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Electricity Generation and Renewable Energy Policy in Nigeria: Resolving the Regulatory Challenges

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ABSTRACT

Since the 1960s, inadequate electricity generation has been the bane of economic developments in Nigeria. The introduction of reforms and policies in the electricity sector, for the purposes of exploring renewable energy in electricity generation, is yet to bring about increased electricity generation. This paper examines the challenges of renewable electricity in Nigeria from the regulatory perspective. Studies have shown that the failure of Nigeria to have a regulator specifically for renewable energy is closely linked with the history of electricity generation in Nigeria. Till date, Nigeria does not have a regulator with specific mandates for the development of renewable energy even though there are many regulators with overlap of functions over the development of renewable electricity. Moreover, the power of the Nigerian Electricity Regulatory Commission over the promotion of renewable energy is limited to renewable technologies of certain capacities. This paper will analyse the history of electricity generation in Nigeria in the context of the law and the policy to ascertain how the country has approached the development of renewable energy for electricity generation. The aim is to identify regulatory impediments to the development of renewable electricity from the law and the policy in Nigeria. Recommendations will be made for the establishment of a renewable electricity regulator independent of the existing bodies. It is the position of this paper that in the absence of specific provisions mandating the electricity regulator to develop renewable energy for electricity generation, the contribution of renewable energy to electricity generation in Nigeria will remain marginal.

INTRODUCTION

With a population of over 200 million, and the projection that the population will be over 267 million by 2030, Nigeria is unarguably one of the most populous countries in Africa (National Council on Power, 2016). On the economic front, Nigeria has one of the largest economies in Africa (International Monetary Fund, 2017). Nigeria is also blessed with abundant energy resources in quantities that are sufficient to make the country one of the largest economies in the world. Ironically, electricity generation in Nigeria has not supported the country's population and economic growth. The rate of electricity access is about 62% comprising of 91% access in urban areas and 30% access rate by the rural population (Varela, 2021). The challenge of power supply in Nigeria is twofold – insufficient generation and poor transmission network. Nigeria is struggling to generate sufficient megawatt of electricity, and this has been the bane of Nigeria's economic development for decades. While the average demand for electricity in Nigeria is said to be above 25,000 MW, with a projection that this will increase to 40,000 MW by 2030, the total installed electricity capacity in Nigeria is currently is barely above 12,000 MW (Amadi, 2021). The 12,000 MW installed electricity generation capacity, the bulk of which is based on on-grid supply, comprised of 10,592 MW and 1,930 MW from gas-fired plants and hydro plants respectively (Advisory Power Team, 2015). The average electricity generation at peak period is 4,810 MW, and the bulk of which is lost during transmission (Adeoba, 2016). The sad reality about

electricity generation is that even if Nigeria generates at full capacity of the current installed capacity, the available electricity will still not be sufficient to address the challenges of electricity generation given that the total installed megawatt is grossly inadequate compared to the demand (Energy Commission of Nigeria, 2015).

The other leg of the challenge is inefficient transmission and distribution system caused by reliance on old and outdated transmission network. Electricity transmission network in Nigeria consists of 5,523.8 km of 330 KV and 6,801.49 km of 132 KV. Apart from the fact that the transmissions lines do not cover all parts of the country, the transmission lines are old and require high maintenance costs (KPMG Nigeria, 2016). Electricity supply is transmitted over these old and outdated transmission lines thereby resulting in the lost of the bulk of the electricity (Ohajanya, Abumere, Owate and Osarolube, 2014).

The state of the electricity generation is a direct opposite of the available energy resources in Nigeria. Nigeria is richly endowed with energy resources (natural gas, crude oil, biomass, solar, small hydro and wind). The resources exist in quantity that is sufficient to address the power situation and transform the country. Despite the abundance of different energy resources, electricity generation in Nigeria is dominated by gas and hydro (Advisory Power Team, 2015). In fact, electricity from gas-powered plants accounts for more than 80% of electricity generation (Kukoyi and Esan, 2018). Frequent disruption in gas supply has affected the ability of the gas-

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powered plants to deliver at maximum capacity (Nigeria Bulk Electricity Trading, 2016). On many occasions, the fluctuation in gas supply has caused the country to rely on hydropower alone (Nigeria Bulk Electricity Trading, 2016). The spate of insecurity in southern parts of Nigeria, which has defied any viable solution for now, has further compounded the challenges of gas-based electricity generation in Nigeria. The challenge of gas-based electricity has underscored concerns about Nigeria's energy security and served as a constant reminder of the need to diversify the country's energy mix (Dalberg Global Development Advisors, 2017)a.

The quest to address the challenges of electricity generation and supply informed the policy change in favour of renewable electricity. By the policy Nigeria will pursue the inclusion of electricity generation from renewable energy sources in the electricity mix. The pursuit of electricity from renewable energy source is also based on the global paradigm shift towards a low-carbon energy source. So, for a country like Nigeria where fossil based electricity dominates, the global shift towards renewable electricity is also an opportunity to address climate change. The idea is that electricity from renewable source will not only lead to increased electricity generation but also help in addressing the challenge of electricity distribution network. Nigeria recognises renewable-sourced electricity as key to solving the country's power deficit in the country (National Council on Power, 2016). Moreover, electricity generation from renewable energy has been identified as key to addressing environmental and climate concerns.

The FGN has, in recent years, focused on the development of renewable energy for electricity generation. This has led to the introduction of policies and regulatory supports aimed at promoting renewable electricity generation. On the policy front, the National Energy Policy ("NEP") is the main enabler of renewable electricity generation in Nigeria. The NEP provides the policy framework for exploiting Nigeria's renewable energy resources. The policy thrust of the NEP is the optimal utilisation of energy resources for sustainable electricity generation. Since the approval of the NEP, the policy landscape for renewable electricity has continued to evolve. Other policy documents have been approved to provide additional guidance for the development renewable electricity in Nigeria. Among the policy documents, the 2006 Renewable Electricity Policy Guideline and, the 2015 National Renewable Energy and Energy Efficiency Policy are relevant to the discussions in this article.

The enactment of the Electric Power Sector Reform Act ("EPSR Act") serves as a boost to the policy framework. Although the EPSR Act was enacted to provide legislative support for the electricity sector reform at the time, the Act has nevertheless provided legal support for the promotion and development of renewable energy for electricity generation. Like the NEP, the EPSR Act enjoins the Nigerian Electricity Regulatory Commission (NERC) to ensure access to reliable and secure electricity

in urban and rural areas (EPSR Act, 2005)a. In addition to the policy intervention, the Federal Government of Nigeria (FGN) has introduced a number of instruments, which are geared towards the promotion of electricity generation from renewable energy. The FGN has introduced a standard power purchase agreement (PPA) to incentivise renewable electricity. The FGN has signed a number of PPAs with electricity generators in a bid to drive renewable electricity especially off-grid solar projects.

Despite the paradigm shift and the policy interventions to drive renewable electricity generation, electricity generation from renewable energy in Nigeria remains marginal. The regulatory framework is yet to advance the development of renewable electricity. The hope of deploying renewable electricity to address the challenges of electricity generation and supply is fading by the day in view of the insignificant contribution of renewable electricity to the electricity mix.

The aims and objectives of this paper are briefly as follow:

- (a) To review the status of energy resources and electricity generation in Nigeria.
- (b) Investigate the adequacy of the existing regulatory frameworks on renewable electricity in Nigeria.
- (c) Identify and analyse the challenges of renewable electricity in Nigeria from the regulatory perspective.
- (d) Suggest a proposal for reforms.

Renewable electricity in this context means electricity generation from renewable or alternative energy sources, both on-grid and off-grid electricity generation.

This article is divided into six (6) parts. Part 1, this introduction, sets the context for regulatory challenges to renewable electricity in Nigeria. Part 2 discusses the research methodology and theoretical framework which informed the conceptual design of this paper. In part 3, this article undertakes historical analysis of electricity generation and regulation in Nigeria. In this part, this article will analyse the sources of electricity generation in Nigeria from inception, and how Nigeria has approached the development of renewable electricity. Part 4 will consider the policy and legal frameworks for renewable electricity in Nigeria. Specifically, this article will analyse the National Energy Policy and the National Renewable Energy and Energy Efficiency Policy for the purposes of understanding the policy shift in favour of renewable electricity. The work of some players whose works impact on renewable energy will also be considered. Part 5 analyses regulatory challenges to renewable electricity, while Part 6 concludes with key recommendation on the development of renewable electricity in Nigeria.

METHODOLOGY AND THEORETICAL FRAMEWORK

Methodology

In order that the aims and objectives of this paper are achieved, this study adopts a doctrinal approach. This procedure or technique becomes imperative because the purport of this exercise is to investigate the regulatory

frameworks that are put in place for the administration of renewable electricity in Nigeria. One certain and dependable way by which a law can be understood is to examine the peer-reviewed literatures (Langbrook et al, 2017). It is after investigation of the regulatory frameworks and other existing materials that a researcher is able to make assertion, proffer opinion and put forward his suggestions (Hoecke, 2015).

In order to get to the depth of methodology adopted for the conduct of this research, doctrinal materials relevant to the theme of this paper are gathered from primary and secondary sources. Statutes, Conventions and Protocols that are reviewed in this paper are derived from the primary source while journals, books, periodicals, manuals and articles that are as well examined are obtained from secondary source. The use of internet, library and other educational media were also engaged to be able to access all relevant materials that are gathered for the production of this work.

Theoretical Framework

The configuration and outline design of this paper is illuminated by Resource Curse Theory. It was Richard Auty who propounded or set forth this theory in the early 90s and its turning point is centered on why countries that are highly blessed with abundant natural resources are the most suffering economic adversity (Kova, 2017). In other words, this theory postulates that countries that are highly endowed with enormous natural resources always have nothing to show for such endowment (Ross, 2015). In a nutshell, the propagation of Resource Curse theory is that if a country is not to be entrapped by underdevelopment despite abundant natural resources at his control, then there is cogent need for such country to deploy an adequate legislation and sufficient policy which are to aid and assist in the use and development of its natural resources (Olujobi, 2020).

In spite of this theory's exposition, there are still criticisms trailing its concept. Phloeg (2011), posits that Resource Curse theory should not create the assumption that all countries of the world which have abundant natural resources do suffer underdevelopment despite having what it takes to develop their economies. In trying to justify his submission, this researcher cited Norway, Botswana and Chile as countries with abundant natural resources as well as robust economies. It is the conclusion of this researcher that Resource Curse theory is fallacious and deceptive. In another stretch, Stevens, Lahn and Kooroshy (2015), asserts that the theory has failed to investigate individual country and the circumstances surrounding the development of its economy. In that regard, these writers conclude that the theory may have to contend with large-scale affirmation.

Nevertheless and notwithstanding the criticisms, it would however appear that the Resource Curse theory is relevant to the economic status of many countries of the world and in particular the developing countries of which Nigeria is notably one. In summing up on how this theory has helped to fortify the structure of this

paper, it is imperative that one should review the theory's postulation on the necessity of engaging the laws and policies to fine tune the country's development of its natural resources. Nigeria is richly blessed with renewable energy resources and despite the fact, its renewable electricity sub-sector is abysmally not developed. There is energy poverty in the country and renewable energy resources are yet to be exploited or developed to shore up the electricity generation content. In order that the country must overcome these challenges, Resource Curse theory dictates that Nigeria must put in place sufficient and adequate regulatory frameworks to quicken the use and development of its renewable electricity resources.

Availability of sound legal framework and competent policy on the regulation and control of renewable electricity industry is a panacea to the series of challenges inhibiting development of the sub-sector (Kovab, 2017).

DISCUSSION

Energy Resources and Electricity Generation in Nigeria

Nigeria is blessed with renewable and non-renewable energy resources. With proven oil reserves of over 37 billion barrels and natural gas in excess of 187 trillion cubic feet, Nigeria is one of the oil-rich countries in the world. Nigeria also boasts of commercially viable renewable energy resources (that is, solar, biomass, small hydro, wind and tidal). The renewable energy resources exist in quantity that can be exploited to generate sufficient megawatts of electricity (Federal Ministry of Power, 2015). From about 1% of land areas, for instance, solar energy in Nigeria can generate 36,000 MW (Oyedepo et al, 2018). Nigeria's solar radiation is in the average of 3.5-7kmhm per day (Shaaban and Petinrin, 2014). The rate of solar radiation is even higher in the northern part of the country. The 36,000 MW from solar energy alone is far higher from the total megawatts of electricity from all the electricity plants in Nigeria. Wind energy is another renewable energy resource with high potential for electricity generation in Nigeria. In the South, the average wind speed is between 1.4m/s and 3.0m/s while in the North it ranges from 4.0m/s to 5.12m/s (Agbetuyi, Abdulkareem and Awosope, 2012). Nigeria is also blessed with small hydro resource, and this energy resource available in nearly every part of the country. The Nigeria's small hydro potential is estimated at 3,500 MW (National Planning Commission, 2009).

In addition to having the potentials to boost the installed electricity capacity, electricity technologies that rely on renewable energy offer opportunity for electricity distribution that is independent of the grid network. Globally, the use of off-grid renewable energy such as solar PV, micro grids and standalone systems has been providing stable and cost-effective power supply that does not rely on the grid network (Tester et al, 2012). According to Nagpal & Parajuli (2019):

Off-grid renewable energy systems have the ability to deliver secure and affordable electricity to rural

communities all over the world, and are important in breaking a cycle of energy poverty that has affected the socio-economic progress of millions of people’.

Nigeria has failed to take the opportunities of the country’s rich renewable energy resources to address the challenges. The failure to develop the renewable energy can be traced to the history of electricity generation which has evolved on the strength of fossil energy. Nigeria has set ambitious targets for renewable electricity, that is, increased availability of energy, improved energy access and sustainability of the environment (Ebii, 2019). The setting of targets for renewable electricity has, however, not changed the electricity situation in the country. The failure of Nigeria to really develop renewable electricity generation can be traced to the early history of electricity generation and distribution in Nigeria.

The Nigeria Electricity Supply Company (NESCO), the first electricity utility company in Nigeria, was established in 1929. NESCO, a British-owned company and the first independent power producer in Nigeria, was created purposely to provide electricity generation and supply services to some parts of Nigeria (Federal Ministry of Power & Steela, 2006). The creation of NESCO took place about three decades after the installation of the first electricity plant in Lagos by the British (Aladejarea, 2014). Few years after its establishment, NESCO’s power-generating plants increased to six comprised of one diesel and five hydroelectric plants. The six electricity generation plants were deployed to serve only the tin industry and the Jos environs (Audu, 2020). Prior to the establishment of NESCO, Nigeria had in 1923 commissioned the Nigerian Power and Tin Fields with a 2 MW hydro-electricity capacity plant in Jos. In 1930 NESCO took over control of the Nigerian Power and Tin Fields hydro-electricity plant (Federal Ministry of Power & Steel, 2006) b. Later in 1946, Nigeria welcomes the creation of the Public Works Department, a government department in charge of management and operation of electricity plants across Nigeria. The Nigerian Government Electricity Undertaking (“NGEU”) later took over the operation and management of electricity plants from Public Works Department following the creation of NGEU as an arm of the Public Works Department (Olaoye, 2014). The Public Works Department, the NESCO and the Native Authority were granted licence to generate and distribute electricity. While the Public Works Department was responsible for electricity generation in Lagos State, NESCO and the Native Authority were responsible for electricity generation in other parts of the country (Aladejareb, 2014).

In 1950, and pursuant to the 1950 Electricity Corporation of Nigeria Ordinance No. 15, Nigeria established the Electricity Corporation of Nigeria. The Electricity Corporation Nigeria harmonised the electricity structure in the country, and integrated the electricity infrastructure into what is now referred to as the national grid (Awosopea, 2014). The Ordinance did not provide for guidance on electricity expansion in the country. So, the

Electricity Corporation of Nigeria was unable to extend the electricity infrastructure at the time to cover parts of the country that were without electricity before the harmonisation. As a result, there was lopsidedness in the electricity architecture of the country as between urban and the rural areas. To the present day the inequality in the architectural platform of the national grid continues to exist in Nigeria (Awosopeb, 2014).

The effort by the government to improve the electricity situation of the country eventually led to the creation of the Niger Dams Authority in 1962, and the construction of Kainji Dam (the first hydro dam) in the same year (Zarmaa, 2006). The Niger Dam Authority was responsible for the development of hydro-electricity generation as well as the construction and maintenance of dams on the River Niger (Zarmab, 2006). Based on the existing structure, the Niger Dam Authority would generate electricity and later sell to the Electricity Corporation of Nigeria for distribution. In June 1972, Nigeria created the National Electric Power Authority (NEPA) pursuant to Decree No. 24 by merging the Electricity Corporation of Nigeria and the Niger Dam Authority (Amadia, 2018). The merger aimed at ensuring that a single body undertook electricity generation and distribution functions in Nigeria (Amadib, 2018). The creation of NEPA as well as the monopoly it was granted could not, however, deliver the anticipated change in the electricity sector given that the gap between the demand and supply for electricity persisted. Furthermore, NEPA was unable to address the inequality in electricity access that existed between urban and the rural population prior to that time. The focus of the Ordinance and the Decree No. 24, under which NEPA was created, was the development of hydro electricity. It is also important to know that the creation of the NEPA did not affect the operation of NESCO. Based on the NESCO’s track record, the FGN permitted NESCO to continue to operate independent of the NEPA (Anyago, 2018).

Up to this time, there is no legislative provision on the use and development of renewable energy resources for electricity generation. Electricity generation at that time was mainly from hydro and coals. The switch by Nigeria to a predominantly gas-based electricity generation could also not address the electricity challenges in the country (Emodi, 2016).

By the early 1980s, the pursuit of sustainable and clean electricity had assumed a central role in the Nigeria’s quest to drive economic development. Nigeria opted for diversification of the country’s energy base, including electricity generation, to include renewable energy (United Nations, 1981)a. Among other things, Nigeria considered the need to generate electricity from renewable sources. The proposed policy shift aimed at exploring biomass (mainly crops and wood plantation), hydro and solar energy for electricity generation (United Nations, 1981) b. The proposed approach to electricity generation was based on the understanding that electricity technologies based on renewable energy was capable of addressing

the challenges of energy security as well as unreliable supply system (Energy Commission of Nigeria, 2003)a. In 1984, there was an attempt by the FGN to produce a draft energy policy guideline through the Federal Ministry of Science and Technology to drive the policy change, but this did not materialize (Energy Commission of Nigeria, 2003)b. So, the proposed renewable electricity generation could not be pursued due to the absence of a policy framework. The search for a policy framework for renewable electricity continued until the year 2003.

Regulatory Frameworks for Renewable Electricity Policy Framework

The policy landscape for renewable electricity evolved with the approval of the National Energy Policy in 2003 (and later revised in 2013). It is the first comprehensive and all-sector energy policy that focuses on sustainable use of energy resources in Nigeria. As a panacea to the electricity challenges in the country, the NEP emphasises the need for Nigeria to engage in optimal use of energy resources (Energy Commission of Nigeria, 2003)c. One of the policy planks of the NEP is the expansion of electricity generation sources in Nigeria to include renewable energy resources, which the country has in abundance (Energy Commission of Nigeria, 2003)d. Among other things, the NEP seeks to promote sustainable and environmentally friendly electricity generation and supply both on-grid and off-grid ((Energy Commission of Nigeria, 2014). The NEP further sets out the long-term objectives for sustainable development and use of renewable energy for electricity generation (National Planning Commission, 2009)b. Off-grid renewable electricity generation will permit the adoption of decentralised power system. The decentralised electricity option is a plus to Nigeria; this will enable government to provide electricity access in areas that are not connected to the grid (Iwayemi et al, 2014). It is beyond doubt that adoption of renewable electricity technologies such as solar, micro grids and standalone system is key to addressing the challenges of grid network (UNDESA, 2014).

Since the introduction of the NEP, successive policy documents in Nigeria have tried to incorporate the NEP's long-term objectives on the use of renewable energy for a diversified electricity mix (Energy Commission of Nigeria, 2003)e. Two of the policy documents, that is, the 2006 Renewable Energy Policy Guidelines (REPG) and the NREEEP, are relevant to the discussions here. The REPG and the NREEEP have as one of their respective objectives the use of renewable energy for electricity generation.

The REPG sets out the FGN's objectives for the development of renewable energy for electricity generation and distribution. Through the REPG, Nigeria plans to increase the share of electricity generation from renewable energy for sustainable development in the country (Federal Ministry of Power & Steel 2006) c. According to the REPG, continued reliance on fossil fuel for electricity generation, and the expansion of the grid network cannot solve the challenges of electricity

generation in Nigeria. The REPG then enjoins the FGN to actively pursue diversification of electricity generation source to include renewable electricity (Federal Ministry of Power & Steel, 2006d). For the first time, the challenges of power supply in Nigeria are aptly captured in a policy document (Federal Ministry of Power & Steel 2006)e. As way of addressing the power supply situation the REPG provides for the setting up of the Renewable Electricity Trust Fund (RETF) (Worika, 2016a). Among other things, the RETF will apply to support the development of small-scale renewable energy for electricity generation especially in the rural areas (Worika, 2016)b. In addition to the fund, the REPG aims at incentivising the production of electricity from renewable energy through the introduction of measures such as a tax holiday for investors in renewable energy equipment (Federal Government of Nigeria, 2017). There are also concessional loans, which will be granted at a rate below the prevailing market interest rates (Federal Ministry of Power & Steel 2006)f.

Nigeria takes a bold step on the development of renewable energy by approving the National Renewable Energy and Energy Efficiency Policy in 2015. The policy trust of the NREEEP is the 'optimal utilization of the nation's energy resources for sustainable development' (Federal Ministry of Power, 2015)a. The NREEEP sets the pathway for power supply to every part of the country. Electricity supply to urban areas will be through grid electricity, while rural areas, where there is no grid coverage, will benefit from off-grid renewable electricity (Federal Ministry of Power, 2015b). The reliance on grid electricity for electricity supply to urban areas is based on the fact that there is grid coverage in many parts of the urban areas. The different options for power supply between urban and the rural areas shows a clear understand of one of the challenges of power supply in Nigeria, and this accords with one of the main objectives of the NEP. In a bid to propel the attainment of the renewable energy objective, the NREEEP sets a 16% renewable energy target (Federal Ministry of Power, 2015c). The NREEEP further targets removal of regulatory and institutional barriers to aid the development of renewable energy. The NREEEP identifies the roles of renewable portfolio standard (either voluntary or mandatory), feed-in tariff, net-metering, bidding, etc. in incentivising renewable electricity (Federal Ministry of Power, 2015d).

Legal Framework for Renewable Electricity

The Constitution of Nigeria is the foundation of electricity/energy law in Nigeria. The Constitution grants powers over grid electricity to the FGN while the powers of the state governments in Nigeria are limited to electricity generation that is not covered by the grid (Federal Republic of Nigeria Constitution 1999). Since the commencement of electricity generation in Nigeria there has always been legislation to provide legal backing for a system of electricity generation. The first known legislation on electricity in Nigeria was the 1950 Electricity Corporation of Nigeria Ordinance. The Ordinance

established the Electricity Corporation of Nigeria, whose work was the regulation of hydro-based electricity. Later in 1972, the federal military government promulgated the Decree No. 24 of 1972. The Ordinance and the Decree later became acts of the Parliament as the Electricity Act 1990 and the National Electric Power Authority Act 1990 respectively. Up to this period, the focus of the electricity legislation was on the development of hydro electricity. So, there were no provisions either in the Electricity Act or the National Electric Power Authority Act to promote the development of renewable electricity. The country was close to enacting a law for the regulation of renewable energy in 1979 following the enactment of the Energy Commission of Nigeria Act ("ECN Act"). While the ECN Act targets the development of alternative energy, there is specific provision on how the nation's renewable energy resources can be exploited for electricity generation. The Energy Commission of Nigeria is, however, involved in electricity through policy formulation. It is in this context, that the Energy Commission of Nigeria is regarded as a body involved in the regulation in Nigeria. There is also a department within the Energy Commission of Nigeria, the Alternative and New and Renewable Energy Department within the Energy Commission of Nigeria, which is saddled with the responsibility of research in alternative energy (Energy Commission of Nigeria Act, 1979a).

Effort is being made to change the nature of involvement of the Energy Commission of Nigeria in electricity in electricity regulation. There is a proposed bill, the Energy Commission of Nigeria (Amendment) Act, before the National Assembly that seeks to amend the ECN Act. The proposed amendments seek to, among other things, make the ECN Act a truly energy-oriented Act by prioritising the promotion and development of renewable energy (ECN Act (Amendment) Bill, 2009a). In addition to prioritizing the development of renewable energy, the amendments will grant the Energy Commission of Nigeria powers to register and issue licences to operators of private grids for electricity generation below 1 MW capacity (ECN Act (Amendment) Bill, 2009b). Until the amendments are passed into law, the ECN Act will continue to be regarded as not containing provisions on electricity regulation, and as such has no bearing on the promotion of renewable electricity generation beyond policy formulation.

The search for a law to propel the development of renewable electricity continued until 2005 when the EPSR Act was passed into law, and has remained the extant law on electricity in Nigeria. The EPSR Act targets four areas: electricity regulation, policy formulation, restructuring of electricity structure and the re-organisation of the rural electrification programme. The EPSR Act provided legal support for the electricity sector reform in the National Electric Power Policy. The Act sets a broad mandate for power generation reform and for the regulation of the electricity market (Ayanruoh, 2012). The EPSR Act introduces a competitive electricity sector by allowing

private sector participation in core electricity activities. It was on the basis of private sector participation that the FGN incorporated the Power Holding Company of Nigeria (PHCN) as the successor company to NEPA. The FGN later divested its interest in the electricity generation and distribution functions by unbundling the PHCN to 18 companies comprising of 11 distribution companies, 6 generation company and 1 transmission company (Amadi, 2018)c. The EPSR Act also seeks to reduce electricity generation and transmission losses, as well as achieving sustainable cost pricing without subsidies (Papaefstratiou, 2019). The FGN, through the electricity regulator, has established cost reflective tariffs for electricity generation and distribution. In the area of regulation, the EPSR Act establishes the Nigerian Electricity Regulatory Commission (NERC) as the electricity sector regulator in Nigeria (EPSR Act 2005)b. NERC, as the apex electricity regulator, is empowered by law to grant or revoke electricity generation and distribution licences, permits and tariffs. It is part of NERC's mandates to expand the electricity grid, develop isolated mini-grids and promote electricity generation from all energy sources (EPSR Act 2005c). Riding on the provisions of the EPSR Act on electricity generation sources, NERC has been promoting renewable electricity. In accordance with the mandate to boost electricity to promote electricity generation, NERC approved the feed-in tariff regulations (FiT). FiT is a tariff structure that is specifically designed incentivising renewable electricity. A key objective of the FiT is to attract private investors to invest in renewable electricity generation through attractive tariffs. The FiT will apply to promote 2,000 MW of renewable electricity from biomass, solar, small hydro and wind energy. Although, FiT is a major booster for attracting investors to renewable electricity in Nigeria, the tariff structure has its shortcomings. Basically, FiT applies only to grid-based electricity, while off-grid renewable electricity, being outside the coverage of the FiT, will have to be negotiated on a case-by-case basis with NERC. The subsidy structure in the FiT is also not clearly structured to actually promote renewable electricity. The subsidy does not apply to end-users of mini-grid electricity with less than 1 MW capacity. As a result, there is a disparity in the tariffs between urban and the rural areas (Dalberg Global Development Advisors, 2017b).

In the area of mini-grid, NERC has developed a framework for the operation and maintenance of mini-grids in Nigeria with the approval of Mini-Grid Regulation of 2017. The Regulation targets accelerated electrification in unserved and underserved areas. Mini-grids are key to achieving increased uptake of renewable energy given that the deployment of mini-grid has aided the development of renewable electricity, especially solar power projects, in Nigeria (Esan, Akinola, Onakoya and Monnou, 2021a). An important programme in this regard is the Nigeria Electrification Programme which targets increased electricity access in the rural areas through the deployment of hybrid mini-grids with assistance from the

World Bank and the African Development Bank (Esan, Akinola, Onakoya and Monnou, 2021b).

Overall, the promotion of renewable energy by NERC has been in the areas of FiT and mini-grids. How the introduction of FiT has not really contributed to increased uptake of renewable energy for electricity generation will be discussed later in this article.

Renewable Electricity Regulatory Bodies

The regulation of renewable electricity is not separate from the general electricity regulation. As well as the NERC there are two other bodies whose works are relevant to the regulation of renewable electricity in Nigeria are the Federal Ministry of Power, Works and Housing, the Energy Commission of Nigeria and the Rural Electrification Agency. These bodies will now be discussed starting from the ministry.

Federal Ministry of Power Works and Housing (FMPWH)

The FMPWH is the government ministry that is administratively saddled with the responsibilities of coordinating the power sector. The FMPWH provides general policy direction to NERC on the coordination of the Nigeria's electricity sector (EPSR Act 2005d). It is on the basis of the policy direction from the Ministry that NERC develops frameworks for promoting electricity generation from renewable energy sources. By law, NERC is required to submit a report annually about the performance of the electricity sector especially as it relates to the competitiveness of the electricity sector (EPSR Act 2005e). The ministry has also entered into agreements with some companies for the provisions of solar power. In furtherance of the Ministry's over policy direction in the energy sector, the FMPWH has made some policies documents specifically for the development of renewable energy. The ministry also has power of oversight over the rural electrification program. The FMPWH is also taking steps to address the electricity challenges in the rural areas of Nigeria. In the performance of its oversight function and the need to address electricity access in the rural areas, the FMPWH has approved the rural electrification strategy.

Energy Commission of Nigeria

The Energy Commission of Nigeria (ECN) was established pursuant to the Energy Commission Nigeria Act for strategic development of alternative energy. The ECN is responsible for planning, coordinating and monitoring of energy development in Nigeria ((Energy Commission of Nigeria Act, 1979b). By the ECN Act, the ECN is obligated to periodically prepare energy master plan and advise the Minister to ensure a broad-based participation in the energy sector (Energy Commission of Nigeria Act, 1979c). In carrying out the duties of planning and coordination, the ECN formulates energy policies and makes recommendations to the FGN on the development of alternative energy in Nigeria (Ufondu, Ibeku and Obetta, 2019). The involvement of the ECN in electricity has been largely in the area of policy documents (e.g. the National Energy Policy, the Renewable Energy

Master Plan, etc.).

Renewable Electricity and Regulatory Challenges in Nigeria

Looking at the renewable energy potentials and the state of electricity generation in Nigeria, it is undeniable that Nigeria is yet to take advantage of renewable energy in electricity generation. The little that Nigeria has achieved in renewable electricity is in the area of off-grid renewable electricity (mini-grids, solar PV and standalone systems). There are challenges in the development of renewable electricity – absence of key provisions in the law, lack of funding, high initial costs, absence of technical know-how, etc. So far, Nigeria has failed to achieve increased electricity generation through renewable electricity, and there is no evidence that the future targets will be realized given that the uptake of renewable energy has remained marginal (Barros, Ibiowie & Managi, 2014). Four points, which are regulatory-based, will be discussed here.

First, the regulatory structure in the 1999 Constitution, which favours the centralization of electricity regulation to the detriment of states, constitutes a barrier to the development of renewable electricity. In Nigeria, the Constitution recognizes the powers of the FGN and the states over electricity. The extant regulation structure does not, however, reflect the constitutional provisions which recognize the powers of the state government over off-grid electricity. From the time of the first utility company to the present day Nigeria, electricity regulation has always been constituted as a national/federal matter. The centralization of electricity regulation is a challenge to the development of renewable electricity. The country has not been able to take into consideration the peculiarity of areas in use of renewable energy for electricity access (Oke, 2017). The peculiarity of areas has been major reason why some areas are connected and some are not, and why other are considered not practically possible for grid extension.

Second, the NERC's mandate to generate electricity from all sources without creating a special regime for renewable electricity is another fundamental regulatory challenge to the development of renewable electricity. Globally, electricity from fossil fuel source has dominated electricity market for a long time (Wiseman, Grisamer & Saunders, 2011). The domination of fossil-based electricity is as a result of the contribution of fossil fuels to the development of modern society. As a result of the domination by fossil fuels, the practice globally is to create a special regime for the development of renewable energy in the area of access to the grid network (Von Danwitz, 2006). Prior to and after Nigeria's independence in 1960, fossil fuels comprising of hydro, petroleum and gas have been the Nigeria's main sources of electricity generation. NERC later approved the FiT as a means of promoting renewable electricity. However, in the EPSR Act and the policy, access to grid network by renewable electricity is on the non-discriminatory principle (EPSR Act 2005f). There is no provision in the law granting exception to renewable-sourced electricity in accessing the

grid network. It is on the basis of the non-discriminatory principle that the NERC has been regulating the access connection of renewable electricity. This is a major challenge given that renewable electricity, which has not been fully developed in Nigeria, has to compete with fossil-based electricity that has been with us for many decades.

Third, the existence of many bodies is another factor that is affecting the development of renewable electricity. The NERC, the Ministry and the ECN exercise powers over electricity regulation with no linkages in respect of their respective functions. Each of these bodies has developed one policy document and/or regulation for the on renewable electricity (Rural Electrification Strategy and Implementation Plan (RESIP) 2016). In most cases, these electricity bodies hide under their supervisory and oversight functions to provide directions on the development of renewable electricity (ECN Act 1979d). The challenge of overlap of function becomes more pronounced in view of the fact that none of these bodies has a specific mandate to develop the nation's renewable energy for electricity generation. The absence of linkage among the regulators has made it difficult for the regulators to come up with framework for large-scale development of renewable energy for electricity generation. In most cases, the regulators find it difficult to effectively articulate the kind of information that is required to unlock the potentials of renewable energy for electricity generation in Nigeria energy unlike what is obtained in the other segment of the energy sector (National Planning Commission, 2009c). Effective dissemination of policy is key to promoting the use of renewable energy for sustainable. An indication of this situation is aptly captured in the Sustainable Energy for All Action Agenda (National Council on Power 2016)c: There is need for high level executive decision/policy makers to understand the role of clean energy technologies and sustainable energy policy and planning process in the economic and social development of the population.

Since there are many bodies involved, it is very difficult to hold a particular body accountable for the failure of renewable electricity.

Lastly, the power of NERC over renewable electricity tariff does not cover all capacities of renewable energy technologies. In theory, the powers of NERC over electricity tariffs cover all capacities of renewable electricity technologies. However, the reality is that the FiT applies only to renewable technology of 1 MW up to certain maximum capacities (solar 5 MW, wind 10 MW, biomass (10 MW) and small hydro 30 MW) (NERC), and not to renewable technology of capacity below 1 MW or above the thresholds in the NERC's regulation. The FiT only provides that renewable technology of capacity below and above the FiT thresholds shall be procured by net-metering and competitive bidding respectively (NERC 2015a). In cases of renewable technology of capacity below 1 MW, FiT provides that net metering will

apply (NERC 2015b). A renewable electricity generator will have to submit a bid through a process known as competitive bidding in cases where the renewable technology is above the FiT thresholds (NERC 2015c). While NERC appears to have a framework for different capacities of renewable electricity technology, the reality is that NERC is yet to develop a framework for other technologies as it has done for FiT. Till date, NERC does not have a framework for the operation of net-metering and the competitive bidding (Edomah, 2016). So, tariffs for renewable electricity of capacity that is below or above the thresholds are usually negotiated on a case-by-case basis rather than on a standardised basis (Idemudia & Nordstrom, 2016). The failure of the electricity regulator to cover all classes of renewable technology capacities is also a major impediment to the uptake of renewable energy for electricity generation (UNFCCC, 2018). The use negotiation in fixing the tariffs for technology capacities outside the thresholds rather than standardised process may lead to arbitrary application of discretionary powers of NERC.

More so, the FiT applies to grid electricity only, as off-grid renewable electricity does not fall within the ambit of the regulation. Whereas, off-grid renewable electricity is key to addressing the electricity challenges in Nigeria particularly the challenge of non-coverage of grid network. This operates as a limitation to the powers of NERC over renewable electricity given that the promotion of off-grid renewable electricity is practically left out.

CONCLUSION

From the analysis in this article, the electricity situation in Nigeria requires a carefully designed approach. In view of the poor state of electricity generation and distribution, what Nigeria needs at this time is an aggressive but strategic approach to renewable electricity. In view of this, this paper recommends the inclusion of specific provisions in the law setting out what and who should undertake the functions of developing renewable electricity. There is need for Nigeria to have a body specifically for renewable electricity apart from the existing body. Creating a new body will mean stripping the existing bodies of any duplicated but unproductive powers over renewable electricity. While the FMPWH and the NERC can retain their respective functions of policy formulation and the regulation of electricity, the role of NERC can be modified to cover monitoring of compliance with renewable electricity generation law and policy. Another area that also needs be addressed is the regulation of private sector participation in renewable electricity generation. This paper recommends that the regulation of renewable electricity should be done in a way that will promote more private sector participation in renewable electricity generation. This can be achieved by having legislation that sets out minimum percentage for private sector participation in renewable electricity. Meeting or proffering solution to the challenges of electricity generation in Nigeria through deployment of

renewable electricity will go a long way in addressing the Nigeria's poor rating in electricity generation and consumption. For many years, Nigeria is one of the countries ranked globally as countries with the lowest electricity access caused by inadequate electricity generation and consumption (Banerjee et al, 2017). The above recommendations cannot be achieved in the absence of provisions to that effect in the law. While it is desirable to amend the EPSR Act, the most prudent option is to have a new law that will address all the points raised in this article as they relate to way out of the challenges of renewable electricity generation in Nigeria. Having a new law specifically for renewable electricity generation will put Nigeria on the path to having increased electricity generation from renewable energy.

REFERENCES

- Adeoba, I., 'Opportunities for Off-Grid Solutions in the Nigerian Power Sector', Detail Commercial Solicitors (2016)1<<https://www.addleshawgoddard.com/globalassets/insights/africa-2016/opportunities-for-off-grid-solutions-in-the-nigerian-power-sector.pdf>>.
- Advisory Power Teama, 'Nigeria Power Baseline Report' Office of the Vice President (Federal Republic of Nigeria: August 2015) 14
- Advisory Power Teamb, 'Nigeria Power Baseline Report' Office of the Vice President (Federal Republic of Nigeria: August 2015) 11
- Agbetuyi, F.A., Abdulkareem, T.O.A., Awosope, C.O.A., 'Wind Energy Potential in Nigeria' (2012) 3(1) *International Electrical Engineering Journal* 601; FMP, *National Renewable Energy and Energy Efficiency Policy* (n 17)
- Amadi, J., Renewable Energy and Nigeria's Power Sector, (Foundation Chambers 2021)2<<https://foundationchambers.com/wp-content/uploads/2021/02/NIGERIA%E2%80%99S-POWER-SECTOR.pdf>>
- Amadi, Sa., 'Improving Electricity Access through Policy Reform: A Theoretical Statement on Legal Reform in Nigeria's Power Sector' in Y. Omorogbe and O.A. Okoye (eds), *Ending Africa's Energy Deficit and the Law: Achieving Sustainable Energy for All in Africa* (Oxford University Press, 2018) 346
- Amadi, Sb., 'Improving Electricity Access through Policy Reform: A Theoretical Statement on Legal Reform in Nigeria's Power Sector' in Y. Omorogbe and O.A. Okoye (eds), *Ending Africa's Energy Deficit and the Law: Achieving Sustainable Energy for All in Africa* (Oxford University Press, 2018) 346 and 370
- Amadi, Sc., 'Improving Electricity Access through Policy Reform: A Theoretical Statement on Legal Reform in Nigeria's Power Sector' in Y. Omorogbe and O.A. Okoye (eds), *Ending Africa's Energy Deficit and the Law: Achieving Sustainable Energy for All in Africa* (Oxford University Press, 2018) 352
- Aladejare, S.Aa., 'Energy, Growth and Economic Development: A Case Study of the Nigerian Electricity Sector' (2014) 2(2) *American Journal of Business, Economics and Management* 41, 42.
- Aladejare, S.Ab., 'Energy, Growth and Economic Development: A Case Study of the Nigerian Electricity Sector' (2014) 2(2) *American Journal of Business, Economics and Management* 42
- Anyagou, I., 'Powered by NESCO, Plateau Communities that have enjoyed 24/7 electricity for 90 years', *Business Day* (21 December, 2018)
- Audu, O., 'Northern Govs Mourn Kretser, MD NESCO', Independent (Online) 26 March 2020
- Awosope, C.Aa., 'Nigeria Electricity Industry: Issues, Challenges and Solutions' (Public Lecture Series, 38th Public Lecture, Covenant University, Ota, 2014) 6
- Awosope, C.Ab., 'Nigeria Electricity Industry: Issues, Challenges and Solutions' (Public Lecture Series, 38th Public Lecture, Covenant University, Ota, 2014) 6
- Ayanruoh, F., 'Will Liberalizing the Nigerian Electricity Power Sector Solve the Problem of Shortage of Capacity?' (2012) <www.works.bepress.com/felix_ayanruoh/2>
- Banerjee, S.G., et al, Regulatory Indicators for Sustainable Energy: A Global Scorecard for Policy Makers (*World Bank Group*, 2017) xvii, 7
- Barros, C.P., Ibiowie, A., and Managi, S., 'Nigeria's Power Sector: Analysis of Productivity' (2014) 44 *Economic Analysis and Policy* 65, 65
- Dalberg Global Development Advisorsa, Improving Access to Electricity Through Decentralised Renewable Energy, Policy Analysis from India, Nigeria, Senegal and Uganda (2017) 54
- Dalberg Global Development Advisorsb, Improving Access to Electricity Through Decentralised Renewable Energy, Policy Analysis from India, Nigeria, Senegal and Uganda (2017) 50
- Danwitz, T. V., 'Regulation and Liberalization of the European Electricity Market - A German View' (2006) 27 *Energy Law Journal* 423, 432
- Ebii, C., 'Can Nigeria Meet its Electricity Goals by 2030? We found out' (Heinrich Boll Stiftung, 2019) <<https://ng.boell.org/en/2019/10/11/can-nigeria-meet-its-electricity-goals-2030-we-found-out>>.
- Edomah, N., 'On the path to sustainability: Key issues on Nigeria's sustainable energy development' (2016) 2 *Energy Reports* 28, 31; Nextier Power Dialogue Communiqué, 'Bridging the Collection Gap: Meter Asset Provider Regulations and Industry Outlook', a power dialogue held in Abuja on 27 February 2019, 4 <https://www.detailsolicitors.com/wp-content/uploads/2019/03/Nextier_Communique-February2019.pdf>
- Electric Power Sector Reform Act 2005a, Sec. 32(1)
- Electric Power Sector Reform Act 2005b, Sec. 31
- Electric Power Sector Reform Act 2005c, Sec. 32
- Electric Sector Power Reform Act 2005d, Sec. 33
- Electric Sector Power Reform Act 2005e, Sec. 24
- Electric Power Sector Reform Act 2005f, Sec. 82(4) & (5)
- Emodi, V., 'Energy Policies for Sustainable Development Strategies: The case of Nigeria' (Springer, 2016) 26

- Energy Commission of Nigeria, 'Commission Puts 2015 Power Need at 31,240MW' (2015) <http://www.energy.gov.ng/index.php?option=com_content&view=article&id=121>
- Energy Commission of Nigeria (ECN)a, *National Energy Policy* (Presidency, April 2003) 4
- Energy Commission of Nigeria (ECN)b, *National Energy Policy* (Presidency, April 2003) 2
- Energy Commission of Nigeria (ECN)c, *National Energy Policy* (Presidency, April 2003) 8
- Energy Commission of Nigeria (ECN)d, *National Energy Policy* (Presidency, April 2003) 36
- Energy Commission of Nigeria (ECN)e, *National Energy Policy* (Presidency, April 2003) 4
- Energy Commission of Nigeria (ECN), *Energy Implications of Vision 20: 2020 and Beyond* (Report No ECN/EPA/2014/01, 2014) 7
- Energy Commission of Nigeria Act 1979a, Sec. 5
- Energy Commission of Nigeria Act 1979b, Sec. 1(1)
- Energy Commission of Nigeria Act 1979c, s. 5(d), (e)
- Energy Commission of Nigeria Act 1979d, Ss. 4(a),(d),(e),(h) & 33
- Energy Commission of Nigeria Act (Amendment) Bill 2009a, Sec. 5
- Energy Commission of Nigeria Act (Amendment) Bill 2009b, Sec. 5(c)
- Esan, W., Akinola, J., Onakoya, D., and Monnou, Ga., 'Renewable energy in Nigeria: law, regulation, trends and opportunities' *International Bar Association* (June 2021) <<https://www.ibanet.org/renewable-energy-nigeria>>
- Esan, W., Akinola, J., Onakoya, D., and Monnou, Gb., 'Renewable energy in Nigeria: law, regulation, trends and opportunities' *International Bar Association* (June 2021) <https://www.ibanet.org/renewable-energy-nigeria>
- Federal Government Pioneer Industry List, Gazette No. 84, Vol. 104 of 2017
- Federal Ministry of Power (FMP), *National Renewable Energy and Energy Efficiency Policy* (Federal Republic of Nigeria, 2015) 1-2
- Federal Ministry of Power and Steele (FMPS), *Renewable Electricity Action Program* (Federal Republic of Nigeria, 2006) 9.
- Federal Ministry of Power and Steelb (FMPS), *Renewable Electricity Action Program* (Federal Republic of Nigeria, 2006) 9.
- Federal Ministry of Power and Steelc, *Renewable Energy Policy Guidelines*, (Federal Republic of Nigeria, 2006) 4
- Federal Ministry of Power and Steeld, *Renewable Energy Policy Guidelines*, (Federal Republic of Nigeria, 2006) 4
- Federal Ministry of Power and Steele, *Renewable Energy Policy Guidelines*, (Federal Republic of Nigeria, 2006) 3, 13,16
- Federal Ministry of Power and Steelf, *Renewable Energy Policy Guidelines*, (Federal Republic of Nigeria, 2006) 28
- Federal Ministry of Power (FMP)a, *National Renewable Energy and Energy Efficiency Policy* (Federal Republic of Nigeria, 2015) 1
- Federal Ministry of Power (FMP)b, *National Renewable Energy and Energy Efficiency Policy* (Federal Republic of Nigeria, 2015) viii
- Federal Ministry of Power (FMP)c, *National Renewable Energy and Energy Efficiency Policy* (Federal Republic of Nigeria, 2015) 36
- Federal Ministry of Power (FMP)d, *National Renewable Energy and Energy Efficiency Policy* (Federal Republic of Nigeria, 2015) 8
- Federal Republic of Nigeria, 1999 Constitution, 2nd Schedule, paras. 13,14
- Hoecke, M.V., 'Methodology of Comparative Legal Research' (Law and Method 2)
- Idemudia, I.G., and Nordstrom, D.B., *Nigerian Power Sector: Opportunities and Challenges for Investment in 2016*, Latham and Watkins African Practice (Client Alert White Paper, February 2016) 12
- International Monetary Fund, 'Regional Economic Outlook: Sub-Saharan Africa Fiscal Adjustment and Economic Diversification' (World Economic and Financial Survey, 2017) 1
- Iwayemi, A., Diji, C., Awotide, B., Adenikinju, A., and Obute, P., *Towards Sustainable Universal Electricity Access in Nigeria* (Centre for Petroleum, Energy Economics and Law, 2014) 58
- Kova, A.Z.a, 'Resource Curse: A Case Study of Nigeria' (8th Economic and Finance Conference, London, 29th May, 2017) 258, 269
- Kova, A.Z.b, 'Resource Curse: A Case Study of Nigeria' (8th Economic and Finance Conference, London, 29th May, 2017) 258, 269
- KPMG Nigeria, *A Guide to the Nigerian Power Sector* (KPMG Nigeria, 2016) 2,5
- Kukoyi, D., and Esan, A., 'Nigeria' in Karen B Wong (ed), *The Renewable Energy Law Review* (Law Business Research, 2018) 108, 108
- Langbrook, P.M., Bas, K.V., Thomas, M.S., Milo, J.M., and Rossum, W.M., 'Methodology of Legal Research: Challenges and Opportunities' (2017) 13(3) *Utrecht Law Review* 2,3
- Nagpal, D., and Parajuli, B., 'Off-grid renewable energy solutions to expand electricity access: An opportunity not to be missed', (International Renewable Energy Agency, Abu Dhabi, 2019) 3.
- National Council on Power (NACOP), *Sustainable Energy for All Action Agenda* (SE4ALL-AA) (2016) 9, 19; Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2017*
- Revision, *Key Findings and Advance Tables* (United Nations, 2017) 5 <https://esa.un.org/unpd/wpp/publications/Files/WPP2017_KeyFindings.pdf>
- National Council on Power (NACOP)b, *Sustainable Energy for All Action Agenda* (SE4ALL-AA) (2016) 12
- National Council on Power (NACOP)c, *Sustainable Energy for All Action Agenda* (SE4ALL-AA) (2016) 96

- National Planning Commission (NPC)a, 'Report of the Vision 2020 National Technical working Group on Energy Sector' (Presidency, 2009) 92
- National Planning Commission (NPC)b, Report of the Vision 2020 National Technical Working Group on Energy Sector" (Presidency, 2009) 144
- National Planning Commission (NPC)c, Report of the Vision 2020 National Technical Working Group on Energy Sector" (Presidency, 2009) 57
- Nigerian Bulk Electricity Trading (NBET)a, 'Utility Scale Solar Development in Nigeria in Comparison to Other African Countries' (NBET Discussion Paper Series, 2016) 5
- Nigerian Bulk Electricity Trading (NBET)b, 'Utility Scale Solar Development in Nigeria in Comparison to Other African Countries' (NBET Discussion Paper Series, 2016) 5
- Nigerian Electricity Regulatory Commission (NERC), *Renewable Energy Sourced Electricity* <<http://www.nercng.org/index.php/home/operators/renewable-energy>>
- Nigerian Electricity Regulatory Commission (NERC)a, *Regulation on Feed-in Tariff for Renewable Energy Sourced Electricity in Nigeria* (2015) s 4(b)
- Nigerian Electricity Regulatory Commission (NERC)b, *Regulation on Feed-in Tariff for Renewable Energy Sourced Electricity in Nigeria* (2015)
- Nigerian Electricity Regulatory Commission (NERC)c, *Regulation on Feed-in Tariff for Renewable Energy Sourced Electricity in Nigeria* (2015)
- Offgrid Nigeria, United Nations Framework Convention on Climate Change (3 March, 2018) <<https://www.offgridnigeria.com/nigeria-readies-three-solar-mini-grid-plants-concessioning/>>
- Ohajanya, A.C., Abumere, O.E., Owate, I.O., and Osarolube, E., 'Erratic Power Supply in Nigeria: Causes and Solutions' (2014) 3(7) *International Journal of Engineering Science Invention* 51, 53
- Oke, Y., 'Conflicting Laws Keep Nigeria's Electricity Supply Unreliable', *The Conversation*, 24 August 2017 <<https://theconversation.com/conflicting-laws-keep-nigerias-electricity-supply-unreliable-81393>>
- Olaoye, O.P., 'Privatization of Electricity Industry in Nigeria: Lessons from Europe and United States of America' (2014) 5(2) *Renewable Energy Law & Policy Review* 136, 137
- Olujobi, O.J., 'The Legal Sustainability of Energy Substitution in Nigeria's Electric Power Sector: Renewable Energy as Alternative' (2020) 5(32) *Protection and Control of Modern Power System* 1,12 <<https://doi.org/10.1186/541601-020-00179-3>>
- Oyedepo, S.O., Babalola, O.P., Nwanya, S.C., Kilanko, O., Leramo, R.O., Aworinde, A.K., Adekeye, T., Oyebanji, J.A., Abidakun, A.O., and Agberegha, O.L., 'Towards a Sustainable Electricity Supply in Nigeria: The Role of Decentralized Renewable Energy System' (2018) 2(4) *European Journal of Sustainable Development Research* 1, 14
- Papaefstratiou, D., 'The Nigerian Power Market Experiment: A Critical Appraisal of the PHCN Privatisation', DLA Piper, Insights (15 March, 2019) <<https://www.dlapiper.com/en/uk/insights/publications/2019/03/the-nigerian-electricity-market-experiment/>>
- Phloeg, F.V., 'Natural Resources: Curse or Blessing?' (2011) 49(2) *Journal of Economic Literature* 366, 420
- Ross, M.L., 'What Have We Learned about Resource Curse' (2015) 18 *Annual Review Political Science* 239,259 <<https://doi.org/10.1146/annurev.polisci-052213-040359>>
- Rural Electrification Strategy and Implementation Plan (RESIP) 2016
- Shaaban, M., and Petinrin, J.O., "Renewable Energy Potentials in Nigeria: Meeting Rural Energy Needs (2014) 29 *Renewable and Sustainable Energy Reviews* 76
- Stevens, P., Lahn, G., Kooroshy, J., 'The Resource Curse Revisited, (Research Paper Gathan House: The Royal Institute of International Affairs, 2015) cited in Adela Zubi Kova, 'Resource Curse A Case Study of Nigeria' (8th Economic and Finance Conference, London, 29th May, 2017) 258, 269
- Tester, J.W., Drake, E.M., Driscoll, M.J., Golay, M.W., and Peters, W.A., *Sustainable Energy: Choosing Among Options* (MIT Press, 2nd ed, 2012) 9; (2014) <<http://www.un.org/en/development/desa/news/sustainable/rural-energy-access.html>>.
- Ufodu, I., Ibeku, I.C., and Obetta, F., 'Renewable Energy in Nigeria', *Lexology* (2019) <<https://www.lexology.com/library/detail.aspx?g=e3a5d485-f596-4f59-b9bd-ba5dd5ae31f5>>
- United Nations Department of Economic and Social Affairs, *Improving Sustainable Energy Access for Rural Areas* (8 January 2014) <<https://www.un.org/en/development/desa/news/sustainable/rural-energy-access.html>>
- United Nationsa, Report of the United Nations Conference on New and Renewable Sources of Energy (United Nations A/CONF.100/11, 10–21 August 1981) 113 <https://digitallibrary.un.org/record/25034/files/A_CONF-100_11-EN.pdf>
- United Nationsb, Report of the United Nations Conference on New and Renewable Sources of Energy (United Nations A/CONF.100/11, 10–21 August 1981) 113 <https://digitallibrary.un.org/record/25034/files/A_CONF-100_11-EN.pdf>
- Varella, S., *Electricity access in Nigeria 2019, by area, Statista* (October 2021) <<https://www.statista.com/statistics/1119633/share-of-households-without-electricity-access-in-nigeria-by-area/>>
- Wiseman, H., Grisamer, L., and Saunders, E.N., 'Formulating a Law of Sustainable Energy: The Renewables Component' (2011) 28 *Pace Environmental Law Review* 827, 829

- Worika, I.La., 'Rural Applications' in R. Ottinger et al (eds), *UNEP Handbook for Drafting Laws on Energy Efficiency and Renewable Energy* (United Nations Environmental Programme, 2016) 269.
- Worika, I.Lb., 'Rural Applications' in R. Ottinger et al (eds), *UNEP Handbook for Drafting Laws on Energy Efficiency and Renewable Energy* (United Nations Environmental Programme, 2016) 269
- Zarma, I.Ha., *Hydro Power Resources in Nigeria, Energy Commission of Nigeria* (Country position paper presented at 2nd Hydro Power for Today Conference, International Centre on Small Hydro Power (Hangzhou China, 2006)
- Zarma, I.Hb., *Hydro Power Resources in Nigeria, Energy Commission of Nigeria* (Country position paper presented at 2nd Hydro Power for Today Conference, International Centre on Small Hydro Power (Hangzhou China, 2006)