. The final decision of NERC has to be concluded within 6 months of NERC's acknowledgement of the application received. NERC is obligated to communicate its decision in writing to the applicant, proffering reasons if it declines the application. The applicant has the option to appeal NERC refusal decision by making representation to NERC's within 21 days of the decision. The aggrieved applicant may tender further documentation to support its appeal for NERC to reconsider its decision. A meritorious appeal will receive the approval of NERC to issue the license to the applicant. If NERC makes a positive decision in favor of the applicant either at the initial or appeal stage of the application, the prospects then proceeds to make the required authorisation payment. The applicable fees depend on megawatts capacity the power plant is proposed to generate. There are NERC stipulated fees to be paid for various capacities of power plants. The operational license is issued for a term of 10 years, with specific terms and conditions which the licensee must abide by or risk relinquishing the license.[394]

[392]Ley, K., Gaines, J. &Ghatikar, A. 2015. The Nigerian Energy Sector: An Overview with a Special Emphasis on Renewable Energy, Energy Efficiency and Rural Electrification. Nigerian Energy Support Programme Report 2nd ed. Homburg: Deutsche Gesellschaft für Internationale Zusammenarbeit 101.
[393]*ibid*.
[394]*ibid*.

5.5 Power Purchase Agreements for the 13 National grid Connected Solar Power Projects in Nigeria

Following the issuance of the REFIT in 2015, which is the primary legal framework that seek to promote renewable energy in Nigeria, NBET executed PPAs with 13 IPPs/investor companies in July 2016. The PPAs were basically targeted at developing solar photovoltaic power plants in Nigeria, which are valued at US$2.5 billion, with a gross capacity of 1,125 megawatts projected to be infused into the national grid network. The 13 power plants were proposed to be cited in the northern region of Nigeria, given the comparative advantage which that region of the country has in terms of high sun radiation.

The PPAs for the 13 solar power projects provided for many terms among which are the applicable law, price or energy charge rate and financial close. Under clause 1, the applicable law, inter-alia, includes: "… all duly constituted regulatory actions on the part of the FGN, including any agencies thereof".

Studies reveal that this provision includes the standard practice and procedure that are in line with government policies, market rules, market codes etc., relevant to the power sector as applicable law. Example of such practices is the practice and procedure of obtaining the approvals or non-approvals of the Attorney Generation of the Federal for duly executed PPAs and ancillary contracts,[395] and the approvals for dispatch of electricity by TCN. The price or energy charge rate agreed in the PPA[396] is 11.5 cent/kWh. This agreed price is not above the limit of 17.7cent/kWh[397].

The issue of the Financial Close is provided for in the PPA. Financial close in the PPA means the execution and delivery of the Finance Document and the satisfaction or waiver by the Finance Parties of the condition precedent for the initial availability of fund under the finance documents (other than the satisfaction of the Conditions Precedent under this agreement). The approval of the AGF is also required for the consequential finance documents made by the parties to the PPAs

There are ancillary contracts that need to be executed by the parties in order to ensure the bankability of power projects. An example of such ancillary contracts is the Put

[395] Exercise of AGF power is by virtue of his duty under Section 174(3) CFRN 1999. This provision is in tandem with the Public Interest Theory adopted in this study.
[396] Clause 1 of Schedule of the PPA.
[397] Schedule 5 of the REFIT, 2015.

and Call Option Agreement (PCOA), to be executed between the 13 IPPs/Investor companies and NBET through the FGN, with respect to the projects. The essence of the PCOA is to provide a guarantee for both the buyer and the seller from default in carrying out their contractual obligations at termination of the PPA. Example is payment obligations on the part of the buyer or off-taker and the electricity generation obligation from the seller or the IPPs. However, when there is default on the part of buyers, the IPPs can put up the solar power plants for sale at a predetermined price, to which the FGN through the NBET is obligated to purchase. In the same vein, if the seller is in default, the off-taker/FGN can by virtue of the PCOA, put up the solar power plant for sale and the IPP also has the obligation to sell at the predetermined price.

This study found that none of the PPAs got to Financial Close due to many factors. One of the contentions on the part of government by the then Minister of Finance, Kemi Adeosun was that the PCOA should be satisfied in Naira, the Nigerian currency. None of the investor companies accepted this proposition on the ground that their financial commitments and liabilities incurred in preliminary preparation for the project was in the US dollars and as such, it would be commercially unprofitable to them. Another contention was that the price or energy charge rate of US$0.115 per kWh agreed to in the 13 PPAs was too high.[398] The FGN, through the Ministry of Finance, contended that US$0.075 per kWh should be the price for PPA transaction. In its argument to supports this new position, the FGN referred to the decline in the price of solar across the globe by 74% ever since 2009. It also argued that, in similar projects in Senegal and Zambia, the agreed tariff prices were US$0.05 per kWh and US$0.06 per /kWh respectively. Due to these disagreements, the parties could not secure PCOA and PRGA from the FGN and international financial institutions. Thus , the PPAs could not get to Financial Close.[399]

Even with the execution of the PCOA by two of solar power plant developers, they are yet to commence development of solar power plants. This is because the Partial Risk Guarantees Agreement (PRGA) that is supposed to be signed by NBET, on the one hand, and development financial institution (DFI), specifically, African Development Bank and World Bank, on another hand, are yet to be signed. This PRGA is supposed

[398] Clause 1 of Schedule to the PPA.

[399]Kukoyi, D., Oigiagbe, U., Cookey, M., Amodu, A. & Sulaimon, O. 2020. The Renewable Energy Law Review: Nigeria. Detail Commercial Solicitors. Retrieved 7 March 2021 from https://thelawyerreviews.co.uk/title/the-renewable-energy-law-review/nigeria.

to enable the PPAs reach financial close. The essence of the Partial Risk Guarantees Agreement is to make liquidity support available for NBET, by undertaking to defray certain fraction of the payment to the IPPs. Effectively, the PRGA is to enable NBET facilitate a loan from DFI to boost liquidity. The DFIs developed cold feet in providing the PRG facilities, they are skeptical about the ability of NBET to repay the facility given the liquidity predicament in the power sector. The DFIs are withholding their desire to provide the PRG for the nominated solar power projects conditional upon the satisfactory implementation of the PSRP which the federal authority agreed alongside the DFIs. Under the Partial Risk Guarantees Agreement, the FGN and World Bank reached an understanding and took a commitment to take up the responsibility of satisfying the tariff shortfall in NESI between the periods of 2017 to 2021.[400] A sum of NGN1.934 trillion is required to make up for the tariff shortfalls for the aforesaid periods. This shortcoming has caused serious delays in the course of concessionary financing that need to power the power projects in consideration of the huge financial implications associated with the execution of these projects. These are the challenges that have affected the ability of even the two solar IPPs to execute the power projects, even though they had later agreed to the renegotiated tariff terms in the PCOA. As it stands none of the 13 solar power projects have been developed. NBET has not signed any further PPAs in that regard. Therefore, the intendment of the REFIT 2015 to ensure renewable energy infusion in the energy mix of the country has not yet been realised.

The study revealed that the cost of solar power procurement has globally been on the decline. However, there are unique peculiarities in the markets of different countries that have left a disparity in the prices across countries. Also, there are risk-adjusted factors which are of important in placing a real cost of solar in Nigeria which will make it slightly higher or lesser than the prices applicable in other countries. This would imply that a right balance should be placed between stimulating sufficient returns on investment for investors and providing affordable electricity supply for areas experiencing deficit in electricity supply. The setting of tariffs at less than cost reflective standard is largely responsible for the liquidity failures of the power sector which have discouraged the DFIs to sign the PRGA. The consequence is that it has

[400]Adeniyi, F. 2019. Overcoming the Market Constraints to On-Grid rRnewable Energy Investments in Nigeria. Oxford Institute for Energy Studies Paper EL 37. 36. Retrieved 7 March 2021 from https://doi.org/10.26889/9781784671495

affected the growth of renewable power-based electricity within the Nigerian electricity sector. Power projects have stalled because of this challenge.

The imbroglio which ensued in the execution of the 13 solar power projects in Nigeria has also placed Nigeria as a high-risk market for power sector investors. The attitude of the Nigerian government reneging on already agreed terms in legally binding contracts speaks volumes of the impunity and rule of law deficiency prevalent in the electricity sector of the country.[401] It is also noted that there is a laxity in regulatory steel in ensuring that market participants adhere to existing contractual terms and obligations. NERC has not been able to impose sanctions on market participants who fail to abide by the terms of their contractual obligations and other regulatory requirements thereto.

Utter disregard for PPAs legally entered by parties possess the potential to negatively affect the assurance and trust of shareholders to commit their scarce resource into Nigerian power sector. The prospect of having future investments in the power sector is also affected drastically. While it is desirable that PPAs should contain renegotiation clauses in order to address unforeseen circumstances such as inflation and exchange rate variations to enable parties evade risks and secure their businesses,[402] parties must not exploit it at will except the real need arises. In renegotiating the PPAs, there is need for government to balance the equation by establishing certain policy framework that would balance the interest of parties into more positive result for all parties and stakeholders.[403]

5.6 Other Clauses to Consider in a Power Purchase Agreement

The development of renewable energy projects are high risk ventures. The risks range from factors which may either be within or outside the control of the parties. This section shall identify the various forms of risks which may pose as challenge to the growth of renewable energy power plant projects. These risks are in various forms:

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[401]Amadi, S. 2019. Doing it Right : A Rule of Law Critique of Privatization Methodology in Nigeria *Afe Babalola University: Journal of Sustainable Development Law & Policy* 10.1: 1-31, 31.

[402]Okpoudhu, U., Oniemola, P. K. & Wifa, E. L. 2019. The Dilemma of Electricity Pricing and Cost Recovery in Nigeria: Repositioning the Law to Balance the Interests of Investors and Consumers. *Africa Nazarene University Law Journal* 115-137, 136.

[403]Akanonu, P. C. 2019. How to Resolve the Tariff Disputes Blocking Nigeria's Solar Project Pipeline? Centre for the Study of the Economies of Africa. Retrieved 7 March 2021 from https://www.energyforgrowth.org/memo/how-to-resolve-the-tariff-disputes-blocking-nigeria's-solar-project-pipeline/

i. Dispatch Risk

There are chances that upon the completion of the renewable energy power facility, the off-taker may not be able to dispatch the power generated by the plant. This concern, therefore, makes it imperative for lenders to mitigate this risk. This informs the need for parties to insert the take or pay clause in the PPA. By virtue of this clause, the off-taker is expected to pay a fixed tariff encompassing capacity fee and output fee. The capacity fee is a regulated sum which is to be paid for the plants available capacity; output fee on the other hand is the sum payable for actual energy supplied. The capacity charge enables the power producer to satisfy its fixed costs, debt services, operating costs and estimated equity returns. In the instance where parties agree to a take and pay agreement, this implies that the off-taker is obligated to acquire and pay specific charges for power delivered. Where it is impossible for energy to be physically obtained from the off-taker and output is restricted, the energy to be paid for will be accessed on a supposed delivered basis.[404]

ii. Fixed Tariff

The essence of stipulating a fixed tariff for a renewable electricity power project is to secure the capital investment of the developer. There is need for the proceeds of a PPA, either entered on the "take or pay" or "take and pay," basis to be subjected to a fixed sum for every kWh of power generated from the facility. The tariff regime should be accessed at a sum that will sufficiently contemplate the operating cost, debt repayment sum and provide reasonable return on investment.

iii. Currency Risk

Currency risks arise or are likely to arise when a developer is to be indemnified in a currency other than the one on the basis of which it is to satisfy its indebtedness. In order to side step this currency risk, the PPA should stipulate that the applicable currency should be that which is applicable to defray the developers indebtedness procured in the course of developing the power project. It could also be added that there shall be no restriction or inclusion of additional approvals that would be needed to transmit assets to offshore bank accounts.

iv. Change in Legal or Fiscal Regime

[404]Scheider Electric. 2019. How Do PPA Buyers Manage Risks? Retrieved 6 February, 2022 from https://perspectives.se.com/blog-stream/how-do-ppa-buyers-manage-risks

A change in the industry specific legal regime or fiscal regime of a country is one factor that is of significant effect that can change the fortunes of a PPA. Investors would ordinarily have a legitimate expectation that the legal or fiscal regime would not be inordinately or abruptly changed in such a way that would affect the viability of their investments. It is therefore, imperative that the PPA should stipulate the specific party that will bear the responsibility for any change in legal or fiscal regime which will decrease the economic fortunes of the party from the transaction after commencement date of the contract. In most cases, most lenders usually require that the off-taker should undertake to bear this risk. This is because, most times the off-taker is usually the proper party who is in the position to orchestrate or prevent the adverse regime change.[405]

v. Force Majeure

*Force maj*eure is a course of events which occurs beyond the contemplation and reasonable control of the parties to frustrate the continuous execution or negatively affect the viability of a project. Force majeure is usually associated with natural disasters, such as: earthquakes, hurricanes, floods, typhoons, explosions, fire accidents, etc. However, political force majeure is another variant of force majeure, due to the politically motivated influence of the frustrating factor. [406] This could be in the form of decisions reached or actions taken by governments, citizens or civil society groups. For instance, wars, riots, civil unrests, industrial actions, boycotts and changes in legal regime, are politically motivated actions which could affect the continuous execution or financial viability of a project. Nationalisation or sequestrations of power plants to national ownership are also variants of political force majeure. There is no limit to category of issues that can come within the contemplation of force majeure assets of the investors. Essentially, force majeure are factors which the parties to the PPA agree to include as force majeure.[407] In *Allegiance Hillview L..P. v. Range Texas Prod. LLC*,[408] the law court held that the contours of the parties involved determine the extent, application and effect of force majeure. A model PPA should contemplate force

[405]Sharma, D. and Aggarrwal, M. 2022. Change in Law Clause in Power Purchase Agreements: Issues and Challenges. *Indian Journal of Projects, Infrastructure and Energy Law* Retrieved 6 February, 2022 from https://ijpiel.com/index.php/2022/01/07/change-in-law-clause-in-power-purchase-agreements-issues-and-challenges/

[406] Oniemola, P. K., Ajayi, S. J. & Herbert, E. B. 2019. Building a Contractual Architecture for Wholesale Electricity Purchase in Nigeria. *Journal of Commercial Law* 5.2: 723-746, 740.

[407] See, *Sun Operating Ltd. Partnership v. Holt* (1998) 984 S.W.2d 277.

[408] (2011) 347 S.W.3d 855, 865.

majeure eventuality. Hence, provision should be made to absolve the developer from contractual obligation in the event that such factors occur. There could also be need to resort to insurance to guarantee adequate allocation of the cost implication of such force majeure.

vi. Dispute Resolution

It is not unexpected that disputes may arise in the ordinary course contract implementation. In contemplation of dispute that may arise from a contract, it has become a practice for parties of model PPAs and contracts to set out mechanisms for resolving disputes as they arise. Failure of parties to decide on a dispute resolution mechanism implies that resort has to be made to litigation as a means of dispute resolution. The challenge associated with litigation has made it unsuitable for commercial transactions, particularly with respect to the need to save time in the determination of dispute. Thus, most contracts usually fall back to alternative dispute resolution (ADR) methods like: arbitration, mediation, conciliation or a hybrid method. In the event that parties' elect arbitration, they have to also adopt the applicable system or rules of arbitration.

vii. Discharge and Termination Payments

Another important provision which should be clearly stipulated in a PPA should be to state how parties may be discharged of their obligations in the contract or grounds upon which a party may terminate the agreement. Where the termination is done by the off-taker, it puts the project in a position where it is left without access to the market. This implies that the right to terminate the PPA should not be open or on the basis of flimsy grounds but upon the occurrence of specific significant events. To be on the safe side, it is necessary for the PPA to provide a clause to the effect that if the termination of the PPA is at the instance of the off-taker, the off-taker should make a termination payment of not less than equivalent value to the full sum of the developer's outstanding indebtedness; if the termination is at the instance of the developer, the off-taker should be entitled to a return on investment.

viii. Assignment

The PPA should enable parties to make collateral assignment of obligations in the contract to lenders of the electricity producers. This should include the freedom to be given notice of non-compliance and freedom to remedy those defects. Parties may also

enter additional step-in rights in a separate agreement entered by the lenders and off-taker.

ix. Off taker Payment Support

The magnitude of the project, solvency of the off-taker and phase of growth of the electricity sector in Nigeria should be determining factors in deciding whether a provisional liquidity device, fluidity facility or independent guaranty should be adopted as a backup mechanism to offset the off-taker's disbursement obligations.

x. Transmission or Interconnection Risks

It is imperative that the PPA should identify the party that has the responsibility and risks associated with the power plant connection to the grid network or its transmission to the nearest power substation. This clause is of significant relevance due to critical factors such as: terrain, distance, population, location, etc. This is the more reason why lenders would want the off-taker to undertake this risk or a major aspect of the risk.[409]

5.7 Bankability of Power Purchase Agreements for Renewable Electricity Projects

The tariff structure under the PPA is usually a dual pricing mechanism: the capacity charge (to take care of fixed cost); and the energy charge (for variable cost and actual energy taken by off taker). This extends some comfort to lenders to the extent that the GENCO is entitled to some cash flow (in form of capacity charge); even if (for some reason) no energy is actually taken (for which to receive energy charge.

Bankability simply means the possibility of acceptability of a given project by lenders, it also denotes the range of deliberation of a project in search of project bankrolling in the profitmaking loaning market place. On the other hand, a project can also get funding from financiers rather than profitmaking banks, which includes private equity capital and DFIs. Thus, bankability could also mean the capacity to appeal to funding from any cash source instead of restricting it to a single source. Bankability of a PPA is the conviction that returns from the agreement would be sufficient for the satisfaction of debts and interest repayment. This does not necessarily have to be

[409]OPIC, Department of Commerce, United States of America, United States Agency for International Development & US Trade and Development Agency. 10 Important features of bankable power purchase agreements for renewable energy power projects. Retrieved 9 November, 2021 from https://ppp.worldbank.org/public-private-partnership/library/important-features-bankable-power-purchase-

captured in the PPA, even though the upfront financing guarantee for costs procured by GENCOs gives the assurance that the stipulated tariff of the PPA offers them a cushioning effect of the developer's reliance on the PPA to address the loan repayment. The only revenue stream in the PPA is payment that is to be obtained from NBET. The inability of NBET to meet up with its obligations would automatically translate to the inability of the GENCOs to service and eventual timely satisfaction of their indebtedness to lenders.[410]

The mechanism for pricing is the main mechanism for allotting income and market risks in relation to the plan between the public and free-market sectors. This is essential to the private scheme advocate and its financiers' evaluation of the profitable and bankability feasibility of the task. Usually, free-market project advocates and financiers will need the PPA in order to work for a lengthy duration to ensure investment retrieval.

PPA is the contract that describes the money flow system of a project, which will be crucial to it bankability. Similarly, it connotes that the buyer's solvency will be the main concentration of the financier's credit scrutiny of the task. Hence, financiers may need that credit augmentation devices like government promises be organized into the contract in order to alleviate the risks disturbing the income stream. Suitable provisions risks in general and specifically in the expiration regime, are of great importance in ensuring the successful outcomes of the plan. When discussing about PPAs, risks like construction delays, cash transferability and convertibles, also, natural and political force majeure deserves to be properly apportioned. Those involved should discuss the dissolution outlays. However, there remain tough market standards which set the expected penalties of nonpayment under the PPA in a finance project situation. Therefore, it is pertinent to be in the know of market opportunities, so as to stay within the range of promised consequences which could be acknowledged by the guarantors and investors while trying to discuss a more favourable contractual term.

Irrespective of whether a PPA has been signed earlier, grounds for its modification may be written in the appendix to the PPA or in a deed known as a "direct agreement".

[410]Detail Commercial Solicitor. 2018. The Declaration of Transitional Electricity Market (TEM) and Stakeholder Expectations for the Nigerian Electricity Supply Industry (NESI). 7. Retrieved 7 December, 2021 from https://rise.esmap.org/data/files/library/Energy/Supporting/Documentation/Nigeria_The_Declaration_of_Transitional_Electricity_Market_(TEM)_and_Stakeholder_Expectations_for_the_Nigerian_Electricity_Supply_Industry_(NESI).pdf

The aforesaid agreement would then be signed by the off-taker, the corporate entity and the financiers, which may also factor in any modifications to the PPA expected by the financiers, and also, certain requirements connected to the off-taker's agreement to the mission company's guarantee or PPA's restrictive assignment to the financiers in a nonpayment situation, and the financiers' step-in liberty. Where we have the off-taker or the host country approved the process of a standardised inflexible PPA, engaging with the financiers early or in the course of the purchasing phase in order to assess the bankability of the contracts would be wise. These negotiations will also permit the financier to tackle any concern relating to material which may impede the capacity of the project company to get financing or irrationally add to the cost of funding. Other than effect occasioned by cost associate with funding the cost of the project, the monetary implication will vary, depending on the threat factors impeding the ability of the project to produce adequate and consistent income flows to settle its reimbursement obligations. Therefore, the solvency of the off-taker and risk extenuating devices are vital factors in defining a scheme's bankability as well as its capacity to draw long standing debt funding.

Being the durable credit in the country as well as the secondary recipient of the scheme, the host state is adequately situated to offer credit assistance to ascertain its commitments through various provisions. Considering the host country to be the principal figure in guaranteeing the effective execution of a scheme, most especially when it comes to PPA with a government-owned off-taker, oftentimes, it is required to alleviate some of the threats that are associated with the physical and political environments, and also to make critical infrastructure available, like, the distribution and transmission network or fuel supply. Debt burden can be costly, especially for project sponsor debt; particularly when contrasted with a host country's capacity to fund the construction of electricity project via their independent balance folio. Also, different forms of borrowing money exist, which include: concessional funding from development financial institutions as against the regular market valued funding, that have lesser prices than profitmaking project funding. Though, it is imperative to not only contemplate the price of these funding sources. Host governments' financing may appear economical, however, tying up huge sums of state capital that otherwise could be used to fund societal programs, domestic security, or better still, infrastructure projects, is not a wise policy choice. Likewise, development financial institution's concessional funding is quite restricted when contrasted with general profitmaking

funding available from development financial institutions, oftentimes, it is reserved for developing technologies or risky markets that otherwise stands not bankable with no admittance to lesser capital cost. Therefore, recourse to concessional or government funds goes with the alternative of making use of those funds for other cost-sensitive and high impact investments.

The PPA is crucial to bankability. With respect to usual electricity projects, it has one source of revenue - costs from the purchaser in the PPAs. Once the customer fails in payment, it will be extremely hard for the project to timely refund its creditors. The PPAs will also aid in accommodating the distinctive nature of electricity projects. Electricity generation is distinct because the power generated is often sold into a physically restricted, and much structured market. As against high-price commodities like precious metals, hydrocarbons or minerals that can be conveyed to meet up with request, the electricity project is bound to the market demand that it services. Also, electricity pricing to consumers in developing markets is oftentimes controlled by directives as against market drivers. The PPAs is crucial as it focuses on both the instability in demand as well as in pricing. For demand, PPA sets a long-standing acquisition commitment that makes provision for a steady income source for the producer and steady power flow to the off-taker. For pricing, PPAs include a tariff plan which is tailored towards the operations, technology, and liability features of the task; which of course can be simulated over the complete project's life cycle. This permits the PPAs to set up electricity fee that reveals the accurate price of electricity generation.

5.8 Credit Supports to Power Purchase Agreements for Renewable Electricity Projects

The market peculiarity of the power sector comes with attendant credit and liquidity apprehension on the part of both parties to the PPA regarding the need for credit support to enable the off-taker perform its obligation. This is particularly if the creditworthiness of the off-taker is something to worry about. The creditworthiness of the off-taker would certainly be an issue of serious concern in the instance, where the revenue accruable from electricity wholesale and supply to final consumers is below expectation due to lack of cost reflective tariff rates. This is a concern which NBET has raised as the off-taker in the PPA signed with the solar IPPs. This implies that for NBET to continually perform the role of an off-taker, it has to depend on credit

support from other third-party entities such as DFIs. Although this has to be done in a separate contract with the third party, it may become necessary to capture in the PPA that the off-taker would depend on credit support from a third party. The execution or implementation date of the PPA may be made contingent upon the off-taker obtaining the letter of credit from a stipulated third party or as shall be determined by the off-taker. This would have the off-taker to avoid liability for breach of contract in the event that it cannot secure the credit support from a third party.

5.9 Power Intervention Fund Scheme for Renewable Electricity Projects

The FGN has set up support mechanisms to encourage the development of electricity power generating plants from renewables. Towards this end cash worth N300 Billion was assigned for power and airline intervention fund. The essence of the fund is to help expedite electric power projects through the provision of facilities that would serve as term loans to undertake power projects from start, refinancing of running loans, leases and functioning capital. The repayments for the facility are on the basis of amortization. The fund is only meant to facilitate not higher than 70% of the aggregate cost of the project under consideration for a 15 year period which should not transcend 31st July, 2025. This is in exclusion of a functioning capital facility of one-year duration, which has a roll over provision of not more than 5 years. The annual interest single digit charge of 7% becomes mature for payment on a quarterly interval. This is far more commercially prudent facility when compared to the double digits interest charge payable for loan facilitated by commercial banks.

5.10 Escrow Account for Renewable Electricity Projects

An off-taker can ease short-range fluidity risks by putting cash into savings (whether a reserve account or a deed account) in a secured bank. The wallet is financed to cater for certain sum of ongoing PPAs payment commitments. The escrow accounts should contain a minimum sum of money that is sufficient to meet up advance payments for some number of months which the off-taker is to cover under its PPA obligations. In the event that the off-taker defaults in making the necessary payment under the PPAs, at that point the project developer can make withdrawals from the deed account, letting the project handling company to carry on its procedures or service its indebtedness that need immediate attention. The off-taker would be required to reimburse the deed account around the given time in a deed agreement. This way out calls for the off-taker

to possess surplus funds it can ring-fence or have intact in a fixed account making nominal interest, which oftentimes may not be the situation.

5.11 Risks Associated with the 13 Solar Power Projects and their Power Purchase Agreements

There are several risks related to power plant operations especially the solar power projects in the execution of PPAs. These risks range from derivative contracts, allocate risk, political risks, generation risks, legal and regulatory changes risk, force majeure, power off-take and payment risk; transmission failure risk; distribution risk, etc. This section briefly highlights and discusses these risk factors in a PPA.

5.11.1 Foreign Exchange Risk

This form of risk occurs in the instance where major share of funds required for the project is domiciled in foreign currency as against the local currency on the basis on which payments is to be made in the PPA. For instance, in power projects facilitated in Nigeria, the materials used from the facilities are usually purchased in foreign currency of higher value. Huge loans are also obtained from foreign banks, also in foreign currency. However, the revenue derived from the end users of electricity is usually obtained in the form of local currency which is actually of lesser value to the foreign currency indebtedness of the developer. This disparity is likely to create an imbalance of payment unless strategic wedge is placed against indiscriminate fluctuations in the foreign exchange market.

Where the government in power has approved to make payment to financiers, this will be at high risk the lengthier the time over which it is completed. This can be easily expounded in this manner, the more elongated such period is, the more possible a motive will spring up for the government to change its stand, especially when it comes to other fiscal pressures. In essence, payments are risky the more elongated they are, regardless of the method in which the payment comes. The main risks facing huge infrastructure is that repayment periods are extensive, thereby increasing the threat that plans may be altered while the project is still on. Of course, there are risks peculiar to renewables projects which imply that there are greater chances that there would be a contractual disagreement, for example, in regards to renewables asset performance.

5.11.2 Technology Relating to Risks such as Non dispatchability

Different forms of renewable energy[411] are "non-dispatch able, meaning that, the outcome cannot be manipulated, however, it is based on the predominant wind and sun conditions. Meaning that, productivity from renewables has less value to electricity procurers than that which is from controllable or dispatch-able fossil fuel energies, since its availability cannot be guaranteed during periods of large demand and also may be produced when not demanded. This may also mean that there is need for standby generation just in case productivity from renewables is extremely low, which oftentimes can muddle up system balancing and increases production costs. Also, this could create impression that RE technology is not reliable which could lead to breach of terms in the PPA. Pay or take arrangements, where the off-taker is required to procure the power manufactured by the producer, even though it is not necessary, can mostly be challenging as the off-taker may eventually acquire electricity or restraining production when it is not required (like having to procure electricity when there is low demand).

5.11.3 High Costs of Renewable Energy Technology

In Europe, the common prices of renewable energy are usually greater than the conventional, fossil-fuel alternative, when environmental charges are left out needing some levels of considerable backing.[412] As seen elsewhere, in Africa, this can necessitate an additional support for renewable electricity production, which may be above those needed for other generation sources. These supports are funded from taxation revenues, unlike what is obtainable in developed countries where it is normal for customers to finance any extra charges of renewables. While a particular government is eager to key into such contracts, possibility exists that subsequent governments may have different thought. The issue is that there exist many other responsibilities on tax incomes or the available fiscal space of a given country. When allocations are squeezed, it may look more attractive politically to cut financial aids for renewables –most especially when it is international financiers and investors who are affected rather than local ones – than to minimize spending on, education or health most importantly where renewables charges are more than those of other production

[411]Excluding biomass and hydro.
[412]As evidenced from different levels of ROC banding the UK.

and specially when there is surplus of production capacity. In sum, because renewables depend on financial aid that is not likely to be state's pressing priority, they are then at frequent risk of the financial aid being taken out.

5.11.4 Bankability Risks

In the normal electricity project funding, the sole funding that goes back to investors is the refund of the project deficit and disbursement of lending rates (together with defined agreed charges). But, since the investors have huge capital investments risk, and solely depend on the project income for refund, the investors will assert that project financiers and documentation are sufficiently valid to enable the project attain commercial viability. Amidst the parties involved, the financiers would to prevent a situation that would make the project suffer abysmal failures, particularly within the project construction stage. During operations, the overall concern is assuring that incomes are sufficient to service deficit.

Below are vital considerations that need to be adequately covered for a project to receive funding for its debt:

i. **Term**: The PPA should be given long term so as to allow the repayment of the debt, and if the deficit is not paid in full (meaning that, if at maturity there exists the outstanding principal amount) the PPA term should be elongated to support refunding of the left-over debt.

ii. **Tariffs**: financiers will demand assurance with regards to the payable tariff under the PPA.

iii. **Changes in Law and Fiscal Regime**: financiers are indisposed to accepting risks that have to do with alteration of taxes or law while a project is ongoing.

iv. **Off-taker Creditworthiness**: when the off-taker lacks creditworthiness, financiers will demand other kind of credit assistance that make for extra costs and difficulties for project execution. Same for advanced markets, most off-takers are usually not adequately creditworthy to promote a fundable project.

v. **Sponsor Quality**: The off-taker and lender will contemplate the financial strength, character and experience of the project company's eventual buyers.

vi. **Billing and Payment**: The billing period from the off-taker to the manufacturer should be regular (bi-weekly or monthly) so as to lower the level

of outstanding energy and also to make sure the schedule of deficit service remittances is strictly adhered to. It will also alert the financiers to possible liquidity challenges/payment.

vii. **Calculation/Currency**: PPA payments as well as estimation are usually done in the similar currency expected for debt repayment. If it is not done this way, the need may arise to make exchange rate indexation arrangement and/or foreign exchange hedging and a true-up procedure. Likewise, if there exist any issues of convertibility with the payment legal tender. In such a case, the financiers may request that payment be done in another currency, better still the off-taker or the host country will have need to assure conversion.

viii. **Termination**: Financiers desire that off-takers would not be able to evade the extended purchase agreements under PPA payments, as this will render the project short of fund to maintain the project deficit. Financiers will give special consideration to ensuring that merchant events of force and default majeure happenings do not in any way permit the off-taker to untimely abort the project. If discontinuity does happen, financiers will likewise want guarantee that the project deficit would be fulfilled.

ix. **Remedies upon the Events of the Buyer's Default**: most especially, financiers want the merchant to possess the capability to exercise specific rights during the pendency of the PPA, if the off-taker defaults in making payments or fizzle out in delivering the expected payment security.

x. **Lenders' Rights**: financiers typically will provide for rights of step-in and take security interest above project capitals through direct agreements and loan. Where the above-mentioned can supply some vital guides, most importantly, bankability is a constantly-changing idea. What the loaning market takes (or requests) at present may not be the same it will take (or request) next time. Considering the magnitude, scope, capacity, site of power projects and technology, it may be extremely cumbersome to determine what "market" is in reality (i.e., coherent with conditions you mostly observe market partakers agreeing to). More so, a professional sponsor or developer may be perfectly positioned to convince lenders to take arrangements that are more suiting to the project company. On the other hand, financiers may be willing to accept certain risks or provisions at the level of the project, in as much as they possess a

guaranty or other means of credit aid (whether from the off-taker or project sponsor) to address the risk.

5.12 Partial Risk Guarantee for Renewable Electricity Projects

The partial risk guarantee program which sets out to render support for privatisation in the power sector serves the goal of increasing electricity generated in Nigeria by utilising investments in the private sector and commercial funding channeled into the Nigerian power sector through the mechanism of Partial Risk Guarantees (PRGs). The African Development Foundation (ADF) PRGs have the capacity to alleviate the risk associated with NBET's non-fulfillment of its contractual obligations captured under the PPAs, which were signed with certain IPPs. The ADF PRGs accessible under the programme will alleviate the partisan risk and cause a rise in the relief felt by investors in the private sector and commercial lenders which have ploughed in their investment into the power sector privatisation programme in Nigeria. This will, therefore, give support to the reform efforts put up by the FGN in the power sector and reposition Nigeria along a sustainable growth track.

Factors which are responsible for the increase of partial risk guarantees are basically linked to factors which put the government in a position of likelihood to default on its obligations. This is because the review of policy which come with successive governments or their tendency to renege from unpopular commitments entered by preceding governments; alternatively, what appears to be a good plan at some point might turn out to be a better option in view of prevailing circumstances within their disposal. Instances where commitments contemplate public resources is when the government experiences economic strain. These risks may be applicable to the entire power sector or of particular reference to the renewable energy sub-sector.

The PRGA is a third-party collateral support specially arranged to get NBET committed to its long-term payment obligation captured in the PPA. The World Bank is the entity offering the PRG for NBET. The arrangement is designed in such a way where commercial banks disburse an existing letter of credit. Whereas NBET is unable to meet its payment obligations, the developer is authorised to make withdraw also on the letter of credit in satisfaction of the payment obligation. It is expected that NBET has to reimburse the letter of credit to the commercial bank. Whereas NBET is unable to make the reimbursement to the commercial bank, the bank can proceed to claim the withdrawn sum and interest accruing thereof from the international development

agency (IDA) which provided the PRG. On its part, in order to secure its interest, the IDA has entered an indemnity agreement with the FGN, which is to the effect that it shall be indemnified by the FGN for liabilities which it incurred as a result of NBET not being able to perform its obligation under the PPA and other collateral agreements accruing thereto.[413]

5.13 Renewable Energy Project Financing

5.13.1 Project Finance Transaction Models/ Structures

Renewable energy has experienced a considerable growth in the Nigerian power sector even though it is still at its formative stage. High capital expenses in the development of renewable energy projects and the challenges of funding have been one of the foremost challenges to renewable energy development in Nigeria. Funding sources may include, but are not limited to, investments from local, regional or international bodies, foreign grants and private/public alliance involving the state/FGN[414]. Initial Public Offerings in Stock Markets is also a model for funding investments of RE sourced electricity projects.

5.13.2 Grants

The issuance of grants for renewable energy development is a form of financial rewards offered by governments and international institutions towards the execution of renewable energy projects. Largely, grants exclude financial implications in the category of loans, loan guarantees, subsidy at interest rate, revenue allotment, etc.[415] Examples of specific grants include: United States African Development Foundation, established by the United States' Government;[416] the Sustainable Energy Fund for Africa, under the auspices of the African Development Bank.[417]

[413]Ley, K., Gaines, J. & Ghatikar, A. 2015. The Nigerian Energy Sector: An Overview with a Special Emphasis on Renewable Energy, Energy Efficiency and rural Electrification. Nigerian Energy Support Programme Report 2nd ed. Homburg: Deutsche Gesellschaft für Internationale Zusammenarbeit 116.
[414] Suleiman, Y. 2019. A recent PPP is the 73km Solar Street Light Project between Blue Camel Energy Limited and the Plateau (Jos) State Government, Nigeria. Interview on Jos Solar Street Light Project
[415]Investopedia. Terms. Retrieved 7 December, 2021 www.investopedia.com/terms
[416]Gogla. Energy challenge Retrieved 7 December, 2021 www.gogla.org/usadf-all-on-open-2020-edition-of-100000-energy-challenge
[417]African Development Bank. Sustainable energy fund for Africa. Retrieved 7 December, 2021 www.afdb.org/en/topics-and-sectors/initiatives-partnerships/sustainable-energy-fund-for-africa

5.13.3 Concessional loans

A concessional loan is a form of financial advances which are granted at interest below market rates. This ordinarily contains a period of moratorium within which the beneficiary of the loan is relieved of the debt repayment. Some examples of concessional loans include: Green Energy Fund Programme promoted by the African Guarantee Fund, intervention loans facilitated by the CBN, the Nigerian Bank of Industry facilitated Six Billion Naira Solar Energy Fund.[418]

5.13.4 Venture Capital

Investors who provide venture capital are critical stakeholders to renewable energy financing. One can hardly point out any venture capitalist in Nigeria due to its underdeveloped venture capital structure set out to address the financing needs of the renewable energy sub – sector. Nevertheless, there are specks of interventions littered around.[419] One instance that readily comes to mind is the 2019 renewable sourced energy equity financing of up to US$20 million raised by CRE Venture Capital in conjunction with Omidyar Network and other participants such as: Proparco, Inspired Evolution, I&P, EDPR, Yuzura Honda and Sin Capital. This joint effort enabled the financing of solar solutions constructed for small and medium-scale enterprises operating in Sabon Gari market, Kano State. Thereafter, precisely around June 2019, a home-grown power start-up company known as Arnergy Solar, was able to raise the sum of US$9 million. After the launching of this fund, it would eventually serve the purpose of delivering installed power of 2MW and over 5MWh storage capacity to serve the electricity residential and commercial needs of clients in some parts of Nigeria.[420]

5.13.5 IPO Financing in the USA.

It is trite to state that investments in RE sourced electricity producing companies is becoming very attractive as, it is viewed as a social responsibility globally probably due to increase in concerns for climate change issues and as well due to the fallen cost of solar panels, wind turbines and batteries for energy storages.

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[418]Bank of Industry. Solar energy. Retrieved 5 December, 2021 from www.boi.ng/solar-energy/

[419]Abdulrasheed, I. 2019. A Tale of Two Countries: Financing Renewable ESnergy in Nigeria and Brazil. Retrieved 5 December, 2021 from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3377029

[420]The Africa Report. Nigeria attracts 29m in green equity finance Retrieved 5 December, 2021 from www.theafricareport.com/21981/nigeria-attracts-29m-in-green-equity-finance/

Investors have keen interest on RE technology, putting them in excellent stead to benefit from this investment mega trend. However some energy firms stand above their contemporaries in the RE stock market. Top-tier green energy companies in the US include NextEra Energy, Brookfield Energy, Clearway Energy and First Solar[421].

The above mentioned companies showing their commitments to the global quest for zero-net carbon emission have expanded their RE capacities while replacing their fossil fuel power plant with green energy technology. These companies have excellent track records of creating shareholder value by investing in renewable energy sourced electricity projects. They have displayed return of not below 65% over the last 10 -15 years, for instance, NextEra has expanded its adjusted earnings per share at an 8.3% compound annual rate since 2007, mine while it has increased dividend at a 9.9% annual rate and boosted dividend for more than 25 consecutive years[422].

5.13.6 Reduction in Import Duties

There are fiscal incentives which are set up to serve as a form of encouragement to entities involved in the importation of renewable energy installations, since they are hardly fabricated in this part of the world. One such incentive available to importers is the zero-duty placed on diode bearing solar panels.[423] The Renewable Energy Association of Nigeria, which happens to be the largest cluster of renewable energy enterprises, may canvass for total tax waiver for renewables in order to stimulate growth and create healthy competition within the renewable energy market.[424]

5.14 Incentives for Renewable Energy Investments

Incentives serve the essential need of promoting the growth of Renewable Energy projects and programmes. Considering its status as a largely uncharted pathway, the sub-sector is at the risk of grave difficulties in establishing and solidifying its position in the energy sector. This is notwithstanding its potential as a critical source of

[421] Mathew DiLallo, Investing in Renewable Energy Stocks. The motley fool. https//www.fool.com/investing/stock market/market sectors/ energy – stocks. Updated July 12, 2023. Retrieved August 31st, 2023

[422] Idem: Best Renewable Energy Stocks for 2023. The motley fool. http//wwwfool.com/investing/stock market/market sectors/energy/renewable-energy-stocks. Updated July 12, 2023. Retrieved August 31st, 2023

[423] Africa Clean Energy. Nigerian importation guide 2019. Retrieved 5 December, 2021 from www.ace-taf.org/wp-content/uploads/2020/01/ACE-NIGERIAN-IMPORTATION-GUIDE-2019122001.pdf

[424] Offgrid Nigeria. 2018. Customs slowing down the growth of solar power in Nigeria with arbitrary port charges. Retrieved 5 December, 2021 from www.offgridnigeria.com/customs-slowing-down-growth-solar-power-nigeria-arbitrary-port-charges-rean/

sustainable energy. This therefore, suggests the need for government's establishment of economic incentives which will serve as a means of encouraging its development. The incentives can be in any of these two forms, namely:

i. Financial incentives, constituting of subsidies, grants, etc. which are majorly a target of the demand aspect;

ii. Fiscal incentives, constituting of tax relief, rebate, duty, levy waivers, etc. which is mostly targeted at the aspect of supply.

5.14.1 Financial Incentives

Financial incentives may take the form of soft loans. Soft loans entail that certain fraction of the yearly credits by DFI which issues special low interest loans should be earmarked for renewable energy schemes, at an interest rate of not more than 5% per annum. They could also take the form of subsidies and grants. Subsidies at the rate of 30% initial costs of the renewable energy facility should be given to communities, businesses and persons who wish to embark on those kinds of projects. However, subsidies should be in kind; subject to compliance with the due process which will be supervised by an administering agency to guarantee its accountability and transparency. In countries such as the United States, Thailand, Germany and Korea, subsidies are offered up to the range of 30-50%. Capacity development is another form of financial incentives which entail providing training programmes for sponsorship of members of communities to build skills and advance their knowledge on renewable energy technology ventures.

5.14.2 Fiscal Incentives

These incentive programs are aimed towards producers/providers of renewable energy items and services, including: manufacturers, corporate importers and suppliers and technical services and support providers.

i. Reduced profit tax: corporate entities engaged in RE should pay profit tax at half the current rate.
ii. Tax breaks: A tax vacation should be offered for new RE enterprises for at least an operational period of ten years.
iii. Import duty reduction: The importation of materials, apparatuses and implements for fabricating RE devices and parts by legitimate producers should be duty free.

iv. Allowance for capital: A 20% investment capital allowance each year within the initial four years and 19% on the fifth year is to be supplied, with 1% maintained in the books.

v. Capital Relief The government should offer legitimate makers of renewable energy equipment, gadgets, and systems with 50% interest-free capital relief on first investments. The assistance will be captured as necessary facilities for manufacturing operations. Czechoslovakia, for example, offers a 30% tax break on early expenditures for manufacturers of solar water heating system components.

vi. Purchase Tax Exemption Individual, corporate, and community purchasers of renewable energy systems should be exempt from initial purchase taxes, such as value added tax.

vii. Income Tax and Levies Rebates: Individuals and corporate organizations that buy renewable energy technology at their own expense and are liable to income tax or community levies imposed by the government shall be eligible for a reimbursement.

viii. Feed-in Tariffs: Feed-in tariffs (FIT) encourage the development of new renewable energy sources. The FIT mandates that utilities buy renewable power from qualifying renewable energy providers.

The FGN has earmarked certain industries that are entitled to certain investment incentives, in a bid to stimulate local and foreign investment in those private sectors. On such investment are the incentives applicable to industries conferred with “pioneer status”. The pioneer status incentive is a FGN grant of tax free operations to eligible pioneer industries for a period of seven-year. This is particularly where such industries are cited in economically disadvantaged area with the country. There are 71 industries shortlisted as pioneer industries which are eligible for this incentive. Companies which invest in renewable energy related industries are eligible to access this tax holiday incentive of 5 – 7 years.

5.15 Credit Supports to Power Purchase Agreements for Renewable Electricity Projects

As previously noted, a transaction’s bankability is a significant issue a lender would consider. The amount of relief lenders gets with counterparty credit risk (this implies that an off-taker has the capacity to satisfy its payment obligations as contained in the PPA), is a significant component of bankability. The section that follows gives an

evaluation of the sorts of assistance that financiers and investors may require, as well as the several formats that assistance might take. In general, lenders are concerned with two specific risks:

i. On - going payment assistance of PPA obligations: This is also referred to as liquidity support. It entails the energy capacity and payments; and

ii. Termination support: This risk ensures that moneylenders' debt and interest are refunded at a minimum consequent upon the PPA's determination.

5.16 Liquidity Support

The function of short-term liquidity assistance is to enable the project executing company to maintain buoyancy and carry out its operations and debt servicing in the event that the off-taker comes short in meeting its continuous payment duties to the project company. Lenders require liquidity support to cover about a 3-6 months payment window, depending on the off- taker's condition. If an off-taker or buyer is not forthcoming in meeting the expected obligation in the PPA, it would warrant a trigger of the event of default. The various form of liquidity assistance is accordingly examined below.

5.16.1 Letters of Credit

A commercial bank posts a liquidity letter of credit (LC) that is held by an off-taker and may be called upon by the project firm in the event that the off-taker could not issue payment at the appropriate time. To enable it issue an on-demand LC for the benefit of an off-taker's payment obligation, it is usual for most commercial banks to sign consecutive reimbursements and credit arrangements with off-takers. In the case that the project firm is not paid, the LC may be drawn. To limit the chances that the issuing bank would meet payment demands from the letter of credit, moneylenders expect commercial banks providing the LC to be of a least investment rating. In some areas, a suitable commercial bank may be unavailable or too expensive. Instead, the off-taker's credit risk may be on the high side such that an appropriate commercial bank would not, or cannot assume the off-taker's counterpart risk or may be willing to undertake it only at ridiculously large costs.

5.16.2 Support for Termination Payments

Lenders can use termination payment support to determine if the off-taker can meet up with its commitment to pay compensation for contract termination. Several agreements can give for this assistance. In other cases, the off-taker agrees to pay the termination compensation in the PPA, and the host government guarantees that commitment via a support agreement from the government or guarantee from a sovereign, agreement execution or concession agreement. In other circumstances, the host government has a direct contractual responsibility to pay termination compensation as part of an execution agreement, agreement for concession or put and call option agreement (PCOA). Even though the various documents may contain sovereign support of varying degrees and forms, it would still be regarded as being bankable. It could contain a clause wherein the host government makes commitment to undertake direct payment, or guarantees the off-taker undertaking to make payment and pay compensation to make up for outstanding indebtedness or connected cost in the event the PPA is terminated. Thus, there may be an incorporation of guarantee from the host government, which may be incorporated in this arrangement if the off-taker receives credit assistance for continued payments. Availability to sovereign financial assistance in the case of a termination event simplifies lending because the termination payment is repaid to the host government. These responsibilities of the host government can receive additional credit reinforcement provided by DFI financial facilities, including: payment guarantee or political risk insurance.

5.17 Financial Support Scheme for Renewable Electricity Projects

The lack of an expansive framework for the purpose of renewable energy projects financing creates a significant impediment on renewable energy developments in Nigeria.[425] Funding renewable energy projects is difficult in Nigeria in view of the limitations placed by insufficient capital and stiff competition for scarce funds. This obstacle is exacerbated by the poor credit ranking and lack of accessible investment funds, which characterised the economic climate in Nigeria. High interest rates attached on loans, in combination of severe covenants and other instruments might be used for new renewable energy projects financing. The status of local funding in the financial services industry has compounded the issue in a country like Nigeria.

[425]Omojolaibi, J. A. 2016, Financing the Alternative: Renewable Energy in the Nigerian Economy. *International Journal of Environment and Sustainable Development* 15.2: 183-200, 200.

Professor Pat Nebo, the then-Minister of Power, said that a lack of funding has hindered diversification when appending a US$350 million contract with GE towards investment in renewable energy-based power projects.[426] The foregoing suggests that the financial sector in Nigeria is still undergoing an evolutionary process.[427]

The Zungeru Hydropower project has a financial support based on a solid finance agreement, which demonstrates the possibility of renewable energy growth in Nigeria. However, it is contingent on a favorable financing arrangement. In the project loan agreement valued at US$1.3 billion, Export Import Bank of China undertakes to provide 75% of the total funds required for the execution of the projects throughout a period of 20-years at a 2.5% interest rate and a seven-year window period.[428] In Nigeria, there is a prevalent sense of risks in investing renewable energy initiatives. There are hazards connected with any initiatives, whether they are for renewable or conventional energy. There are various dangers that have been widely acknowledged to impact upon the settling for renewable energy power projects. These risks include regulatory, financial, and market hazards, as well as legal, political, and *force majeure* risks.[429] Licences will be required for the projects due to regulatory hazards. This will be done by submitting an application to the NERC in the appropriate format. There may be delays or concerns that the license will not be awarded. For example, before receiving a grant, applicants must observe the conditions of the Environmental Impacts Assessment Act of 1992.[430] It is not always possible to forecast if such a license will be issued or match the specifications.

There may be a link between the financial risk to obtain loans for project and equipment funding that may prove to be too exorbitant owing to price increases. Political risk is another factor of concern which might be caused by transition in political administration or public officers. As a result of the changes, measures put in place may be abandoned. Its influence renewable energy projects financing has continually occasioned relatively low investment turnout in that area of Nigerian

[426]Nnodim, O. FG Signs N55bn Renewable Energy Agreement with GE. Retrieved 10 December 2021 www.punchng.com/news/fg-signs-n55bn-renewable-energy-agreement-withge- 2/

[427]Popoola, A. T. The Challenge of fFnancial Infrastructure in Nigeria. Retrieved 10 December 2021 www.nigeriadevelopmentandfinanceforum.org/PolicyDialogue/Dialogue.aspx?Edition=101.

[428]Nigeria signs deal with China Exim Bank for 700-MW Zungeru hydropower project. Retrieved 10 December 2021 www.hydroworld.com/articles/2013/09/nigeria-signs-deal-with-chinaexim-bank-for-700-mw-zungeru-hydropower-project.html

[429]de Jager, D. and Rathmann, M. Policy Instrument Design to Reduce Financing Costs in Renewable Energy Technology Projects. Retrieved 10 January 2021 from www.ecofys.com/files/files/retd_pid0810_main.pdf.

[430] Section 2 Environmental Impact Assessment Act 1992; Section 70 EPSR Act 2005.

economy.[431] Renewable energy initiatives, on the other hand, have a greater risk profile. Investors see technologies that have not been demonstrated to work well or have a limited track record as an act of taking a huge risk.[432] This appears to be the Nigerian situation, considering the widespread skepticism about the unreliability of technologies.[433] Potential investors may become skeptical as a result of this. In general, performance risks exist, which closely connected to renewable energy initiatives. A widespread apprehension arises that so many of these renewable energy technologies are largely untested, hence their viability remains unpredictable. Planning approval and licensing may pose regulatory risks. Investors may be concerned that they will not receive the necessary permission. Even if clearance is obtained, they may face opposition from persons and groups questioning situating renewable energy projects in certain region. A renewable energy project's high cost is also a danger.[434] Because of the apparent risk, financiers favour investments in traditional sources of energy rather than renewables.[435] Preferably, prior to renewable energy projects funding, thorough due diligence in regard to the current risks described above would be necessary. However, the banking industry lacks insight about the necessary due diligence expected of renewable energy projects.[436] This is because they are not accustomed to financing this kind of projects. The advocates of the UNDP/Bank of Industry programme on renewable energy correctly acknowledged shortage in financing and limited funding to be the main constrain to renewable energy development in Nigeria.[437]

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[431]Asu, F. Nigeria Lags in Renewable Energy Investment as Peers Lead Charge. *Business Day* 9 May 2013 Retrieved 10 December 2021 from http://businessdayonline.com/2013/05/nigeria-lagsin-renewable-energy-investment-as-peers-lead-charge/

[432]Aliyu, A. O. and Bawa, J. Y. 2012. Identifying Market, Institutional and Financial Barriers to the Implementation of Renewable Energy Technologies in Nigeria. *Green Energy and Energy Security Options for Africa: Proceedings of the 2012 Conference of the Nigerian Association of Energy Economics*. Eds. A. Adenikinju, A. Iwayemi and W. Iledare, Ibadan: Atlantis Books 61.

[433]*ibid*.

[434]Bank of Industry, Access to Financing Renewable Energy in Nigeria– Introduction of Different Models and Requirements. Retrieved 10 December 2021 from http://nigeria.ahk.de/fileadmin/ahk_nigeria/Renewable_EnergyAccess_to_Financing_Nigeria_German_Business_ Council.ppt

[435]Baker, L. Facilitating Whose Power? IFI Policy Influence in Nigeria's Energy Sector. Retrieved 10 December 2021 from www.brettonwoodsproject.org/wp-content/uploads/2014/04/ Nigeria.pdf

[436]Asu, F. Nigeria lLag in Renewable Energy Investment as Peers Lead Charge. *BusinessDay* 9 May 2013 Retrieved 10 December 2021 from http://businessdayonline.com/2013/05/nigeria-lagsin-renewable-energy-investment-as-peers-lead-charge/

[437]Eboh, M. Nigeria: Funding Hinders Development of Renewable Energy. *The Vanguard* 18 June 2013. https://www.vanguardngr.com/2013/06/funding-hinders-development-of-renewable-energy/amp/

5.18 Existing Grid Connected Solar Power Plants in Nigeria and other Jurisdictions

Zambia and Senegal

The installed capacity for the grid connected solar power plant in Zambian is 33MW, while the capacity for the grid connected solar power plant in Senegal is 30MW. The PPA provision for energy charge price at the delivery point for Zambia is USD 0.05 per kw/hour whereas the PPA provision for energy charge price in Senegal is USD 0.06 per kw/hour. The Nigerian PPAs signed in 2016 between NBET and the 13 IPPs/investors provide for energy charge price rate of USD 0.115 per kw/hour which is not above the statutory maximum solar energy sourced electricity charge rate of USD 0.177 per kw/hour as provided for under Schedule 5 of the REFIT, ,2015 . However, the FGN, through the Ministry of Finance, contended that US$0.075 per kWh should be the price for the 13 PPAs. In its argument to supports this new position, the FGN referred to the decline in the price of solar across the globe by 74% ever since 2009.It is imperative to note that the Nigerian 13 grid connected solar power projects are stalled due to these disagreements as the parties could not secure PCOAs and PRGAs from financial institutions, thereby making the PPAs not getting to Financial Close.

Sham 1 Solar Power Farm, Abu Dabi, United Arab Emirate (UAE)

The installed capacity for Sham 1 solar power plant is 100MW. The construction cost is USD 600 million and was financed by ten regional amd institutional lenders which include BNP Paribas, the National Bank of Abu Dhabi and Societe Generale. It is a private equity holding company managed by a Special Purpose Vehicle. The owners of the power plant are Masdar 60%, Abengoa Solar 20% and Total S.A 20%.[438] Sham 1 was commission for operation on 17th march, 2013. It is located in Madinat Zayed,Abu Dhabi.

Solar Power Plant, Kumbosto, Kano State, Nigeria

The installed capacity for this grid connected solar power plant is 9.7MW. It is owned by Nigerian governments. Federal Government of Nigeria, 80%,; Kano State Government 15% and, Kumbosto Local Government Council 5%. It is being managed by the Nigeria Sovereign Wealth Fund Authority.

[438] Concentrating Solar Power in the United Arab Emirates ; Sham 1 Project Secures Financial Close - Solar Server. Retrieved 2011 – 01 -12

5.19 Disputes Resolution for Renewable Electricity Power Purchase Agreement

The creditor operators of the power sector are at the mercy of their debtors. This is because they have not been able to formulate a viable debt recovery mechanism and strategies. Making resort to litigation is some tortuous pathway sector creditors are wary of undertaking. This is in view of the sundry challenges fraught with this option, considering the huge amounts involved, the high rate of default, the cost of litigation, etc. The realisation of the stark reality of litigation as an inefficient option has made the indebtedness in the industry to be regarded as bad debts. Chances of recovery are slim, and they may be easily written off as bad debts at last.[439] A former NERC chairman had once written to the head of the FHC, to the effect that incessant litigious actions in the power sector had the chance of truncating the gains already attained through power sector reforms.[440] This has pointed out the need for the exercise of caution in the use of litigation in order to exert any right or make monetary claims in the Nigerian power sector.

The PPA signed between NBET and the 13 solar PV power plant developing companies anticipate that disputes may arise between the parties in the course of the enforcement of the agreement. Parties did not leave the dispute resolution mechanism of the PPA to the court which is the regular avenue for dispute settlement between contracting parties. Arbitration is therein adopted as the mechanism for dispute settlement between the parties. Most modern contracts usually adopt alternative dispute resolution mechanisms, preferably arbitration. This is because of the delays and public exposure which are usually associated with litigation.[441] The adoption of arbitration implies that disputes arising between parties must first be subjected to arbitration before they dispute can be subjected to litigation. In the situation where any of the contracting parties perceives a dispute between parties but choose to institute a case in court instead of activating the arbitration clause, the court would decline jurisdiction to determine that case until after the case have been subjected to

[439]Umbu, E. I. 2021. Legal and Institutional Evolution of the Nigerian Electricity Industry: A Tale of Ups and Down. *Nigerian Bar Journal* 11.2: 135-163, 159.

[440]Amadi, S. 2015, A Likely Threat to Power Sector Reforms. Retrieved 13 November, 2021 from https://nerc.gov.ng/doclib/nerc-papers-and-presentatios/263-a-likely-threat-to-power-sector-reform-the-vice-president-s-copy/file

[441]Rhodes-Vivour, A. O. 2008. Mediation (A "Face Saving Device") - The Nigerian perspective. *Journal of the International Bar Association Legal Practice Division Mediation Committee Newsletter* 4.1: 8. Retrieved on 25th March, 2021 from www.drvlawplace.com/media/MEDIATION-FACESAVING-%20DEVICE.pdf

arbitration.[442] This does not preclude a party from approaching the courts during the pendency of an arbitration procedure to obtain interim or preservative reliefs in line with the arbitral proceedings; seeking relief to enforce the agreement while the arbitration is ongoing; or to enforce the arbitral award.[443]

An arbitration clause is that special provision in an agreement that sets out arbitration as the dispute resolution mechanism in a contract. A valid arbitration clause should at least disclose the intention of the parties to subject the dispute to arbitration and the relevant law on the basis of which the substantive and procedural issues should be resolved.[444] The applicable law is an important aspect of the arbitration clause. The importance of the arbitration clause cannot be over emphasised. It has been held that even though an arbitration clause is part and parcel of a contract, it still remains active and unaffected by the novation of the entire contract.[445] In other words, the arbitration clause has a life of its own that outlives the contract.

The PPAs that were signed between NBET and the solar development companies, have arbitration clauses and detailed provisions on the form, procedure and approach for the activation of such arbitration clauses under the contracts.[446] The PPA subjected the rights and duties of parties to be interpreted in line with applicable Nigerian law. A dispute is said to have arisen when an aggrieved party transmit a written notice to the other party, setting out the dispute between them parties. Upon delivery of the notice of dispute, parties have thirty days within which to explore amicable settlement of the dispute amongst them through negotiations. If the dispute still remains unresolved, within that period, any of the party is then allowed to refer the matter to arbitration.[447] However, parties are required to continue to perform their contractual obligations amidst disputes arising or while undergoing any form of dispute resolution.[448]

Before embarking on arbitration, parties may explore the advisory opinion option, where an independent expert is to be appointed to make reviews and render opinion of the situation if it relates to technical, commercial, accounting or metering issues.[449]

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[442]See, *M.V. Lupex v. N.O.C. and Shipping Ltd*. (2003) 15 NWLR (Pt. 844) 469; *BCC Tropical (Nig) Ltd v. Government of Yobe State of Nigeria & Anor* (2011) LPELR-9230(CA).
[443]Clause 22.4 NBET Power Purchase Agreement – Solar.
[444]Blackaby, N., Partacides, C., Redfern, A. & Hunter, M. 2015. *Redfern and Husnter on International Arbitration*, Student Version 6th ed. Oxford: Oxford University Press, 233.
[445]*NNPC v. Clifco Nig. Ltd.* (2011) LPELR-2022(SC).
[446]See Clause 22 NBET Power Purchase Agreement – Solar.
[447]*ibid*. Clause 22.2.2
[448]*ibid*. Clause 22.3.7
[449]*ibid*. Clause 22.3

Advisory opinions enable the parties to exercise necessary safeguards to ensure preservation of the contract. Through an advisory opinion, parties can be properly guided on the appropriate measure to take in order to address the particular dispute in issue.[450] It also gives parties a glimpse of the likely arbitral outcome should the matter proceed to arbitration. However, as the name suggests, the opinion rendered by the expert is advisory. The implication is that parties are not bound by the opinion rendered by the expert. Also, it is not imperative that the disputing parties should undertake the advisory opinion step. They may choose to bypass this step if the dispute is not of the nature listed in clause 22.3 of the PPA or they feel otherwise about having it resolved through that method.

Where the shot at negotiation and advisory opinion cannot help parties resolve the dispute effectively, resort can then be made to arbitration. The applicable arbitration Rules under the PPA is the International Chamber of Commerce (ICC) Rules of Arbitration. The arbitration proceedings are conducted in English language, while London is the seat of arbitration.[451] The arbitration tribunal is to be properly constituted by their member panel of arbitrators. The three arbitrators are to be wholly appointed by the ICC International Court of Arbitration. This is a means of securing the neutrality and independence of the prospective arbitrators.[452] The arbitral award is final and binding on the parties. Parties are under obligation to give a total and prompt compliance to the arbitral award. Except there is a waiver by the other party, right of appeal of the arbitral award lies in the circumstance where the award has been given full effect or if the full sum of the arbitration award has been lodged with the arbitral tribunal or appropriate court which has jurisdiction to receive such award.[453] The substantive arbitration proceedings under the PPA can be consolidated into one proceeding with arbitral proceedings in agreement collateral to the PPA such as the PCOA, PRG Agreement, vesting contract, etc., if the issues in both disputes are similar or substantially related. In any of these instances, the prior constituted arbitral tribunal will be in a position to consolidate and determine both disputes arising from the PPA.[454]

[450]Herbert, E. B. The Role of the International Court of Justice in Actualising Global Peace. *Indian Journal of International Law* 59.1–4: 323–354, 338.
[451]Clause 22.3.1 and 22.3.3 NBET Power Purchase Agreement – Solar.
[452]*ibid*. Clause 22.3.2
[453]*ibid*. Clause 22.3.7
[454]*ibid*. Clause 22.5.1

Another means of dispute settlement under the PPA is through the means of expert determination. Expert determination is applicable in the instance when the total pecuniary claim in the dispute is not more than US$3,000,000. However, resort to expert determination can only be had after the advisory opinion of experts had been sought and it did not lead to an amicable resolution of the dispute.[455] Resort to expert determination can be activated by a party issuing a written notice to the counter-party that the dispute should be referred to an expert for determination. The appointment of an expert shall be determined on the basis of mutual agreement of disputing parties.[456] Where parties cannot reach an agreement on the expert to be appointed within ten days after the issuance of the notice of expert determination, the appointment function shall be seconded to be made by the International Centre for Expertise pursuant to the Rules for Expertise of ICC not later than fifteen days after the referral was made.[457] After the parties exercise the opportunity to present their evidential materials and submissions in the expert proceedings, the expert would proceed to make a verdict, of course providing statement of reasons, on the matter as soon as practicably possible.[458] Except on the grounds of manifest error or fraud, the decision of the expert is final and conclusive.[459]

Just as applicable in the instance when the dispute is undergoing arbitration, the fact that a dispute is currently pending before an expert for determination does not mean that the parties should suspend the continuous performance of their obligations under the PPA until the dispute is determined by the expert. The fact that the PPA is targeted at facilitating utility services may have informed the clause of continuous performance of contractual obligations even when parties are having disputes over certain contractual issues. Then the pertinent question is whether a disputing party may still be compelled to continually perform the PPA when the dispute is borne out of its contest of the contract itself.

At this point, it is important to interrogate the role of NERC in the formation, execution and resolution of disputes arising from the PPA. NERC performs a regulatory supervisory role in the power sector. Part of this function includes supervising the PPAs signed by operators in the sector. As discussed earlier, the

[455] *ibid*. Clause 22.6.1
[456] *ibid*. Clause 22.6.2
[457] *ibid*. Clause 22.6.3
[458] *ibid*. Clause 22.6.7 - 22.6.9
[459] *ibid*. Clause 22.6.10

EPSRA and relevant NERC regulations require that before power sector operators sign PPAs, the contract document must be submitted for NERC's review and approval. This is a mandatory requirement, breach of which is capable of affecting the validity of the PPA signed between the parties. It can even lead to NERC revoking the operating license which it granted to the defaulting operators. It is even contained as a preliminary provision in the PPAs that the PPA would be submitted for review by NERC and other relevant authority. Upon submission of the PPA, the parties shall wait for NERC to issue a written approval from of the PPA; a statement of no objection to its execution or a statement to the effect that the agreement is not subject to NERC review. Any PPA signed whereas this pre-condition is not satisfied, would not be valid.

Apart from approval of NERC prior to the execution of the PPA, the PPA did not confer a dispute resolution role to NERC in the event that a dispute arises between parties regarding the clauses in the PPA. The only dispute resolution mechanism under PPAs is captured above. The PPA expressly provides that the outcome of the expert determination and arbitration award are final and conclusive. However, the EPSRA has provisions which deal with dispute resolution for transaction between operators in the sector. While it expressed its preference for alternative dispute resolution, Section 50 (1) (g) EPSRA confers on NERC the power to sit over decision of arbitral or mediation tribunal arising between licensees, if a party still feel aggrieved about the outcome. This essentially places NERC as an appellate or review panel in this regard.

Ordinarily the provision of section 50 (1) (g) EPSRA may be commended for its recognition of alternative dispute resolution mechanism in commercial transaction of this nature, considering the capital-intensive nature of the investment and the utility purposes which it serves consumers. Indeed, it makes for time saving, name saving and promotes chivalry among sector operators.[460] This is also important, as it promotes independence of disputants as consensus has to be reached between them [parties] on many grounds.[461] However, the said question raises issue whether it does not diminish the party autonomy which the preference to alternative dispute resolution seeks to promote. The aforesaid provision of EPSRA is in sharp contrast to the clause of the

[460]Idigbe, A. and Foy-Yamah, O. 2010. Arbitration Agreement. 11. Retrieved on 3rd March, 2014 from: www.punuka.com/uploads/arbitrationagreements.com

[461]Jack-Osimiri, C. 2011, Arbitration as a Conflict Resolution Approach to Oil Spill Compensation Payment in Oil Producing Communities of Rivers State, Nigeria. *International Journal of Advanced Legal Studies and Governance* 2.1: 17-32, 22.

PPA which did not recognise an appellate body outside the dispute resolution methodology adopted under the PPA. It is, therefore, a question that stands to be answered as to between the PPA and the EPSRA, which will prevail over each other on this point. Ordinarily, the court will uphold the contractual agreement as agreed by parties. However, where there is statutory provision which makes variation of a contractual position, such provision of the agreement shall bow to the clear statutory provision. It therefore means that, even though the PPA fails to recognise any appellate body, by the provision of Section 50 EPSRA, NERC can serve as an appellate body in respect of decisions of the arbitration tribunal and expert determination as contained in the PPA, upon the dissatisfaction of an aggrieved party.

The implication of the *PHCN & Ors v. NERC* [462] effectively places NERC under the judicial supervision search light of the court. Superior Court of Records, particularly the High Court, has judicial review powers over administrative bodies' exercise of judicial and quasi-judicial powers. The Court of Appeal and Supreme Court are superior courts of record, which can respectively sit over decisions of the High Court. The issue of whether an arbitral award under the PPA is still subject to appeal to NERC came up for consideration in the *PHCN & Ors v. NERC* [463] case. The fact of the case is that, a party to a PPA filed an application before NERC to determine a dispute arising from the dispute in the PPA. The other party felt it was outside the province of NERC to exercise jurisdiction over such matter considering the arbitration clause captured in the PPA. Hence, the party approached the FHC to make a determination on this point when NERC refused to decline jurisdiction on the matter.

In its decision, the Court held that, the arbitration clause is a legal bar for NERC to determine the application. It was further held that the provision of Section 50(1) EPSRA 2005 was not a compulsory but elective provision of the Act. The effect of this decision is that the regulatory power of NERC on licencees and exercise of its judicial or quasi-judicial power in respect of the PPA has been diminished.[464]

[462]Unreported Suit No. FHC/ABJ/CS/35/09/08.
[463]*ibid*.
[464]Andzenge, T. 2015, Legal Issues in the Contextual Diffusion of Independent Regulatory Agencies in Nigeria. Ph.D Thesis: University of Cape Town xii+288, 219-220.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summary

This study is divided into six chapters. Chapter one discussed preliminary issues, as: background to the study, statement of problem, research questions, aims and objectives of the study, justification for the study, scope of the study and expected outcome. The background to the study traces the global drive towards renewable electricity sources in line with attaining SDGs. The statement of problem pointed out the challenges of renewable energy deployment for electricity towards addressing the energy poverty challenge in Nigeria. The aim and objective point out what the study set out to achieve. These objectives are put in research question format which the study provided answers to. The justification for this study is the recognition of the important role of renewable energy in supplementing the fossil-based energy sources currently in use in NESI. Energy mix in NESI will to a great extent address the energy poverty challenges in Nigeria. The outcome of the study is identification of the legal, regulatory and contractual challenge that plagued the deployment of renewable energy resources into the national grid in Nigeria.

Chapter two is the literature review segment of the work. It examined exiting literature on similar and related subject matter and theoretical framework of the study. The literature was selected on the basis of their relevance, applicability to the subject matter and how recent works were published. The study adopted a combined theoretical framework of public interest and regulatory theories It contended that sector regulators have a duty to guard against conduct of industry operators that are contrary to public interest. Chapter three set out the methodology deployed to realise the research objectives. The study adopted a doctrinal methodology, which examined primary and secondary sources of law. The study also adopted the qualitative research method carrying out field work, using unstructured interview to elicit vital information from key industry players.

Chapter four of the work examined the structure, legal and regulatory framework for renewable electricity in the Nigerian power sector. The structural overview of the Nigerian power sector examined the evolution of the power sector before and after the period of power sector reforms. The legal framework consists of policies, statutes and NERC Regulations. The regulatory bodies considered in this chapter include: NERC, ECN and NBET. NBET, which is supposed to be the major driver of the renewable energy development has been found wanting in funding to effectively meet up with their financial obligations. Most of the policies created to promote renewable energy deployment in the power sector are yet to be enacted into laws. The imperative for Competition law and Institutional framework for the states was also discussed.

Chapter five examined the contractual framework for renewable electricity deployment in Nigeria. The applicable contractual instrument for renewable energy development is the PPA. NBET signed 13 PPAs with IPPs for the development of solar PV electricity to be transmitted to the national grid network. The FGN refused to sign the PCOA with the IPPs but opted to renegotiate the tariff term agreed in the PPA. Also, the international financial institutions also refused to sign PRGA in favour of the FGN due to the liquidity crisis in the power sector. Thus, none of the PPAs reached financial close. These are the factors which have plagued the implementation of the PPA. The implication is that no watt of electricity has been generated from renewable energy sources and infused into the national grid. The foregoing led to the conclusion that, even though there are existing legal and regulatory frameworks which purport to support renewable energy deployment in the power sector, the failure of the FGN to uphold the sanctity of contract has created a stalemate in renewable energy development in Nigeria. Comparative analysis of other jurisdictions where state governments participate across all the value chain in the electricity industry was carried out. The new legal regime under the CFRN 1999 as amended (Fifth Alteration) (No.17) Act, 2023 and Electricity Act, 2023 was discussed vis-à-vis the benefits to the industry.

6.2 Conclusion

This study examined the legal and regulatory framework that addresses regulation of renewable energy tariff in the Nigerian electricity sector. It is particularly interested in identifying the constraints to the infusion of renewable energy into the energy mix of

the Nigerian electricity industry despite the various national policies, regulations (typified by REFIT 2015) and contractual framework in the form of the PPAs signed with the renewable energy power plants developers, all in a bid to achieve this end. In an attempt to make this finding, the study primarily adopted the doctrinal approach of legal research, which entailed a desktop examination and analysis of relevant laws on the subject matter. The study also conducted an unstructured interview with concerned stakeholders in the industry in order to get first-hand information on what transpired between disputing parties to the 13 PPAs for the national grid connected solar power projects.

This study has justified the need for Nigeria to embrace deployment of renewable energy resources to the energy mix. Apart from the advantage inherent in the utilisation of varied energy resources, the environmental friendly merit of renewable energy, and the global drive towards energy transition, there are lots of opportunities which could be leverage upon from international and development agencies which provide financial and technical supports for developing countries that embrace environmental friendly technologies. Examples which were identified in this work is the support scheme which developed countries are obligated to provide to developing state parties to the Paris Agreement with respect to renewable energy and the carbon credit mechanism under the Paris Agreement and Kyoto Protocol to the UNFCCC respectively. Nigeria can take advantage of these opportunities should renewable energy sourced electricity utilised in NESI.

This study concluded that there are legal and regulatory frameworks which have been set up for the purpose of stimulating renewable energy development to supplement electricity generation capacity in Nigeria. The challenge has majorly been in the aspect of implementation of these regimes into practical realisation. There is a lack of policies with long term benefit; political lethargy in clean energy diversification; constant change and re-shuffling of institutional regulators. These barriers pose limitations for future planning towards the adoption and sustainability of renewable energy, considering the apprehension raised by government uncertainty.[465] It was pointed out that the deficit of operational policies does not render support for existing mechanisms.

[465]Abdullahi D., Suresh, S., Renukappa, S. & Oloke, D. 2017, Key Barriers to the Implementation of Solar Energy in Nigeria: A Critical ASnalysis. IOP Conference Series: Earth and Environmental Science 83 1, 4.

One instance is the NREEEP which intends to offer price and tax inducements but is yet to gain practical significance.[466]

Another constraint to the development of renewable energy sourced electricity has been in the aspect of determining the appropriate tariff plan or structure to be applied on electricity derived from renewable energy sources. Although this was not an issue, as NBET and the renewable energy developers had signed a PPA which resolved controversies in this regard. However, NBET later reneged on the terms previously agreed by parties, for reasons including, fall in the price of solar materials in the international market and uncompetitive tariff plan compared to what is obtainable in neighboring African countries.

For whatever merit the argument for NBET may have as it reason for reneging on its earlier agreement and consequential refusal by the FGN to sign the PCOA, this amounts to a clear case of breach of a contractual obligation that was freely entered by parties to the PPAs. This portends serious legal implication that could plunge Nigeria into heavy financial liabilities. PPAs contain arbitration clauses and procedures to activate arbitration and other alternative dispute resolution mechanism. Should the renewable energy developers decide to activate any of these mechanisms, NBET and indeed, the Nigerian government is likely to be found liable to claims amounting to several millions of dollars for breach of contractual obligations. The excuses put up by the Nigerian government for not being able to give effect to the PPAs are not valid reasons under the law that could avail them as a defence. The decision of the arbitration panel in the *P&1D Case*[467] where an arbitral award was granted to the tune of over US$ 9 billion as substantive damages plus $US6.597 billion interest sums against the Nigerian government for its breach of contractual agreement is a case in point on this matter. A similar or worse fate could befall the Nigeria government if the renewable energy developers decide to take up the matter in arbitration. It is still surprising that none of the investor parties to the PPAs have thought it necessary to commence arbitration proceedings or explore any of the legal remedies available to them under the PPAs.

[466]Ley, K., Gaines, J. & Ghatikar, A. 2015, The Nigerian Energy Sector: An Overview with a Special Emphasis on Renewable Energy, Energy Efficiency and Rural Electrification. Nigerian Energy Support Programme Report 2nd ed. Homburg: Deutsche Gesellschaft für Internationale Zusammenarbeit 117.
[467]See, *Process and Industrial Developments Ltd. v. Federal Republic of Nigeria*, No. 18-594, 2018 WL 8997443, 3.

Part of the arrangement was that an international financial institution, particularly World Bank and African Development Bank, was supposed to offer a partial risk guarantee, as a means of securing the financial liquidity of the PPAs. These international financial institutions have reneged on their promises to offer a PRG to the Nigerian government on the agreement. They have cited the liquidity crisis in NESI as the major reason for going back on their promises. The liquidity crisis in the Nigerian power sector is a chain reaction of the uncompetitive nature of the power sector. Government presence is still heavily felt in the Nigerian electricity market. The strict tariff regulation measures, which are not cost reflective, have ensured that the sector is not regulated by market forces. Incidence of electricity theft from end users implies that the DISCOs are not able to realise sufficient return on investment to enable them meet up with their indebtedness to NBET. Consequently, NBET is unable to offset its indebtedness to GENCOs. This effectively affects the productivity of GENCOs. This circle of indebtedness, thus, puts the power sector into a circle of liquidity crisis. Until this liquidity crisis is resolved, investors and development agencies would keep having cold feet about investing into the Nigerian Power Sector. Consequently, the NESI will continue to remain largely underdeveloped.

The foregoing has adverse effect on the confidence of investors to invest in the Nigerian power sector. The power sector is a high capital-intensive industry. Investors need assurance that their investments would be guaranteed. A system which tolerates sudden change in government policies and arbitrary disregard for contractual obligations on the part of government would make investors wary of putting their capital investment at risk. The liquidity crisis has also occasioned adverse effect in developing renewable energy investment in the power sector. This is exemplified by the refusal of international financial institutions and development agencies to provide the PRGA which they initially agreed to furnish. Hence, for investment promotion and renewable energy development as electricity generation source, the Nigerian government has to abide by its contractual undertakings. Also, effort has to be made to resolve the power sector liquidity challenge.

6.3 Recommendations

Following the findings obtained from this study, it is hereby recommended as follows:

i. Nigeria Government should Abide by Contractual Obligations in PPAs or NBET should initiate the renegotiation of the disputed clauses and terms in the PPAs

The general law of contract is that signatory parties are bound to comply with contractual obligations which they freely executed between parties. This is captured in the principle of law known as *pacta sunt servanda*. The decision by the Nigerian government to renege on the tariff terms agreement in the PPAs is responsible for the stalemate which has forestalled the signing of the PCOA, and consequential non-implementation of the renewable energy power project development. The failure of the Nigerian government in this regard could cause the countries serious liability in damages if the renewable energy developers decide to explore their legal remedies under the PPAs.

Alternatively, NBET as a quasi-regulator in the NESI should initiate renegotiation of the disputed clauses or terms (the earlier agreed energy charge/tariff/price per kWh) in the PPAs by virtue of Clause 24.1 of the PPA[468]. This is notwithstanding that NBET is a party to the 13 PPAs so that investors' trust in the Nigerian economy will not be further diminish due to uncertainty in adherence to rule of law in Nigeria.

ii. Adopt a Valid Cost Reflective Tariff in order to Address the Power Sector Liquidity Crisis

The inability of operators in the power sector to meet up with their payment obligations to other stakeholders in the industry is a chain reaction of the non-cost reflective tariff regime in the power sector. It therefore, suggests the need to set up a viable tariff regime that will stimulate some certainty and sustainability in revenue generation for industry players in order to enable them meet up with their financial obligations. This is one means of addressing the liquidity crisis in the sector. Addressing this issue will boost investors' confidence to make investment commitment into the sector. It also boosts the desire of international financial institutions and

[468] Clause 24.1 of the PPA executed between NBET and the 13 IPPs/Solar Power Plant Investors provides, inter alia; The Parties shall vary or replace or add to the PPA by mutual consent in writing signed by the authorized representatives of the Parties and with the prior consent and approval of NERC.

development agencies to partner with the government in promoting renewable energy investment in the power sector.

iii. Implementation of Policies on Renewable Energy Development

There are several lofty government policies on renewable energy development in Nigeria. However, most of these policies have not been given concrete effect by transformation into a legal framework that is of legally binding effect. The implication is that they continue to exist as the intendment of government, without any political will to bring it to life to it. There is need for government to consolidate these renewable energy policies into law and set up practical institutional measures to give effect to its provision.

iv. NERC should Ensure Operators' Strict Compliance with Power Sector Regulation

As the sector regulator, NERC has the duty to ensure that operators in the sector adhere strictly with sector regulations, particularly with regards to the terms and conditions of their respective operating license. NERC must insist on accountability and appropriate application of sanctions against defaulting operators. NERC should ensure that PPAs and other contractual obligations in the industry are closely monitored and complied with by parties.

v. Governments should give Financial Support to Grid Connected RE Sourced Electricity Projects.

Some of the ways governments at all levels can support RE sourced electricity projects that are connected to the national grid include; fiscal and financial support ; government should invest into RE sourced projects by having equity holdings and deliberate policy on promotion of initial public offers in the national grid connected sub sector.

vi. The Imperatives for State Antitrust Laws / Competition Laws and Institutional Framework.

State governments should put framework in place for Antitrust Laws /Competition Laws to prevent anti-competition behavior in the emerging state electricity markets. It is expected that there would be increase in competition in the state electricity market due to the new legal regime for the electricity supply industry.

6.4 Contributions to Knowledge

This study has been able to identify the challenges with the deployment of renewable energy sources in the Nigerian power sector. It has been identified that it is not so much about the availability or lack of legal, regulatory or contractual framework, but about the question of political will and commitment of sector players who are contractual parties to renewable energy PPAs. This work has been able to demonstrate the importance of respect for the rule of law and compliance with contractual obligations in the power sector. This study has made an exposition and further research into the legal perspective or implications on the legal and contractual framework on the deployment of RE technology in the power sector in Nigeria.

This study highlighted the imperative for Antitrust Law/Competition Law for states to ensure fairness in the emerging state electricity markets. This study exposes efficient mechanism for resolution of disputes, which constitute constraints and stagnation to implementation of on-grid connected RE sourced electricity projects in Nigeria.

6.5 Suggestions for Further Studies

This study examined the challenges with the tariff for renewable energy resources deployment in Nigeria. It is suggested that subsequent studies should examine the various legal remedies available to the IPPs as a result of the breach of their contractual agreement with the FGN.

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APPENDIX 1

FIELD REPORT

During the field trip, the researcher visited NERC and NBET. At NERC, the researcher conducted an oral interview with an officer in the Legal Licensing & Compliance Department. At the NBET, the researcher also conducted an oral interview with an officer in the Market Analysis and Compliance Department and the NBET General Counsel and Head of Legal.

From the three interviews conducted, the factors which were identified as responsible for the failure in the infusing renewable energy into the national grid network in Nigeria including the following:

i. The Partial Risk Guarantee (No PRG was signed by World Bank for any of the 13 IPPs/ investors) (Interview: NERC, 2021)
ii. The Put Call Option Agreement (poor- Market performance, fall in price of solar facilities globally, government experience with Azura power project) (Interview: NERC, 2021)s
iii. Solicited and unsolicited bidding (no renewable electricity demand) (Interview: NERC, 2021)
iv. Azura Power Plant Experience (there is no suggestion that Accuaga and Azura commit any crime; the deals were ostensibly meant to encourage them to invest in the projects as well as guarantee markets for their gas and power respectively, the searchlight is now with the government, who enters the agreement and put country at disadvantage which jeopardized the nation's interests) (Interview: NERC, 2021)
v. Fall in the price of solar equipment all over the world
vi. Insecurity in the northern part of Nigeria where the solar power plant projects are to be sited because of the availability of sunlight for solar power projects (Interview: NERC, and IPP/Investors, 2021).
vii. Refusal to sign PCOA constituted too much risk for the investors (Interview: IPP/Investors, 2021).
viii. Risk of bankruptcy or low recovery (Interview: IPP/Investors, 2021).
ix. Azura issues (Interview: NERC, and IPP/Investors, 2021).
x. Failure to issue PCOA is causing delay to financial close and indeed 13 PPAs were signed (Interview: MBET and IPP/Investors, 2021).

APPENDIX 2

NON-DISCLOSURE AGREEMENT (NDA)

This Non-Disclosure Agreement ("NDA") is made on the ..... day of May 2021 ("Effective Date").

BETWEEN

THE NIGERIAN BULK ELECTRICITY TRADING PLC (NBET) (which expression shall include its successors and assigns), a company incorporated in Nigeria, having its principal place of business on the 2nd and 3rd floors, NERC Building, Plot No. 1387, Cadastral Zone, Central Business District, Abuja.

AND

EDOJA R. AKPODIETE, a Ph.D. student in the Centre for Petroleum, Energy Economics & Law, University of Ibadan, Ibadan, Nigeria, with his address at No. 1 Oghenebrorhie Street, off Akpodiete Layout, Ughelli, Delta state.

WHEREAS this NDA relates to disclosure of certain confidential information by either par-y to this NDA ("Disclosing Party') to the other party ("Receiving Party') for the purpose of collecting necessary data for the completion of a field research for academic purpose on Energy Law;

WHEREAS NBET was incorporated under the laws of the Federal Republic of Nigeria in July, 2010 pursuant to the Electric Power Sector Reform Act of 2005, with responsibility for the bulk purchase of electric power from power generating companies including Independent Power Producers ("IPPs") and its on-sale to electricity distribution companies;

WHEREAS Edoja R. Akpodiete is working on his field research titled "REGULATION OF RENEWABLE ENERGY TARIFF IN THE NIGERIAN ELECTRICITY SUPPLY INDUSTRY (NS)" in the area of Energy Law;

WHEREAS pursuant to the purpose of this NDA, NBET and Edoja R. Akpodiete intend to undertake this agreement;

WHEREAS the Disclosing Party and Receiving Party understand and agree that any confidential information that is covered by this NDA is regarded by the Disclosing Party as valuable;

NOW THEREFORE, the parties agree as follows:

I. NBET and Edoja R. Akpodiete are both entering into this NDA in consideration of being granted or having conditional access to certain confidential information as defined in this NDA that is owned by, produced by, produced for or in the possession of either party.

2. NBET and Edoja R. Akpodiete attest that they have read this NDA carefully and understand, agree to, and will comply with all the terms and conditions stipulated in this NDA for access to and use of confidential information covered by this NDA

3. For the purposes of this NDA, the definition of Confidential Information includes printed information, electronic information, telephone conversations, information disclosed in meetings, presentations or otherwise, any other form or medium of information or communication whatsoever and any information, material or documentation whether already disclosed, communicated or given to the Receiving Party by the Disclosing Party or to be disclosed, communicated or given to the Receiving Party at any time in the future by the Disclosing Party.

4. The Receiving Party will use Confidential Information from or relating to the Disclosing Party strictly and only for the specific purpose as agreed herein.

5. The Receiving Party hereby agrees that at all times and notwithstanding the termination of this NDA any Confidential Information as described in this NDA, will be securely held, handled, preserved and safeguarded in a manner that affords sufficient protection.

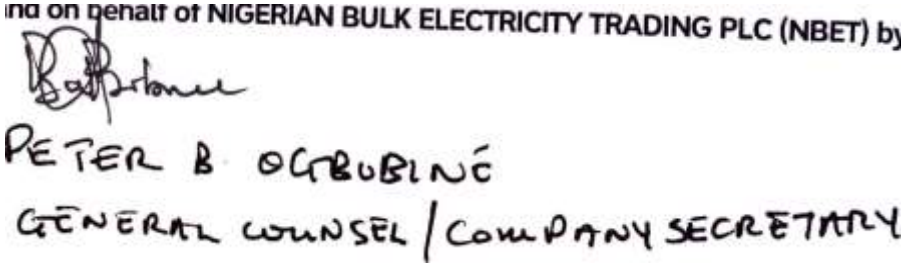
6. Neither this NDA nor the supply of any Confidential Information grants the Receiving Party any licence, interest or right in respect of any intellectual property rights or any other rights of the Disclosing Party including but not limited to ownership rights.

7. The Receiving Party hereby agrees that the Receiving Party shall promptly report to the
   Disclosing Pary, any loss, theft, misuse, misplacement, or unauthorized disclosure of Confidential Information or other violation of this NDA that the Receiving Party has knowledge of and whether or not the Receiving Party is personally involved.

8. NBET and Edoja R. Akpodiete respectively represent and warrant that by signing this NDA, they each have the full authority and mandate to enter into, and be legally bound by this NDA

IN WITNESS WHEREOF the parties hereto have executed this contract on the day and year first above written.

SIGNED for and on behalf of NIGERIAN BULK ELECTRICITY TRADING PLC (NBET) by:

Signature: 

Name: PETER B OGBUBINÉ

GENERAL COUNSEL / COMPANY SECRETARY

Designation:

IN THE PRESENCE OF:

Name: ONIWON RICHARD ADABARA.

Address: NO 30, OKEMESI CRESCENT, GARKI 2, ABUJA

Signature:

SIGNED by EDOJA R. AKPODIETE:

Signature:

Name: Edoja Rufus Akpodiete

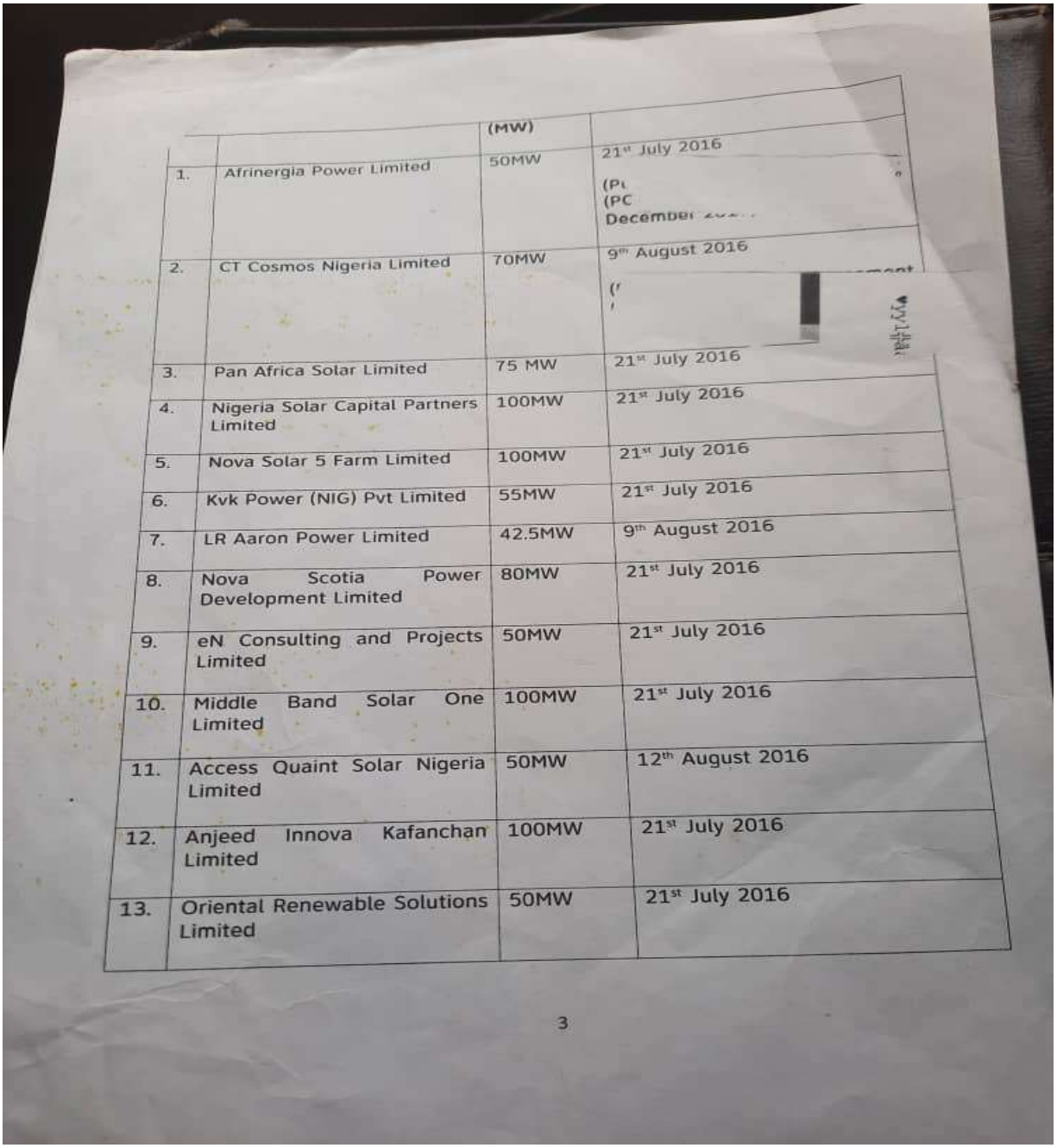
IN THE PRESENCE OF:

Name: Samson Isichei

Address: 366 Obafemi Awolowo Jubi, Abuja

Signature:

APPENDIX 3



		(MW)	
1.	Afrinergia Power Limited	50MW	21st July 2016 (Pı (PC December
2.	CT Cosmos Nigeria Limited	70MW	9th August 2016 (r
3.	Pan Africa Solar Limited	75 MW	21st July 2016
4.	Nigeria Solar Capital Partners Limited	100MW	21st July 2016
5.	Nova Solar 5 Farm Limited	100MW	21st July 2016
6.	Kvk Power (NIG) Pvt Limited	55MW	21st July 2016
7.	LR Aaron Power Limited	42.5MW	9th August 2016
8.	Nova Scotia Power Development Limited	80MW	21st July 2016
9.	eN Consulting and Projects Limited	50MW	21st July 2016
10.	Middle Band Solar One Limited	100MW	21st July 2016
11.	Access Quaint Solar Nigeria Limited	50MW	12th August 2016
12.	Anjeed Innova Kafanchan Limited	100MW	21st July 2016
13.	Oriental Renewable Solutions Limited	50MW	21st July 2016

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