

**ANALYSIS OF THE LEGAL FRAMEWORK FOR OPTIMIZATION OF RENEWABLE  
ENERGY OPTION IN NIGERIA.**


**BY**

**CHIMEZIE JACOBSPASCHAL OGUGBARA**

Cover Page

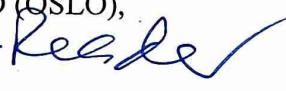
**CERTIFICATION**

THIS is to certify that this research work on “ANALYSIS OF THE LEGAL FRAMEWORK FOR OPTIMIZATION OF RENEWABLE ENERGY OPTION IN NIGERIA,” is an Original Research work carried out by Chimezie JaobsPaschal Ogugbara with Candidate Number PGS19040919125778 of the Faculty of Centre for Petroleum, Energy Economics and Law, University of Ibadan, Oyo State, under the erudite supervision of DR. P.C. OBUTTE, in Partial fulfillment of the requirements for the grant of LLM degree in ENERGY LAW 2020/2021.

  
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## **DEDICATION**

This piece of research is dedicated to God Almighty for seeing me through yet another LL.M Program, and this time in Energy Law. HE was completely instrumental through Grace, favour and Inspiration. This work is further dedicated to my Beautiful and amiable wife, Promise Chisomaga Ogugbara; to my Children Kamsiyochukwu Noah Dike, Chikamso Sarah Dike and Somkelechi Abraham Dike.

## **ACKNOWLEDGMENT**

It is wisdom that the most important place for anybody to prosper is in his spiritual life. I acknowledge my Spiritual Father and mentor; Senior Prophet T.B. Joshua. It is him who taught me that as a student to “work as if it all depends on me and pray as if it all depends on God.” This principle has led me and has seen me through this program. I also want to acknowledge the works and efforts of men and women of God in their respective capacities in the vineyard of the Lord. Their prayers and struggle to stand tall and maintain focus in the face of the scourge called COVID-19 that nearly swept off the entire humanity from the face of the earth in the year 2020.

There is also need for respect for those who have honestly contributed in various capacities to the development of the Nigerian Energy Sector and more particularly those who co-founded the Centre for Petroleum, Energy Economics and Law that has given countless scholars the opportunity of a conducive platform to explore the Energy scholarship.



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## ABSTRACT

*It has been argued that the need to attend energy sufficiency amidst scarce resources has birthed the desire for energy mix. This is not far from the global tune for sustainability, climate preservation, energy security and efficiency among nations. Nigeria is richly bestowed with enormous energy resources, yet energy security has remained a mirage. The peculiar industrial and human developments have considerably spurred continued increase in Energy demand. Unfortunately, only 40% of the 170 million Nigerian Populations have access to electricity, out of which a lesser quotient enjoys sustainable electricity; hence sustainability becomes a key factor.*

*The real fact is, renewable energy has been part of the Nigerian energy mix. Kainji, Jeba and Shiroro Dams contribute 15% of the Nigerian electricity sourced from hydropower. However, Nigeria has not achieved potency in her effort to integrate renewable energy into the nation's energy profile through policies and regulatory instruments. While this may be attributed to the impotence of ideas by political actors who make policies and laws, there is also the consequential externalities of such new areas that have not been addressed. Its implication in terms of national security and territorial sovereignty must also be considered. Obviously, the renewable energy does not stop at its names. They must be captured and harnessed with renewable energy technologies before use.*

*This dissertation takes a thorough 'Analysis of the Legal Framework for Optimization of Renewable Energy Option in Nigeria.' The candidate applied various research models to identify what legal imbroglio underpins the deficiency in the midst of abundance. He examined the efficacies or otherwise of various laws and policies. The dissertation further looks at the market models, regulatory instruments, legal frameworks and other associated mechanisms needed for the operationalization of renewable energy in the Nigerian energy business. By way of conclusion the dissertation found doomsday for the Nigerian renewable energy, however, the candidate optimistically enunciated practicable principles that can advance the renewable energy in all ramifications in the Nigerian project.*

## CHAPTER ONE

### GENERAL INTRODUCTION

#### 1.1. Background of the Study

The global surge in technology and human activities has set a stage where energy has become one of the basic necessities of life. Most of human activities are presently energy driven. Although the impact of the traditional fossil fuel on the human race clearly has indicated that the need for diversification and energy mix is not only economical, but also for sustainability and survival. Recent occurrences have dawned on mankind that preservation of the earth for future generation and safety of the people of today is paramount for continuity of human race. Global warming, climate change, greenhouse gas and other consequential externalities of fossil fuel use are no more issues of rhetoric. Apart from the preservation arguments, the researchers have also argued that the Nigerian fossil fuel depletion is in sight, thereby reminding stakeholders constantly on the need for an urgent shift from the status quo.<sup>1</sup>

Nigeria is endowed with abundant natural resources. According to an estimate made by the defunct National Utility Company; NEPA, Nigeria's outstanding total exploitable hydro potential stood at 12,220 MW.<sup>2</sup> Also from a 1980 survey of 12 of the old states of the federation, it was established that some 734 MW of small hydropower (SHP) could be harnessed from 277 sites.<sup>3</sup> Added to the 1930 MW (Kainji, Jebba and Shiroro),

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<sup>1</sup> Akuru, Udochukwu & Okoro, O.I. (2011). A Prediction on Nigeria's Oil Depletion Based on Hubbert's Model and the Need for Renewable Energy. International Scholarly Research Network (ISRN) Renewable Energy. 2011. 6 pages. 10.5402/2011/285649.

<sup>2</sup> The Renewable Electricity Policy Guidelines (REPG) (2006) Policy Document at Pg 30; see also The Renewable Energy Master Plan (REMP) (2005) pg 42.

<sup>3</sup> Ibid.

already developed, the gross hydro potential for the country would be approximately 14,884MW. Nigeria receives an average solar radiation of about 7.0kWh/m<sup>2</sup> (25.2MJ/m<sup>2</sup> per-day) in the far north and about 3.5kWh/m<sup>2</sup> per day (12.6MJ/m<sup>2</sup> per day) in the costal latitudes.<sup>4</sup> The estimate of potential solar energy in Nigeria, with 5% device conversion efficiency is  $5.0 \times 10^{14}$  KJ of useful energy annually.<sup>5</sup> According to Akinbami, this estimate is equivalent to about 258.62million barrels of oil produced annually and about  $4.2 \times 10^5$  GWh of electricity production annually in the country.<sup>6</sup> Similarly, a study on the wind energy potentials for a number of Nigerian cities shows the annual average speeds of about 2.2 m/s at the coastal region and 4.5 m/s at the far northern region of the country.<sup>7</sup> With an air density of 1.1 kg/m<sup>3</sup>, the wind energy intensity perpendicular to the wind direction ranges between 4.4 W/ m<sup>2</sup> at the coastal areas and 35.2 W/m<sup>2</sup> at the far northern region.<sup>8</sup>

Unfortunately, in the midst of these efforts, despite the Nigerian electricity market being made up of about 23 grid-connected generating plants in operation, Nigeria still drags behind with a meager installed capacity of 10,396 MW, out of which only 6,056 MW is optimized to serve a population of over 200 million people. It is not as if there are no

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<sup>4</sup> See O. C. Iloeje. Potentials for Renewable Energy Application in Nigeria, Energy Commission of Nigeria, pp.5-16, 1997; See also A. S. Sambo: Matching Electricity Supply with Demand in Nigeria, (International Association for Energy Economics Fourth Quarter 2008) pg 35. A. S. Sambo was a former Director General of the Energy Commission of Nigeria. See finally also the National Energy Policy (NEP) (2003); Chapter two pp. 27-28 and the National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015) pg 13.

<sup>5</sup> See Onyebuchi, E.I. (1989). Alternative Energy Strategies for the Developing World's Domestic Use: A Case Study of Nigeria Household's Final Use Patterns and Preferences, Energy Journal, 10(3), 121 – 138.

<sup>6</sup> See Akinbami, J. (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.

<sup>7</sup> Sambo, A. S. (2009). Strategic developments in renewable energy in Nigeria. International Association for Energy Economics. 4:15-19. See also the National Energy Policy (NEP) (2003): Chapter two pg 31; and the National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015) pg 15.

<sup>8</sup> Akinbulire, T.O, Oluseyi, P.O and Babatunde, O.M (2014), 'Techno-economic and environmental evaluation of demand side management techniques for rural electricity in Ibadan, Nigeria', Int. J Energy Environ Eng. 5(132): 1 – 11.

laws to harness these resources; there are, but the lack of political will, often associated with implementation of even the minutest part of such policies ends up making the target seemingly impossible if not a mirage. To some point it has become a political campaign promise; “we will give you light.” The sector has suffered more politicization, large scale corruption and inefficiency than any other sector. These fundamental problems have also multiplied and replicated in multifaceted quagmires. Available statistics indicate that Brazil with a population of about 192 million produces over 100,000 megawatts of electricity and South Africa with a population of about 50 million generates over 40000 megawatts of electricity. Our present low generation with a population in the region of over 200 million people is a major challenge to the economy which is reputed to be the largest in Africa whether a delusion or a reality is a different ball game. In terms of efficiency and performance, the Nigerian electricity power sector has been rated by the UNDP/World Bank Report 1993 as having one of the highest rates of losses (33%), the lowest revenue and the lowest rate of return when compared to nations with similar profiles such as South Africa, Brazil and Indonesia.<sup>9</sup> The story has not changed over the years. Most of the huge investments that have been made by government in the past 16 years into the sector have made little or no impact in the sector due to large scale corruption and gross mismanagement and ineptitude on the part of government officials. Nigerians spend over \$5 billion every year to generate their own energy with fuel (fossil energy).<sup>10</sup>

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<sup>9</sup> Adeola Adenikinju, Efficiency of the Energy Sector and its Impact on the Competitiveness of the Nigerian Economy. International Association for Energy Economic Newsletter, fourth quarter 2008 p28

<sup>10</sup> . Idris N.A., et al, “Nigeria’s Wind Energy Potentials: The Path to a Diversified Electricity Generation-Mi’x; International Journal of Modern Engineering Research (IJMER), Vol.2, Issue4, July to August 2012 pp.2434-2437

Although Nigeria has been part of the recent international agreements on renewable diversification, the country has been active in renewable energy integration from the beginning. There have been efforts by successive regimes to enthrone the renewable energy through various laws, policies and programmes. Section 4(4)(a) Part II of the Second Schedule Items 13(c) and 14(c) of both the 1979 and 1999 Constitution of Nigeria as amended had conferred the regulation of the right of any person or authority to dam up or otherwise interfere with the flow of water from sources in any part of the Federation on the National Assembly of Nigeria. The Niger Dams Act, 1962 No. 23 of 13<sup>th</sup> September, 1962, amended by the Niger Dams (Amendment) Decree 1970 of 12<sup>th</sup> January, 1970, was an Act to establish an authority to be responsible for the construction and maintenance of dams and other works on the river Nigeria. It also provided for the use, in connection with the works of water and power for generating electricity. By the strength of these provisions, a dam on the river Niger in the village of Kainjin was constructed solely for the purposes of generating electricity.<sup>11</sup>

However, huge shortfall between the demand for electricity in the Nigerian economy and the supply is an indication of the great investment potentials which if properly harnessed will produce greater opportunities than the telecommunication sector. Yemi Oke in the preface on Nigerian Electricity Law and Regulation,<sup>12</sup> stated that the development of Nigeria's power sector has been regressive and largely stunted. The author argued that this is due to the inability or failure to deploy legal, policy and institutional frameworks to bring about effective administration through socially sustainable and economically viable management of the power sector. The appalling performance of this sector calls for

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<sup>11</sup> Niger Dams Act, 1962 No. 23. of 13th September, 1962

<sup>12</sup> Yemi Oke, Nigerian Electricity Law and Regulation, (Princeton & Ass, Publishing Co. Ltd, 1st Edition, 2013).



an urgent total re-engineering for the enhancement of electricity supply and management. As said earlier, the huge market that Nigeria offers makes this sector a compelling investment destination. However, this can only be properly harnessed where the necessary policies and institutions are put in place. The import of this paper will be to determine if the present reforms are far reaching enough to bring about the required improvement in the various highlighted renewable options available in Nigeria thereby ensuring energy security for the country.

## **1.2. Statement of the Problem**

According to report the gross hydro potential for Nigeria is approximately 14,884MW. Also, the Nigerian sun energy is about 7.0kWh/m<sup>2</sup> (25.2MJ/m<sup>2</sup> per-day) in the far north and about 3.5kWh/m<sup>2</sup> per day (12.6MJ/m<sup>2</sup> per day) in the costal latitudes. More so, the wind energy potentials for a number of Nigerian cities shows the annual average speeds of about 2.2 m/s at the coastal region and 4.5 m/s at the far northern region of the country. With an air density of 1.1 kg/m<sup>3</sup>, the wind energy intensity perpendicular to the wind direction ranges between 4.4 W/ m<sup>2</sup> at the coastal areas and 35.2 W/m<sup>2</sup> at the far northern region. Apart from renewable energy resources, Nigeria has a conservatively estimated 187 trillion cubic feet of proven natural gas reserves.<sup>13</sup> Another source estimates it at 232trillion cubic feet.<sup>14</sup> This estimated proven reserve figure puts Nigeria amongst the top ten countries with the largest gas reserves in the world and the largest in

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<sup>13</sup> BP Statistical Review of World Energy, December 2011 at <http://www.bp.com/sectiongenericarticle800.dc> accessed on the 25<sup>th</sup> of June, 2012.

<sup>14</sup> Natural Gas Reserves in Nigeria at <http://www.oilgasarticles.com/articles/89/Natural-Gas-Reserves-i...> (last visited on September 1<sup>st</sup> 2015)



Africa.<sup>15</sup> Nigeria's proven gas reserve is about triple its proven crude oil reserve.<sup>16</sup> The government in its bid to increase gas utilization for electricity has deplored various policies and programmes to make a head way yet nothing positive to show for it. One of such programmes is gas to power. Yet as at July 2016, the total installed power generation capacity in Nigeria, a country of over 200 million people was 12,522MW; of which 85% of the energy resources thereof is derived from natural gas i.e. (gas fired or thermal) while the remaining 15% is hydro based. The country achieved its highest peak generation output of 5,074MW in February 2016.<sup>17</sup> Only about 40% of the population has access to electricity supply.<sup>18</sup> This clearly indicates that it is not the abundance or deficiency of the resources that is the Nigerian problem. There is indeed need to look into other areas that have not been considered.

It is very regrettable that despite the abundance of the renewable energy resources in Nigeria, there have been weak and inadequate renewable energy policies. Considering the multidimensional nature of the country, relying on policies and programs of each government to drive the renewable energy objective indeed shows how policy makers and stakeholders intended to have a failed system from the beginning. Since 2003 till date, Nigeria has never gotten it right on policies and legislations to integrate renewable energy into the nation's energy profile. Apart from the energy realization itself, consequential externalities have not been addressed. Obviously, the renewable energy

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<sup>15</sup> According to the US Energy Information Administration Nigeria Country Analysis brief of August 2011, the estimated proven natural gas reserves as of December 2011 of 187 tcf makes Nigeria the ninth largest natural gas reserve holder in the world and the largest in Africa. See <http://www.eia.gov/countries/cab.cfm?fips=NI> accessed on 25<sup>th</sup> of June, 2012.

<sup>16</sup> Natural Gas [www.onlinenigeria.com/links/petradv.asp?blurd-486](http://www.onlinenigeria.com/links/petradv.asp?blurd-486) accessed on the 31<sup>st</sup> of August 2015

<sup>17</sup> Detail Commercial Solicitors, "Prospects of Solar Power Generation in Diversifying Nigeria's Energy Mix," August 2016 *Newsletter*

<sup>18</sup> The National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015)

does not stop at its names. They must be captured, harnessed with renewable energy technologies before use. It requires land for cultivation of raw material for biofuel as well spaces for installation of wind energy turbines. The requirement for technical understanding of national security to avoid underplaying the territorial sovereignty is necessarily important. Worst-still the political actors who are expected to make policies and laws in the effort lack the technical competencies to understand policy reasons. They are completely in the dark as to the basic framework to help the country. One of their usual political promises “we will give you light,” is understandably intended for speech making other than economic plans.

As rightly observed, Nigeria is not new to the renewable space. Her dominance in that subsector especially in the African region is very pronounced as shown by history. There have been several policies and laws to project the Nigerian hydropower investment, yet she is incapable of showing any distinction in the frontline of renewable energy optimization. The existing legislations have not in any way assisted or even addressed any of the problems associated with hydro power electricity generation and governance. Although the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015 and the Electric Power Sector Reform Act, 2005 (through the successor Generation Plants) placed the Renewable Energy electricity under the regulatory ambit of the NERC.<sup>19</sup> In response to the global demand for applications of renewable energy resources, the Energy Commission of Nigeria Act, 1979 was enacted and which created

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<sup>19</sup> Section 12(a-m) of the Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015.

an Energy Commission of Nigeria (ECN).<sup>20</sup> The Act made a provision for a department for the Renewable Energy resources.<sup>21</sup> Clearly there is obviously a regulatory conflict.

The Electric Power Sector Reform Act, 2005 confers all existing rights in or over land or water which, immediately before the initial transfer date, vested in any person pursuant to the Electricity Act or the National Electric Power Authority Act shall, on and after the initial transfer date, continue to vest in the initial holding company concerned as if it had been acquired in terms of this Act.<sup>22</sup> The current position of the law is that a land compulsorily acquired for public purpose can be vitiated where it was subsequently diverted to serve private need. If a property is ostensibly acquired for public purpose and it is subsequently discovered that it has directly or indirectly been diverted to serve private needs, the acquisition can be vitiated. The acquiring authority cannot 'rob Peter to pay Paul' by divesting one citizen of his interest in a property only to vest same in another. If the acquiring authority can no longer find a public purpose for the land so acquired the only avenue open to it is to de-acquire it and let the same revert to the person in whom it was already vested.<sup>23</sup>

### **1.3. Research Questions**

Since the renewable energy is not new in the Nigerian energy mix as shown in the Country's hydroelectricity energy profile, the study interrogates the following questions:

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<sup>20</sup> Section 1 of the *Energy Commission of Nigeria Act*.

<sup>21</sup> Section 1(2)(b). The section stipulates that the Commission shall consist of the following department that is Energy Planning and Analysis (including Energy Efficiency Demand Management and Conservation, Rural Energy, Alternative and New and Renewable Energy Sources).

<sup>22</sup> Section 98(4) of the Electric Power Sector Reform Act, 2005.

<sup>23</sup> *Osho vs. Foreign Finance Corporation* (1991) 4 NWLR (PT. 184) 157.

- (a) Are there sufficient laws and policies to support the transition to renewable in order to achieve energy mix, sustainability, security and energy sufficiency?
- (b) Are there adequate regulatory framework and institutional governance mechanisms for the various dimensions of renewable energy?
- (c) What is the apparatus on ground to guarantee technical competencies or assist the transferring of technology and technical expertise to the local stakeholders?
- (d) Would States be allowed in the mainstream of energy electricity regulation in Nigeria?
- (e) What factors are undermining the renewable energy dimension with respect to investment destination as compared to the trajectories in the various transitions over time?

#### **1.4. Research Aims and Objectives**

1. This research aims to investigate the various legislative instruments and policies as well as their respective potencies towards achieving sustainable renewable energy development in Nigeria.
2. The study aims to identify the shortfalls and the extent thereof in the existing institutional regulatory framework which has underpinned the retarded development output in renewable energy investment in Nigeria.
3. This study also aims to examine the resource strength of the various demographic fragments of the Nigerian State, for the attainment of energy sufficiency, energy mix and sustainable renewable energy transition.

4. The first objective of this study is to awaken the consciousness of all key stakeholders towards accepting renewable energy transition as a compelling panacea to energy problems free of impairment to the environment.
5. While assessing the success of other jurisdictions, part of the objective of this study is to uphold the indispensable position of legislative framework and regulatory institutional governance in the achievement of a sustainable renewable energy transition.

### **1.5. Research Methodology**

The research utilized multidisciplinary approach to ascertain various specialized and scientific facts. In arriving at data obtained in the course of research the candidate used the quantitative and qualitative approach to reach certain conclusions. For the legal analysis of the research, the candidate study applied doctrinal method which involved the analysis of primary and secondary sources of the Nigeria laws most of which were extensively criticized, appraised and extolled. There were references and use of constitution, statutes, delegated/administrative regulations and case laws. There were also comparative analyses of various jurisdictions' legal instruments to determine the global perspectives of the renewable energy profiles. The researcher also applied empirical approach through one-on-one interviews with industry experts. Scientists and Staffers of the NERC were also interviewed.

### **1.6. Significance of the Study**

Despite series of legislations and efforts to get it right in the Electricity sector, the industry has remained and continued ranking high in the cadre of failure and

unproductiveness. The supply of electricity has remained epileptic. The relationship between the suppliers and consumers has also remained unprogressive. These inadequacies no doubt have flourished, not necessarily because of lack of laws, but because of the ineffectiveness of the law implementers and regulatory activism. No doubt each law contributed immensely to the advancement of the Nigerian electricity sector in its own way because despite all odds, each successive regime witnessed the best legislative output. The clamour for energy mix and the advent of renewable various renewable energy resources and options presently growing up globally, there is need for a robust argument in support of comprehensive legislative and regulatory instruments to harness the renewable resources in Nigeria. This study presents key strategies for the roadmap needed by policy makers to navigate out of the obstacle of repeating the paths of our past.

### **1.7. Limitation of the Study**

The study is strictly centered on legislative and regulatory frameworks as well as policies that impair or advance the development of renewable energy in Nigeria. It further advocated for shifts where necessary. It laid down the best approach to be adopted in optimizing the abundant renewable energy resources for the attainment energy sufficiency in Nigeria.

This study has no answers to the question on the data used by authors as regards to the quotient of solar energy, wind energy, geothermal or biomass energy in Nigeria. It could not also add to knowledge in the area of scientific propositions and also unable to justify the various mathematical and scientific conclusions found in the course of the research.



## CHAPTER TWO

### THEORETICAL FRAMEWORK AND LITERATURE REVIEW.

#### 2.1. Theoretical Framework

Renewable energy is derived from natural processes that are replenished constantly. Some typical sources of renewable energy are: Heat & Light from the Sun, Ocean Wave, Purposely-Growth Energy Crops, Potential Energy of Running water, Geothermal Energy and Wind Energy.<sup>1</sup> Renewable electricity refers to electric power obtained from energy sources whose utilization does not result in the depletion of the earth's resources.<sup>2</sup> The Renewable energy exploits the off the grid opportunities and serves as clean alternative to fossil fuels. The prospects are high and the opportunities are enormous in Nigeria. As a coherent description or explanation of phenomena, theories explore why and how acts, events, and thoughts occur.<sup>3</sup> In human endeavour, the trajectories that help observers to understand, perceive and forecast phenomena are found in the various existing theories. In renewable energy, there are various perceptions to its rationale. These theories vary and are most often influenced by impacts and purposes. Two theories guide the discourse and the perceptions on renewable energy. They are as follows:

##### 2.1.1. Sustainable Development Theory

Sustainable development was introduced by the Brundtland Report of 1987. The theory emphasizes that there is need for indefinite span in the existence of mankind. It postulates that in order to achieve inexhaustible human existence,

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<sup>1</sup> Renewable Energy Working Party of the International Energy Agency (IEA), *World Energy Outlook*, 2011, Paris.

<sup>2</sup> Renewable Electricity Policy Guidelines (REPG) (2006)

<sup>3</sup> Gioia DA, Pitre E. Multiparadigm perspectives on theory building. *Acad Manag Rev* 1990;15:584–602

there is need for a balance between the carrying capacity of eco-system and the human economic and social activities. Thus, while there is clamour for development, such must necessarily be within the ambits of tolerability by the eco-system. Although it may appear as if there is a tiny line between the concept of sustainable development and environmental preservation of the ecosystem, however, in the light of renewable energy transition, it is purely spurred by the desire to preserve for the future generation. Pure sustainable development preserves the resources than preserving the environment. Under the sustainable theory, the reality of a projected but certain fall of Nigeria's oil reserve as confirmed in relevant studies.<sup>4</sup> Therefore since the depletion is certain and no doubt very near, in very clear terms, there an urgent need for increased investment and utilization of renewable energy resources and system in Nigeria.<sup>5</sup> Considering the dependency of all other sources of energy on oil, it will be reasonable if such energy transition is speedily initiated.<sup>6</sup>

#### **2.1.1.1. Environmental Preservation**

Recent data confirm that consumption of fossil fuels accounts for the majority of global anthropogenic GHG emissions.<sup>7</sup> Since there are

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<sup>4</sup> Udochukwu B. Akuru, Ogbonnaya I. Okoro, "A prediction on Nigeria's Oil Depletion Based on Hubbert's Model and the Need for Renewable Energy," *International Scholarly Research Notices*, vol. 2011, Article ID 285649, 6 Pages, 2011 culled from <https://doi.org/10.5402/2011/285649>

<sup>5</sup> Ibid

<sup>6</sup> Ibid

<sup>7</sup> The contributions of individual anthropogenic GHGs to total emissions in 2004, reported in AR4, expressed as CO<sub>2</sub>eq were: CO<sub>2</sub> from fossil fuels (56.6%), CO<sub>2</sub> from deforestation, decay of biomass etc. (17.3%), CO<sub>2</sub> from other (2.8%), methane (14.3%), nitrous oxide (7.9%) and fluorinated gases (1.1%) [Figure 1.1b, AR4, WG III, Chapter 1. Contained in IPCC, 2011: Summary for Policymakers. In: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA



multiple options for lowering GHG emissions from the energy system while still satisfying the global demand for energy services,<sup>8</sup> the renewable energy option becomes very imminent for some reasons. Renewable energy production can offer an environmentally sustainable means of economic growth in the future.<sup>9</sup> Indeed the environmental impact of the remnant of the energy resources, particularly the traditional fossil fuel and the huge impacts of the resource revenue on the economies of states for infrastructural and national development demands for an uninterrupted immediate transition. The continued global concern about environmental safety has brought about tremendous increase in energy production from the renewable energy sources. Just as the Paris Agreement of 2015 and other similar international instruments appear as necessary interventions to salvage the ugly effect of the activities of man on the climate and ecosystem over time, so also has the call for renewable energy transition has immensely been propagated to preserve the environment. According to Silva (2012), one subject that has been heavily discussed is the use of alternative energy sources, as a way to mitigate the impact of CO<sub>2</sub> emissions.<sup>10</sup>

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<sup>8</sup> IPCC, 2011: Summary for Policymakers. In: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

<sup>9</sup> Nadia Singh, Richard Nyuur and Ben Richmond, *“Renewable Energy Development as a Driver of Economic Growth: Evidence from Multivariate Panel Data Analysis”* Newcastle Business School, Northumbria University, Newcastle NE1 8ST, UK;

<sup>10</sup> Filipa Inês Gil Silva (2012), *“The Impact of Renewable Energy Sources on Economic Growth and CO<sub>2</sub> Emissions: Evidence from Iberian Peninsula”* Quantitative Methods Department, ISCTE Business School, University Institute of Lisbon. Dissertation submitted as partial requirement for the Master’s degree in Economics,

Globally, there has been the continued call for diversification and to reduce the emission and greenhouse gas. Countries have set the year 2020 target to meet the targets. It is on record that most producers of solar, battery, and wind technologies are based in China. But for the global pandemic of the COVID-19, the country was already on track to meet its emissions targets for 2020.<sup>11</sup>

### **2.1.2. Entrepreneurial Theory**

The impact of renewable energy production on economic growth is higher in developing economies, compared to developed economies.<sup>12</sup> This no doubt is largely because of the developing nature of the economy. Most economies in Africa and other third world countries are dominated by entrepreneurs. According to Venkataraman (1997), “one of the most neglected questions in the entrepreneurship literature is where opportunities to create goods and services in the future come from.”<sup>13</sup> Studies have shown that entrepreneurial perspective of renewable energy is always absent, whereas that was predominantly the force behind the innovation of the technologies. From an entrepreneurship perspective, environmental problems should be viewed as an opportunity for new value

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<sup>11</sup>Taiya Smith, Senior Associate (non-resident), Energy Security and Climate Change Program: Experts React: COVID-19 Impacts the Energy Sector, March 6, 2020 culled from <https://www.csis.org/analysis/experts-react-covid-19-impacts-energy-sector>.

<sup>12</sup> Nadia Singh, Richard Nyuur and Ben Richmond, “*Renewable Energy Development as a Driver of Economic Growth: Evidence from Multivariate Panel Data Analysis*” Newcastle Business School, Northumbria University, Newcastle NE1 8ST, UK;

<sup>13</sup> Venkataraman, S. (1997), The distinctive domain of entrepreneurship research: an editor’s perspective, in Katz, J. and Brockhaus, J. (Eds.), *Advances in Entrepreneurship, Firm Emergence, and Growth*, JAI Press, Greenwich, CT.

creation.<sup>14</sup> Some authors believe that entrepreneurs engage in the allocation of scarce resources because environmental degradation is an intrinsic problem of the distribution of resources and the process of allocation.<sup>15</sup> Therefore an entrepreneurial act is needed to recognize the profit opportunities while simultaneously introducing innovations for addressing the challenges.<sup>16</sup> Other scholars demonstrate the role of entrepreneurship in environmental problem solving through the exploitation of opportunities as consequences of market failures which helped move the global economic system on the road to sustainability.<sup>17</sup> There are still few scholars who advocates that entrepreneurs have to focus not only on technological advancements for addressing the environmental degradation, but also on the formation of new markets and communicate with consumers.<sup>18</sup>

Keeping in mind the chain of advancement, discovery, production and distribution of the renewable, this candidate submits that indeed the argument for the consideration of renewable energy resources from the perspective of entrepreneurship is clear and real. Necessity they say is the mother of invention. It is an African cliché that life is full of problem, and each that is identified and solved creates an opportunity for exploits. The global warming and the associated desire for healthier and safer environment has created a specific problem possible

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<sup>14</sup> Salah Koubaa, 2017. "Renewable Energy through the Lens of Entrepreneurship Theory; The case of Morocco. Casablanca Hassan 2nd University (Morocco). culled from <https://www.cairn.info/revue-projectique-2017-3-page-69.htm>;

<sup>15</sup> Ibid;

<sup>16</sup> Ibid;

<sup>17</sup> Dean, T.J. and McMullen, J.S. (2007), Toward a theory of sustainable entrepreneurship: Reducing environmental degradation through entrepreneurial action, *Journal of Business Venturing*, 22, pp. 50-76.

<sup>18</sup> York, J.G. and Venkataraman, S. 2010, "The entrepreneur—environment nexus: uncertainty, innovation, and allocation", *Journal of Business Venturing*, 25, p.449-463.

extinction of mankind due to climate change and greenhouse emission. Thus, to create answers to problem becomes an opportunity for skillful entrepreneurs.

## 2.2. Literature Review

The Renewable electricity came to limelight in Nigeria due largely to electricity challenges in the country manifesting in epileptic supply of electricity to consumers and partly as a result of the global clamour for reduction in the emission of carbon dioxide in the atmosphere. The latter is shown in increasing devastating effects of the use of fossil energy resources that are essentially inexhaustible, unlimited and naturally renewable and replenishable such as wind, water, sun, wave, refuse and bio-fuel, among others.<sup>19</sup> Countless authors have advanced theories and literary works on the various dimensions of the available and usable renewable energy resources in Nigeria. These works have contributed immensely to the development of renewable as a major competitor in the demand for energy mix. Oke argues that there is a policy gap on the renewable electricity as the focus of national strategies on initiatives have centralized on conventional sources of electric power.<sup>20</sup> He further argues that although the power sector of Nigeria has now been privatized, it is yet to be liberalized in practical terms due to lack of definitive regime for renewable energy.<sup>21</sup> According to Oni the adaptation of renewable energy sources in Nigeria is recent, however renewable energy sources have contributed to Nigeria's energy mix in the last centuries in a largely primitive way.<sup>22</sup> Oniemola opines that there are many legal barriers to the successful utilization of renewable energy in

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<sup>19</sup> Yemi Oke, *Nigerian Electricity Law and Regulation*, (Law Lords Publications, 2013) at 58

<sup>20</sup> *Ibid* pg. 318

<sup>21</sup> Yemi Oke, *Essays on Nigerian Electricity Law*, (Princeton & Ass, Publishing Co. Ltd, 2016) pg 94.

<sup>22</sup> Ayodele Oni, *The Nigerian Electricity Market; Understanding the Transactional, Legal and Policy Issues*, (CIPLUS Limited, 2021) pg. 422.

Nigeria, and one of such is the overlapping roles and lack of clarity of purpose of institutions relevant to the promotion of renewable energy.<sup>23</sup>

While the works of the earlier authors on the subject of renewable energy appear to have the background of legal and sociological without detailed implementation measures, others however, are more of scientific and technically patterned. They jointly failed to adhere to providing the imminent knowledge that can enhance the optimization of the existing legal frameworks on renewable energy resources in order to achieve renewable energy integration for energy mix in Nigeria. The basis of this research is the domestication of the globally accepted knowledge for the implementation of available legal frameworks for renewable energy in Nigeria, while advocating for more expansion.

### **2.3. Prospects of Renewable Energy in Nigeria**

There is massive opportunity for renewable energy investment through harnessing the off-grid, mini-grid or grid and exploiting the potentials to provide electricity for the unfed, unserved and even underserved areas that make up the over 60% of energy deficiency in Nigeria. The Renewable energy covers all forms of energy generated from natural resources such as sunlight, wind, water (or hydro power), tide, geothermal heat, biomass and biofuels. Renewable energy easily exploits the off-grid or mini-grid opportunities. They are derived from natural processes that are constantly replenished and each of them has characteristics that determine where and how they are used. Renewable as the name suggest exists perpetually and in abundant quantity in the environment. Renewable energy is ready to be harnessed, inexhaustible, and more importantly, it is a

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<sup>23</sup> Oniemola, Peter. (2016). Powering Nigeria through renewable electricity investments: legal framework for progressive realization. *Journal of Sustainable Development Law and Policy (The)*. 6. 83. 10.4314/jsdlp.v6i1.4.

clean alternative to fossil fuels. The main resources that can harness investments in the electricity option of the energy sources for the Nigerian electricity market are solar, wind, water (small or big hydro) and geothermal. The works of several authors mostly scientific on the potentials of the Energy in Nigeria is examined hereunder.

### **2.3.1. Solar Energy**

It is a common knowledge that Electricity is generated from solar energy predominantly through photovoltaic materials (cells or modules) that converts sunlight directly into electricity. Solar thermal electricity technologies are also available whereby solar energy are concentrated unto boilers to produce vapor which could then be used in a conventional steam power plant. According to the Renewable Electricity Policy Guidelines (REPG) (2006), in Nigeria, solar photovoltaic technologies are used for small-scale power supply in some rural electrification programs of some States of the federation.<sup>24</sup> Awogbemi, O. and Asaolu opines that most current technology of photovoltaic modules is about 10 percent efficient in converting sunlight.<sup>25</sup> Iloeje propounds that solar radiation represents the largest energy flow entering the terrestrial ecosystem. According to him, Nigeria receives an average solar radiation of about 7.0kWh/m<sup>2</sup> (25.2MJ/m<sup>2</sup> per-day) in the far north and about 3.5kWh/m<sup>2</sup> per day (12.6MJ/m<sup>2</sup> per day) in the costal latitudes.<sup>26</sup> In the view of Onyebuchi, the estimate of potential solar energy

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<sup>24</sup> See Supra note 2 at pg 8.

<sup>25</sup> Awogbemi, O. and Asaolu, J.I., "Overview of Renewable Energy Situation in Nigeria" *Faculty of Engineering, University of Ado-Ekiti, Nigeria*, 2008 16 – 25.

<sup>26</sup> See O. C. Iloeje. Potentials for Renewable Energy Application in Nigeria, Energy Commission of Nigeria, pp.5-16, 1997; See also A. S. Sambo: Matching Electricity Supply with Demand in Nigeria, (International Association for Energy Economics Fourth Quarter 2008) pg 35. A. S. Sambo was a former Director General of the Energy



in Nigeria, with 5% device conversion efficiency is  $5.0 \times 10^{14}$  KJ of useful energy annually.<sup>27</sup> Akinbami holds that this estimate is equivalent to about 258.62million barrels of oil produced annually and about  $4.2 \times 10^5$  GWh of electricity production annually in the country.<sup>28</sup> Scholars like Aliyu have stated that given an average solar radiation level of about 5.5KWh (m<sup>2</sup> per day) and the prevailing efficiencies of commercial solar-electric generators, then if solar collectors or modules were used to cover 1% of Nigeria's land area of 923,773km<sup>2</sup>, it is possible to generate 1850x103GWh of solar electricity per year, which is over one hundred times the current grid electricity consumption level in the country.<sup>29</sup>

### 2.3.2. Wind Energy

The energy contained in the movement of air in form of wind is used to turn the blades of windmills or wind turbines which in turn could be used to drive electrical generators to produce electricity. The Renewable Electricity Policy Guidelines (REPG) (2006) categorizes that large modern wind turbines operate together in "wind farms" to produce electricity for utilities, while small turbines are used to meet localized and small energy needs.<sup>30</sup> According to Mahmud *et al*, in the scientific parlance, winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and rotation of the

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Commission of Nigeria. See finally also the National Energy Policy (NEP) (2003); Chapter two pp. 27-28 and the National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015) pg 13.

<sup>27</sup> See Onyebuchi, E.I. (1989). Alternative Energy Strategies for the Developing World's Domestic Use: A Case Study of Nigeria Household's Final Use Patterns and Preferences, *Energy Journal*, 10(3), 121 – 138.

<sup>28</sup> See Akinbami, J. (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.

<sup>29</sup> Aliyu Musa Kofa, "Solar energy for sustainable power supply in Nigeria" *Nuhu Bamalli Polytechnic, Zaria, Kaduna State*, 2012 retrieved from <http://sweetcrudereports.com/2012/12/25/solar-energy-for-sustainable-power-supply-in-nigeria/>

<sup>30</sup> See Supra note 2 at pg 8.

earth.<sup>31</sup> According to Sambo, wind is a natural phenomenon relating to the movement of air masses caused primarily by the differential solar heating of the earth's surface.<sup>32</sup> In the words of Pandey et al once wind energy is harvested by modern wind turbines, can be used to generate electricity.<sup>33</sup> For Brady, the wind power is available only when the wind speed is above a certain threshold.<sup>34</sup>

Wind energy technology is one of the fastest growing technologies in renewable energy generation industry. The erratic and epileptic state of the centralized power supply in Nigeria and the concern about global warming and harmful effects of the remnants of the fossil fuel have stimulated a great concern for immediate renewable alternatives. It has indeed kick started the drive into strong quest for wind energy as one of the alternative means of power generation. The advantages of wind electricity generation are enormous, the consequential harmless emissions and the almost infinite availability of the wind that is converted into electricity is an exploitable opportunity. Unfortunately, no significant achievement has been recorded in Nigeria in wind energy generation. Nigeria is yet to match the trends in parts of Africa like Egypt, Morocco, South Africa, Kenya and Tunisia. As at 1998, a 5-kW wind electricity conversion system for village electrification was

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<sup>31</sup> M. A. Parvez Mahmud, Shahjadi Hisan Farjana: "Wind Power Technology Schemes as Renewable Energy in Bangladesh," *International Journal of Engineering and Advanced Technology (IJEAT)* (ISSN: 2249 – 8958, Volume-1 Issue-5, June 2012) pg. 315 culled from <https://www.ijeat.org/wp-content/uploads/papers/v1i5/E0527061512.pdf>.

<sup>32</sup> A.S. Sambo "Renewable Energy for rural development: The Nigerian perspective" *ISESCO Science and Technology Vision Volume 1* Pp.16-18 (May 2005).

<sup>33</sup> Mahesh Pandey et al, "ELECTRICITY GENERATION USING VERTICAL AXIS WIND TURBINE:DESIGN AND DEVELOPMENT" *International Journal of Advance Research in Science and Engineering*, Volume No.06, Special Issue No.(02), December 2017, pg 234

<sup>34</sup> T. F Brady "A simulation solution of the integration of wind power into an electricity generating network" A paper presented at the proceedings of the 2009 winter Simulation Conference *Department of Engineering Technology Westville USA*, Pp. 1523-1529.



installed at Sayyan Gidan Gada, in Sokoto State.<sup>35</sup> A study on the wind energy potentials for a number of Nigerian cities shows the annual average speeds of about 2.2 m/s at the coastal region and 4.5 m/s at the far northern region of the country.<sup>36</sup> With an air density of 1.1 kg/m<sup>3</sup>, the wind energy intensity perpendicular to the wind direction ranges between 4.4 W/ m<sup>2</sup> at the coastal areas and 35.2 W/m<sup>2</sup> at the far northern region.<sup>37</sup> More on the wind resources in Nigeria revealed that the North, Central and South-East of the nation possess enormous potential for harvesting wind energy, with possible wind speeds reaching as high as 8.70 m/s in the north.<sup>38</sup>

### 2.3.3. Hydro Energy

Globally, hydropower is a very significant contributor to energy systems. Hydropower is derived from the potential energy available from water due to the height difference between its storage level and the tailwater to which it is discharged.<sup>39</sup> This power is therefore generated by mechanical conversion of the energy into electricity through a turbine, at a usually high efficiency rate.<sup>40</sup> Depending on the volume of water discharged and height of fall (or head), hydropower can be large or small.<sup>41</sup> Although there may not be any international consensus on the

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<sup>35</sup> O. S Mutlu “Evaluating the impacts of wind farms on power system operation” *Journal of Naval Science and Engineering*, Vol 6, No 2, Pp.166 -185 (2010).

<sup>36</sup> Sambo, A. S. (2009). Strategic developments in renewable energy in Nigeria. International Association for Energy Economics. 4:15-19. See also the National Energy Policy (NEP) (2003): Chapter two pg 31; and the National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015) pg 15.

<sup>37</sup> Akinbulire, T.O, Oluseyi, P.O and Babatunde, O.M (2014), ‘Techno-economic and environmental evaluation of demand side management techniques for rural electricity in Ibadan, Nigeria’, *Int. J Energy Environ Eng.* 5(132): 1 – 11.

<sup>38</sup> Ajayi, O.O (2009) Assessment of utilization of wind energy resources in Nigeria, *Energy Policy*, 37, 750–753.

<sup>39</sup> See the Renewable Energy Master Plan (REMP) (2005) Policy Document pp 39 - 40.

<sup>40</sup> *Ibid.*

<sup>41</sup> *Ibid.*

definition of small hydropower, an upper limit of 30 MW has been considered.<sup>42</sup> Small hydro can further be subdivided into mini hydro (<1MW) and micro hydro (<100KW).<sup>43</sup> The lifetime of small hydro facilities is 20 – 30 years, compared with 8 – 10 years for diesel engine generators. Long service life is an important attraction of the small hydro system.<sup>44</sup> In Nigeria, some NESCO SHP projects, which were completed between 1923 and 1964, have continued to provide virtually uninterrupted power to not only supply the Jos metropolis and meet local consumption, but have also continued to feed surplus energy into the national power grid.<sup>45</sup> Although, small hydropower may require a moderately high capital cost, its low operation and maintenance (O & M) requirements coupled with long life span are its major advantage over other prospective sources of power to small and medium sized rural communities and industries. Among the limitations of SHP are its being drought sensitive, weather- and seasonal dependence, and its site-specificity.<sup>46</sup> According to an estimate made by the then National Utility Company; NEPA, Nigeria's outstanding total exploitable hydro potential stood at 12,220 MW.<sup>47</sup> Also from a 1980 survey of 12 of the old states of the federation, it was established that some 734 MW of small hydropower (SHP) could be harnessed from 277 sites.<sup>48</sup> Added to the 1930 MW (Kainji, Jebba and Shiroro), already developed, the gross hydro potential for the country would be approximately 14,884MW. Only about 15% of this potential had been developed

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<sup>42</sup> Ibid.

<sup>43</sup> Ibid.

<sup>44</sup> Ibid; Section One pg 13.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

<sup>47</sup> The Renewable Electricity Policy Guidelines (REPG) (2006) Policy Document at Pg 30; see also The Renewable Energy Master Plan (REMP) (2005) pg 42.

<sup>48</sup> Ibid Section One pg 13.

as of 2012. The small and medium scale hydropower potential is estimated to be greater than 3,500 MW of which less than 2% had been harnessed as of 2012.<sup>49</sup> Although it is presently estimated by the Inter-Ministerial Committee on Available Energy Resources (2004) that the total SHP potential could reach 3,500MW, representing 23% of the country's total hydropower potential.<sup>50</sup> Presently Hydropower is classified as follows: Pico Hydropower: Pico <100kW; Micro Hydropower: 100kW ≤ Micro <500kW; Mini Hydropower: 500kW ≤ Mini <1MW; Small Hydropower: 1MW ≤ Small < 30MW; Medium Hydropower: 30MW ≤ Medium <100MW and Large Hydropower: Large > 100MW).<sup>51</sup> However, except unknown to this candidate, it is submitted that, no new surveys have been conducted since those undertaken in only three northern states 40 years ago, to either affirm, update on the earlier data or even improve the work over other states not considered in the earlier survey, especially the states under the south-southern, south-western and south-eastern geopolitical zones where rainfall is high and most streams and rivers are almost constant. As the population continues to increase, there is correspondent growth in the energy demands. Over-population usually leads to demographic changes in which the urban dwellers migrate to the rural areas, around where most rivers for small hydropower development. These set of new immigrants provide the demand and market for the Small Hydropower. Hence the Government-sponsored programs as rural electrification, water resources development, cottage industries, rural enterprises, agriculture, poverty alleviation programs and health care services constitute

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<sup>49</sup> The National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015) Policy Document at Pg 10.

<sup>50</sup> See supra note 39 at pp 42 - 43.

<sup>51</sup> See supra note 49.

important activities that can draw from the Small hydro scheme.<sup>52</sup> As it has severally been argued by this candidate, acknowledgement of Hydro power generation in Nigeria as at this time supports the submission that the renewable energy is not new to the Nigeria scene. Annual rainfall decreases from a height of 3400mm depth in the south central shores of the Niger Delta to 500mm over the northern boundaries of the country, with a perched increase to 1400mm over central Jos Plateau region.<sup>53</sup>

Similarly, the eastern ranges of Adamawa and Cameroon boundaries experience elevated precipitation as high as 2,000mm relative to contiguous low areas of the country whereas rainfall duration is longest in the South and decreases progressively northwards.<sup>54</sup> In the southern areas, precipitation lasts over 8 months of the year, whereas at the extreme north annual rainfall duration can be less than 3 months.<sup>55</sup> The most attractive areas would be the southern, Plateau and Southeastern regions of the country, where rainfall is highest and of long duration and local topography provides appropriate drops and necessary hydraulic heads.<sup>56</sup> In the northern and Jos Plateau regions where stream flows are substantially ephemeral, the SHP would require flow regulation via storages and reservoirs.<sup>57</sup> Whatever position, it is still objectively accepted that this part of our electricity concern could not have been exploited up to the current status without existing and enabling legislations, policies and regulations.

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<sup>52</sup> See the Renewable Energy Master Plan (REMP) (2005) Policy Document pp 51 - 52.

<sup>53</sup> Ibid pp 39 - 40.

<sup>54</sup> Ibid.

<sup>55</sup> Ibid.

<sup>56</sup> Ibid.

<sup>57</sup> Ibid.

#### 2.3.4. Geothermal Energy

Geothermal energy refers to the production of energy from the internal heat of the Earth's crust. This heat comes from the radioactive decay of minerals and continual heat loss from the earth's original formation.<sup>58</sup> The production of geothermal energy involves drilling wells into the Earth's crust at approximately a depth of 3-10 km to extract heat using water and steam.<sup>59</sup> This heat produces steam that spins turbines on a generator that generates electricity using a geothermal power plant. Where there is proper use of geothermal technology, study have shown that it is one of the best forms of renewable and sustainable energy as the electricity produced are from the natural heat from the Earth. In 2004 over 9,000 megawatts of electricity were produced from some 250 geothermal power plants in 22 countries around the world.<sup>60</sup> These plants provide reliable base-load power for well over 60 million people, mostly in developing countries. African countries with geothermal energy potential are those that are traversed by the East African Rift Valley. These countries include Djibouti, Eritrea, Ethiopia, Kenya, Tanzania and Uganda.<sup>61</sup> There are three power plant technologies being used to convert geothermal fluids to electricity: Dry steam plants, which directly use geothermal steam to turn turbines; Flash steam plants, which pull deep, high-pressure hot water into lower-pressure tanks and use the resulting flashed steam to drive turbines; and Binary-cycle plants, which pass

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<sup>58</sup> See [https://www.studentenergy.org/topics/geothermal?gclid=CjwKCAjwssD0BRBIEiwA-JP5rCL7c1lc0TASdacXvSX6ORHE6ebzdmTiazK0MHotU9DGWBTj1DC8KxoCeAMQAvD\\_BwE](https://www.studentenergy.org/topics/geothermal?gclid=CjwKCAjwssD0BRBIEiwA-JP5rCL7c1lc0TASdacXvSX6ORHE6ebzdmTiazK0MHotU9DGWBTj1DC8KxoCeAMQAvD_BwE).

<sup>59</sup> Ibid.

<sup>60</sup> See supra note 52, pg 18.

<sup>61</sup> Ibid.

moderately hot geothermal water in thermal contact with a secondary fluid with a much lower boiling point than water.<sup>62</sup> The cost of geothermal power production vary from US\$ kWh 5-7 for plants less than 5MW and US\$ kWh 2.5–5 for large plants of more than 30MW for high quality reservoirs. Direct capital costs vary significantly. Large plants in high quality sites can be as low as US\$750/kW and as high as US\$2300/kW for small plants.<sup>63</sup>

Geothermal energy is environmentally friendly and produces little or no greenhouse gas. Although geothermal energy is currently almost occupying no portion of the Nigeria's energy supply mix, it holds great potential for future development because it is a reliable source of power generation that can serve base-load electricity needs. Largely due to the process of generation, geothermal technology can only be used in locations with specific or appropriate geologic conditions. For this reason, the major regions for likely geothermal development are in the most volcanically active states of Nigeria. For instance, Chappal Waddi hill in Taraba State, Tsaunin Kwaiki and Zumo Rock in Niger State, Kumari in Borno State, Mount Dimlang in Adamawa State, Sankwala Mountains in Cross River State, Shere Hills in Plateau State, Masaijeh Hill in Bauchi State, Idanre Hill in Ondo State, Plateau in Federal Capital Territory, Oba and Iragbiji Hills in Osun State, Olumo Rock in Ogun State, Eruwa, Ibarakpa and Igboora Oyo State etc., with the hills measuring between 137m and 2,419m respectively. Also, beyond the aforementioned areas in Nigeria, high geothermal gradient trends have been identified in the Lagos sub-basin, the Okitipupa ridge, the Auchi-Agbede

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<sup>62</sup> Ibid at pg 19.

<sup>63</sup> Ibid.



within the Benin flank/hinge line as well as the Abakaliki anticlinorium.<sup>64</sup> Where the resource exists, geothermal energy is a secure source of energy. It is readily available in all seasons of the year. It is constant. One important advantage of the geothermal energy option is that the costs of geothermal plants are usually low; this is of course subject to the initial costs of well drilling, pipeline construction, and other geophysical activities, which is usually reasonably high. The design of the plant as well as the power plant construction is also expensive. Another area that will require intensive expenditure would be the storage or reservoir provision. This is because the steamed fluid when transported over long distances tends to lose its heat. Thus, it is prominent to locate the project where there is reservoir; otherwise, the investor is compelled to make alternative provisions which on their own are usually expensive. Geothermal energy is nonexistent in the Nigerian energy market. Therefore, the choice of an investment in geothermal energy option in Nigeria has good prospects. This situation can change in the event of major discoveries of commercial geothermal reservoirs as well as major changes in the market for other energy sources.<sup>65</sup> Geothermal reservoirs of commercial proportions have not been discovered yet. It has once been believed that Nigeria is located in a so-called stable Pre-Cambrian–Paleozoic age Basement terrain believed to be seismically safe.<sup>66</sup> This assertion has indeed also been proven wrong especially in the midst of the various incidents of earthquakes and tremors

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<sup>64</sup> See the Renewable Energy Master Plan (REMP) (2005) Policy Document pg 119.

<sup>65</sup> Ibid at pg 118 - 120.

<sup>66</sup> Tsalha M S, Lar U A, Yakubu T A, Umar A K and Duncan D (2015), “The Review of the Historical and Recent Seismic Activity in Nigeria. IOSR”, *Journal of Applied Geology and Geophysics*, e-ISSN; 2321-0990, Vol.3, No. 1, pp. 48-56. See also Orakpo Ebele. 2017, Earthquake in Nigeria: Measures to avert devastating impacts— Experts. Vanguard Newspaper. Assessed on the 25<sup>th</sup> July, 2021 via <https://www.vanguardngr.com/2017/01/earthquake-nigeria-measures-avert-devastating-impacts-experts/>

that had taken place in the country in the recent times.<sup>67</sup> Studies have shown that Earthquakes are said to occur along tectonic boundaries, faults, etc, as a result of sudden release of energy from strain failure.<sup>68</sup> However, these negative pictures, do not convince a prudent argument that the occurrence of earthquakes and other natural disasters are capable of deterring geothermal energy investments. According to Oluwafemi, Natural disasters are events that happen unexpectedly in nature and the occurrences of these disasters have been as far as man can remember, the beginning of his existence on the planet earth.<sup>69</sup> According to Nwankwoala, now that it is a foregone conclusion that earthquakes are here with us, and Nigeria will continue to witness more of them in future, the country has to do the needful by adopting measures that will assist the agency saddled with natural hazard monitoring and investigation to carry out its mandate effectively and efficiently.<sup>70</sup> As it is the convention worldwide, Nigeria needs to immediately adopt a healthy and sustained monitoring of seismic activities within the country and its environs to avert the devastating impact of earthquakes in future.<sup>71</sup> According to Nwankwoala application of earthquake resistant designs in buildings located in earthquake prone areas is a necessity.<sup>72</sup> As alternatives, the author went suggests that construction of bungalows should be encouraged at places where

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<sup>67</sup> Nwankwoala, Hycienth & Orji, O. 2018, An Overview of Earthquakes and Tremors in Nigeria: Occurrences, Distributions and Implications for Monitoring. *International Journal of Geology and Earth Sciences*. 4. 56. 10.32937/IJGES.4.4.2018.56-76.

<sup>68</sup> See supra note 66.

<sup>69</sup> J.O. Oluwafemi, O.M. Ofuyatan, A.N. Ede, S.O. Oyebisi, I.I. Akinwumi, K.O. Babaremu, Review of Earthquakes in Nigeria: An Understudied Area. *International Journal of Civil Engineering and Technology*, 9(8), 2018, pp. 1023-1033.

<sup>70</sup> Nwankwoala H O. 2018, "Geoethics: Georisk Management for a Safer and more Resilient Society. A Lead Paper Presented at the First Nigeria Conference of the International Association for Promoting Geoethics (IAPG), held between 18 – 19 October, 2018 at the Faculty of Law Auditorium", Rivers State University, Port Harcourt, Nigeria.

<sup>71</sup> See supra note 67.

<sup>72</sup> Ibid.



standards in structures could not be guaranteed.<sup>73</sup> Thus houses should be built in adherence to conventional building code that can withstand shocks and prevent their falling apart and or breakages. This can be extended to the exclusion of residential houses from areas prone to seismic activities. While advocating technological improvements in the management of earthquakes in Nigeria there has been suggestions that Nigeria needs to acquire more recording and monitoring sensors, especially the short-period sensors specifically designed for local earthquakes recordings, seismicity and seismic hazards studies.<sup>74</sup>

### **2.3.5. Biomass/Biofuels**

Biofuel is a fuel that is produced through contemporary biological processes such as agriculture and anaerobic digestion, rather than a fuel produced by geological processes such as those involved in the formation of fossil fuels, such as coal and petroleum, from prehistoric biological matters.<sup>75</sup> Biofuel is a term for fuel from plant sources. Biofuels are just fuels which are grown using plant sources (sometimes called “biomass”) such as hemp, soya, oil seed rape, sugar and palm oil”. These fuels can be in a solid, liquid or gaseous state. Biofuel is also defined as a gaseous, liquid, or solid substance of biological origin that is used as a fuel.<sup>76</sup> From all these definitions, it can be deduced that biofuel can be made out of anything that ferments or rots, including digestive system waste products.<sup>77</sup> In

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<sup>73</sup> See supra note 67 at page 70.

<sup>74</sup> Ibid page 71-72.

<sup>75</sup> <https://en.wikipedia.org/wiki/Biofuel>

<sup>76</sup> Collins English Dictionary-complete and unabridged 2012 digital edition

<sup>77</sup> Cotula, L., Dyer, N., and Vermeulen, S., 2008 Fuelling Exclusion? The Biofuels Boom and Poor People's Access to Land, IIED, London. ISBN: 978-1-84369-702-2. Assessed on 25<sup>th</sup> May, 2021 through <https://pubs.iied.org/sites/default/files/pdfs/migrate/12551IIED.pdf>.

other words, biofuels are produced from renewable resources, especially plant, biomass, vegetable oils, and treated municipal and industrial wastes. They are considered neutral with respect to the emission of carbon dioxide because the carbon dioxide given off by burning them is balanced by the carbon dioxide absorbed by the plants that are grown to produce them.<sup>78</sup> To this extent, biofuels are derived from renewable biological materials such as ethanol from corn, kernels, corn stover, perennial grasses, woody biomass etc. Currently, available biofuels are made from sugar crops (sugar cane, sugar beet) starch crops (corn potatoes) oil seed crops such as soya-bean, sun flower, rapeseed and animal fats.<sup>79</sup> It powers vehicles and produces heat and electricity homes.<sup>80</sup> Biogas on the other hand is a mixture of methane and carbon dioxide produced by the anaerobic decomposition of organic matter such as sewage and municipal wastes by bacteria. Ethanol produced by fermenting the sugars in biomass materials such as corn and agricultural residues is known as bioethanol.<sup>81</sup> Biofuel can be distinguished as a gaseous, liquid or solid fuel and is generally used for vehicles, homes and cooking. Recent research shows that there are efforts to develop next-generation biofuels made from non-food (cellulosic and algae-based) resources.<sup>82</sup>

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<sup>78</sup> Demirbas, A. 2011, Biodiesel from oilgae, biofixation of carbon dioxide by microalgae: A solution to pollution problems. *Applied Energy*. 88 (10): 3541–3547. doi:10.1016/j.apenergy.2010.12.050. Assessed on 25<sup>th</sup> May, 2021 via <https://www.sciencedirect.com/science/article/abs/pii/S0306261910005702?via%3Dihub>

<sup>79</sup> Perstop. 2013, Verdis Polaris Aura – second generation B100 – The advanced green one. Pulled 25<sup>th</sup> May, 2021: [https://web.archive.org/web/20140804182248/https://www.perstorp.com/en/Media/Pressreleases/2013/20130701\\_Verdis\\_Polaris\\_Aura\\_second\\_generation\\_B100/](https://web.archive.org/web/20140804182248/https://www.perstorp.com/en/Media/Pressreleases/2013/20130701_Verdis_Polaris_Aura_second_generation_B100/)

<sup>80</sup> <http://www.biofuelwatch.org/>

<sup>81</sup> The American Heritage Science 2002 Houghton Mifflin online etymology dictionary Douglas Harper (accessed September 18, 2015)

<sup>82</sup> Office of Energy Efficiency & Renewable Energy. Bioenergy Technologies Office. Assessed on the 25<sup>th</sup> July, 2021 via <https://www.energy.gov/eere/bioenergy/biofuel-basics>.

## CHAPTER THREE

### LEGAL FRAMEWORK FOR RENEWABLE ENERGY IN NIGERIA

#### 3.1. Hydropower

The Hydro-electricity has had its fair share of history in Nigeria. The National Energy Policy (NEP) (2003) recorded that hydro power plants entered the Nigerian energy scene in the 1960's.<sup>1</sup> However, according to the H.M.M Moore report in paragraph 82, it was stated that “in the southern parts of Nigeria there is little fall in the rivers, but on the Bauchi-Plateau, there is a considerable amount of power available and there is some promise that use will be made of it for the production of electricity.”<sup>2</sup>

Interestingly, the Hydro Energy has multiple regulatory institutions. However, the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015 places the Renewable Energy electricity under the regulatory power of the Nigerian Electricity Regulatory Commission (NERC).<sup>3</sup> It defines Eligible Renewable Energy Power sources to include hydro technologies.<sup>4</sup> There is energy security for the Hydroelectricity producers. There is an assurance that the offtaker ‘must buy’ all electricity supplied by such renewable energy projects within the capacity limits defined in the regulation. The Regulation also requires the Nigeria Bulk Electricity Trading Company (NBET) to prioritize the purchase of 50% of the renewable energy electricity capacity limit, while the Distribution licensees are mandated to take up the remaining

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<sup>1</sup> The National Energy Policy (NEP) (2003) Policy Document Pg 4.

<sup>2</sup> See the Colonial Annual Reports No. 1315, of 22nd February, 1926, prepared by H.M.M. Moore, Principal Assistant Secretary, Lagos, particularly in Paragraphs 124 and 140.

<sup>3</sup> Section 12(a-m) of the Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015.

<sup>4</sup> Section 2(a) and Schedule 1.

50% of the capacity.<sup>5</sup> This is guaranteed in the Regulation where the Regulator compulsorily allocates a total of 337.5MW.<sup>6</sup> Where there is default by the off-taker, the Commission is empowered under the regulation to enforce penalties for defaults in duties.<sup>7</sup> Finally, with a threshold of about 30MW output capacity for small hydro technologies,<sup>8</sup> the regulator has shown adequate willingness for the expansion of the hydroelectricity in Nigeria.

### **3.1.1. The Niger Dams Act, 1962 and the Niger Dams (Amendment) Decree 1970**

This Act created the Niger Dams Authority, a Power generating authority. The earlier Act was the Niger Dams Act, 1962 No. 23 of 13<sup>th</sup> September, 1962, amended by the Niger Dams (Amendment) Decree 1970 of 12<sup>th</sup> January, 1970. The authority was saddled with the responsibility of constructing and maintaining dams and other works on the river Niger and elsewhere. It was also created to provide for the use, in connection with the works of water and power for generating electricity and of water for the purpose of improving navigation and providing fisheries and irrigation. The Act regulates the supply in bulk to the Electricity Corporation of Nigeria (ECN) all electricity generated by the Authority.<sup>9</sup> Thus while the Niger Dams Authority generated electricity, it was the duty of the Electricity Corporation of Nigeria to distribute such electricity to end-users as utility voltages. This represents a classical regime of electricity

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<sup>5</sup> Section 5(a-j) and section 13(a-f) of the Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015.

<sup>6</sup> Schedule 3.

<sup>7</sup> Section 22.

<sup>8</sup> Section 15(c) and Schedule 4 of the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015.

<sup>9</sup> Section 2 of the *Niger Dams Act, 1962 No. 23. of 13th September, 1962.*

governance in which power generation was separated from distribution.<sup>10</sup> It need be said that the amended Act of 1970.<sup>11</sup>

### **3.1.2. River Basins Development Authorities Act, 1986**

There are total of 11 Rivers Basin Authorities in Nigeria. They are located in Owerri, Benin, Maiduguri, Calabar, Kano, Makurdi, Port Harcourt, Minna, Abeokuta and Yola. The primary functions of each in their respective areas of authority include construction, operation and maintenance of dams.<sup>12</sup> It also has the functions of keeping and providing up-to-date comprehensive water resources master plan that identifies all water resources requirements in the Authority's area of operation, through adequate collection and collation of water resources, water use, socio-economic and environmental data of the River Basin.<sup>13</sup>

### **3.1.3. The Water Resources Act, 1993**

The Water Resources Act of 1993 vests the ownership, control, right to use and administration of all surface and groundwater and of any watercourse affecting more than one State together with the bed and banks thereof in the Government of the Federation.<sup>14</sup> The Act also regulates the water resources for the generation of hydro-electric energy.<sup>15</sup> The Federal Ministry of Water Resources (FMWR) is the statutory body conferred with the responsibilities of implementing the Act. It is the duty of the Ministry to formulate the national water resources policies for the

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<sup>10</sup> Supra note 1 at 3.

<sup>11</sup> Section 99 of the Electric Power Sector Reform Act, 2005.

<sup>12</sup> Section 4(b) of the River Basins Development Authorities Act, 1986.

<sup>13</sup> Section 4(e).

<sup>14</sup> Section 5(a)(ii) Water Resources Act, 1993.

<sup>15</sup> Ibid.

planning and allocation of water resources for the use of power generation, agricultural, industrial etc. The Minister draws up the Master plan for the administration, general of use, technological development and monitoring of the water resources.<sup>16</sup> It is also the ministry of water resources that obtains applications for use of any water resources for projects.<sup>17</sup>

It must be noted that the property of the Federal Government of Nigeria is held in trust for Nigerians. With this background, there is no doubt about the optimum use of the water resources in the very interest of the various electricity agencies of the then Federal Government. In the present regime, electricity generation has become the private business of Nigerian citizens for which other citizens pay for its use. Being an entity in profit, common sense argues that the territorial water resources of the geographical location called Nigeria should be utilized for common good.

#### **3.1.4. The Electric Power Sector Reform Act, 2005**

The need to finding the lasting solution necessitated the enactment of the Electric Power Sector Reform Act, 2005. The legislation sets the machinery in motion for the privatization of the electric power sector with a view to increasing market competition and consequent efficiency. This was considered at the time a radical turnaround from the trend which the sector has almost become used to.

The Electric Power Sector Reform Act, 2005 confers all existing rights in or over land or water which, immediately before the initial transfer date, vested in any

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<sup>16</sup> Section 6.

<sup>17</sup> Section 8(a).

person pursuant to the Electricity Act or the National Electric Power Authority Act shall, on and after the initial transfer date, continue to vest in the initial holding company concerned as if it had been acquired in terms of this Act.<sup>18</sup>

### **3.1.5. Hydroelectric Power Producing Areas Development Commission Act, 2010**

The Hydroelectric Power Producing Areas Development Commission Act established the commission to see to the Physical Development of Hydroelectric Power Projects. The Commission prepares schemes designed to promote the physical developments of the hydroelectric power producing areas and estimate the cost of implementing such schemes.<sup>19</sup> They tackle ecological problems that arise from overloading of dams in the hydroelectric power producing areas and advice federal and state governments on the prevention and control of floods. Finally, they also implement all measures approved for development of hydroelectric power producing areas by the Federal Government, identify factors inhibiting the development of the hydroelectric power producing areas and assist States in the formulation and implementation of policies to ensure efficient management of the resources of the hydroelectric power producing areas.<sup>20</sup>

### **3.1.6. Nigeria Hydrological Services Agency (Establishment) Act, 2010**

Hydrology is simply the field of science that deals with the happening, movement, and storage of water. Hydrologic science comprises understanding the underlying physical and stochastic processes involved and estimating the quantity and quality

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<sup>18</sup> Section 98(4) of the Electric Power Sector Reform Act, 2005.

<sup>19</sup> Section 8 (1) (d) of the *Hydroelectric Power Producing Areas Development Commission Act, 2010*.

<sup>20</sup> Section 8 (1) (e - f).

of water in the various phases and stores.<sup>21</sup> The study of hydrology also includes quantifying the effects of such human interventions on the natural system at watershed, river basin, regional, country, continental, and global scales.<sup>22</sup>

The Hydrological Services Agency is saddled with the responsibility to prepare, advise the Governments on all aspects of hydrology.<sup>23</sup> In line with its mandate, the agency may interface with related agencies to achieve its objective. The biggest question that would be in the mind of an innocent observer is, what programs, projects, data, analysis and advise has the agency offered to the government. Have they offered and the government failed to listen? These questions become imperative because a thorough assessment of the Nigeria electricity profile does not indicate that there is sufficient apparatus to aid hydro electricity generation. It does not look as if there is in existence an organization that aggregate data for future planning and other purposes. One also wonders what such agencies do to forestall the scarcity of water needed for future energy generation in order to guarantee the Nigeria energy security and self-sufficiency.

### **3.2. Solar Energy**

According to Oke, solar energy is one of the veritable sources of renewable electricity in Nigeria.<sup>24</sup> The photovoltaic (PV) systems are being employed to provide electricity service to rural communities that are not connected to the country's electricity grid.<sup>25</sup> One

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<sup>21</sup> Salas, Jose & Govindaraju, Rao & Anderson, Michael & Arabi, Mazdak & Francés, Félix & Suarez, Wilson & Lavado, Waldo & Green, Timothy. (2014). Introduction to Hydrology. 10.1007/978-1-62703-595-8\_1.

<sup>22</sup> Ibid.

<sup>23</sup> Section 7(1) (a-p) of the Nigeria Hydrological Services Agency (Establishment) Act, 2010

<sup>24</sup> See Yemi Oke, Nigerian Electricity Law and Regulation, (Law Lords Publications, 2013) at 323.

<sup>25</sup> P.A. Ilenikhena: Solar Energy Applications in Nigeria; (WEC Montreal 2010: Paper) No. 135 Revised, Pg 2, assessed through <https://www.osti.gov/etdeweb/servlets/purl/21390205>.



of the earliest solar photovoltaic (PV) project in Nigeria is 7kWp village PV lighting in Tunga-Buzu and Gotomo villages that was financed by Sokoto state government in 1985.<sup>26</sup> The Sokoto Energy Research Centre (SERC) installed another 7.2 kWp rural electrification system in Kwakwalawa village in Sokoto state in 1993.<sup>27</sup> The National Centre for Energy Research and Development (NCERD), Nsukka has a 1.5kWp capacity standby PV system to supplement power supply from electric company.<sup>28</sup> The energy centre also built a 2kWp capacity PV system at Iheakpu-Awka community in Enugu State and a 2.85kWp solar PV plant at Hu-Mbauzo in Abia State.<sup>29</sup> These are practical demonstration of the viability of the electricity generation through solar energy option and investment. According to Nwofe, a national survey by the Energy Commission reveals a total of 33 companies that were active in Solar PV by 1999 and most of them were established within the last ten years. There are over 200 solar PV installations, in the country as at 1998, with capacities ranging from 3.5 to 7.2 kwp.<sup>30</sup> Jigawa State Government initiated a proposal to bring solar-generated electricity (PV) to power essential services in 3 villages of Jigawa State.<sup>31</sup>

The NERC has demonstrated interest and eagerness to harness the untapped potentials in the solar energy. The Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015 placed a target for Grid-Connected Solar Electricity

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<sup>26</sup> Ilenikhena Op cit p. 2.

<sup>27</sup> Ibid at pg 6.

<sup>28</sup> Ibid.

<sup>29</sup> Animalu, A.E.O. and Adekola, S.A. (eds) (2002). *Science Toady in Nigeria*, The Nigerian Academy of Science, Abuja, 190 – 208.

<sup>30</sup> P.A. Nwofe, "Utilization of Solar and Biomass Energy- A Panacea to Energy Sustainability in a Developing Economy" *International Journal of Energy and Environmental Research* Vol.2, No.3, Pp.10-19, September 2014.

<sup>31</sup> Chendo, M.A.C., "Factors Militating Against the Growth of the Solar – PV Industry in Nigeria and their Removal." *Nigeria Journal of Renewable Energy* 10 (1&2):151 – 158, 2002.

Generation Capacity by the year 2018 at 380MW.<sup>32</sup> Although this target was never met but the readiness expressed through the policy and administrative approaches is a good indicator of eagerness to drive the sector. The regulator also created a platform to realize the security of the solar electricity demand. In the regulation of the NERC, NBET or its successor is mandatorily required to procure 50% of the solar energy produced while the Discos take up the remaining 50%.<sup>33</sup> The Regulator compulsorily allocates a total of 193.3MW of electricity capacities to be shared between all the 11 Discos and the NBET.<sup>34</sup> It is however an offence under the Regulation for the Discos and NBET not to comply with the provision of the law as to purchase of electricity from the solar electricity producers to the tune of the allocated capacities.<sup>35</sup> In terms of Tariffs, there is favourable benchmark capital cost and technical parameters for the solar technology.<sup>36</sup> Considering that energy investment is heavy and capital intensive, however in order to encourage little but steady investment, the current solar electricity investment regime outlines a maximum benchmark of 5MW.<sup>37</sup> It is a liberated tariff regime because the investors' have firsthand opportunities of recouping investment expenses through the tariff framework. There is right for higher tariffs in the Mini-Grid Regulation, 2016 if the community and the Commission approve same.<sup>38</sup> This will allow for small, middle and average companies to minimize the capital and operating expenses (OPEX & CAPEX).

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<sup>32</sup> Schedule 2 to the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015.

<sup>33</sup> Section 8(h).

<sup>34</sup> Schedule 3.

<sup>35</sup> Section 21(a).

<sup>36</sup> Section 15(c) and Schedule 4.

<sup>37</sup> Section 15(c) and Schedule 1.

<sup>38</sup> Annex 8 of the Guideline to the Nigerian Electricity Regulatory Commission Mini-Grid Regulation, 2016.

There is also a liberated approach to the application of operating licenses under the NERC Regulation.<sup>39</sup> The solar energy system is community driven and offers an opportunity for the off-grid and mini-grid generation. This is very lucrative. The chances of the investors knowing all their customers are very assuring through the KYC or other similar concepts. The investment opportunities provided by the off-grid or mini grid solar energy in the electricity value chain is profit maximizing. The producer of electricity follows its products through the supplies up to the payment for the products. This enables the investor to run the business profitably. There is transparency which is also another important factor that attracts customers thereby guaranteeing security of electricity demand. There is provision for inspection of accounts for the purpose of adjustment of tariffs and ascertaining depreciated value.<sup>40</sup> The producer where it is mini-grid is allowed to construct, operate and/or maintain its Distribution Network in accordance with the relevant Technical Codes and Standards.<sup>41</sup> In terms of policies, the National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015), the National Energy Policy (NEP) (2003), the Rural Electrification Strategy and Implementation Plan (RESIP) and the Renewable Energy Master Plan (2005) are all indicators of the willingness of the policy makers to stimulate and drive the solar electricity investment in Nigeria.

In the light of the above-mentioned good progresses made in the Solar Energy generation, we submit that the worst is the disaster that bares its monstrous face before us; lack of specific regulatory instrument either by way of legislation or regulatory government. This is an evidence of inefficiency and poor score card for the solar energy in Nigeria.

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<sup>39</sup> NERC Application for Licences (Generation, Transmission, System Operations, Distribution & Trading) Regulations, 2010.

<sup>40</sup> Section 13.

<sup>41</sup> Section 11(1).

### 3.3. Wind Power

The latest results of the Nigerian Meteorological Agency (NIMET) in 2009 based on the outcome of using 40 years (1968–2007) available average wind data from the whole forty-four wind stations across the states of the federation showed that, the country's wind regime is found to lie majorly between poor to moderate regimes, with the southern states having their mean wind profile at 10m height in the range between 3.0 –3.5 m/s, depending on the states, and Northern states capable with mean wind speeds of between 4.0 –7.5 m/s. This means that, Nigeria has good wind resources over most part of the country. Although, wind speeds in the southern states are low, they can however be employed for standalone power generating systems using small scale wind turbines.<sup>42</sup>

The procedure for applying for licenses under the NERC Regulation has been liberated.<sup>43</sup> The NERC has demonstrated interest and eagerness to harness the potential investment accruable from the solar energy option. The Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015 has placed a target for Grid-Connected Solar Electricity Generation Capacity by the year 2018 at 100MW.<sup>44</sup> Just like the solar electricity, the security of wind electricity demand is assured. The bulk trader is mandatorily required to procure 50% of the wind energy produced while the Discos take up the remaining 50%.<sup>45</sup> This is guaranteed in the Regulation where the Regulator

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<sup>42</sup> S.O. Oyedepo et al., "Assessment of Decentralized Electricity Production from Hybrid Renewable Energy Sources for Sustainable Energy Development in Nigeria" (De Gruyter Publisher, 2019) pg 76 accessed through <http://eprints.covenantuniversity.edu.ng/12625/1/Assessment%20of%20Decentralized%20Ele.pdf>.

<sup>43</sup> NERC Application for Licences (Generation, Transmission, System Operations, Distribution & Trading) Regulations, 2010.

<sup>44</sup> Schedule 2 to the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015.

<sup>45</sup> Section 8(h).

compulsorily allocates a total of 205.8MW.<sup>46</sup> It is thereby an offence under the Regulation for the Discos and NBET not to comply with the provision of the law as to purchase of electricity from the solar electricity producers to the tune of the allocated capacities.<sup>47</sup> In terms of Tariffs, the Regulator through the regulation puts favourable benchmark capital cost and technical parameters for the wind electricity.<sup>48</sup> There is equally a liberated tariff regime where the investors' have opportunities of recouping investment expenses. As a way of encouraging investment in the wind electricity, the regulator outlines a maximum benchmark of 10MW,<sup>49</sup> to minimize the interest of any potential investor. The model of land ownership is supportive. The NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012 made pursuant to the Act,<sup>50</sup> primarily provides a legal and regulatory framework for the acquisition of land for electricity projects related to Generation, Transmission and Distribution in Nigeria as well as making provisions for the payment of compensation and resettlement of persons affected by the acquisition (PAP).<sup>51</sup> The regulation further provided for the procedure for both Free Prior Informed Consent of land owner and Compulsory Acquisition where the land owner refuses to let go of the land.<sup>52</sup> It must be noted here that whether there would be compulsory acquisition where Free Prior Informed Consent fails largely depends on the ability of the investor to establish that other than the site, there is no other possibility of harvesting a quantity of wind to generate electricity.

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<sup>46</sup> Schedule 3.

<sup>47</sup> Section 21(a).

<sup>48</sup> Section 15(c) and Schedule 4.

<sup>49</sup> Section 15(c) and Schedule 4 of the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015

<sup>50</sup> Section 77(10) and 96 (1) of the Electric Power Sector Reform Act, 2005.

<sup>51</sup> Sections 1(a-b) and 2 of the NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012.

<sup>52</sup> Sections 3 & 4.

### 3.4. Geothermal Electricity

The National Energy Policy (NEP) (2003) categorized geothermal energy as other renewable energy resources, which are not in common usage worldwide, with an anticipation that it will have a place in the future of the Nigerian energy mix.<sup>53</sup> However, 12 years down the line, the geothermal renewable resource has been recognized as one of the various energy resources that are available in Nigeria. Although these resources are not in use for energy supply at the moment, the National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015) encourage relevant agencies to ensure that data and information relating to these resources are obtained through research and development programmes with a view to immediately commence using these resources to provide power supply where ever it is competitive.<sup>54</sup>

Ordinarily in Nigeria, the hills formed on large areas of lands and are therefore owned either communally as seen in Okanyilule rocky hill in Osun State,<sup>55</sup> or individually as recognized in the regular land tenure system in Nigeria. However, where there are some aesthetic attractions, historical memories or other tourist benefits, a state can acquire an area of land where the hills are situated; one of such instances is the Olumo Rock in Ogun State.<sup>56</sup> It should be noted also that most recently, because of the Nigerian religious peculiarity, mountains and hills are now being owned, controlled and managed by certain religious organizations or religious leaders for spiritual activities. As the maxim *quic quid plantator solo solo credit* is still good law, the owner of the land owns the ensuing rock found thereon. The model of land ownership is supportive for a geothermal energy

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<sup>53</sup> The National Energy Policy (NEP) (2003) Policy Document Pg 34.

<sup>54</sup> The National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015) Policy Document at Pg 17.

<sup>55</sup> See <https://tribuneonlineng.com/iragbiji-hills-monuments-of-natures-beauty/>.

<sup>56</sup> See <http://ogunstate.gov.ng/ogun-state/tourist-sites/olumo-rock/>.



investment. The NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012 made pursuant to the Act,<sup>57</sup> primarily provides a legal and regulatory framework for the acquisition of land for electricity projects related to Generation, Transmission and Distribution in Nigeria as well as making provisions for the payment of compensation and resettlement of persons affected by the acquisition (PAP).<sup>58</sup> The regulation further provided for the procedure for both Free Prior Informed Consent of land owner and Compulsory Acquisition where the land owner refuses to let go of the land.<sup>59</sup> It must be noted here that whether there would be compulsory acquisition in the event of a failed Free Prior Informed Consent, largely depends on the ability of the investor to convince the regulator on the land.

#### **3.4.1. Nigerian Geological Survey Agency (Establishment) Act, 2006**

The Nigerian Geological Survey Agency exists to carry out detailed geological investigations, including analytical and laboratory works, photo geology and other interpretations, core drilling, well-logging, geo-statistics and other mineral calculations as estimations, and valuation.<sup>60</sup> Moreso, the agency has the duty to develop a comprehensive dissemination of knowledge of geology, geo-chemistry, geophysics, engineering geology, economic geology, geochronology, marine geology and geomagnetism.<sup>61</sup> As a research body, the agency studies the use of the surface and sub-surfaces of the land, and from geo-scientific viewpoint, and thereafter advice the government institutions and the general public on the

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<sup>57</sup> Section 77(10) and 96 (1) of the Electric Power Sector Reform Act, 2005.

<sup>58</sup> Sections 1(a-b) and 2 of the NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012.

<sup>59</sup> Sections 3 & 4.

<sup>60</sup> Section 8(a) of the Nigerian Geological Survey Agency (Establishment) Act, 2006.

<sup>61</sup> Section 8(e).

Judicious and safe use thereof.<sup>62</sup> Finally, the agency has the function of conducting investigations from which it renders specialized geological services to the public and private institutions.<sup>63</sup>

Clearly, the Nigerian Geological Survey Agency (Establishment) Act, 2006 as the existing legislation for the Geothermal Electricity is sufficient enough to harness the exploitation of the geothermal power generation. This is because by the provisions of the Act, all that are required to develop the geothermal electricity generation is already provided for. The geographical locations of rocks, the data of rocks and the rock components are already regulated. It would have been expected that Nigeria can be self-sufficient on power generation through electricity generated from the geothermal, but the otherwise is the case. Where is the data? What knowledge do we have to harness? These are questions when analyzing the reality of generating electricity from the geophysical activities.

### **3.5. Biomass/Biofuels**

Nigeria has a major policy on biofuel.<sup>64</sup> The Nigerian President in 2005 issued a directive that spurred the Nigeria National Petroleum Company (NNPC) into renewable energy development and this led to the creation of the Renewable Energy Division in the NNPC in August 2005. Also, the first ethanol refinery in the country has been established in Ekiti and Ondo States.<sup>65</sup>

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<sup>62</sup> Section 8(e).

<sup>63</sup> Section 8(i).

<sup>64</sup> Section 1.3.1 of the Nigeria Biofuels Policy Incentive FRN official gazette Vol. 94 No 72, Lagos 20<sup>th</sup> June 2007

<sup>65</sup> Ben-Iwo, J., Manovic, V.& Longhurst, P. (2016). Biomass resources and biofuels potential for the production of transportation fuels in Nigeria. *Renewable and Sustainable Energy Reviews*, 63, 172-192



### **3.5.1. Directorate of Food, Roads and Rural Infrastructures Act, 1986**

The Directorate of Food, Roads and Rural Infrastructures Act is an Act enacted to establish the Directorate of Food, Roads and Rural Infrastructures for the mobilization of rural communities and the development of the rural areas in Nigeria; and to charge the Directorate with diverse functions directed towards the improvement of the quality of the life in the rural areas.<sup>66</sup> The agency identifies foods that the country has high production strength in the context and view of rural mobilization, development, local participation and integration.<sup>67</sup>

Considering the nature and proven discussions on the biomass/biofuel, it is the belief of this candidate that over 70% of the constituents of biofuels are derived from foods and other agro allied products, hence discussions on biofuels remains inseparable from food and agricultural practices. It is also in proper context to address the two together, as the effective administration of the Act is an integral factor in the country's quest for alternative energy diversification and energy mix.

### **3.5.2. National Agricultural Land Development Authority Act, 1992**

This Act establishes a National Agricultural Land Development Authority to provide, among other things, strategic public support for land development.<sup>68</sup> The primary objective of the Act is to make arable lands available for all forms of economic engagements. The Act became a necessity considering the almost impossibilities farmers and other land users go through before accessing usable

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<sup>66</sup> Long Title to Directorate of Food, Roads and Rural Infrastructures Act, 1986

<sup>67</sup> Section 5(a-r)

<sup>68</sup> Long Title to National Agricultural Land Development Authority Act, 1992

lands for economic development. This Act tends to distribute lands in equitable, fair and just manner.<sup>69</sup> The President commissioned the first NALDA Integrated Farm Estate in Katsina on the 19<sup>th</sup> July, 2021.<sup>70</sup>

According to Hurley *et al* land-use planning is a key site of political power in which differing groups vie for control in part through competition over the landscape visions, or environmental imaginaries, that guide the planning process.<sup>71</sup> It is a known fact that the possibility of having adequate land for agricultural byproducts for the use of biofuel development in the urban and developed cities is a difficult task due to the massive urban migration and its attendant housing demands. Of course, the rural settlers will irresistibly reject any attempt to use their settlement as base for the development ethanol and other biofuel requirements for electricity and energy they rarely use. The theory will then be, while the rural settlers are battling with the anguish of poor life they have been subjected to by the urban dwellers, any attempt to further subjugate them to any peril that will benefit the urban settlers will be resisted.

However, looking at the functions of the Act which aims at providing a platform through a scheme that allow persons in need of land to have access to land irrespective of locations in the country, it becomes a possibility that investors can have access to land for purposes of biofuel development.<sup>72</sup> It need also be noted

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<sup>69</sup> Section 3(a-i)

<sup>70</sup> Gabriel Ewepu. 2021, Buhari commissions NALDA's maiden integrated farm estate worth generating over N1.7Billion. Vanguard Newspaper. Assessed 25<sup>th</sup> July, 2021 via <https://www.vanguardngr.com/2021/07/buhari-commissions-naldas-maiden-integrated-farm-estate-worth-generating-over-n1-7b/>

<sup>71</sup> P.T. Hurley *et al* Whose vision? Conspiracy theory and land-use planning in Nevada County, California; *Environment and Planning A* 2004, volume 36, pages 1529-1547

<sup>72</sup> Section 6(a-n) of the National Agricultural Land Development Authority Act, 1992

that the issue of land availability, as serious as it may appear, may have been resolved totally if the Act is properly implemented.

### **3.5.3. National Agricultural Seeds Act, 1992**

This is the statute that establishes the National Agricultural Seed Council saddled with the responsibility for the overall policy guidelines and monitoring of the development of the national seed system.<sup>73</sup> Under the Act, the Council provides several services ranging from analysis, research, development programming and policy advisory to the government, private sector and general seed industry on various issues of control, regulation, standard, certification, marketing, distribution, treatment and technological advancement as well as general seed businesses.<sup>74</sup> It also serves both as the administrative body and administrative agency for seed business in Nigeria.<sup>75</sup>

Since biofuels are made from sugar crops (sugar cane, sugar beet) starch crops (corn potatoes) oil seed crops (soy bean, sun flower, repressed and animal fats,<sup>76</sup> it therefore follows that government interventions through policies and strict implementations of the existing laws. The availability of the herein statute has the potentials to create for rooms for seed distributions specifically for biofuels. Thus, as farmers are planning for seed for a circle of crop production, there would also be seed for investors who are available at the biofuel's development.

### **3.5.4. The Nigerian Biofuel Policy and Incentives (NBPI) (2007)**

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<sup>73</sup> Section 1(1) National Agricultural Seeds Act, 1992

<sup>74</sup> Section 3(a)

<sup>75</sup> Section 3(b-h)

<sup>76</sup> Smatway biofuel fact sheet 2013

The objective of the policy was to firmly establish a thriving fuel ethanol industry utilizing agricultural products as a means of improving the quality of automotive fossil-based fuels in Nigeria. The aim of the policy was to reduce the nation's dependence on imported gasoline, reduce environmental pollution while at the same time creating a commercially viable industry that can precipitate sustainable domestic jobs.<sup>77</sup> The benefits of this policy was to create additional tax revenue, provision of jobs to reduce poverty, boost economic development and empower those in the rural areas, improve agricultural activities, energy and environmental benefits through the reduction of fossil fuel related GHGs in the transport sector. (Nigerian National Petroleum Corporation.<sup>78</sup> The policy was structured to be implemented in two phases. The first phase was intended to commence with what was identified as seeding of the market with volumes and quantities of ethanol. The second phase was the agricultural integration programme that will entail the establishment of plantations and the construction of bio-fuel distilleries and plants. The policy advocated for a sound regulatory framework and governance with incentives to drive its development and acceptability.

### **3.6. Utility Legislation**

The Utility Legislation is an umbrella where all legislations, statutes and relevant laws that cut across all the renewable energy options in Nigeria. So, in order to avoid unnecessary duplications of discussions on the various options, it is academically sound to consolidate the discussions and come under an umbrella as done hereunder by this

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<sup>77</sup> Federal Republic of Nigeria Official Gazette of the Nigerian Bio-fuel Policy and Incentives, Abuja; 2007

<sup>78</sup> Emodi and Ebele; BJECC, 6(1): 1-17, 2016; Article no. BJECC.2016.001 See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/299654484>.

candidate. Thus, the various legislations that affects the development of hydropower, biomass/biofuels, solar, wind, geothermal and hydrogen are thoroughly examined here.

### **3.6.1. Energy Commission of Nigeria Act, 1979**

The Energy Commission of Nigeria established by the Energy Commission of Nigeria Act, 1979. The Minister in charge of Power and Steel is mandatorily a member of the Energy Commission of Nigeria.<sup>79</sup> In response to global demand for applications of renewable energy resources, the Energy Commission of Nigeria (ECN) was established in 1979.<sup>80</sup> The primary responsibility of the Energy Commission of Nigeria was coordinating, maintaining a road map to sustainable development of the energy resources.<sup>81</sup> There must be full adherence to the terms and conditions of the Energy Commission of Nigeria in area of renewable energy generation of power from biomass and bio - fuels, coal, wind, dams and solar.

### **3.6.2. National Environmental Standards and Regulations Enforcement Agency (NESREA)**

A serious legislative effort on the Nigeria environment did not begin until the koko toxic waste incident in 1988 which created much awareness on the environmental hazard and led to promulgation of the Harmful Waste (Special Criminal Provision etc.) Decree 1998; thereafter in the same year the Federal Environmental Protection Agency (FEPA) Decree No 58 1988 was promulgated

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<sup>79</sup> Sections 2(a)(i), 3(2)(b) of the *Energy Commission of Nigeria Act Cap 109, Laws of the Federation, 1990.*

<sup>80</sup> P.A. ILENIKHENA: SOLAR ENERGY APPLICATIONS IN NIGERIA; (WEC MONTREAL 2010: PAPER) NO. 135 REVISED, Pg 2, assessed through <https://www.osti.gov/etdeweb/servlets/purl/21390205>.

<sup>81</sup> Section 5 of the *Energy Commission of Nigeria Act.*

establishing FEPA as the Nigeria environmental regulatory body.<sup>82</sup> This is the enforcement Agency for environmental standards, regulations, rules, laws, policies and guidelines.<sup>83</sup> The National Environmental Standards and Regulations Enforcement Agency is established by the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act. The Agency has responsibility for the protection and development of the environment, biodiversity conservation and sustainable development of Nigerians natural resources in general and environmental technology, including coordination and liaison with relevant stakeholders within and outside Nigeria on matters of enforcement of environmental standards, regulations, rules, laws, policies and guidelines.<sup>84</sup>

### **3.6.3. Environmental Impact Assessment (EIA) Act**

Environmental impact Assessment Act 1992<sup>85</sup> has an important bearing on Solar Energy technology and installation in Nigeria. The main objective of environmental impact assessment is to establish and take into account, any activity that may likely or significantly affect the environment, their environmental effects before undertaking or authorizing the activity.<sup>86</sup> The public or private sector of the economy shall not undertake or embark on public or authorize projects or activities without prior consideration, at on early stages, of their environmental effects.<sup>87</sup> Where the extent, nature or location of a proposal

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<sup>82</sup> Note that FEPA Act has been repealed by the National Environmental Standards and Regulations Enforcement Agency Act 2007 in section 36 thereof.

<sup>83</sup> Citation to the *National Environmental Standards and Regulations Enforcement Agency (ESTABLISHMENT) Act 2007*.

<sup>84</sup> Sections 7.

<sup>85</sup> Cap E12, LFN, 2004

<sup>86</sup> Section 1 (a) EIA Act

<sup>87</sup> Section 2 (1)

project or activity is such that is likely to significantly affect the environment, it environmental impact assessment shall be undertaken in accordance with the provisions of this Decree.<sup>88</sup> Unarguably, Wind, Solar, Biotechnologies, Hydropower technologies and developments are the activities<sup>89</sup> that must be subjected to compulsory environmental impact assessment. There must be due Environmental Impact Assessment Program for every Site or location where Renewable Electricity Installations are to be carried out. The Environment Impact Assessment (EIA) approval Certificate is required to be issued by the Ministry of Environment.<sup>90</sup> This Assessment is regulated by the Environmental Impact Assessment (EIA) Act.<sup>91</sup> It sought to assess the likely or potential environmental impacts of proposed activities, and identify measures available to mitigate adverse environmental impacts.<sup>92</sup> Renewable energy technological installation for solar power, wind power or even hydro requires proper certification to ensure full compliance with human consumption and suitability for use in the human environment. It was in the news recently, that two medical doctors from France requested to have the ever first set of COVID-19 Vaccines tested in the African Shores.<sup>93</sup> This is evident in a number of technologies and discoveries. Consequently, in order to ensure safety, it is important these regulatory procedures are fully complied with. But in reality, one is left to wonder if truly Nigeria considers regulation more important. This question is eminent considering

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<sup>88</sup> Section 2 (2)

<sup>89</sup> Items 1, 9, 13, 18 of the Schedule to EIA Act

<sup>90</sup> Item 7 of Schedule 1A to the *NERC Application for Licenses (Generation, Transmission, System Operation, Distribution and Trading) Regulations* 2010.

<sup>91</sup> Long title to the *Federal Environmental Protection Agency Act, 1992*.

<sup>92</sup> Sections 61 of the Act.

<sup>93</sup> Sections 61 of the Act.



the Nigerian peculiar situations where regulation is replaced with revenue. In this instance, once an investor fulfills the financial requirements for certain documents and probably wet the itching palms of some regulatory officials, he is at liberty to comply or do it the other way round.

#### **3.6.4. Nigerian Meteorological Agency (Establishment, Etc.) Act**

According to the Act, meteorology means the study dealing with the phenomena of the atmosphere.<sup>94</sup> The Act in the creation of the Board of the Agency made provisions for a part-time chairman, Director-General of the Agency, two persons from the public interest with cognate experience in meteorological matters and representatives from the following Federal Ministries; Aviation; Agriculture and Rural Development, Transport, Water Resources, Environment<sup>95</sup> The agency advises the Federal Government on all aspects of meteorology. It also issues weather forecasts for the safe operation of aircrafts, ocean going vessels and oil rigs.<sup>96</sup> It is also within the ambit of the agency to provide meteorological services in operational hydrology and water resources activities as well as weather services in marine, environmental pollution and bio- meteorology for climatic and human health activities.<sup>97</sup>

It is expected that considering the hullabalos made over the potentials of the Country in terms of solar and wind energy production, the Meteorological Agency would have concentrated adequate resources in expanding the horizon of the two

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<sup>94</sup> Section 40 of the Nigerian Meteorological Agency (Establishment, Etc.) Act, 2003.

<sup>95</sup> Section 2(a-h).

<sup>96</sup> Section 7(a & c).

<sup>97</sup> Section 7(e-f).

energy potentials. Unfortunately, the Act's only related provision for them patterns to collection, process and dissemination of all meteorological data and information within and outside Nigeria, keep in safe custody all meteorological records in the National Meteorological Archive and train, conduct and undertake research particularly in the field of tropical, and other related areas of meteorology.<sup>98</sup> No specific provision in relation to operation of wind and solar data. It is indeed a complete disaster that such area is not given a deserving attention. This leaves one with such questions as to what is the noise all about.

Another huge lapse of this Act which it is expected would have hindered the country from achieving solar proficiency and sufficiency, lies on the fact that the States have failed to understand the idea of solar energy production. This is despite the powers of legislative processes on science and research development being shared between the Federal Government.<sup>99</sup> There is no Universal weather system in Nigeria. The hot weather in Abeokuta, Abuja, Kano, Borno, Jigawa, Sokoto etc., should ordinarily be the business of each state government to harness the solar energy available in their respective states.

### **3.6.5. Nigerian Electricity Regulatory Commission (NERC) (Permits for Captive Power Generation) Regulations, 2008**

The Nigerian Electricity Regulatory Commission (Permits for Captive Power Generation) Regulations, 2008, titled Regulation No: NERC-R-0108 is made pursuant to 96 (1) of the Electric Power sector Reform Act, 2005. It empowers the

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<sup>98</sup> Section 7(i-j & m).

<sup>99</sup> Section 4(4)(a) Part II of the Second Schedule Items 20 and 21 of the 1999 Constitution of Nigeria as amended

Nigerian Electricity Regulatory Commission to grant electricity permits to a person to generate electricity in excess of 1MW personal use.<sup>100</sup> The underlining objective of the regulation is to streamline the procedure for power generation by interested person(s), groups or corporate organization in excess of 1 MW, but without the intention of trading or engaging in the sale of electricity to a third party.<sup>101</sup> Where there is abundant power generated by the permit holder and which **(does not exceed 1MW)**, section 8(a&b) respectively provides that a Permit holder can apply for, and receive prior written consent of the Commission before supplying surplus power to an off-taker.<sup>102</sup> Also where there is an intention to supply excess of 1MW to an off-taker, a Permit holder must apply for a generation license in compliance with the provisions of the EPSR Act, 2005.<sup>103</sup> Another important aspect of the captive electrification is the furnishing of detailed information to the Commission by all Captive Power Plants owners or permit holders. The holders are mandatorily required to provide annual detailed information to the Commission on the operation of the plant. Such information and documents among other things must provide information on health and safety standards and procedures in the plant, environmental issues arising from operation of the plant and such other information as the Commission may from time to time request.<sup>104</sup> Also while the contravention of any of the terms of the Permit, may

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<sup>100</sup> Section 2 of the *Nigerian Electricity Regulatory Commission (Permits for Captive Power Generation) Regulations, 2008*. The section defines 'person' to include an individual, a company, partnership or any association of individuals whether incorporated or not.

<sup>101</sup> See Yemi *supra* note 1 at 190.

<sup>102</sup> Section 8(a) of *Nigerian Electricity Regulatory Commission (Permits for Captive Power Generation) Regulations, 2008*.

<sup>103</sup> Section 8(b).

<sup>104</sup> Section 9(a).

lead to cancellation of the permit,<sup>105</sup> failure to adhere to the regulatory provisions with respect to operation and application may be considered an offence punishable under the Regulation pursuant to Section 94(1) of the EPSR Act.

### **3.6.6. The Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015**

The Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015 is made pursuant to Sections 32(1) and 96 of the Electric Power Sector Reform Act 2005 (Act No. 6 of 2005). The regulation is made to provide regulatory framework for technologies and capacities to generate above 1MW renewable energy sourced electricity in the 2000MW Renewable Energy target of the Federal Government through the commission.<sup>106</sup> It defined Eligible Renewable Energy Power sources as such new electricity generating project achievable through the use of the instrument of wind, small hydro, biomass and solar photovoltaic technologies.<sup>107</sup> It has several objectives, among which are to Encourage greater private sector participation in power generation from renewable energy technologies, by providing investment security and market stability for investors; To develop, promote and harness the Renewable Energy (RE) resources of the country and incorporate all viable ones into the national energy mix; Establish a guaranteed price for electricity generated from renewables for a fixed period that provides a stable income stream and an adequate return on investment; Establish a level playing field for renewable and

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<sup>105</sup> Section 14(a & b).

<sup>106</sup> Section 4(i)(a-b)(ii)(a-b) of the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015.

<sup>107</sup> Section 2(a) and Schedule 1.

conventional electricity generation etc.<sup>108</sup> There is energy security for the energy producers. This guarantees an assurance to an investor that the offtaker ‘must buy’ all electricity supplied by such renewable energy projects within the capacity limits defined in the regulation. The Regulation also requires the Nigeria Bulk Electricity Trading Company (NBET) to prioritize the purchase of 50% of the renewable energy electricity capacity limit, while the Distribution licensees are mandated to take up the remaining 50% of the capacity.<sup>109</sup> The regulation also places the Renewable Energy electricity under the regulatory ambit of the Nigerian Electricity Regulatory Commission (NERC).<sup>110</sup> The Regulation provides that it is the responsibility of the various distribution companies and the Nigerian Electricity Bulk trading company to meet their assigned targets. Furthermore, the Nigerian Bulk Electricity Buyer and All distribution Operators/licences are mandatorily required to obtain performance guarantee of 5% of project estimated cost from Renewable Energy contractors against delayed completion. Also, if there is any breach or failure to comply with any part or the regulation, same shall attract financial penalties.<sup>111</sup> Finally, as the regulator and in order to achieve compliance, the Commission is empowered under the regulation to enforce penalties for defaults in duties.<sup>112</sup>

### **3.6.7. The NERC Nigerian Electricity Supply and Installation Standards (NESIS) Regulations, 2015.**

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<sup>108</sup> Section 3(a-j).

<sup>109</sup> Section 5(a-j) and section 13(a-f).

<sup>110</sup> Section 12(a-m).

<sup>111</sup> Section 21(a-e) and Schedule 6.

<sup>112</sup> Section 22.

The Nigerian Electricity Regulatory Commission (NERC) Nigerian Electricity Supply and Installation Standards (NESIS) Regulations, 2015 Regulation No: NERC/REG/1/2015 is primarily to lay the standard for Engineering Designs, Construction Installations, Commissioning and Maintenance of electric power systems and electrical infrastructure all through the value chain of electricity generation, transmission and distribution of the Nigerian Electricity Supply Industry. The regulation replaces the Electricity Supply Regulations and the Electrical Installation Regulations of 1996 issued under the repealed Electricity Act. It stipulates the inspections and enforcement of penalties for noncompliance. Taking into consideration the risk and the implications of quackery in electrical installations, this regulation basically enthrones a regime of standard, safety, precautions and sanity in the industry.

#### **3.6.8. The Land Use Act, 1978**

To generate electricity using the wind turbine requires the use of land. The amount and number of wind turbine in place is determined by the quotient of electricity needed. If large size of electricity is required, it will need a large number of turbines thereby producing a wind farm. A wind farm is a group of wind turbines located at a particular place. It is believed that the largest wind farm in the world is Gansu Wind Farm located in China with a total capacity of over 6,000 MW as at 2012.<sup>113</sup>

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<sup>113</sup> Watts, Jonathan & Huang, Cecily. Winds Of Change Blow Through China As Spending On Renewable Energy Soars, *The Guardian*, 19 March 2012, revised on 20 March 2012. Retrieved 4 January 2012.

The need for land in the renewable energy generation, particularly, the wind power is sacrosanct. An author argued that the land use debates surrounding electricity generation among other forms of development can cause political friction between urban and rural areas.<sup>114</sup> The Land Use Act, 1978 provides for compulsory acquisition of landed properties of any holder of Statutory Right of Occupancy. The requirements and or conditions which must be complied with before a Statutory Right of Occupancy can successfully be revoked are: Overriding public interest, Notice and Prompt Payment of Compensation to the holder of the Right of Occupancy.<sup>115</sup>

### **3.6.9. NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012**

The NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012 is made pursuant to sections 77(10) and 96 (1) of the Electric Power Sector Reform Act, 2005. The primarily objective of the Regulations is to provide a legal and regulatory framework for the acquisition of land for electricity projects related to Generation, Transmission and Distribution in Nigeria as well as making provisions for the payment of compensation and resettlement of persons affected by the acquisition (PAP).<sup>116</sup> The regulation further provided for the

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<sup>114</sup> See Supra Note 71.

<sup>115</sup> See Sections 28 (1)(2)(4); 29 (4) of the Land Use Act, 1978; Section 44 of Constitution of the Federal Republic of Nigeria 1999 (as amended). Except these provisions are complied with, the right of occupancy of the Claimant remains inviolable until the Governor acts and complies with conditions stipulated above. See *Alhaji Dantsoho vs. Alhaji Mohammed* (2003) 6 NWLR (PT. 817) 457 and *Goldmark (Nigeria) Ltd vs. Ibafo Company Ltd* (2012) 10 NWLR (Pt. 1308) p.291 at 356 Para. E-G.

<sup>116</sup> Sections 1(a-b) and 2 of the NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012.



procedure for both Free Prior Informed Consent of land owner and Compulsory Acquisition where the land owner refuses to let go of the land.<sup>117</sup>

### **3.6.10. Nigerian Electricity Management Services Agency (NEMSA)**

The Nigerian Electricity Management Services Agency (NEMSA) is an Agency set up to carry out the Functions of Enforcement of Technical Standards and Regulations, Technical Inspection, Testing and Certification of all Categories of Electrical Installations, Electricity Meters and Instruments to ensure the Efficient Production and Delivery of Safe, Reliable and Sustainable Electricity Power Supply and Guarantee safety of Lives and Property in the Nigerian Electricity Supply Industry; and for Related Matters.<sup>118</sup> This body is called Nigerian Electricity Management Services Agency (NEMSA) and it was established by the Nigerian Electricity Management Services Agency (NEMSA) Act, 2015.

## **3.7. Renewable Energy Policies in Nigeria**

Just like the utility legislation, under this heading, the Renewable Energy Policies in Nigeria will examine the various renewable energy programmes and policies that have been formulated and applied to the development of renewable energy in Nigeria.

### **3.7.1. The Renewable Electricity Policy Guidelines (REPG) (2006)**

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<sup>117</sup> Sections 3 & 4. It must be noted here that the applicability of sections 3 and 4 largely depends on Privately owned electricity projects. Where it is that of a State Government, the State will simply acquire the property in accordance with Sections 28 (1)(2)(4); 29 (4) of the Land Use Act, 1978; Section 44 of Constitution of the Federal Republic of Nigeria 1999 (as amended).

<sup>118</sup> BBC News: Two French doctors have been accused of racism after a TV debate in which one suggested trial in Africa to see if a tuberculosis vaccine would prove effective against coronavirus. Culled from <https://www.bbc.com/news/world-europe-52151722>.

The Renewable Electricity Policy Guidelines (REPG) (2006) on Renewable Electricity represents an all-encompassing policy of the Federal Government of Nigeria on all electricity sourced from renewable energy resources. The Policy Guidelines sets out the Federal Government's vision, policies and objectives for promoting renewable energy in the power sector.<sup>119</sup> The Policy Guidelines is drawn primarily from the Constitution of the Federal Republic of Nigeria (1999), the National Energy Policy (2003), the National Electric Power Policy (2001), Electric Power Sector Reform Act (2005), the Renewable Energy Master Plan (2005), the draft Rural Electrification Policy and the National Economic Empowerment and Development Strategy (NEEDS).<sup>120</sup> It also serves as the vehicle driving the implementation of the aforementioned regulatory instruments and policies. It is part of the objective of this Policy Guideline to expand the role of renewable electricity in sustainable development through effective promotional and regulatory instruments.<sup>121</sup> The guideline aims at streamlining and striking win-win balance in the feed-in tariffs of the various renewable electricity sources.<sup>122</sup>

### **3.7.2. The Renewable Energy Master Plan (REMP) (2005 and 2012)**

The Renewable Energy Master Plan (REMP) for Nigeria was drafted by a committee of consultants contracted by the Energy Commission of Nigeria (ECN) and the United Nations Development Programme (UNDP). The Renewable Energy Master Plan (REMP) for Nigeria was first drafted in 2005, later revised

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<sup>119</sup> Renewable Electricity Policy Guidelines (REPG) (2006)

<sup>120</sup> Ibid.

<sup>121</sup> Ibid.

<sup>122</sup> Ibid.

and amended in 2012 with overall objective of articulating a national vision and a road map for addressing the exploitation of renewable energy.<sup>123</sup> It was to put in place a comprehensive framework for developing renewable energy policies, technologies, manpower, infrastructure, legal instruments.<sup>124</sup> Among other things, the master plan targeted economic growth, employment and empowerment as well as increasing quality of rural services, including, schools, and health.<sup>125</sup> Apart from reducing environmental degradation and health risks, the policy also sought to become a road map for achieving a substantial share of the national energy supply mix through renewable energy, thereby facilitating the achievement of an optimal energy mix.<sup>126</sup> It made provision that developers of Renewable Energy based electricity projects e.g. wind farms or solar PV need to sell the generated electricity to electric utilities through instruments.<sup>127</sup> The policy also recognized the importance of independent institutional regulatory authority and establishment of Nigeria Renewable Energy Development Agency.<sup>128</sup> It also encouraged the emergence of Renewable Energy Professional/Industry Associations and promotion of adequate funding for Research and Development (R&D).<sup>129</sup> It finally emphasized on the urgent need for Industry standards and permits to prevent inferior hardware from getting into the marketplace, while making a case for models like the Power Purchase Agreement (PPA).<sup>130</sup>

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<sup>123</sup> The Renewable Energy Master Plan (REMP) (2005) Chapter One pp 36 -38

<sup>124</sup> Ibid.

<sup>125</sup> Ibid.

<sup>126</sup> Ibid.

<sup>127</sup> The Renewable Energy Master Plan (REMP) (2005 and 2012) Chapter Five at pp 169 – 172.

<sup>128</sup> Ibid.

<sup>129</sup> Ibid.

<sup>130</sup> Ibid.

### **3.7.3. The National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015)**

The policy classified the Energy supply in Nigeria into urban and rural. The urban areas are essentially on the grid while rural areas are largely off the grid.<sup>131</sup> Off-grid areas will have to depend on alternative solutions. This policy is divided into two major policies built into one. The first is Renewable Energy Policy (REP) introduced to drive hydropower, biomass, solar and wind as energy sources. It is intended to serve as a blue print for the sustainable development, supply and utilization of renewable energy resources within the economy for both on-grid and off-grid energy solutions.<sup>132</sup> The second is the Energy Efficiency Policy (EEP). This is to canvass for improvements in the efficiency of power utilization. This intends to reduce inefficient consumption, thereby providing greater access to electricity consumers. The policy marks the initial steps of aligning the Nigerian renewable energy and energy efficiency policy with the ECOWAS renewable energy (EREP) and ECOWAS energy efficiency policies (EEEP).<sup>133</sup> It further mandates the implementation of the national renewable energy action plan (NREAP) and a national energy efficiency action plan (NEEAP). The overall thrust of this policy is the optimal utilization of the nation's energy resources for sustainable development.<sup>134</sup>

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<sup>131</sup> The National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015).

<sup>132</sup> Ibid.

<sup>133</sup> Ibid.

<sup>134</sup> Ibid.

## CHAPTER FOUR

### BARRIERS TO RENEWABLE ENERGY IN NIGERIA.

#### 4.1. Regulatory Barriers.

The Renewable energy has been undeveloped and had remained so because of several issues ranging from inconsistent legislative and statutory framework, unstable policies, rigidity of rules, inadequate committed regulatory framework etc. The implementation of the regulations, laws and policies have also negatively been affected and marred with corrupt practices, bureaucratic bottleneck, inexplicable rigidity, regulatory interference and in most cases, incompetence. Ordinarily, one would have expected that the Energy Commission of Nigeria will take the place of the regulatory agency in the regulation of renewable energy in Nigeria taking into account the reason for its establishment. According to Ilenikhena, the Commission was created as a response to the global demand for applications of renewable energy resources.<sup>1</sup> However, this expectation was vanquished when the Act,<sup>2</sup> only created a mere department for Energy Planning and Analysis (including Energy Efficiency Demand Management and Conservation, Rural Energy, Alternative and New and Renewable Energy Sources).<sup>3</sup>

In another effort, the Electric Power Sector Reform Act, 2005, established the Nigerian Electricity Regulatory Commission as a body corporate.<sup>4</sup> The primary regulatory function of the Commission is issuance of licenses to companies wishing to engage in generation,

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<sup>1</sup> P.A. Ilenikhena. 2010, Solar Energy Applications in Nigeria; (WEC Montreal 2010: Paper) No. 135 Revised, Pg 2, assessed through <https://www.osti.gov/etdeweb/servlets/purl/21390205>.

<sup>2</sup> Energy Commission of Nigeria Act Cap 109, Laws of the Federation, 1990.

<sup>3</sup> Section 1(2)(b).

<sup>4</sup> Section 31(1) of the Electric Power Sector Reform Act, 2005.

distribution, transmission of electricity.<sup>5</sup> The Act went further to provide for the Rural Electrification Agency.<sup>6</sup> The Agency was created to expand the main grid, develop the isolated and mini-grid systems as well project the renewable energy power generation.<sup>7</sup> With such provision, one wonders whether the Agency was created to play the role of institutions in the line of governance or as an entity to participate in the development of renewable energy in the Nigerian Electricity Market and Supply Industry.

There is also the Utilities Charges Commission which was established by the Utilities Charges Commission Act, 1992. The major function of the Commission was evaluation on a continuing basis, trends in tariffs charged by any of the public utilities with a view to providing the Federal Government with such information as would enable the Federal Government to determine permissible increases.<sup>8</sup> Under the National Electric Power Authority (NEPA) Act, the activities of the National Electric Power Authority (NEPA) came under the supervisory powers of the Utilities Charges Commission.<sup>9</sup> Unfortunately, the Utilities Charges Commission Act does not apply in the light of the Electric Power Sector Reform Act, 2005.<sup>10</sup> This no doubt is a major fall out in the reforms, and Justice Kanyip in a seminar had lamented that such exclusion is not safe for the sector.<sup>11</sup> We shall examine some of the barriers in the manner they are detailed below:

#### **4.1.1. Overcrowded Regulatory Governance for registration, licensing, approvals.**

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<sup>5</sup> Section 32(2)(d).

<sup>6</sup> Section 88 (1) and (13).

<sup>7</sup> Section 88(9) (a-c) and (10).

<sup>8</sup> Section 6(a) of the *Utilities Charges Commission Act, 1992*.

<sup>9</sup> Item (a) of the Second Schedule pursuant to Section 6.

<sup>10</sup> Section 98(6) of the *Electric Power Sector Reform Act, 2005*.

<sup>11</sup> Kanyip B.B. (J) "Protecting the rights and interests of consumers in the Electric Sector" Paper delivered at the seminar for Judges on Regulation in the Power Sector organized by the *Nigerian Electricity Regulatory Commission (NERC) in collaboration with the National Judicial Institute (NJI)*, held at Assa Pyramid Hotel, Kaduna, 12<sup>th</sup> – 14<sup>th</sup> July, 2010 at p 8 in Yemi Oke, *Nigerian Electricity Law and Regulation*, (Law Lords Publications, 2013) at 7 & 8 note 25.

Operating or investing in Renewable Electricity in Nigeria under the present legal regime clearly brings on board a concern about heavy regulation involved. Investors planning to incorporate a company to execute any renewable energy project may be easily discouraged when faced with multi-agency and over-regulatory requirements with respect to obtaining of certificate, licenses, permits, approvals, registration, among other things. This also applies to an existing Nigerian company planning to execute an IPP. A good example of the over-regulatory and multi-agency requirements is captured as follows:

- a. Registration of the company is required to be done by the Corporate Affairs Commission (CAC) and filing of annual returns by the renewable energy company to the (CAC) under CAMA. The sanctions that follow the failure to comply oftentimes can be alarming and dissuading.
- b. Where the company is a public company, further registration of the same company is required to be done by the Securities and Exchange Commission (SEC) under ISA.
- c. If the company wants to operate in the secondary capital market, further registration for listing under the Nigerian Stock Exchange (NSE) Code of Listing.
- d. Should the company desire to bring in a new technology on board, further registration and transfer of the technology is required to be done by the National Office of Technology Acquisition and Transfer (NOTAP) under NOTAP Act. Although this stage is encouraged for the purpose



transferring technologies but it is advised that the process should be stress free and less cumbersome.

- e. If the investors in the company are non-Nigerians, certificate of capital importation from an approved financial institution is required by NERC to satisfy the company's capability to meet the financial demands of the IPP.
- f. If the company wants to operate in a Free Trade Zone in Nigeria for the purpose of escaping tax liability, registration is further required to be done by the Nigeria Export Processing Zone Authority (NEPZA) under NEPZA Act.
- g. If the company is a foreign company, foreign investment approval from (NIPC) is required under the NIPC Act.
- h. Expatriate quotas, residence permits and amongst all other permits from the Nigeria Immigration Service as mandated by the Nigeria Immigration Act, for foreign direct investors.
- i. Fulfillment of federal Inland Revenue Service regulations bordering on registration and obtaining tax identification number. Although this has now been mitigated following the policy of the current regime to integrate every company into tax system with the Tax Identification Number upon registration by the CAC.
- j. Fulfillment of Nigeria Custom Service regulations on imported machinery, equipment and spare parts. There are countless chaotic customs clearance

procedure and excise duties that each investor is required to fully comply with before he can have these highly needed equipment can be cleared.

- k. Environment Impact Assessment (EIA) approval Certificate is also required to be issued by the Ministry of Environment.<sup>12</sup> The danger in the issuance of the EIA lies in the fact that apart from the certificate issued by the Federal Ministry of Environment, the environmental agencies of the States and Local Governments where the projects are sighted are not left out as they will continually confront the company with endless harassment until their itching palms are also wetted.
- l. Fulfillment of all condition precedent in obtaining licenses from the Federal Ministry of Water Resources where it involves hydro power, or back to the same Ministry of Environment were biomass, wind, sun. Moreso, it relates to geothermal; the Meteorological Agency will also have their turn. Furthermore, adherence to the terms and conditions of the Energy Commission of Nigeria relating to renewable energy generation of power from biomass and bio - fuels, wind, dams and solar. Moreover, conformity is required with the regulations of the Nigeria Atomic Energy Commission as mandated by the NAEC Act, in the sensitive area of nuclear power generation.
- n. Application to National Electricity Regulatory Commission (NERC) under the Electric Power Sector Reform Act 2005 for a license to execute an

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<sup>12</sup> Item 7 of Schedule 1A to the NERC Application for Licenses (Generation, Transmission, System Operation, Distribution and Trading) Regulations 2010.

Independent Power Project, or Permit to execute Captive Power, which will put all the requirements from other relevant agencies in consideration as condition precedents to grant of the license or permit.

- m. One of the legal and mandatory requirements for licensing by NERC is the requirement that the following novation,<sup>13</sup> contracts are present: Power Purchase Agreement (PPA); Off-takers Agreement; Project Finance; and Engineering, Procurement and Construction (EPC) Contract

All the regulatory agencies and parastatals have procedures that are somewhat slow and frustrating, which in effect usually serve as a disincentive to prospective investors. Moreso, while these requirements are needed to be sure of the integrity of the investors and their readiness to execute the projects, such hydra-headed regulatory governance serve as a disincentive to prospective investors and financial institutions that may be financiers of the projects. This is because the requirement opens the company to the issue of project-to-project or permit-to-project risks which means that the failure or breach of any of the above listed permits or contracts can seriously affect operation of the primary project and which may eventually lead to collapse.

#### **4.1.2. The National Grid debacle**

A Renewable Energy project initiated as an Independent Power Plant is bound to be affected by the current NERC regulation that requires all the power generated

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<sup>13</sup> See Schedule 1A to the NERC Application for Licences (Generation, Transmission, System Operation, Distribution and Trading) Regulations 2010.

by IPPs to be sent to the National grid.<sup>14</sup> This requirement is mandatory and must be complied with being an integral part of the terms in the generation license to be granted by Nigerian Electricity Regulatory Commission (NERC) to IPPs. Failure to comply with the requirement may, amount to suspension or cancellation of the license granted to the IPP by NERC.<sup>15</sup> This requirement not only jeopardizes the prospect of renewable investment, it may slow down the operation of such infrastructure when eventually located. It also downplays the freedom and importance business decision of the IPPs to fully be in charge of money realized from power generation.<sup>16</sup> Furthermore, there is likelihood of difficulty for the investors in IPPs to obtain loan facilities from banks and other financial institutions.<sup>17</sup>

#### **4.1.3. Inadequate Regulatory Framework and Lack of Political Will**

One of the cardinal steps every government would ordinarily take is to develop robust policy framework of legislative and regulatory mechanisms that would encourage the development of renewable energy technology, attract foreign and indigenous investors and also set standards to drive the sector. As at today, there are two major policies and one regulation administer the renewable sector. They are National Renewable Energy and Energy Efficiency Policy (NREEEP) (2015),

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<sup>14</sup> NERC Application for Licences (Generation, Transmission, System Operation, Distribution and Trading) Regulations 2010.

<sup>15</sup> Regulation 16 provides that NERC may suspend a license granted if the IPP is unable to discharge or perform the duties imposed on it by the terms and conditions of the licence, the Act, applicable laws, NERC's regulations, market rules etc. Regulation 17 provides that NERC may cancel a license granted if the IPP willfully or unreasonably contravenes terms and conditions of the licence, the Act, applicable laws, NERC's regulations, market rules etc.

<sup>16</sup> Ikechi Mgbeoji, *Nigeria's Independent Power Producers (IPPs) Demand Reform of Electricity Power Distribution System*, Blackfriars LLP Publication, June 2010, vol. 23: Issue 6. Available at [www.blackfriars-law.com](http://www.blackfriars-law.com). Last accessed 30<sup>th</sup> September, 2015.

<sup>17</sup> Ibid.

Rural Electrification Strategy and Implementation Plan (RESIP) (2017) and the Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015. To some quarters, these set of instruments are apt and concrete enough to project the renewable energy in Nigeria. But are there adequate opportunities and political will to achieve the desired goal? The answer is no. One major thing every investor will always look out for in a market is not necessarily the size of the market but the certainty and stability in the political terrain of the environment. The practice of having a single policy document for all the renewable resource (combining both renewable and nonrenewable or combining all renewable energy sources together) may not be very good to show commitment. It amounts to jack of all trade and master of none. Individual energy source represents specific dynamics and should be individualized. There is also absolutely lack of political will to implement policies. In most cases, there are no decisive measures to prevent corruption and vices that militate against development of the sector. There are instances where defaulters are selectively determined on the basis of political patronage. These are serious obstacles.

#### **4.1.4. Multiple-Regulations and Lack of Certainty**

Operating or investing in the Electricity Sector of the Nigerian Economy under the present legal regime clearly brings on board a concern of heavy regulation. The NERC alone has countless regulations for the industry. These multi-patterned regulatory structures create suspicion. Most of these regulations and or rules of the industry are obsolete. They are rather dumped in the archives or even intentionally hidden from investors just to save for a raining day. These attitudes

are disheartening and frightening. You don't lure investors into your shores on the basis of obviously non-existent rewards. These practices have a way of raising a red flag for investment in the economy of a nation. It also undermines the stake of that country at the international community and comity of nations. Failed policies are not meant to be approached in a manner of win-loss. Also, investors planning to incorporate Electricity Companies in Nigeria may be easily dissuaded having been faced with multi-agency and over-regulatory requirements with respect to obtaining of certificate, licenses, permits, approvals, registration, among other things.

#### **4.1.5. Ineffective Delegated Legislations**

There are numerous regulations and rules in the Electricity sector. While these are needed regulations put together by experts in the field, it is also interestingly important to state that regulations are not legislative instruments. They are administrative and regulatory instruments having the force of law. Although they are laws, but their viability and strength to safeguard the desired development in the sector remains another area of thought. Nigeria as in most countries, do not adopt rigid application of doctrine of separation of powers. The complexity of modern government has made it necessary to delegate powers of legislation to the executive or administrative bodies to make delegated legislation subject to legal and legitimate criteria prescribed by law.<sup>18</sup> Most Regulations in the sector appear more fundamental to determine fate of investments than being a mere aid or guide to administer the substantive Act. For instance, the provisions of the *NERC*

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<sup>18</sup> Ese Malemi Administrative Law, Lagos Princeton publishing co, 4th edition, 2013.

*(Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012* deals with acquisition of land for electricity investment by private companies. This is an affront. The authority for this regulation was derived from the Electric Power Sector Reform Act, 2005. The issue of Land tenure in Nigeria as contained in the Land Use Act forms part of the 1999 Constitution. The National Assembly cannot even legislate on it without first amending the Constitution. Clearly, the NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012 is inconsistent with the provisions of the Constitution. It is true the provisions of the EPSR Act, 2005 regulate Electricity generally. The provision of the Act is to the effect that electricity as the end product is the ultimate goal and not necessarily the manner and where it was sourced.

#### **4.1.6. Inadequate Statutory Legislative Framework**

The Electric Power Sector Reform Act, 2005 which ought to be an opportunity to key into the new frontiers ended up being the major catalyst in achieving otherwise. The Rural Electrification Agency created by the Act has not achieved its set out goal.<sup>19</sup> Instead of expediting actions in bringing electricity to the unconnected areas, the officials of the Rural Electrification Agency for unknown reasons have boycotted their essence and focused on the areas already connected to various Disco networks. The REA should have been handed over to the States and Local Government instead of the Federal Government doing their

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<sup>19</sup> Section 88 (9) of the Electric Power Sector Reform Act, 2005. The Act provides that the Agency is to achieve the following through the Rural Electrification Strategy and Plan; expansion of the main grid; development of isolated and mini-grid systems; and renewable energy power generation.



abracadabra. The 1999 Constitution of the Federal Republic of Nigeria places electricity generation, transmission and distribution on the Concurrent Legislative List. This allows all tiers of government to be involved in most aspects of the electricity supply industry. Furthermore, we lost another opportunity to get it right through the Energy Commission of Nigeria Act, 1979, which was a response to global demand for applications of renewable energy resources. The Act established an Energy Commission of Nigeria (ECN),<sup>20</sup> but unfortunately failed to incorporate as part of its functions, the regulation or promotion of Renewable Energy resources in Nigeria. It merely created an appendage with no known portfolio in the Act.<sup>21</sup> According to Oniemola, using the law to integrate renewable energy into the Nigerian power sector will promote energy security and access, a clean environment and economic development.<sup>22</sup>

#### **4.2. Human and Institutional Resource Barriers.**

Where there is adequate legislative instrument and proactive institutional governance, the absence of resources; human or capital can hinder the prospect of renewable energy. The policy makers have also failed to lead by example. It is only in Nigeria that stakeholders preach for the enthronement of renewable energy in the Nigerian energy profiling yet rely completely on fossil fuel powered generators as alternatives for electricity generation in their various offices. These and many more are the underpinning factors for the steady

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<sup>20</sup> Section 1 of the *Energy Commission of Nigeria Act*.

<sup>21</sup> Section 1(2)(b). The section stipulates that the Commission shall consist of the following department that is Energy Planning and Analysis (including Energy Efficiency Demand Management and Conservation, Rural Energy, Alternative and New and Renewable Energy Sources).

<sup>22</sup> Oniemola, P. (2016). Why Should Oil Rich Nigeria Make A Law for the Promotion of Renewable Energy in the Power Sector? *Journal of African Law*, 60(1), 29-55. DOI:10.1017/S0021855315000212).

decline in the development of renewable energy in Nigeria. A categorization of the renewable resource barriers are as follows:

#### **4.2.1. Lack of Adequate Research and Development**

Research and Development (R&D) that focuses on renewable energy technology in the nation have been few, slow and not encouraging. The available data have not also been adequately employed to develop physical models that would translate the huge resources to power. There are just two Renewable Energy Research Centers in Nigeria, which are: Sokoto Energy Research Centre (SERC) and the National Centre for Energy Research and Development (NCERD) at Nsukka.<sup>23</sup> Although Ilenikhena submitted that the Energy Commission now has six centers spread across the country and they are: (1) National Centre for Energy Research and Development (NCERD) at University of Nigeria, Nsukka. (2) Sokoto Energy Research Centre (SERC) at Usman Dan Fodiyo University, Sokoto. (3) National Centre for Petroleum Research and Development (NCPRD), Abubakar Tafawa Balewa University, Bauchi. (4) National Centre for Energy Efficiency and Conservation (NCEEC), University of Lagos, Lagos. (5) National Centre for Hydropower Research and Development (NCHRD), University of Ilorin, Ilorin. (6) National Centre for Energy and Environment (NCEE), University of Benin, Benin City.<sup>24</sup> These centers are deficient in representation or solving some critical scientific questions. The fact that there are no data today to give accurate position of the Nigerian renewable energy profile is a clear indicator

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<sup>23</sup> Energy Commission of Nigeria-United Nations Development Programme; Renewable Energy Master Plan: Final Draft Report at Pg 93.

<sup>24</sup> See supra note 1.

that such centers as canvassed above, if in existence, have become moribund. As noted in the 2005 National Renewable Energy Master Plan,<sup>25</sup> supplies and servicing for renewable electricity projects are not readily available in Nigeria. Therefore, potential Independent Power Projects may face significant logistical challenges in procuring equipment and maintenance support for renewable electricity projects.

#### **4.2.2. Lack of Training Institutes and Awareness**

The current annual budget allocations to education as well as science and technology have not been encouraging. With the meager sum made available to these ministries, much productive training and retraining programmes may not be supported. Apart the research for the renewable energy technologies, the training of personnel for the sustenance and maintenance of the technologies are also key. Moreso, the level of awareness on the viability of renewable energy as a good alternative to fossil fuel is very low in Nigeria. Majority of the schools' curriculum in Nigeria lack adequate information on renewable resources, technology, potentialities and their environmental position. The mass media too has not helped in any way. Hardly can information regarding renewable energy utilization or technology be seen on the pages of newspaper or heard discussed on television or radio. This lack of awareness has led to high level of technical ineptitude, thereby making adoption of renewable as veritable source of power generation a difficulty. The inadequacy of awareness creates a market distortion which results in higher risk perception for potential renewable electricity

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<sup>25</sup> See supra note 1.

projects.<sup>26</sup> The general perception is that these forms of energy technologies are not mature and only suited for niche markets.<sup>27</sup> There is also inadequate resource assessment. The growth of the renewable energy industry will largely depend on the availability of a solid resource database.<sup>28</sup> Unfortunately such is lacking.

#### **4.2.3. Lack of Adequate Funding**

Lack of adequate funding has invariably been a major setback in the growth of the renewable energy sources in Nigeria. Renewable energy projects are capital intensive. These costs are reflected on the overall cost of energy produced per kWh. Investors will not be favorably disposed to wind, small hydro or power from generation plants if they will not make profit by selling the electricity.<sup>29</sup> Average electricity tariff in Nigeria is estimated to be N6:75 per KW-h (approximately 5 cents per kWh).<sup>30</sup> Average cost of typical sources of renewable power for mini hydro is 5-10 cents; solar PV: 20-40 cents; biomass power: 5-12cents; wind power: 6-10 cents.<sup>31</sup> A thorough analysis of the above will show that without adequate financial incentives, market entry will be almost zero percent. Also, Renewable electricity projects are not common, therefore bankers during their due diligence usually perceive greater risks than non-renewable and are usually very reluctant to lend. The interest rates are generally high and the

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<sup>26</sup> Renewable Electricity Policy Guidelines (REPG) (2006) Policy Document at pg 7.

<sup>27</sup> Ibid

<sup>28</sup> Ibid

<sup>29</sup> Ibid pg 6.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

appetite for long term credits are low among financial institutions, especially for non-business-as-usual projects as small-scale renewable power projects.<sup>32</sup>

#### **4.2.4. Lack of Focus on the Renewable Energy Master Plan**

One of the two federal government initiatives at resolving the country's energy poverty led to the creation of the nation's Renewable Energy Master Plan in 2005.<sup>33</sup> This master plan stipulates that the country should endeavour to increase the energy generation capacity from 5000 MW to 16000 MW by 2015 through the exploration of renewable energy resources. Presently, we are in 2021, yet there has not been an improvement in the existing capacities.

#### **4.2.5. Poor Government Motivation on Renewable Technology**

Though various governments in Nigeria have been looking for ways of getting the nation out of the energy poverty, they have however not done enough at all levels to create enabling business environment to promote and encourage Renewable Energy Technology. It is a known fact that the initial capital cost for Renewable Energy Technology is usually very high compared to other conventional energy sources. Yet if the governments (local, state and federal) would give tax incentives or holidays to willing investors, remove or reduce custom duties payable on importation of the technology, give subsidies to sales and purchases of the technology applications, provide low or interest free loans through banks primarily for wind energy investors and also restructure the energy framework of

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<sup>32</sup> Ibid.

<sup>33</sup> Energy Commission of Nigeria-United Nations Development Programme; Renewable Energy Master Plan: Final Draft Report.

the nation to include wind energy, the awareness level of the public will be enhanced and invariably there would be rapid embracing of the technology of wind for power generation.

#### **4.2.6. Land Acquisition and Current Land Tenure System**

Land acquisition for Renewable Energy Project remains a serious legal issue that can be viewed from multi-faceted directions. The procedure for land acquisition under the Electric Power Sector Reform Act, section 77 empowers NERC and the President to acquire a private land from its owner and give same to owners of the Renewable Energy Investor. To help realize the provisions thereof, the NERC introduced a Regulation.<sup>34</sup>

The procedure under the section can be summarized as follows:

- a. The Company either for Wind, Solar, and Geothermal or even Biofuels in need of land for Wind Power Plant, Solar Plant or Dump site for Biomass gasification process is to apply to NERC for a declaration that a particular piece of land belonging to another person is required for purposes of electricity generation.<sup>35</sup>
- b. NERC may invite submission from Commissioner of Lands in the State where the land is to be acquired.<sup>36</sup>

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<sup>34</sup> NERC (Acquisition of Land and Access Rights for Electricity Projects) Regulations, 2012. The primary objective of the Regulations is to provide a legal and regulatory framework for the acquisition of land for electricity projects related to Generation, Transmission and Distribution in Nigeria as well as making provisions for the payment of compensation and resettlement of persons affected by the acquisition. The regulation further provided for the procedure for both Free Prior Informed Consent of land owner and Compulsory Acquisition where the land owner refuses to let go of the land.

<sup>35</sup> Section 77(1) of the Electric Sector Power Reform Act (ESPRA) 2005

<sup>36</sup> Section 77(2)

- c. NERC may thereafter declare on behalf of the owners of the company that the land is required for electricity generation.<sup>37</sup>
- d. The original owner(s) of the land will be given adequate opportunity to make representation against the declaration.<sup>38</sup> The representation does not, however, guarantee that NERC will not make the declaration. The owners of the company also make representation that generation of electricity is not practicable unless the land is acquired.<sup>39</sup>
- e. NERC's declaration will thereafter be brought to the President's attention for him to issue a notice in the gazette that land is required by the government of the Federation for public purposes.<sup>40</sup>
- f. Once the President has issued the notice, the Governor of the state where the land is situated is to revoke the existing right of occupancy on the land under section 28(4) of the Land Use Act in favour of the company investing in the Renewable Energy Project and grants a certificate of occupancy to it, although the denied previous owner will be able to claim compensation.<sup>41</sup>

The whole drama of acquisition of land in favour of the Renewable Energy investor appears to be a situation that can best be likened to robbing Peter to pay Paul. Revoking the right of occupancy and acquisition of the land of one private or corporate citizen to satisfy the business need of another private or corporate citizen is most questionable in the modern times. The rather questionable

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<sup>37</sup> Section 77(3)

<sup>38</sup> Section 77(4)

<sup>39</sup> Section 77(5)

<sup>40</sup> Section 77(6)

<sup>41</sup> Section 77(9)



conversion of a private purpose to a public purpose with the sole aim of acquiring a private land for a limited liability company is most unfair and offends the spirit of the Constitution and the Land Use Act.<sup>42</sup>

Again, there is the legal quagmire that arises where the Governor refuses to revoke the rights of occupancy and grant a certificate of occupancy in favour of the company either for political differences or just peculiarly gain. What will be the remedy of the President and/or the investor? Can an order of mandamus be made against the Governor, considering that land matters are residual matters? What if the state has an interest in the land proposed for acquisition by the President?

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<sup>42</sup> See Sections 28 (1)(2)(4); 29 (4) of the Land Use Act, 1978; Section 44 of Constitution of the Federal Republic of Nigeria 1999 (as amended). Except these provisions are complied with, the right of occupancy of the Claimant remains inviolable until the Governor acts and complies with conditions stipulated above. See *Alhaji Dantsoho vs. Alhaji Mohammed* (2003) 6 NWLR (PT. 817) 457 and *Goldmark (Nigeria) Ltd vs. Ibafo Company Ltd* (2012) 10 NWLR (Pt. 1308) p.291 at 356 Para. E-G.

## CHAPTER FIVE

### COMPARATIVE ANALYSIS OF RENEWABLE ENERGY LEGAL FRAMEWORKS IN SELECTED COUNTRIES AND LESSONS FOR NIGERIA

#### 5.1. Comparative Analysis on Selected Jurisdiction

It is important to note that for Nigeria to rely on renewable energy that is naturally inexhaustible, it needs to develop the country's renewable energy profile and potentials, not only for achieving the global sustainable development trajectory, but also for meeting her energy demand through energy mix for economic developments. By these factors, she would have contributed to the improvement of the global condition through the pursuit of greener energy devoid of the greenhouse gases and global warming that deplete the ozone layer.<sup>1</sup> However, for several years past and despite the efforts with policies and renewable energy legislations, the Nigeria's renewable energy resources potentials remain undeveloped. Better still, the most recognized one remains the hydro power, which is largely susceptible to seasonal variations in the amount of water levels at dams.

Efficiency, safety and technology have underpinned the various energy transitions. Hitherto the global call for alternative energy resources having seen the dangers of the fossil fuel, renewable energy in all countries of the world received little or no recognition at all, including Nigeria. When the devastating impact of the use of coal and oil became glare, countries were forced by necessity to seek out reforms directed towards clean energy resources. It is interesting to know that while other countries articulated

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<sup>1</sup> Renewable Energy and Electricity: "World Nuclear Association." Online <http://www.world-nuclear.org/info10.html>, accessed on 13th April, 2011, at p.3 in Oke, *supra* note 79 at 322

modalities to key up with development of the renewable energy industry, Nigeria was not left out. While many countries have surmounted the challenge for renewable integration, the case of Nigeria remains a mystery. Although part of the driving force in the developments is dependent on a number of factors and principles. For instance, under the sustainable development goals, the principles of polluter pays and common but differentiated responsibility spurred the developed nations into the various successes in the global development of renewable energy.

These successes shall be examined in a comparative manner in order to unravel what is done differently in Nigeria that has impaired the progress in renewable energy sufficiency. Three countries among successful countries were carefully selected. They are the People's Republic of China, the Government of India and the Republic of Ghana. The criteria for their choices are on the basis of demography, heterogeneity and economic-geographical location. They are as follows:

### **5.1.1. The Peoples Republic of China**

China is a country of 1,439,323,776 in population,<sup>2</sup> with an economic growth rate of 8.6% based on IMF projection for the year 2021.<sup>3</sup> As of 2020, approximately 2,200 gigawatts of electric power generation capacity had been installed in China.<sup>4</sup> China has manifested great zeal in the regime of renewable energy. In

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<sup>2</sup> <https://www.worldometers.info/demographics/china-demographics/>.

<sup>3</sup> IMF projects India's economic growth rate at 12.5% in 2021. Assessed on the 11<sup>th</sup> May, 2021 through: [http://timesofindia.indiatimes.com/articleshow/81933929.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](http://timesofindia.indiatimes.com/articleshow/81933929.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst).

<sup>4</sup> Samantha Wong, Feb 25, 2021, "*Installed capacity of power generation in China 2010-2020*" Energy & Environment: Statista. Assessed on the 11<sup>th</sup> May, 2021 through <https://www.statista.com/statistics/302269/china-installed-power-generation-capacity/#:~:text=Installed%20capacity%20of%20power%20generation%20in%20China%202010%2D2020&text=>

October 2001, the State Economic and Trade Commission (SETC) proposed its Tenth Five-Year Plan for Sustainable Development, including the Tenth Five-Year Plan for New and Renewable Energy Commercialization Development.<sup>5</sup>

The Renewable Energy Law of the People's Republic of China, 2005 came into force on 1<sup>st</sup> January, 2006 to underpin all Chinese Renewable Energy Plans, Programmes and Policies. The Law was adopted at the 14th Meeting the Standing Committee of the Tenth National People's Congress on February 28, 2005 was later amended according to the Decision of the 12th Meeting of the Standing Committee of the 11th National People's Congress of the People's Republic of China on December 26, 2009. The Law was enacted primarily to promote the development and utilization of renewable energy, increasing the supply of energy, improving the structure of energy, safeguarding the safety of energy, protecting environment and realizing a sustainable economic and social development.<sup>6</sup> Due to the Communist State structure of the Chinese Government, the Law was enacted to be in operation throughout the country irrespective of regional demarcation.<sup>7</sup> However, the law liberalized and allowed all level of participation in the development of renewable energy resources.<sup>8</sup> This no doubt highlighted priority in the development and utilization of renewable energy in energy development and promotes the establishment and development of the renewable

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[As%20of%202020%2C%20approximately%202%2C200.had%20been%20installed%20in%20China.&text=China%20is%20known%20to%20be.populated%20country%20in%20the%20world.](#)

<sup>5</sup> Renewable Energy Policy in China: Overview; Renewable Energy in China. NREL International Programs Fact Sheet culled from <https://www.nrel.gov/docs/fy04osti/35786.pdf>.

<sup>6</sup> Article 1 of the Renewable Energy Law of the People's Republic of China, 2005, accessible through <http://english.mofcom.gov.cn/article/policyrelease/Businessregulations/201312/20131200432160.shtml>.

<sup>7</sup> Article 3

<sup>8</sup> Article 4



energy market by setting an overall target for the development and utilization of renewable energy and adopting corresponding measures.<sup>9</sup> Such provision had also encouraged different ownership in the development and utilization of renewable energy.<sup>10</sup> Another arm of this widened opportunity for all encompassing interest is the assurance of protection of the legitimate rights and interests of those who develop and utilize renewable energy.<sup>11</sup>

Based on the step-by-step plans and policies already laid down, the law was amended in 26<sup>th</sup> December 2009 to improve on what is already established. In 2007, China amended the Energy Conservation Law, again focusing on the utilization of renewable energy and promotion of green consumption to realize sustainable development from the demand side.<sup>12</sup> Other changes introduced by the 2009 amendments of the 2005 Renewable Energy Law include detailed planning and co-ordination of renewable energy strictly for Electricity power generation in a bottom-top planning model whereby there is a coordinated link connecting the local (provincial) level with the national development plans. Different entities had different roles to play at all levels of the Country's renewable energy development. The Energy authorities of the State Council and local people's governments above the county level have the duties to implement management and administration of the development and utilization of renewable energy at their

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<sup>9</sup> Ibid

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> See Xin Qiu and Honglin Li: Energy Regulation and Legislation in China: Environmental Law Institute, Washington, DC. Reprinted Copyright © 2012 culled from <https://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/SSRN-id2145789.pdf>.

respective levels.<sup>13</sup> The various departments of the National and Local people's Governments participate and indeed are responsible for the management, development and utilization of renewable energy within their respective authorities.<sup>14</sup> By this provision, agencies, institutions and government offices are made to source their own electricity without depending on anybody. The implication is that departments engage in generation of renewable energy for their personal use at the office. This is unlike Nigeria, where all the agencies of the Government depend on the Gencos-TCN-Discos to source for their energy.

Under the Chinese renewable energy law, planning, survey and targets for various levels of governments are statutorily provided for.<sup>15</sup> The Standardization of renewable energy technologies is not left in the hands of energy regulators; rather it was conferred on the standardization authorities of the National Government to put in place the technical standard for relevant renewable energy electric power and products that require technical assessment.<sup>16</sup> Considering the importance of continuity, sustenance and maintenance through education, the law mandated all educational authorities of the State Council to incorporate the teaching and knowledge of renewable energy technologies into educational curricula.<sup>17</sup> Except in the event of sole applicant, all applications for licenses and permits are granted through an open tender and bid rounds.<sup>18</sup> This is an all interesting procedure. With such process, competences, expertise, focus and preparedness is achieved. This is

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<sup>13</sup> Article 5 of the 2005 Renewable Energy Law of the People's Republic of China

<sup>14</sup> Ibid

<sup>15</sup> Articles 6 – 10

<sup>16</sup> Article 11

<sup>17</sup> Article 12

<sup>18</sup> Article 13

unlike what obtains in Nigeria where application for license is chaotic and made rigid with the primary intent of preparing openings for clandestine activities, bribery, connection and political-god-fatherism.

It is also understandable that the duty of electricity transmission is decentralized to accommodate private enterprises. Such enterprises are mandated to enter into off-taker contract with duly licensed renewable energy producers.<sup>19</sup> In the event of breach of such agreement by the grid enterprises, same shall attract a sanction from the National Power Supervisory Institutions.<sup>20</sup> Real estate development companies are required to design, construct and build houses in line with renewable energy plan; designing buildings in line with utilization of solar energy.<sup>21</sup> The 2009 amendment to the law granted entities and individuals the right to install and use solar water heating systems, solar heating and refrigeration systems and solar photovoltaic electricity generation systems.<sup>22</sup> The tariff regimes are solely the responsibilities of the price authorities of the State Council and same shall be determined by three major factors; to wit: beneficial development of renewable energy, technological development, economically reasonableness.<sup>23</sup> There is also huge tax cut for investments in renewable energy<sup>24</sup> and there are also

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<sup>19</sup> Articles 13 - 14

<sup>20</sup> Article 29

<sup>21</sup> Article 17

<sup>22</sup> Article 17 of the 2009 Amendment to the earlier 2005 Renewable Energy Law assessed through <http://english.mofcom.gov.cn/article/policyrelease/Businessregulations/201312/20131200432160.shtml>. It is important to point out that presently, there is no separate document for the two laws. The amendments made to the law is incorporated in the original law and this is why it is described cited as (Adopted at the 14th Meeting the Standing Committee of the Tenth National People's Congress on February 28, 2005; Amended according to the Decision of the 12th Meeting of the Standing Committee of the 11th National People's Congress of the People's Republic of China on December 26, 2009).

<sup>23</sup> Article 19 of the 2005 Renewable Energy Law of the People's Republic of China

<sup>24</sup> Article 26



preferences and interest subsidy for renewable energy projects loans by financial institutions.<sup>25</sup>

There is total unbundling of the regulation of the renewable energy in China. It is not the exclusive preserve of any entity. Infact the people's governments of different levels appear to have regulatory powers over energy authorities of their respective levels.<sup>26</sup> They have powers to request remediation, impose punishments and sanctions for improper conducts on the energy authorities or personnel.<sup>27</sup> Also the supervisory roles to ascertain rate of compliance by renewable energy producers are carried out by the Power supervisory institutions.<sup>28</sup>

The achievements of the law are mind-blowing. China is now second only to the United States in total wind capacity. The Country's wind turbine manufacturing industry became the largest in the world in just four short years, with three Chinese producers now in the top 10 globally,<sup>29</sup> with the largest manufacturer of solar PV, supplying almost 40% of all solar PV worldwide in 2009. Among suppliers of wind turbines, China now dominates the market, with three Chinese manufacturers.<sup>30</sup> According to the report by Mr. Sridhar Samudrala,<sup>31</sup> the future, the Chinese government's current draft plan calls for 300 GW of hydropower, 150

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<sup>25</sup> Article 25

<sup>26</sup> Article 28

<sup>27</sup> Ibid

<sup>28</sup> Article 27

<sup>29</sup> BTM Consult Press Release, 29<sup>th</sup> March, 2009. Assessed on the 4<sup>th</sup> May, 2021 through <https://medier.publicwebsites.se/media/article6311602.ece/BINARY/BTM%20Consult%20World%20Market%20Update%202009%20Pressmeddelande>.

<sup>30</sup> Ibid.

<sup>31</sup> Sridhar Samudrala, "Report on a consultancy assignment from the Asian and Pacific Centre for Transfer of Technology (APCTT) of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP)," *International Energy Consulting Co, USA* July, 2013.

GW of wind power, 30 GW of biomass power, and 20 GW of solar PV, for a total of 500 GW of renewable power capacity by 2020. This would be almost one-third of China's expected total power capacity of 1600 GW by 2020.

### **5.1.2. The Republic of India**

India is the fourth largest energy consumer after the United States, China, and Russia. It is also one of the fastest growing economies with an economic growth rate of 12.5% by 2021 according to the IMF,<sup>32</sup> and a population of 1,330,637,000 as at 2020.<sup>33</sup> Projections have placed India the fastest economic growth among 132 countries over the next five years.<sup>34</sup> India along with China account for the largest share of Asian energy demand growth and together account for half of the global energy growth through 2035.<sup>35</sup> India relies heavily on conventional fuels to meet the energy demand.<sup>36</sup> Out of the total installed capacity of 326 GW, the share of coal, gas and diesel power projects is close to 67% in the overall capacity mix, while the share of renewable energy in the overall capacity mix is 18% (57 GW) as of March 2017.<sup>37</sup> The Government of India targets for achieving 175 GW of electricity sourced from renewable energy resources by year 2022.<sup>38</sup> The target

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<sup>32</sup> See supra note 3.

<sup>33</sup> <https://www.britannica.com/place/India>.

<sup>34</sup> FocusEconomics, 2021, The World's Fastest Growing Economies. Assessed on the 4<sup>th</sup> May, 2021 through <https://www.focus-economics.com/blog/fastest-growing-economies-in-the-world> FocusEconomics is a leading provider of economic analysis and forecasts for 131 countries in Africa, Asia, Europe, the Middle East and the Americas, as well as price forecasts for 34 key commodities. The company is supported by an extensive global network of analysts.

<sup>35</sup> U.S. Energy Information Administration 19<sup>th</sup> September, 2011. Assessed on 4<sup>th</sup> May, 2021 through <https://www.eia.gov/todayinenergy/detail.php?id=3130>.

<sup>36</sup> State Renewable Energy Action Plan for Assam, Final Report, 2017. Culled out on the 10<sup>th</sup> May, 2021 from <http://www.indiaenvironmentportal.org.in/files/file/State%20Renewable%20Energy%20Action%20Plan%20for%20Assam.pdf>.

<sup>37</sup> Ibid

<sup>38</sup> Ibid

comprises of 100 GW of solar power, 60 GW of wind power, 10 GW of biomass power, and 5 GW of small hydro power (SHP). Each and every segment of renewable energy i.e., solar, wind, biomass, hydropower, biomass, waste to energy is being harnessed to their full potential as the government aims to fulfil its objective of providing 24x7 power to all households by 2022.<sup>39</sup> The country's Ministry of New and Renewable Energy was launched in January 2010 at a time when the country's solar energy market had a capacity of only 17.8 MW.<sup>40</sup>

India is a heterogeneous country with a total of 28 federating states and 8 union territories. Each State of India has an administrative, legislative and judicial capital; in some of the states all three functions are conducted in one capital.<sup>41</sup> As a federation, the legislative powers in the country are shared between the Indian Parliament and the Legislatures of the various federating States.<sup>42</sup> The constitution accommodates the principle of covering the field. In any case, notwithstanding anything in the clause, the Parliament has power to make laws with respect to any of the matters enumerated in List III in the Seventh Schedule (in this Constitution referred to as the "Concurrent List").<sup>43</sup> Electricity falls within

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<sup>39</sup> Ibid

<sup>40</sup> Mohua Mukherjee, 2014, Private Participation in the Indian Power Sector Lessons from Two Decades of Experience. The World Bank Group. Assessed on the 4<sup>th</sup> May, 2021 through <http://documents1.worldbank.org/curated/en/855761468041672781/pdf/Private-participation-in-the-Indian-power-sector-lessons-from-two-decades-of-experience.pdf>

<sup>41</sup> Delhi August 5. "States and Union Territories". Know India Programme. Retrieved 21 April 2020; [https://en.wikipedia.org/wiki/States\\_and\\_union\\_territories\\_of\\_India](https://en.wikipedia.org/wiki/States_and_union_territories_of_India); and <https://www.careerpower.in/states-and-capitals-of-india.html#:~:text=There%20are%20a%20total%20of,are%20conducted%20in%20one%20capital>

<sup>42</sup> Article 245 of the India Constitution of 1949.

<sup>43</sup> Article 246 (2).

the concurrent legislative powers of the Indian Constitution.<sup>44</sup> This warranted the enactment of the Indian's Electricity Act, 2003.

Although the Act<sup>45</sup> contains no clear definition of renewable energy, the 2017 Regulation however, defines 'renewable energy' as grid quality electricity generated from renewable energy sources.<sup>46</sup> It was further identified to include small hydro, wind, solar including its integration with combined cycle, biomass, biofuel cogeneration, urban or municipal waste and other such sources as may be approved by the Ministry of New Renewable Energy.<sup>47</sup> There are however provisions pertaining to renewable energy in the Electricity Act 2003. Under the Act, the Central Government shall, from time to time, prepare and publish the National Electricity Policy and Tariff Policy, in consultation with the state governments and authority for development of the power system based on optimal utilization of resources such as coal, natural gas, nuclear substances or material, hydro and renewable sources of energy.<sup>48</sup> There is also a requirement that the Central Government shall, after consultation with the state governments, prepare and notify a national policy, permitting stand-alone systems (including those based on renewable sources of energy and other non-conventional sources of energy) for rural areas.<sup>49</sup> The Act further mandated the appropriate commission to specify the terms and conditions for the determination of tariff in line with the promotion of cogeneration and generation of electricity from renewable sources

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<sup>44</sup> Item 38 of the List III (Concurrent List) in the Seventh Schedule of the Constitution.

<sup>45</sup> The Electricity Act, 2003 (No.36 of 2003) of 26th May, 2003.

<sup>46</sup> The Central Electricity Regulatory Commission (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations 2017.

<sup>47</sup> Indian Ministry of New Renewable Energy Renewable Energy Schedule of Investment.

<sup>48</sup> Section 3(1-2) of the Electricity Act, 2003.

<sup>49</sup> Section 4.

of energy.<sup>50</sup> The Act allowed some level of State participation in both regulation and practice of renewable electricity. Hence the State commissions are allowed to promote cogeneration and generation of electricity from renewable sources of energy by providing, suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution license.<sup>51</sup>

This Act authorized the enactment and creation of the following renewable energy legislative and regulatory instruments: National Electricity Policy, 2005; Tariff policy, 2006; Integrated Energy Policy, 2006; Rural Electrification Policy, 2006; National Action Plan on Climate Change (NAPCC), 2008; National Biofuel Policy, 2009; Jawaharlal Nehru National Solar Mission, 2010; Renewable Energy Certificates (REC) Mechanism, 2010; National Solar Mission, 2015; National Offshore Wind Energy Policy, 2015; Priority Sector Lending Programme, 2015 and Tariff Policy 2016 (amendment).

The Indian Tariff Policy 2006 and the National Electricity Policy 2005 also have introduced incentive programmes and policies to encourage investment in the renewable energy sector. There are fiscal incentives available to renewable power projects. Certain areas of renewable energy investments are exempted from certain categories of taxes and duties. The Ministry of New Renewable Energy introduced the National Offshore Wind Energy Policy and the Policy for

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<sup>50</sup> Section 61(h).

<sup>51</sup> Section 86(1)(e).



Repowering of the Wind Power Projects as energy source specific policies.<sup>52</sup> There is also a policy on speedy commencement of renewable energy projects. This was necessitated to avoid unnecessary bureaucratic bottleneck. Thus, apart from biomass power plants with installed capacity of 10MW, all other renewable energy power plants shall be given a 'must run' status and not be subject to 'merit order dispatch' principles.<sup>53</sup> The Tariff Policy, the CERC has exempted payment of inter-state transmission charges and losses for solar and wind energy generators for 25 years from commissioning for projects set up through competitive bidding, based on compliance with certain terms and conditions.<sup>54</sup>

As a compliant of the doctrine of covering the field, the Federating States in India do not have businesses enacting any further substantive law on electricity generally in the presence of the National Electricity Act, 2003. Rather while depending on the Act, the states also drive their electricity practices through regulations, codes, rules, policies and programmes. In line with the Constitution and the Act,<sup>55</sup> all the federating states of the Republic of India have their various regulatory institutions for the regulation of electricity in their respective states. The scheme is arranged in a way that the Central Government exercises some level of control and regulation over States in terms of Renewable Energy and this is achieved through the Ministry of New Renewable Energy. The Government of India's targets for achieving 175 GW of electricity sourced from renewable

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<sup>52</sup> Dibyanshu, *et al*: Khaitan & Co, 23<sup>rd</sup> September, 2019. "The legal framework for renewable energy in India" Lexology. Assessed on the 5<sup>th</sup> May, 2021 through [https://www.lexology.com/library/detail.aspx?g=47fc6bca-75ad-486c-9373-b48063b6b3e4#:~:text=According%20to%20the%20CERC%20\(Terms,run'%20status%20and%20not%20be](https://www.lexology.com/library/detail.aspx?g=47fc6bca-75ad-486c-9373-b48063b6b3e4#:~:text=According%20to%20the%20CERC%20(Terms,run'%20status%20and%20not%20be)

<sup>53</sup> Ibid.

<sup>54</sup> Ibid.

<sup>55</sup> See Supra notes 44 and 51.

energy resources by year 2022,<sup>56</sup> compelled the Central government to allocate various quotient of Renewable Energy contributions to all the Federating States. One important factor considered in allocating the targets, is the prospects and potentialities of renewable energy resources in such states. These targets are achievable by the States through the various regulations and policies conveniently put in place for their local purpose. We shall examine some of the states below.

Andhra Pradesh has been apportioned 8% (14,000 MW); of which the allocation for wind is 57% (8,100 MW) and for solar is 38% (5,357 MW).<sup>57</sup> The share of renewables in Gujarat has increased from 13% in 2011 to around 25% in 2017, expanding at an annualized rate of 7.1% and by 2022, it is expected that overall renewable capacity in this state will increase to 17,133 MW, as per the targets suggested by MNRE.<sup>58</sup> Karnataka has been apportioned 8.5% (14,817 MW) of the 2022 national RE target: of this, the share of solar is targeted at 38% (5,697 MW), wind at 42% (6,200 MW), and the rest is from biomass and small hydro.<sup>59</sup> Madhya Pradesh has been apportioned 6.8% (11,979 MW) of the 2022 national RE target; of which the share of solar is 47% (5,636 MW) while the nonsolar share of 53%, wind has been allocated 6,200 MW, small hydro 25 MW and biomass 118 MW.<sup>60</sup> Maharashtra as a State on its own has a RE target of 14.4

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<sup>56</sup> See Supra note 36, page 15 thereof

<sup>57</sup> National Institute for Transforming India (NITI Aayog formerly known as the Planning Commission of India); State Renewable Energy Capacity Addition Roadmap Action Plan 2022 and Vision 2030: Summary of findings. Organized by the Confederation of Indian Industry. Assessed on 10<sup>th</sup> May, 2021 through <https://niti.gov.in/sites/default/files/energy/Executive-Summary.pdf>

<sup>58</sup> Ibid page 19.

<sup>59</sup> Ibid page 23.

<sup>60</sup> Ibid page 27.



GW by 2020 under the State RE policy.<sup>61</sup> However, considering high potential of RE in the State, MNRE has allocated a target of 22 GW of RE by 2022.<sup>62</sup> To promote RE consumption in Maharashtra, MERC has also imposed RPO target on obligated entities.<sup>63</sup> Considering its low RE potential and low state demand, MNRE has assigned to Assam an RE target of 688 MW by 2022.<sup>64</sup> Given the low wind and biomass potential, the state has not been allocated any targets in these two areas.<sup>65</sup> Almost 99%, or 663 MW, of the target is from solar and the remaining 25 MW from small hydro power.<sup>66</sup>

We shall examine the operational activities of individual States in the Republic of India. To this we shall concentrate on State of Assam. The reason for the choice is to critically x-ray the operational modalities of the least among all other equal states in the country. The State electricity is regulated through Assam Electricity Regulatory Commission (AERC).<sup>67</sup> The Assam Electricity Regulatory Commission (AERC) is responsible for providing Operational and Commercial framework for development of renewable energy in the State.<sup>68</sup> AERC has defined regulatory framework for promotion of small as well as large Renewable Energy projects through proactively issuing tariff orders and regulations pertaining to Renewable Purchase Obligation (RPO), Open Access (OA) and

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<sup>61</sup> Ibid page 30.

<sup>62</sup> Ibid.

<sup>63</sup> Ibid.

<sup>64</sup> Ibid page 42.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

<sup>67</sup> See Supra note 36, page 15 thereof.

<sup>68</sup> Ibid page 18.

Captive Consumers called as Obligated Entities (OE) etc. in the State.<sup>69</sup> This is contained in the Renewable Purchase Obligation and its Compliance Regulation 2010.<sup>70</sup> The regulations mandated Obligated Entities such as DISCOMs, CPP and OA Consumer to procure certain percentage of their consumption from Renewable Energy sourced electricity. Further, AERC has also determined separate RPO target for Solar and Non-Solar RE sources.<sup>71</sup> Later, AERC also issued amendment to this regulation in February, 2015 and thereafter in 2017.<sup>72</sup>

Apart from State participation, the Central Government has also assigned several large-scale consumers of power (including Obligated Entities) to develop RE capacities.<sup>73</sup> This has resulted in such consumers moving away from states by setting up their own captive solar plants to ensure compliance with their RPOs.<sup>74</sup>

### 5.1.3. The Republic of Ghana

According to International Trade Administration, the total installed capacity for existing plants in Ghana is 4,132 Megawatt (MW), consisting of hydro 38%; thermal 61%; and solar less than 1%,<sup>75</sup> though actual availability rarely exceeds 2,400 MW due to changing hydrological conditions, inadequate fuel supplies and

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<sup>69</sup> Ibid.

<sup>70</sup> Assam Electricity Regulatory Commission, Notification. Regulation No. AERC/21/2010. Government of Assam, by the Orders of the Governor. Assessed on the 10<sup>th</sup> May, 2021 through [https://rpo.gov.in/ProjectFiles/Assam/AERC\\_RPO\\_Regulations-2010.pdf](https://rpo.gov.in/ProjectFiles/Assam/AERC_RPO_Regulations-2010.pdf).

<sup>71</sup> Ibid.

<sup>72</sup> The Statement of reasons for Assam Electricity Regulatory Commission (Renewable Purchase Obligation and its Compliance) Regulations, 2010, (Second Amendment), 2017 assessed on 10<sup>th</sup> May, 2021 through [http://www.aerc.nic.in/AERC%20SOR\\_RPO.pdf](http://www.aerc.nic.in/AERC%20SOR_RPO.pdf).

<sup>73</sup> Ibid pages 8-9.

<sup>74</sup> Ibid.

<sup>75</sup> International Trade Administration, 2020, "Energy Sector: This is a best prospect industry sector for this country. Includes a market overview and trade data." Ghana - Country Commercial Guide. Assessed on 11<sup>th</sup> May, 2021 vide <https://www.trade.gov/country-commercial-guides/ghana-energy-sector#:~:text=The%20total%20installed%20capacity%20for,and%20solar%20less%20than%201%25>.

dilapidated infrastructure.<sup>76</sup> As at 2018, it has a population of about 29.6 million,<sup>77</sup> with GDP growth rate of 6.48% as at 2019.<sup>78</sup>

The Ghana electricity sector is hitherto governed by the Energy Commission Act, 1997.<sup>79</sup> It regulates and manages the utilization of energy resources in Ghana and co-ordinate policies in relation to them.<sup>80</sup> The Act has no meaningful provision for renewable energy integration in the Ghanaian energy profile. The only known provision is regards to the energy fund.<sup>81</sup> However, following the global call for diversification to other alternative sources of energy, the renewable energy resources endeared massive development through legislation and policies one of which is the Renewable Energy Act.<sup>82</sup> In principle, the Act provides for the development, management and utilization of renewable energy sources for the production of heat and power in an efficient and environmentally sustainable manner.<sup>83</sup> The Act considered the ingredients that underpin investments in the renewable energy and mandated as part of its objectives the provisions for an enabling environment to attract investment in renewable energy sources.<sup>84</sup> As part of its objectives, the Act mandated the use renewable energy.<sup>85</sup>

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<sup>76</sup> USAID: Ghana Power Africa Fact Sheet, Energy Sector Overview. Assessed on 11<sup>th</sup> May, 2021 through <https://www.usaid.gov/powerafrica/ghana>.

<sup>77</sup> The World Bank: The World Bank in Ghana, Overview. Assessed on 11<sup>th</sup> May, 2021 through <https://www.worldbank.org/en/country/ghana/overview>.

<sup>78</sup> Macrotrends. "Ghana GDP Growth Rate 1961-2021" Assessed on 11<sup>th</sup> May, 2021 through <https://www.macrotrends.net/countries/GHA/ghana/gdp-growth-rate>.

<sup>79</sup> The Energy Commission Act, 1997 (Act 541) of the Republic of Ghana.

<sup>80</sup> Section 2(1).

<sup>81</sup> Section 42(b). The Act provides that one of the objectives of the Energy Fund is for promotion of projects for the development and utilisation of renewable energy resources, including solar energy;

<sup>82</sup> Renewable Energy Act, 2011 (Act 832) of the Republic of Ghana.

<sup>83</sup> Section 1(1).

<sup>84</sup> Section 1(2)(a)(ii).

<sup>85</sup> Section 1(2)(b).

The Act further made provisions for the sustenance, maintenance and continuity of the value chain through public education on renewable energy production and utilization in the various institutions in Ghana.<sup>86</sup> There appears to be a total unbundling of the regulatory institutions. The Act recognized the following regulatory institutions with different and complementary responsibilities under the Act. They are: the Minister, the Energy Commission, Public Utilities Regulatory Commission. First, the Minister has only the responsibility of providing policy direction for the achievement of the object of the Act as well as making necessary regulation for the realization of the objectives of the Act.<sup>87</sup> Thereafter it is the responsibility of the Energy Commission Board<sup>88</sup> to grant licenses upon application by any entity as prescribed by the Act, while the Public Utilities Regulatory Commission regulates the tariff regimes for the renewable energy produced and distributed by licensees.<sup>89</sup>

As aptly defined and categorized in the Act, renewable energy cuts across wind, solar, hydro, biomass, bio-fuel, landfill gas, sewage gas, geothermal energy, ocean energy; and any other energy source designated in writing by the Minister.<sup>90</sup> This implies that before any entity can successfully produce renewable energy, there would be need for cross regulatory institutional interface. The Act mandated relevant institutions responsible for the development, promotion, management and utilization of renewable energy sources to collaborate with the

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<sup>86</sup> Section 1(2)(f).

<sup>87</sup> Sections 3 and 50

<sup>88</sup> Section 10

<sup>89</sup> Section 5(a-c)

<sup>90</sup> Section 2(a-j)



Commission in the exercise of its powers.<sup>91</sup> This simply creates a one-stop-shop for every applicant for license to achieve same easily and conveniently. There is also security of supply of electricity under the feed-in-tariff administered by the Act which was put in place to guarantee the purchase of electricity produced by the renewable resources.<sup>92</sup>

The Renewable Energy Master Plan, 2019 was targeted at increasing the proportion of electricity sourced from renewable energy into the national energy generation mix from 42.5 MW in 2015 to 1,363.63 MW.<sup>93</sup> It also aimed at reducing dependence on biomass as the main fuel for thermal energy applications, provide platforms for local content and local participation in the renewable energy industry.<sup>94</sup> The policy is targeted at projecting approximately 22,000 MW of installed capacity of energy by 2030.<sup>95</sup> The Private sector would be provided with the enabling business environment and with policies to address bottlenecks that hinder private sector participation and growth in the renewable energy space.<sup>96</sup> It further stated that incentives would be given to private sector actors engaged in the local assembly and manufacturing of renewable energy technologies and related services to increase their competitiveness.<sup>97</sup> The policy also promotes research and development in renewable energy technologies.<sup>98</sup>

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<sup>91</sup> Section 7(1)

<sup>92</sup> Sections 25(1) and 26(1-2)

<sup>93</sup> See supra note 75.

<sup>94</sup> Ghana Renewable Energy Master Plan, 2019 Policy Document page 3 sourced from <http://www.energycom.gov.gh/files/Renewable-Energy-Masterplan-February-2019.pdf>.

<sup>95</sup> Ibid page 23.

<sup>96</sup> Ibid page 49.

<sup>97</sup> Ibid pages 49 - 50.

<sup>98</sup> Ibid page 50.

## 5.2. Lessons for Nigeria

Truly, Nigeria has an abundance of various renewable energy resources of which solar, wind, biomass and small hydro power (SHP) are the most ubiquitous.<sup>99</sup> The NERC as a regulator, assures of committed effort to stimulating investment in renewable energy generation in Nigeria,<sup>100</sup> and has set a target of generating a minimum of 2,000MW of electricity from renewables by the year 2020.<sup>101</sup> According to the Nigerian Electricity Regulatory Commission (NERC), the main features of the renewable energy regime include guaranteed price and access to grid; Feed-In-Tariff for Solar, Wind, Biomass & Small Hydro as well as Power Purchase Agreement (PPA) based on plant life cycle of 20 years.<sup>102</sup> It further boasts of the procurement obligation of a minimum of 1000MW (50 per cent of the total projected renewable sourced electricity) by the Distribution Companies (DISCOs) and the Nigerian Bulk Electricity Trading Company (NBET) respectively.<sup>103</sup>

Having critically examined the activities of the aforementioned three countries, it is obvious that so many things are not on the right track in Nigerian renewable energy pursuit. As submitted earlier by this candidate, the choice of these countries is borne out of the similarities in attributes that exist among them. First, population cannot be the reason for the inability of Nigeria to overcome the problem of electricity; otherwise, China could have been a different story. Although India has almost equal population to China, but the choice of India is based on its similar governance system with Nigeria.

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<sup>99</sup> Nigerian Electricity Regulatory Commission, "Renewable Energy Sourced Electricity." Assessed on 12<sup>th</sup> May, 2021 through <https://nerc.gov.ng/index.php/home/operators/renewable-energy>

<sup>100</sup> Ibid.

<sup>101</sup> Ibid.

<sup>102</sup> Ibid.

<sup>103</sup> Ibid.

India is heterogeneous and has 28 Federating States with 8 Regions. Nigeria has 36 States with 6 Regions. There is also similar legislative pattern. The only difference is the Parliamentary System which ordinarily should give Nigeria with Presidential System better advantage. Finally, the reason for the choice of Ghana lies in its West African geographical location and economic categorization with Nigeria. The areas of lessons are divided into Institutional, Legislative and Administrative headings.

### **5.2.1. Institutional and Regulatory Framework**

A closer look into China electricity regulation clearly shows that the Institutional Regulatory Framework is watered down.<sup>104</sup> It is totally unbundled. Every institution that participates in the use of electricity is a regulator in one way or the other. Blameworthy acts are traced to its factor and resolved in line with communal participation. This is very innovative, because the wound of one they say is the wound of all. We fall together and we rise together. In such atmosphere, everyone is police in the sector and such allows for transparency and accountability. Moreso, this system allows for competence and excellence. Experts in the standardization procedure are up and doing and never ready to compromise.

Another area of lessons in institutional regulatory framework for Nigeria is in the interagency cooperation that exists between the Ghana Energy Commission Board and other institutions that relate with the identified renewable energy resources.<sup>105</sup>

There is urgent need for Nigeria to adopt the one-stop-shop system adopted by

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<sup>104</sup> See supra notes 13 to 16

<sup>105</sup> See supra note 91



Ghana that brings all renewable energy resource institutions into a statutorily compelled cooperation. With such cooperation, unnecessary regulatory and administrative bottlenecks are avoided, thereby giving opportunity for effortless licensing procedure.

### **5.2.2. Legislative Framework**

The pattern of Ghana to enact a tangible Renewable Energy Act that serves as back bone for all renewable energy policies is worthy of emulation. Although Nigeria has a Regulation on Feed-In-Tariff, it is incapable of driving the desired growth in the renewable energy. What is the penalty for failure to meet up with the renewable energy purchase obligation and by what law will the defaulter be punished for defaulting taking into consideration the decision of the court as regards to fining by a regulatory institution without a court order.<sup>106</sup> So clearly with the introduction of a substantive legislation, any default can be challenged in the court of competent jurisdiction? Since regulations and policies are susceptible to change overnight, the introduction of an Act will also give an impression of stability in the mind of the investors.

### **5.2.3. Administrative Procedure**

Chinese and Indian governments understood that in the administration of renewable energy technology practice, it is very important to eliminate the shackles of boundaries and restrictions. This is why private individuals are allowed to produce renewable energy. It is not to be left in the hands of

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<sup>106</sup> NOSDRA vs. Mobil Producing Nigeria Unlimited (EXXONMOBIL) *Op cit.*

government alone or corporate entities. Government agencies in China do not depend on anybody to generate electricity, they source their own electricity and, in the event, they produced excess of what they needed, they are encouraged to sell to grid enterprises. While in India obligated entities are given targets on the quantity of electricity, they are to integrate in the national energy profile. Again, another system that is worthy of emulation is the target system employed by the Indian Central Government to the federating states of the nation.<sup>107</sup> This allocation is basically on the basis of the potentials of each state.

There are very important lessons for Nigeria to learn from all these practices. The story of Electricity in Nigeria will turn around for better the day government agencies are allowed to source and produce their own energy. There is need to encourage households to generate their own electricity as done in China. First it will encourage efficiency, reduce laxity and provide more opportunities. For instance, Universities should be allowed to generate electricity using renewable energy resources. This is not the category of permission allowed under the captive electricity. They don't need to be given any permit, all that the government should do is to apportion target of electricity they must produce at certain intervals. Another example is when various states in the North with high wind prospects such as Plateau would be given targets while other states in the regions where there are many rocks like Oyo, Ogun etc will explore the opportunities in geothermal electricity. Borno State of Nigeria is high in hot weather, they can add up using solar. These States as seen in India can independently regulate the

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<sup>107</sup> See supra note s 55 to 66

electricity practices within their territories while keeping to their obligation to the central government.

Secondly, there is transparency in the issuance of license in the Chinese renewable energy practice. Issuance of license is on the basis of open bidding.<sup>108</sup> Nigeria can also adopt the open bidding pattern for grant of the licenses for renewable energy generation. According to NERC, in line with the National Policy on Renewable Energy and Energy Efficiency, it has approved three windows for grid connected renewable energy projects, and those are Net-metering for very small capacities (typically below 1MW); Feed-in tariff for capacities up to 5 MW of solar, 10 MW of wind, 10 MW of Biomass and 30MW of small hydro; while the third is Competitive tender for capacities above these thresholds to be procured through NBET.<sup>109</sup> It is baffling that there have been approvals to some companies for the aforementioned projects, yet there is nothing to show for it. It clearly shows that the current procedure used in the issuance of license in Nigeria does not encourage efficiency and competences.

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<sup>108</sup> See supra note 18

<sup>109</sup> See supra note 99

## CHAPTER SIX

### CONCLUSION AND RECOMMENDATIONS

#### 6.1. Summary of Findings

Before delving into the conclusion, this research will endeavour to make a summary of the findings based on the tools, information and data derived in the course of research. First, there is an established truism that the renewable resources potentials in Nigeria is beyond imagination. Nigeria is richer than most nations that have attained sufficiency and security in energy through renewable energy mix. Secondly, the abundant resources are geographically and strategically distributed. Consequently, while some areas are rich in one resource, the others are abundantly blessed with the others. Thirdly, the Nigerian renewable energy resources are yet untapped and the available renewable energy resources is capable of leading the country into optimum energy sufficiency without mix from the fossil fuel and or nonrenewable.

The research also identifies that Nigeria has more than enough legal framework to actualize renewable energy sufficiency if there is a volition and political will to do so. It was evident that although there is multiplicity of laws to harness the resources, there was a clear-cut piece of legislation that sets out to promote renewable energy simpliciter. Fourthly, it was discovered that while there several laws already in existence, there was however deliberately abandonment of the renewable project in reality while lip service is being paid to it. Finally, it was discovered that the major shift from what is practiced in China, India and few other countries of relative comparison was the fact that there was no piece of legislation directed only towards renewable energy in Nigeria.

## 6.2. Conclusion

In the continued global call for more efforts in the use of energy in a more sustainable manner and promotion of greener ecosystem, a theory has been postulated that technologically viable pollution-free, no cost energy sources are being suppressed by governments, corporations, or advocacy groups.<sup>1</sup> According to this theory, the devices allegedly suppressed include perpetual motion machines, cold fusion generators, torus-based generators, reverse-engineered extraterrestrial technology and other generally unproven, low-cost energy sources.<sup>2</sup> The renewable energy in the global space will remain a continuous effort. First, the diversification to the renewable energy is not only profit driven, it is basically survival driven and major international institutions that regulate the activities of mankind in the globe are behind the quest. No country is left exclusively to rely on the trajectory of its domestic regulatory framework. Rather it is environmentally based and cooperatively pursued by all nations.

One would have expected self-sufficiency in the Nigerian energy security and demand. It is also expected that these sheer abundance of renewable energy reserves and resources in Nigeria relative to other countries suggests that, naturally, electricity availability in Nigeria would play important future role in the development of Nigeria's economy both in the sub regional level and at the global space. The few Nigerian energy research institutes had been denied needed fund to improve research and development. Since 1950s, crude oil has overtaken and played monumental roles in the Nigeria's economy,

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<sup>1</sup> See Park, Robert L. *Voodoo Science: The Road from Foolishness to Fraud* (Oxford University Press, 2000) USA. ISBN 0-19-860443-2

<sup>2</sup> See Sebastien Point, *Free Energy: When The Web Is Freewheeling*, *Skeptical Inquirer*, Volume 42, No. 1 January/February 2018. Culled from <https://skepticalinquirer.org/authors/sebastien-point/>.



accounting for about 90% of export and 90% of its total foreign exchange earnings.<sup>3</sup> From 1970s oil contributes 80% of Nigerian government revenue.<sup>4</sup> These findings are good enough to justify the reason for the lackadaisical attitude of the Nigerian policy makers towards the diversification goal. In the usual Nigerian way, ‘we shall sort it out’. This explains the unfortunate policy position of the Vice President of Nigeria, Professor Yemi Osinbajo. The erudite professor had stated in his social media platform (Facebook) that, *“Global energy transition must be inclusive, equitable and just, taking into account the different realities of various economies and accommodating various pathways to net-zero by 2050. This is important for two reasons: First, the Paris Agreement which highlights the role just energy transition plays in sustainable development, and second, an ongoing ban pushed by wealthy nations and institutions on public investment in fossils including natural gas. While some organizations such as the AfDB understand the importance of fossil investments, they are facing pressures to end it. A move that does not take into account the principles of common but differentiated responsibility enshrined into global treaties around sustainable development and climate action. But to understand this move and the case for equity in energy transition, we must look at the numbers. Excluding South Africa, the remaining 1 billion people in sub-Saharan Africa depend on 81 GW which has contributed less than 1% of cumulative CO2 emissions. Energy poor countries like ours emit low quantities of CO2 in comparison to the US and Europe. Also, these foreign countries develop gas in African countries for export while*

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<sup>3</sup> See Monday, Titus Utibe et al: Crude Oil and the Politics of Nigerian Foreign Policy: Issues and Explanations (Research on Humanities and Social Sciences ISSN (Paper) 2224-5766 ISSN (Online) 2225-0484 (Online) Vol.7, No.7, 2017). See also Global Edge on Nigeria: Economy culled from <https://globaledge.msu.edu/countries/nigeria/economy>. The Global Edge has a slight difference. It states that the oil sector provides for 95% of Nigeria’s foreign exchange earnings and 80%.

<sup>4</sup> Ibid.

*limiting financing to gas projects for domestic use. So, what is the case for social justice and fairness? What is often not sufficiently considered in the transition to net zero emission is the critical role energy plays in catalyzing the economic development of poorer countries from its use industrialization and manufacturing, to basic things such as cooking. In Nigeria, there is a transition from petrol to natural gas, as well as the gradual replacement of charcoal and kerosene cookstoves with LPG. However, if financing is constrained, it could set back the progress we've made. We also witnessing a dramatic mismatch in energy investments. High income countries who hold 15% of the world's population receive 40% of global energy investment, while other countries, home to 40% of the world's population receive just 15%.”<sup>5</sup>*

It is unfortunate that Professor Yemi Osinbajo is completely getting it all wrong. Talking about Nigeria contributing less than 1% CO<sub>2</sub> emission will make people with great knowledge of the global effort to transit from fossil fuel to renewables laugh and cry the same time. This is particularly considering the principle of common but differentiated responsibilities. Funny enough the countries that the Nigerian Government blames for contributing more to the global CO<sub>2</sub> emission in the light of the above principle have contributed immensely to the promotion of the transition efforts. When the so called larger contributors of GHG were buying the crude oil from the lesser contributors, in this instant, Nigeria, was it for free? Were they not paying? For the record, it needs to be stated that it is uncharitable for one devil to blame another devil of its mishaps. How can the kettle blame pot? Apparently the two sides benefited; the buyer and the seller. On the

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<sup>5</sup> See Professor Yemi Osinbajo, 19<sup>th</sup> May, 2021. The official Facebook page for Professor Yemi Osinbajo, SAN. VICE President, Federal Republic of Nigeria. Assessed today 2<sup>nd</sup> June, 2021 through: [https://mobile.facebook.com/story.php?story\\_fbid=3789703954473276&id=633018823475154&\\_rdc=1&\\_rdr](https://mobile.facebook.com/story.php?story_fbid=3789703954473276&id=633018823475154&_rdc=1&_rdr).



contrary, the lesser contributors should be blamed for their lackadaisical attitude towards a global effort. These countries have paid their dues and complied fully with the Polluter pays principle through their various commitments in the promotion of transition. They pay more in virtually every commitment towards the fight against global warming. As at today the countries that buy oil e.g., India and China are right behind USA as countries with highest producers of energy using the Renewable Energy Resources. They have added over 20GW of renewable-sourced electricity to their energy profile since the inception of the Paris Agreement. Now that is sincerity and commitment. They are facing reality whereas in Nigeria, the renewable energy prospects have remained gloom and continued to deteriorate, largely as a result of over dependence of the entire economy on crude oil and the lack of interest and political will as exhibited by the Vice President. These factors have contributed immensely to the retarded development.

Indeed by relying on renewable energy that is naturally inexhaustible in nature, the country can potentially be able to develop economically while also contributing in the improvement of the global condition through the pursuit of greener energy devoid of the greenhouse gases that deplete the ozone layer.<sup>6</sup> However the hydroelectricity which is largely susceptible to seasonal variations in the amount of water levels at dams continues to condescend the hope of expansion in the quest for the renewable resources. Nigeria as a nation cannot afford to remain in the dark perpetually in the face of the growing demand for electricity. Other African countries have taken proactive steps. Ghana has two laws regulating electric power; one of which concentrates on the renewable energy

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<sup>6</sup> Renewable Energy and Electricity: “World Nuclear Association.” Online <http://www.world-nuclear.org/info10.html>, accessed on 13th April, 2011, at p.3 in Oke, *supra* note 79 at 322

resources, while Kenya has a comprehensive single Act that coordinates all aspect of energy resources including the renewable and non-renewable.

There are so many renewable energy resources. As shown in Chapter three, these resources have adequate legislative instruments to harness them in their different zones. There is however no coordinating legislation that established legal, economic and institutional basis to promote or coordinate the use of the various renewable energy resources and for connected matters. There is also no independent Authority in affiliation with the existing Nigerian Electricity Regulatory Commission (NERC) to recommend national targets for the use of renewable energy resources. Tax incentives are part of the drivers of renewable energy development hence the absence of legislation that supports tax incentive policies seem to discourage investors. Investment principles and practice suggest that in exploiting incentives, investors are better secured where there is a legislative instrument with necessary stability as a backup than relying on the Ministerial regulations. Such an Act would also stimulate the required investment interests, if measures are in place to exempt certain equipment from tax obligations.

The Renewable Energy is incapable of being regulated using the Feed-In Tariff Regulation<sup>7</sup> only. Feed-in-Tariff is not the only start-to-end of the entire renewable spectrum. The Provisions regulating the feed-in-tariffs can be more secured and well entrenched if there is more reliable Act of the Parliament. There is no credible institutional framework for the workability of the Renewable Energy through collaborative efforts in alliance with other Ministries, Associations, Research Centers, Universities and other training providers to promote the implementation of educational

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<sup>7</sup> The Regulations on Feed-In Tariff for Renewable Energy sourced electricity in Nigeria, 2015

programmes within the renewable energy sector. The feed-in-tariff regime has no mechanisms for Green or Renewable Certification. There is no compelling provision that obtains compliance with renewable energy purchasing obligations. There is also no strong and compelling authority behind the Regulation being a subsidiary legislation. It has no force of law in the face of competing interest. For instance, according to Vivour JSC,<sup>8</sup> *“it is the principal law that provides the subsidiary legislation the source of its existence and without the principal law, there can be no subsidiary law.”*<sup>9</sup> If the provisions of the Regulations are inconsistent with any Statute, the provisions of the regulation may not be valid for regulatory use. An act carried out, outside the ambit of the delegated power may be regarded as abuse of power and as such ultra vires and void.<sup>10</sup> For emphasis, as much attractive most of these provisions may appear to some investors, they are just aid to obsolescing bargains.<sup>11</sup> Many of the stiffer regulations are also not usually within the reach of investors. A delegated legislation generally is and has always been considered an aberration to the 1999 Constitution of the Federal Republic of Nigeria as Amended. Essentially, it cannot confer on the regulator the power of penal sanction. The Regulation makes it an offence if the Discos and Bulk Traders fail to buy certain

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<sup>8</sup> NNPC vs. FAMFA OIL LTD (2012) ALL FWLR (Pt.635) Pg 204.

<sup>9</sup> Ibid at 238 Paras. G-H.

<sup>10</sup> Olatunbosun vs Niser Council (1988) 3 NWLR (PT 80) 25.

<sup>11</sup> A model of interaction between a multinational enterprise and a host country government, which initially reach a bargain that favors the MNE but where, over time as the MNE's fixed assets in the country increase, the bargaining power shifts to the government. The obsolescing Bargain (OB) Theory, first introduced by Vernon (1971), holds that in the multinational-host country interaction, the initial bargain power is assumed to favour the multinational companies because the Host Country (HC) offers generous concession agreements to entice the firm (Egan, P.J. (2010). Hard Bargains: The impact of Multinational Corporation on economic reform in Latin America. Latin American Politics and Society, 52(1), 1-32). However, once the investment is proven sound and is operating successfully, the perceived level of risk drops and the host country no longer views the high levels of return to the Multinational as appropriate (Jenkins, B. (1986) Reexamining the “obsolescing bargain”:A study of Canada's national energy program. International Organization, 40(1), 139-165).

capacity of electricity from a renewable generation company.<sup>12</sup> It went further to empower the Commission to enforce penalties in the event of default.<sup>13</sup> As much ambitious the provision may appear, it is however not tenable in Law. In *Sofekun vs. Akinyemi & Ors*,<sup>14</sup> the Western State Public Service Commission amended the State's public service regulations<sup>15</sup> by which it acquired the power to 'try' public officers for acts of misconduct in the nature of criminal offence. The plaintiff took out a writ seeking a declaration by the court that the amendment to the regulations and the subsequent 'trial' conducted under it were a usurpation of legislative and judicial powers. This suit succeeded in favour of the Plaintiff and the Supreme Court pointed out that if the regulations such as those under attack were valid, the judicial power could be wholly absorbed by the commission which is one of the organs of the executive branch of the state government and taken out of the hands of the magistrates and judges. They also went further to conclude that, such being the case, the amendment made to the regulations which is not in line with the due process of law, is clearly ultra vires.<sup>16</sup> This view was further reiterated by the Court of Appeal in **NOSDRA vs. Mobil Producing Nigeria Unlimited (EXXONMOBIL)**.<sup>17</sup>

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<sup>12</sup> Section 21(a-e) and Schedule 6.

<sup>13</sup> Section 22.

<sup>14</sup> (1980) 1 ANLR 153.

<sup>15</sup> Section 72 of the 1963 Constitution empowered the commission to make regulations, but gave the commission no express power to try criminal offences. Under the new regulations, the plaintiff was 'tried' on an accusation of committing "unlawful and indecent assault" on a female patient in conducting a "vaginal examination" on her without "securing the attendance of a nurse or some party at such examination."

<sup>16</sup> Fatayi-Williams, C.J.N. at 155.

<sup>17</sup> (2018) 13 NWLR (PT. 1636) 334 or (2018) LPELR-44210 (CA). In this case, the court defined fine as a payment of money ordered by a Court from a person who has been found guilty of violating law. It may be specified as the punishment for an offender, usually a minor offence, but could also be specified and used as an option to imprisonment for major crimes or a complement to other punishments specified for such crimes. The court went further to rule that it is the exclusive preserve of the Court to impose fine as a punishment for offences and such exclusive preserve cannot be shared, exercised or usurped by any persons, organization or regulatory body as it will

It needs also be said that soft laws like Policy Statements or Policy Documents are neither bodies of rules nor pieces of legislations. Policies are not laws and they do not have force of laws. Potential investors will always hope to see the level of seriousness which the governments have demonstrated and what opportunities have been put in place to enhance marketability of the technology within the country before investing. Such seriousness is basically demonstrated in legislative instruments to support policy documents that have been put in place. An example of such policy is the Denmark renewable energy policy.<sup>18</sup> This Policy contains among many other things factors that have improved wind power development in Denmark for over 2 decades, making the country one of the leading nations utilizing wind energy for productive purposes. Part of the policy statement includes those that favour different subsidies and remuneration rates for wind energy investors, the right to connect renewable generation to the national electricity grid, legal obligations for electric utilities to purchase wind energy and promotion of private individuals, farmers and cooperatives to own wind turbine installations. The overall goal of the Danish energy policy was to promote sustainable energy development and to comply with commitments to reduce greenhouse gas emission in an effort towards the mitigation of climate change.<sup>19</sup> Germany and South Africa<sup>20</sup> have also adapted the Danish energy policy to develop their own energy policy. It is very important to note that the success story behind the Danish Policy is hidden in the legislative instrument that followed the policy. There was an Act to promote energy

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be ultra vires. An attempt to impose penalties or fines by persons or bodies other than the Court shall be deemed illegal, null and void and of no effect whatsoever.

<sup>18</sup> Meyer, N.I. Renewable energy policy in Denmark, *Energy for sustainable development*, 8(1), 2004, 25–35.

<sup>19</sup> Danish Ministry of Energy (DME) 2000 –A plan of Action for Sustainable Development, Copenhagen, Denmark. 1990

<sup>20</sup> *South Africa's Department of Mineral and Energy (SAMDE), Study Tour on Energy.*



production through the use of renewable resources.<sup>21</sup> Things are different in Nigerian system. Policies in Nigeria are categorized into the Directive Principles of State Policies which are predominantly non-justiciable.<sup>22</sup> In the case of *Okogie & Ors vs. The Attorney General of Lagos State*,<sup>23</sup> it was held by the Court that, “*the Fundamental Objectives identify the Ultimate Objectives of the Nation, and the Directive Principles lay down the policies which are expected to be pursued in the efforts of the Nation to realize the national ideas. While section 13 of the Constitution makes it a duty and responsibility of the Judiciary among other organs of government to conform to and apply the provisions of Chapter II, Section 6(6)(c) of the same constitution makes it clear that no court has Jurisdiction to pronounce any decision as to whether any organ of government has acted or is acting in conformity with the Fundamental Objectives and Directive Principles of State Policy. It is clear therefore that Section 13 has not made chapter II of the Constitution Justiciable.*”<sup>24</sup>

Indeed, the Renewable Energy Resource technologies are byproducts of combined chemicals mixture, mechanical and biotechnologies. Nigeria does not have competent, credible and independent Legislation to regulate the technical and standardization requirements and certification for renewable energy technologies and installations. Suffice to say there is zero quality control especially for small scale installations, whether for residential or commercial purposes. There is also an unresolved regulatory conflict between the NERC and the Energy Commission of Nigeria. The latter has a department

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<sup>21</sup> Section 1(1) of the Promotion of Renewable Energy Act, Act no. 1392 of 27 December 2008 of the Kingdom of Denmark.

<sup>22</sup> See Section 6(6)(c) of the 1999 Constitution of the Federal Republic of Nigeria.

<sup>23</sup> (1981) 2 NCLR 350.

<sup>24</sup> Ibid.



for Energy Planning and Analysis for Renewable Energy Sources.<sup>25</sup> This provision in the absence of any statutory provision on the NERC to manage renewable energy resource calls for concerns.

Electricity and energy resources generally are utility commodities and are the backbones of economic development and human capital development. No country can develop without electricity in sufficiency. Moreso, dependence on the fossil fuel to drive energy has proved to be inimical to the survival of the present human race on earth, while mortgaging the destiny and wellbeing of the future generations. The choice of alternative energy resources appears no more as an option but an imperative factor for the continued human existence. Nigeria has abundance of renewable energy resources to attend energy sufficiency and security. Despite so, the Nigerian Renewable Energy profile remains far below expectation. These are largely due to absence of committed legislative instruments to integrate renewable energy into the Nigerian power sector to promote energy security and access to a clean environment and economic development. We must wake up from the deep slumber and face the reality.

### **6.3. Recommendation.**

Technological advancement and economic emancipation remain the top gear that promotes the interdependence of independent nations on each other. Countries learn from each other. This study has established that there are several dimensions of the renewable resources. Unlike non-renewable energy, where fossil fuel and natural gas are derived from the same source, the various sources of renewable energy resources are sourced

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<sup>25</sup> Section 1(2)(b) of the Energy Commission of Nigeria Act.

from different quarters and under the regulatory mandates of distinct agencies. This study also demonstrated that there are sufficient laws to harness the renewable energy in Nigeria, but the country lacks coordinated or focused governance for renewable energy and electricity. It becomes a problem of appetite and not that of famine. When other jurisdictions are critically examined, they are shown to have primacy for renewable in terms of law and policy frameworks.

On the above premises and foundations therefore, this study argues for a strong and Comprehensive Renewable Energy Legislation as seen in the Republic of Ghana. Such legislation no doubt will decentralize the current governance structure and regulatory framework. It will rather support a befitting competitive and deregulated market. Apart from deregulation, the Act is expected to be innovative through the introduction of different flexibilities and opportunities in the Nigerian Electricity Supply Industry. Electricity should not be made a goldmine because of the path it plays in the developmental processes of the populace.

First, there is need to have a regulator at every level of the governments to regulate the various renewable energy resources within their respective geographical spaces; be it Federal, State or Local Government. These institutions would be composed of coordinating experts and heads of different renewable energy resources subsectors. The most prominent of the renewable energy resources in Nigeria are; solar, wind, hydro, biofuels/biomass, geothermal and hydrogen. The agency's scope and boundaries at any level will be properly defined and its mandates will not be limited to electricity alone but extending to all sphere of the renewable energy. For instance, hydrogen has been

considered as one of the transportation fuels.<sup>26</sup> Clearly NERC is overwhelmed with challenges. Nigeria hopes to have electricity sufficiency, yet holding fast to franchising system? A country of over 270 million populations made up of 36 Federating States, with just 11 Distribution Companies, 1 Transmission entity and about 23 Grid connected Generating Companies with less than 10 GW of installed generating capacity and less than 3 GW of actual electricity outputs. The regulatory agency will serve as one stop shop for all the identified Renewable energy sources in terms of licenses. The recommended composition of the agency should be public-private driven. The membership should be by public election and should not be left in the hands of jamboree politicians who may eventually sacrifice professionalism at the altar of political sentiments and fraternity.

Secondly, it will not be out of place if the Renewable Energy Act introduces Communal Electricity system. As has been argued earlier in Chapter three, the solar energy system is community driven and offers an opportunity for the off-grid and mini-grid generations to thrive.<sup>27</sup> This is unlike the system of franchising as being done with the 11 Discos presently. Under this system, the community on its own can as well venture into generation business and can only hold itself accountable for the losses and problems arising from its operation. Under this platform, an integrated license can be issued to a particular community for the purpose of generating, transmitting and distributing to its members. The electricity generated under this arrangement is usually off-grid transmission. A typical example of the communal system could be seen in the Aba IPP (Aba Phase I) owned by the Geometric Power Limited (GP). The Geometric Power

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<sup>26</sup> Section 318 of the Petroleum Industry Bill, 2020.

<sup>27</sup> Annex 8 of the Guideline to the Nigerian Electricity Regulatory Commission Mini-Grid Regulation, 2016.

Limited (GP) is a pioneer power project developer in Nigeria. It has established a power generation facility in Ariaria Market in Aba, Abia State of Nigeria, with the intention of providing high quality electric service to its clients within the fenced-out zone. It was an embedded electricity facility designed to generate and distribute its own electricity. It was the first independent and integrated power system in Nigeria having power plant and a distribution network within a ring-fenced network.<sup>28</sup> The company established two separate corporate entities – Geometric Power Aba Limited (GPAL), to own and operate the new power generation station; and, Aba Power Limited Electric (APLE), to manage the electric power distribution system.<sup>29</sup> Another option can also be through Captive electricity system. Under this arrangement, the Renewable Act incorporates the provisions of the Permits for Captive Power Generation Regulations.<sup>30</sup> The regulation caters for the grant of electricity permits to persons.<sup>31</sup> The phrase captive power “Captive Power Generation” means generation of electricity exceeding 1 MW for the purpose of consumption by the generator, and which is consumed by the generator itself, and not sold to a third-party.<sup>32</sup> However as seen in China where excess electricity generated through the renewable resources can be sold to grid enterprises, a captive permit holder is required to apply for, and receives prior written consent of the Commission before supplying surplus power **not exceeding 1MW** to an off-taker.<sup>33</sup> Under this arrangement, it is the community that will obtain the permit and operate the facility. In a situation

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<sup>28</sup> Ogugbara C.J. 2017. A Critical Evaluation of the Regulated Electricity Practices in Nigeria. LL.M. Project. Faculty of Law. University of Lagos. iii + 74.

<sup>29</sup> *Ibid*.

<sup>30</sup> Nigerian Electricity Regulatory Commission (Permits for Captive Power Generation) Regulations, 2008, titled REGULATION NO: NERC-R-0108, made pursuant to 96 (1) of the Electric Power sector Reform Act, 2005.

<sup>31</sup> Section 2. The section defines 'person' to include an individual, a company, partnership or any association of individuals whether incorporated or not.

<sup>32</sup> *Ibid*

<sup>33</sup> Section 8(a)

where the community obtains the permit, there are two options in operating such model. The first is where the community acquires the equipment to be installed for electricity generation, while the second is where such is contracted to a company in such business. In the second option, there are possibilities of using contractual instruments such as Operating and Maintenance Agreement, Leases or even Powers of Attorney. In any case, after obtaining the permits, the communities can now contract with owners of the generating equipment in any of the above highlighted contractual arrangements. Whereas, where the community deems otherwise, they can contract under a Power Purchase Agreement (PPA) or Build-Operate-Transfer (BOT) with a captive generating company who had already obtained a permit from the recommended regulator, to generate and sell to offtakers. It must be noted that the said Regulation,<sup>34</sup> will require an amendment that will incorporate two regulators, to wit: the existing NERC and the Renewable Energy Regulators to be established by the Renewable Energy Act. Another important aspect of the communal based electricity system under the recommended Renewable Energy Act will be a fiscal provision where the community will be required to pay taxes to the government.

Thirdly, for other Independent Power Producing companies, the Act will make a provision where the regulatory institution will lay down a competitive licensing procedure for companies seeking to undertake renewable energy projects. Although the procedure for applying for licenses under the NERC Regulation,<sup>35</sup> appears liberalized. However, for the purpose of competence, standard and efficiency, it is recommended that

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<sup>34</sup> Supra note 11.

<sup>35</sup> NERC Application for Licences (Generation, Transmission, System Operations, Distribution & Trading) Regulations, 2010.

an open and competitive bidding process be adopted as done in the Chinese Jurisdiction. As seen above, part of the challenges of under the NERC administration of electricity business is the license application procedure. This study opines that there is need for transparency, accountability, competency, standardization and decentralization in the procedure for license issuance in the industry.

Also in the new Act, Research & Development would be given primacy. This idea no doubt is not new to the Nigerian renewable energy policy developments. Energy Research Centers have mandate to conduct researches and develop renewable energy technologies as well as to popularize the applications of renewable energy resources.<sup>36</sup> However a clear defined research into renewable energy resources for electricity cannot be said to be in existence within the country. This is one of the reasons why infrastructures continue to deteriorate in Nigeria. However, there should be integration of renewable energy research and development into the curricular and extracurricular activities in the interest of the future generation. China is a classic example of such a noble step in the direction making renewable energy diversification a sustainable progress. Such research enhances opportunities for innovative improvements on the existing technologies without undermining the main essence of the idea. For instance, research directed at development of low-cost materials for renewable energy technology applications. Other areas of research may include more robust renewable resource assessment for the nation to cover both onshore and offshore areas. This may involve establishing more resource stations across the states and geopolitical zones of the nation for data collection, development of suitable national wind atlas, such that could be used

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<sup>36</sup> Renewable Electricity Policy Guidelines (REPG) (2006) Policy Document pg 7.



in renewable power assessments at specific sites, site specific assessment of performance of each technology. The Act will equally create a compulsory trust fund to cater for the research and the manpower needed for such assignments.

The Act can also make provisions for quota system within specific thresholds as done in the Government of India. India has an identified Federal Ministry of New Renewable Energy that relies on the National Master Plan to allocate Renewable Electricity quotas to various federating states. As seen in the Government of India with a heterogeneous system like Nigeria, different states are made to be independent in electricity generation based on their respective areas of strength. This means that such states like Oyo, Ogun, Ondo, Niger etc where there is appreciable rate of geophysical deposits will statutorily be required to generate electricity using geophysical resources within their States. Of course, at the State levels with their respective independent regulator as would have be provided for by the Act, there would be proper regulation, competitive market and full optimization of the resources within their areas of catchment. Similar modality will apply to states like Bauchi, Sokoto, Kano and Plateau with high potency for sun and wind respectively. Another very important area the new Act can revitalize the renewable energy in Nigeria under the quota system is in the allocation of electricity contribution to the National mainstream. An Agency like NAFDAC can be electricity independent and self sufficient without relying on the overburdened national government for electricity. This system will be very instrumental to the full utilization of the renewable opportunities prevalent in Nigeria. Part of the reasons why electricity is not meeting the tripod stand of availability, accessibility and affordability is primary because there is overdependence of users on the available little electricity. In this case, each agency of the governments at all

levels might consider generating their own electricity and which they will use at their own pleasure. This system will also avail the entire society the opportunity of accountability and waste minimization. In pursuing this quota system, it will be imperative if there would be suspension of the Renewable Energy import duties. Other useful incentives that are capable of projecting the Renewable Energy can also be introduced. The list of 44 Pioneer Industry/Products Approved by the National Council of Ministers in 1989,<sup>37</sup> should be revisited.

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<sup>37</sup> See the Federal Republic of Nigeria Official Gazette No. 61 dated Lagos – 27<sup>th</sup> May, 2015 Vol.102, Government Notice No. 63.

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