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## Legal Analysis of Erratic Supply of Electricity in Nigeria: Is Renewable Energy a True Alternative?

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### Abstract

*Uninterrupted energy supply is a fundamental problem for Nigeria today. Energy is an important factor in all the sectors of any nation's economy. Lack of access to uninterrupted energy promotes poverty, deprivation, and economic decline. Future economic growth crucially depends on the long-term availability of energy from affordable, accessible, and environmentally friendly sources. Nigeria is blessed with significant renewable energy resources, namely large and small hydroelectric power resources, solar energy, biomass, wind, and geothermal, with the potential for hydrogen utilization and development. The role of renewable energy in attaining sustainable development in any society cannot be overemphasised, as energy generation remains crucial for the sustenance of human existence. However, Nigeria is yet to tap the benefits of abundant renewable energy sources deposited in the country for its socio-economic development. The study aims to examine the potentials of renewable energy resources in Nigeria that could be harnessed for continuous energy supply in the country and the Federal Government's efforts to ensure its sustainability. The study utilises the doctrinal legal research approach; the study further uses primary and secondary sources of legislation such as case laws, statutory authorities, textbooks, and peer-reviewed journals. Comparative legal analyses of renewable energy in China, Spain, Germany, and Nigeria were carried out to gain useful insights for a stable electricity supply in Nigeria. Theories were also utilised to guide the study. The finding is the non-existence of a specifically designed, comprehensive legal framework on renewable energy utilisation in Nigeria. There is incoherence in laws on renewable energy utilization. The article designs a hybrid model to facilitate the adoption of renewable energy as an alternative energy source in Nigeria. The study recommends the need for decentralized renewable energy systems and the need for the Federal Government to review the policies on renewable energy development in the country and advocate comprehensive reform of the existing legal regime on renewable energy sources. The study further advocates for the need to invest and embrace renewable energy as alternative sources of energy to mitigate environmental protection concerns and ensure sustainable development. Hence, renewable energy sources exploitation is a sine qua non for stable electricity in Nigeria.*

**Keywords:** Renewable Energy, Sustainable Development, Supply, Electricity, Nigeria.



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## 1.0 Introduction

Over the years, adequate and reliable energy supply, with emphasis on renewable energy, has been a veritable instrument for achieving sustainable energy development in any nation. Renewable energy is significant to any economy as it plays a cardinal role in energy generation, which occasioned greater outputs and innovation, particularly in the industrial sector. Conventional energy sources are not sustainable in the long run, being perishable and unrenowable. Renewable energy came to prominence in Nigeria due to electricity challenges in the country occasioned largely by the epileptic supply of electricity to consumers and due to the global trend on reduction of emission of carbon dioxide to curtail the devastating effects of the fossil energy resource, which led to climate change and other environmental.<sup>57</sup>

The exploitation of fossil fuels to meet global energy demand has raised concerns about safeguarding environmental quality while meeting global energy demands. Therefore, there is a need for a paradigm shift in energy demand to avert the depletion of the ozone layers caused mainly by fossil fuel combustion<sup>58</sup>. The use of renewable energy, including traditional biomass, was 1,684 million tonnes of oil, equivalent to approximately 13 percent of global primary energy demand. Renewable energy possesses the capacity to deliver cost reduction with an appropriate policy framework. However, the development of renewable energy in Nigeria has not been steady despite the huge potential of renewable energy sources. Lack of human resources/technical know-how to handle renewable energy resources cost of renewable materials. The fiscal, legal and regulatory policy framework is at the initial stage in Nigeria. The unstable water and heat supply to hydropower and thermal stations caused by seasonal factors often lead to frequent power outages and load shedding, thereby heightening the need for alternative renewable energy utilization in Nigeria.

The use of renewable energy sources will reduce over-dependence on fossil fuels. Instead of flaring gas in Nigeria, the gases can be converted to methanol and used as a fuel for domestic and industrial use. With good energy efficiency practices and products, the burning of fossil fuels for energy will be greatly minimized.<sup>59</sup> Renewable energy has been identified as a

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<sup>57</sup>O.J., Olujobi, the Legal Sustainability of Energy Substitution in Nigeria's Electric Power Sector: Renewable Energy as Alternative, (2020), Protection Control Modern Power System 5, 32.

<sup>58</sup>A.C., Osigwe, O.B., Adebayo, Renewable Energy Technology and Energy Efficiency Measures: A Demand-Side Analysis of some Selected Firms in Oyo State, Nigeria, In Energy Access for Economic Development Policy, Institutional Framework, and Options., 641-

<sup>59</sup>S.O., Oyedepo, Energy and Sustainable Development in Nigeria: The Way Forward, (2012), 2, 15, Energy, Sustainability Society,1-17.

significant alternative energy source for environmental friendliness and meeting the challenge of ensuring a stable energy supply in most developing economies.

The success of renewable energy in Nigeria has been limited due to poor institutional framework, infrastructure, inadequate renewable energy planning policies, lack of coordination and linkage in the renewable energy program, pricing distortions that place renewable energy at a disadvantage, high initial capital costs, weak dissemination strategies, lack of skilled manpower, poor maintenance service, and energy infrastructure<sup>60</sup>.

Sustainable development is an evolving process of investment, orientating technology and institution to ensure compatibility of both present and future needs without compromising the ability of future generations to meet their own needs. Sustainable development aims to improve quality of life, including improving living standards in less developed countries while safeguarding the ecological processes through affordable and reliable energy availability is a *sine qua non* for sustainable development.<sup>61</sup> Sustainable energy development strategies comprise technological changes, energy savings on the demand side, efficiency improvements in energy production, and the replacement of fossil fuels with the various sources of renewable energy, which is one of the most promising ways to handle the challenges of the energy demand of numerous consumers globally.<sup>62</sup> Sustainable development calls for an efficient, reliable, and decentralized energy economy focused on local and clean energy sources. The price paid by the consumers will reflect the real cost of energy products to the economy.

Currently, energy generation and utilization in Nigeria are mainly dependent on a few energy sources such as petroleum, coal, biomass, solar, hydropower, and thermal energy, of which petroleum, hydropower, biomass, and thermal energy are the most dominant, approximately 95 percent of energy consumption in Nigeria.<sup>63</sup> Renewable energy from hydropower has been the core of Nigeria's grid electricity production since the 1960s. Recently, the Kanji and Jebba Dams of 1300MW were approximately 50 percent of Nigeria's stable power source.

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<sup>60</sup>O.J., Olujobi, "The Legal Regime on Renewable Energy as Alternative Sources of Energy in Nigeria's Power Sector: The Impacts and the Potentials (2020), *Academy of Strategic Management Journal*, 19(3),1-19.

<sup>61</sup>S.O., Oyedepo, *Towards Achieving Energy for Sustainable Development in Nigeria*, *Renewable and Sustainable Energy Reviews*, (34), 255-272.

<sup>62</sup>S.O., Oyedepo, *Efficient Energy Utilization as a Tool for Sustainable Development in Nigeria*, *Renewable and Sustainable Energy Reviews*, 2583-2589.

<sup>63</sup>C., Newsom, *Stakeholders Democracy Network Renewable Energy Potential in Nigeria*, *Energy Information Association*, (International Institute for Environment and Development).

Gas power stations have recently taken up the stage, but their role continues to be constrained by the poor state of the national grid and unstable gas supplies.

The main thrust of the study is to examine the potential of renewable energy resources in Nigeria that can be harnessed for continuous energy supply and the government's efforts to ensure its sustainability. The paper is organized into five sections, with the introduction as the first. Section two considers the methodology, the statement of problem, literature review, and theoretical framework on renewable energy. Section three considers the international legal framework on renewable energy, the national legal framework on renewable energy in Nigeria, the prospects of renewable energy in Nigeria, the challenges of renewable energy in Nigeria, epileptic supply of electricity: Renewable energy options for Nigeria, the comparative legal framework on renewable energy in China, Spain, Germany, and Nigeria. Section four discusses the findings.

As a contribution to knowledge, the study designs a hybrid model to facilitate the successful exploitation of renewable energy sources for stable electricity in Nigeria. Section five contains the conclusion and recommendations and advocates the need to invest in and embrace renewable energy as alternative sources to mitigate environmental protection concerns and ensure sustainable development. Hence, renewable energy sources exploitation is a *sine qua non* for Nigeria's energy success and stability. The study concludes that Nigeria lacks an enforceable legal, and regulatory framework to govern and manage renewable energy utilization for national growth and socio-economic development. Nigeria's laws and policies on renewable energy are not adequate.

## **2.0 Methodology**

The study adopts a conceptual legal research method, reviewing existing literature to explore the topic from various authors' views. The study utilises the doctrinal legal research approach; the study further uses primary and secondary sources of legislation such as case laws, statutory authorities, textbooks, and peer-reviewed journals. Comparative legal analyses of renewable energy in China, Spain, Germany, and Nigeria were carried out to gain valuable insights into stable electricity in Nigeria. This approach in legal research is coherent with the law, and it is readily available for verification. Further justification for using the method was to establish the trustworthiness of the findings on renewable energy. The study successfully designs a hybrid model to exploit renewable energy sources for stable electricity in Nigeria.

Besides, there has been scarce research on legal analysis of the epileptic supply of electricity to consumers: Renewable energy as discretions for Nigeria. Therefore, there is a need to utilise the legislation to justify the need for this study. The author also evaluated the problems and extracted inferences that concluded in the findings of this study. To the best of the current author's knowledge, little research attention has been paid to the legal analysis of the epileptic supply of electricity to consumers in Nigeria.

### **2.0.1 Statement of Problem**

All economic activities and processes require some form of energy, which effectively makes energy a crucial primary factor of production that is inevitable for a nation's economic growth. Electric power in Nigeria is characterised by frequent load shedding and power failure, which has hindered sustainable growth and development in Nigeria. The national energy supply is at present almost entirely dependent on conventional energy sources such as fossil fuels and firewood, which are fast depleting. Despite the abundance of energy resources in Nigeria, the country is in short supply of electrical power. Access to a reliable and stable supply of electricity is a major challenge for both rural and urban dwellers in the country<sup>64</sup>. This energy problem has overwhelmed Nigeria for nearly two decades and has largely contributed to the prevalence of poverty by incapacitating industrial and commercial operations during this period. The Council for Renewable Energy of Nigeria approximates observed that power failure brought about a loss of 126 Billion Naira (US\$ 984.38 Million) yearly.<sup>65</sup>

Approximately 40 percent of Nigerians have access to grid electricity, and in the rural areas where over 70 percent of the population live in a country of over 200Million population. The availability of electricity drops to 15percent.<sup>66</sup> Adequate renewable energy utilization in Nigeria will mitigate climate change, meet energy security and needs, and promote economic development.

Oniemola posited that Nigeria is also contributing to environmentally damaging activities, particularly by increasing its global share of greenhouse gas emissions due to continued

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<sup>64</sup>O.J., Olujobi, T., Olusola-Olujobi, (2020), Nigeria: Advancing the Cause of Renewable Energy in Nigeria's Powers Sector Through its Legal Framework, Environmental Policy and Law,433-444.

<sup>65</sup>Council for Renewable Energy, Nigeria (CREN): Nigeria Electricity Crunch. 2009. available at [www.renewablenigeria.org](http://www.renewablenigeria.org). (accessed October 26, 2021).

<sup>66</sup>E.C.N., Okafor, C.K.A, Joe-Uzuegbu, Challenge to Development of Renewable Energy for Electric Power Sector in Nigeria, International Journal of Academic Research, 2(2), 211.

reliance on fossil fuels for electricity generation.<sup>67</sup> Oyedepo in analysing the problem of Nigeria's electricity supply and prospects, found that the electricity demand in Nigeria far outstrips the supply that is epileptic. Also, Oke opined that rigorous competition as a result of privatization could discourage investment in renewable energy in Nigeria, and to maximize the benefits of renewable energy, proper planning is required to avert unnecessary loss that tends to discourage investment due to lack of a definitive legal regime for renewable energy with a decentralized energy structure. The author avers that 60 percent to 70percent of the Nigerian populace currently does not have access to electricity. There is no doubt that the present power crisis affecting the country will continue except the Federal Government diversifies the energy sources in domestic, commercial, and industrial sectors and implements new technologies on renewable energy to decrease energy depletion. To save costs and the environment.<sup>68</sup>

Besides the enormous revenue loss, it has also occasioned health risks owing to exposure to carbon emissions triggered by the continuous use of 'Generators' in various homes and commercial firms due to unreliability of electricity from the national commercial grid, which occasioned the use of generators for electricity thereby polluting the environment<sup>69</sup>.

## **2.0.2 Literature Review**

Many academic scholars have contributed to the plethora of literature on the importance of using renewable energy to attain sustainable development. Still, they have failed to emphasize the legal analysis of the epileptic supply of electricity to consumers of renewable energy as discretions for Nigeria, which is a gap in the literature that this study intends to fill by recommending the need for decentralized renewable energy systems and the needs for the Federal Government to review the law and policies on renewable energy for stable electricity in the country.

Oniemola posits that the energy crisis in Nigeria is characterized by a lack of energy access and unsustainable utilization of the country's abundant energy sources. Oyedepo reiterated the need for viable energy development through renewable energy for sustainability in the energy sector in both developing and industrialized countries. He further stated that only 40

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<sup>67</sup>Oniemola, P.K., Powering Nigeria through Renewable Electricity Investments: Legal Framework for Progressive Realization, *Afe Babalola University Journal of Sustainable Development, Law & Policy*, 6(1).

<sup>68</sup>S.O., Oyedepo, *Energy and Sustainable Development in Nigeria: The Way Forward*, (2012), *Energy Sustainability Society* 2, 15, available at <https://doi.org/10.1186/2192-0567-2-15> (accessed October 23, 2021).

<sup>69</sup>O.A., Somefun, *the Erratic Electric Power Supply in Nigeria: Causes and Remedy* (2015), available at [file:///c:/users/dr.%20olujobi%20olusola/downloads/causesofandremedyfortheerraticpowersupplyinnigeria%20\(1\).pdf](file:///c:/users/dr.%20olujobi%20olusola/downloads/causesofandremedyfortheerraticpowersupplyinnigeria%20(1).pdf) (accessed October 24, 2021).

percent of the population has access to basic energy services. He advocates that renewable energy is the key component of sustainable development because it causes less environmental impact than other energy sources. The current author opines that utilization of renewable energy technology will help address the environmental concerns that emerged due to greenhouse gas emissions such as carbon dioxide, oxides of nitrogen, oxides of Sulphur due to power generation from oil, natural gas, and coal.

This type of energy can be replenished; thus, it offers a reliable and sustainable supply of energy. It favours decentralization of energy systems independent of the national grids or networks. It is flexible to meet rural areas or small isolated populations' needs. Mustapha and Yasemin postulate that energy consumption plays an essential role in the sustainable economic growth and development of a country. Oke opined that renewable energy is derived from sources that are essentially inexhaustible, unlimited, naturally renewable, and replenishable such as the wind, water, sun, wave, refuse, and bio-fuel, among others. Still, the current further asserts that for efficiency, a coherent legal regime is a sine qua non for stable electricity in Nigeria. Also, Ngala and others *l.*<sup>70</sup> carried out a statistical analysis of the wind energy potential in Maiduguri, Borno State, using the Weibull distribution 10-year (1995 to 2004) wind data. A cost-benefit analysis was also performed using the wind energy conversion systems for electric power generation and supply in the State. These reports point to the fact that Nigeria is rich with vast renewable energy sources for electricity generation, particularly in the Northern States, the Eastern States, and the offshore areas, where the wind is abundantly available throughout the year. The present author also submits that the Federal Government of Nigeria must harness these resources by establishing wind farms in the various regions and zones that have been identified as possessing capacities for garnering wind energy for generating electricity for the country.

### **2.0.3 Theoretical Framework on Renewable Energy**

Several theories have been advanced by various energy law scholars and experts, emphasizing the need for renewable energy for Nigeria. The Sustainable Development Theory was first developed from the Brundtland Report in 1987, following the Stockholm Conference on Human Environment in 1972. The theory is relevant to this study because it is based on the idea that governments should sustainably use their abundance of renewable

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<sup>70</sup>G.M., Ngala, B., Alkali, M.A., Aji, Viability of Wind Energy as a Power Generation Source in Maiduguri, Borno State, Nigeria (2007), *Renewable Energy*,32(13):2242–2246.

energy resources by reforming their renewable energy laws for stable electricity in Nigeria. Failure might have negative consequences for investment in the energy industry and the nation's economy. Stable electricity will encourage socio-economic development and compatibility of both present and future needs without compromising the ability of future generations to meet their own needs. The concepts highlighted the importance of utilization of renewable energy sources for the optimal advantage of Nigerians to ensure stable electricity in the country<sup>71</sup>.

Another pertinent theory to this study is the Resource Curse Theory (also known as the paradox of plenty) which was developed between 1970 and 1990 and was first used by Richard Auty in 1993 to describe how countries rich in mineral resources were unable to use their abundant natural resources wealth to boost their economies. The theory emphasises the failure of many resource-rich countries to benefit fully from their natural resource endowment and for governments in these countries to respond effectively to their citizens' public welfare and infrastructural needs<sup>72</sup>. The theory aids the research by emphasising the need to ensure that abundant natural resources such as renewable energy sources are exploited for the optimal benefit of the citizens through the provision of stable electricity and other basic social amenities. To ensure that the revenues derived from these natural resources are utilised in a way that is commensurate with the amount earned from abundant natural resources.

Developing countries generally must guarantee that their abundant renewable energy sources are exploited to generate electricity and to support development to avert resource curses such as poverty and insufficient social infrastructure, which are out of proportion to their abundant renewable energy resources, and to avert Dutch diseases the government, it must ensure energy security and stable electricity are provided via abundant renewable energy sources in the country for future generations.<sup>73</sup> The theories aid the research by emphasising the importance of upholding the principles of energy sustainability.

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<sup>71</sup>O.J., Olujobi, and T. Olusola-Olujobi, Theories of Corruption: "Public Choice-Extractive Theory" As Alternative for Combating Corruption in Nigeria's Upstream Petroleum Sector(2020), International Journal of Environmental Sustainability and Green Technologies (IJEST) 11(2),68-83.

<sup>72</sup>Natural Resources Governance Institute, the Resource Curse the Political and Economic Challenges of Natural Resource Wealth, (2015), available at [https://resourcegovernance.org/sites/default/files/nrgi\\_Resource-Curse.pdf](https://resourcegovernance.org/sites/default/files/nrgi_Resource-Curse.pdf) (accessed October 26, 2021),1-6.

<sup>73</sup>O.A., Oyewunmi, O.J., Olujobi, Transparency in Nigeria's Oil and Gas industry: Is Policy Re-Engineering the Way Out? (2016, International Journal of Energy Economics and Policy, 5(4), 630-636.

The argument is that resource-rich nations lack economic success and growth due to a failure to decentralize their energy structure. Hence the need to improve stable electricity through abundant renewable energy sources deposited in the country for energy sustainability and economic development for the benefit of Nigerians as well as consistent reform and enforcement of the country's existing energy legal framework for sustainability and development of the sector. Although there are numerous problems unique to renewable energy exploration, the governments can make policy decisions that will help avert some of the negative consequences of the exploitation of renewable energy sources and maximize the benefits of renewable energy sources.

### **3.0 International Legal Framework on Renewable Energy**

Renewable energy has always been an agenda point at the various international environmental conferences organized by the United Nations and other global fora. However, the formulation of international rules binding States to their use was sparingly discussed. Some soft laws will be considered. The 1992 Rio Conference on Environment and Development (UNCED) Principle 2 confers sovereign right over natural resources with the prohibition of transboundary harm to member states.

The Kyoto Protocol to the United Nations Framework Convention on Climate Change is an international treaty that sets binding obligations for industrialized countries to reduce emissions of greenhouse gases. This is an environmental treaty to prevent dangerous anthropogenic interference in the climate system. As part of the Kyoto Protocol, many developed countries have agreed to the reduction of emissions of greenhouse gases. The protocol was amended in 2012 to accommodate the second commitment period. The protocol is relevant to renewable energy developments as the contracting parties are obliged to control their sources of anthropogenic Green House Gases emissions and to adopt climate change mitigation measures<sup>74</sup>.

Currently, Nigeria does not have a comprehensive renewable energy efficiency policy, but there was a reference to renewable energy technologies in the 2003 National Energy Policy, which has not adequately addressed the need to develop a workable national renewable program. The Renewable Energy Master Plan was submitted by the Energy Commission of Nigeria to develop and exploit the renewable energy potentials of Nigeria as an alternative

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<sup>74</sup>Olujobi O.J., (2020), Analysis of the Legal Framework Governing Gas Flaring in Nigeria's Upstream Petroleum Sector and the Need for Overhauling, MDPI Journal of Social Sciences, 9, 132,

source to the conventional energy source, which is expected to contribute 10 percent of the nation's energy supply.<sup>75</sup> The challenge has been weak enforcement and the absence of stringent sanctions for non-compliance.

The International Renewable Energy Agency was set up in 2009 with exclusive authority to promote the use of all forms of renewable energy sources for sustainability. International Renewable Energy Conference was also held to attain a common goal for developing sustainable energy sources<sup>76</sup>.

### **3.0.1 National Legal Framework on Renewable Energy in Nigeria**

Electricity Power Sector Reform Act 2005 is the main legislation that regulates Nigeria's power sector. The Act set up the Nigeria Electricity Regulatory Commission as a regulatory body to provide licenses and regulate the country's generation, transmission, and distribution of electricity. The Nigeria Electricity Regulatory Commission formulated some regulations, such as Renewable Energy Feed-in Tariff Regulations 2015, a feed-in tariff for renewable energy sources for power generation to promote investment in renewable energy. It is estimated that Nigeria will generate at least 1000MW of electricity from renewable energy if adequately utilised<sup>77</sup>. The National Energy Policy guarantees an adequate, sustainable, and reliable supply of energy at appropriate costs and in an environmentally friendly manner to various sectors of the economy for national development. It emphasises the need to promote the use of alternative energy sources to conserve and use the environment for the benefit of the present and future generations. The policy aims to expand the role of renewable energy for electricity sustainability and development through an effective regulatory instrument—also, the Policy Guidelines on Renewable Electricity in Nigeria. Policy 5 of the Guideline provides for financing renewable electricity through Renewable Electricity Trust Fund, which is to be set up under the Rural Electrification Funds to promote renewable energy through private and public-sector participation.

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<sup>75</sup>O.J., Olujobi, Imperativeness of Making Renewable Energy an Option in Nigeria's Power Industry: The Legal Perspective, *Elizade University Law Journal (EULJ)*, 3.,1-23.

<sup>76</sup>I., Mulyana, The Development of International Law in the Field of Renewable Energy, (2016), 2 (1), Halrev Faculty of Law, Hasanuddin University, Makassar, South Sulawesi, Indonesia, available at [https://www.researchgate.net/publication/303669180\\_The\\_Development\\_of\\_International\\_Law\\_in\\_the\\_Field\\_of\\_Renewable\\_Energy](https://www.researchgate.net/publication/303669180_The_Development_of_International_Law_in_the_Field_of_Renewable_Energy) (accessed October 26, 2021), 1-60.

<sup>77</sup>O., Jegede and W., Idiaru, Nigeria: Legal Frameworks For Renewable Energy In Nigeria, Resolution Law Firm, <https://www.mondaq.com/nigeria/renewables/1088088/legal-frameworks-for-renewable-energy-in-nigeria> (accessed October 26, 2021).

The Renewable Energy Policy 2003 provided all forms of energy, including renewable energy sources and how they can be effectively utilised. However, no concrete quantitative targets have been set. The Energy efficiency and conservation Policy 2003 pointed out that energy utilisation of the country is far from efficient and advocates the promotion of energy conservation at all levels by adopting energy-efficient methods in energy utilisation. However, no concrete quantitative targets have been set to date. Rural Electrification 2003 recommends promoting off-grid and standalone systems to supply electricity to remote areas of the country.

Nigeria Electricity Regulatory Commission Mini-Grid Regulation 2016 applies to all mini-grids with a generation capacity of up to 1Mega Watts, the owners, operators, and users of the mini-grids, and other private or public stakeholders. A mini-grid is an electricity supply system with its power generation capacity. It supplies electricity to more than one customer that can operate in isolation or be connected to a distribution licensee's network. While a mini-grid developer is an entity with a permit to operate an isolated mini-grid to generate electricity.

The Environmental Impact Assessment Act<sup>78</sup> makes it obligatory for environmental impact assessment to be conducted for projects likely to have significant effects on the environment, such as renewable energy projects that must be registered with the Federal Ministry of Environment for an environmental impact assessment. Section 2 of the Act provides for the assessment of public or private projects that are likely to substantially affect the ecosystem for prior approval.<sup>79</sup>

The Petroleum Industry Act (PIA) 2021 is to overhaul the Nigerian Petroleum Industry by providing a legal, governance, regulatory and fiscal framework for the Industry. The Act does not say much on the energy transition, and its likely impact on the sector as many oil and gas companies are divesting from fossil fuel to cleaner energy or low carbon business. Decarbonization is called "Net Zero," as countries across the globe have pledged to reduce greenhouse gas emissions by 2030<sup>80</sup>. The Federal Government formulated the National Renewable Energy and Energy Efficiency Policy to generate 30,000 megawatts (MW) of electricity by 2030 from renewable energy sources, contributing 30% of the generation

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<sup>78</sup>Cap E2, Laws of the Federation of Nigeria, 2004.

<sup>79</sup> O.J., Olujobi, the Conundrums of Illicit Crude Oil Refineries in Nigeria and its Debilitating Effects on Nigeria's Economy: A Legal Approach (2021), Journal of Financial Crime, (In Press).

<sup>80</sup> PricewaterhouseCoopers, the Petroleum Industry Act Redefining the Nigerian Oil and Gas Landscape (2021), Available at [www.pwc.com/ng](http://www.pwc.com/ng) (accessed 23 September 2021).

energy mix. of incentives to cover midstream gas operations. Section 64 of the Act stipulates that NNPC Limited is to engage in the development of renewable energy resources in competition with private investors by providing the enabling infrastructure, regulatory framework, and the right level of investment for the energy transition. PIA is expected to attract significant investments; the regulatory and competitive landscape of the industry is expected to change significantly<sup>81</sup>.

National Power Sector Reform Act 2005 is to liberalise by the Electric Power Sector Reform Act (EPSRA) 2005]. This Act, which is a consequence of the National Electric Power Policy adopted in 2001, provides a new legal and regulatory framework for the sector. The fundamental change it entailed was the privatization of the government-owned electricity company and the process toward a completely liberalised market. It makes provisions for the vertical and horizontal unbundling of the electricity company into separate and competitive entities; development of competitive electricity markets; setting out the legal and regulatory framework for the sector; a framework for rural electrification; a framework for the enforcement of consumer rights and obligations establishment of performance standards. It resulted in the transfer of the previously public power company, NEPA, into a (temporary) Holding Company, the Power Holding Company of Nigeria (PHCN), called “Successor Company.”

The National Renewable Energy and Energy Efficiency Policy 2015 (NREEEP) outlines the global thrust of the policies and measures to promote renewable energy and energy efficiency. The policy seeks to bring to the attention of policymakers the economic, political, and social potential of renewable energy. It recommends appropriate strategies to be developed to exploit these potentials and to add value to the ongoing changes in Nigeria's power industry<sup>82</sup>.

Nigerian electricity Management Services Agency (NEMSA) Act is responsible for the enforcement of technical electrical standards and regulations as specified by the Nigeria Electricity Regulatory Commission, involving technical assessment, the analysis, and accreditation of electrical fittings, electricity meters, and apparatuses to ensure efficient production and delivery of safe, reliable and sustainable electric electricity supply and to guarantee the safety of lives and property in the Nigerian electricity supply industry. The Act

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<sup>81</sup> O.J, Olujobi, Covid-19 Pandemic: The Impacts of Decline in Crude Oil Prices on Nigeria’s Economy, Legal and Policy Options, (2021), Benson Idahosa University Law Journal (In Press)

<sup>82</sup> Y., Oke, Nigerian Electricity Law and Regulation (Law lords Publication, 2013), 312.

set up the National electricity Management Services Agency (NEMSA) with the responsibilities stated above.

### **3.0.2 Prospects of Renewable Energy in Nigeria's Power Sector**

Renewable energies are perpetually being replenished from natural resources with the security of supply, distinct from fossil fuels, which are often negotiated on the global oil market and subject to transnational competition. Consistent utilization does not affect renewable energy available in the future since it is inexhaustible. Renewable energy resources are evenly distributed in Nigeria, though longitudinal and chronological variations occur. All the six geo-political zones in Nigeria have reasonable access to one or more varieties of renewable energy sources. Renewable energy sources are clean and pollution-free, and sustainable energy sources are affordable.

Renewable energy sources are distinct from fossil fuels plants which the Federal Government owns, and energy firms' renewable energy can be established in small units suitable for community or rural areas' needs in Nigeria. Thereby creating opportunities for rural electrification. Decentralization of energy system solutions is a useful strategy in Nigeria because of some topographical or geographical challenges in the rural areas, which often makes it uneconomical to extend the grid to such areas. Renewable energy promotes energy efficiency and boosts sustainable development via affordable access to energy by the poor to mitigate greenhouse gas emissions, reduce harmful air pollutants, create new economic opportunities, and enhance energy security via cooperation and collaboration by all stakeholders<sup>83</sup>.

### **3.0.3 The Challenges of Renewable Energy in Nigeria**

In Nigeria, one of the challenges of maximizing renewable energy potential is the lack of technical capacity and innovation required to tap, utilise, and manage renewable energy sources.<sup>84</sup> Institutional and governance failures hampered efficiency in production, investment in the sector, high costs of operation, and low return on investment due to the

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<sup>83</sup> "Political Declaration" of 4 June 2004, para. 1, available online at <ren21.net/Portals/0/documents/irecs/renew2004/ Political\_declaration\_final.pdf> (accessed October 26, 2021), In M. Citelli, M., Barassi, K., Belykh, Renewable Energy in the International Arena: Legal Aspects and Cooperation, (2014), Groningen Journal of International Law, Energy & Environmental Law, 12(1), 6.

<sup>84</sup>J.F.K., Akinbami, Renewable Energy Resources and Technologies in Nigeria: Present Situation, Future Prospects, and Policy Framework, Mitigation and Adaption Strategies for Global Changes (Kluwer Academic Publisher,

Federal Government pricing policies or regulation of electricity and petroleum products markets.

Presently in the country, energy demand is very high while the supply remains inadequate, insecure, and irregular, and energy sources have been dominated by fossil fuel resources which are fast depleted and not environmentally friendly.

Also, there is a technological barrier, National Renewable Energy Master Plan supplies and servicing for renewable electricity projects are not readily available in Nigeria. Therefore, potential Independent Power Projects may encounter substantial logistic problems in acquiring equipment and maintenance assistance for renewable electricity projects. There is limited public awareness of the potential of renewable electricity in meeting some of the energy and in higher risks insight for potential renewable electricity projects<sup>85</sup>. Renewable energy development challenges facing the country due to inadequacy of awareness which has occasioned energy market distortion.

Another challenge is the uncertainty of finance sources. Since renewable energy technology is costly for rural communities and individuals, the cost of owning a self-sponsored renewable energy system is exorbitant in Nigeria, and access to financial facilities may be difficult. Poor resource management, corruption, and lack of commitment by the Federal Government to invest in renewable energy development are challenges militating against the successful implementation of any sustainable energy technology and development in Nigeria<sup>86</sup>.

Similarly, there are policy and regulatory barriers. The lack of a level playing field for all energy sources and technologies has constituted a formidable barrier to the growth of alternative electricity services. Financing and investment barriers, renewable energy projects have high initial costs. This affects the overall cost of energy produced per kWh. Investors

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<sup>85</sup>S.O., Oyedepo, O.P., Babalola, S.C., Nwanya, O., Kilanko, R.O., Leramo, A.K., Aworinde, T., Adekeye, J.A., Oyebanji, A.O., Abidakun, and O.L., Agberegba, Towards a Sustainable Electricity Supply in Nigeria: The Role of Decentralized Renewable Energy System (2018), European Journal of Sustainable Development Research, 2(4), 40.

<sup>86</sup>O.J., Olujobi, A Chapter in a Book, the Oil and Gas Industry Content Development Act, 2010: Can It Combat the Hurdles against Marginal Oil Field Development in Nigeria's Upstream Petroleum Sector? (2021) In Contemporary Legal Issues and Good Governance in Nigeria: Essay in Honour of Arakunrin Oluwarotimi Odunayo Akeredolu, SAN (Published by the Nigerian Bar Association, Owo Branch, Ondo State, Nigeria), Chapter Two.

will not be favourably disposed to wind, small hydro, or power from generating plants if they will not make a profit by selling the electricity

### **3.0.4 Epileptic Supply of Electricity in Nigeria: Renewable Energy as Option**

Several renewable energy options are available in Nigeria, though largely unexplored, including wind, solar, and biomass. Wind Energy is a clean energy source with the potential for a consistent energy supply in the country.

Akinbami maintains that the total hydroelectric power potential of Nigeria was approximately 8,824 Mega Watt (MW) with a yearly electricity generation perspective of more than 36,000 Gigawatt hours (GWh). This comprises 8,000 megawatts (MW) of large hydropower technology, while the outstanding 824 megawatt (MW) is still small-scale hydropower technology. Currently, 24 percent and 4 per cent of both large and small hydropower potentials in Nigeria have been utilized.<sup>87</sup>

Further, Solar energy is abundantly present in Nigeria, though the technologies for solar energy applications are yet to be fully accepted as household commodities in Nigeria. It offers cost-effective options for extending electricity and stimulating sustainable development in rural areas. The Renewable Energy Policy of Nigeria 2006 reiterated this position. Nigeria is located in the tropics with a landmass stretching between latitudes 5 degrees south and 15 degrees North of the equator; the country enjoys abundant sunshine. The average solar insolation in Nigeria is estimated to vary between a 4.0kilowatt-hour (KWh)/m<sup>2</sup>/day on the Southern coasts to a 7.0kilowatt-hour (kWh) /m<sup>2</sup>/day in the Northern part of the country. The daily average is estimated at 5.5KWh/m<sup>2</sup>/day. The technologies for solar energy applications are yet to gain acceptance in most Nigerian households<sup>88</sup>. It is suitable for rural electrification due to the inability to connect to the national electric power grid.

Besides, biomass is biological and derived from living organisms. Biomass can either be used directly as bio-power or converted into other energy products such as biofuel. Sources of biomass include corn, sugarcane, wastes, dead trees, stumps, branches, yard clippings, and

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<sup>87</sup>J.F.K., Akinbami, M.O., Ilori, T.O., Oyebisi, I.O., Akinwumi, O., Adeoti: Biogas Energy Use in Nigeria: Current Status, Future Prospects and Policy Implications, (2001), Renewable and Sustainable Energy Review, 5: 97–112.

<sup>88</sup>P.A., Ilenikhena, Solar Energy Application in Nigeria” WEC, Montreal Paper No: 135(2019), available at <http://www.worldenergy.org/documents/congresspapers/135.pdf>. (accessed October 15, 2021).

wood chips, among others. Biomass is a renewable, low-carbon fuel that is a sustainable fuel that can significantly reduce carbon emissions compared with fossil fuels. However, despite its relative benefits and abundance, there is no enabling legislation on biomass as a source of renewable energy. The utilization of biomass as a source of renewable energy will ensure uninterrupted electricity to rural areas, enhance rural energy efficiency, promote technological innovations and transfer renewable energy technologies to rural communities to improve the lives and incomes of Nigerians. Therefore, there is a need for a crucial definitive legal and policy framework on biomass in Nigeria.

### **3.0.5 The Rights and Redress for Electricity Customers in Nigeria**

Under the provisions of the Nigeria Electricity Regulatory Commission (NERC) Customer Service Standards of Performance for Distribution Companies, Customer Complaints Handling Services and Procedures, Connection and Disconnection Procedures for Electricity Services, and Meter Reading, Cash Collections and Credit Management for Electricity Supply, every electricity customers have the following rights: Right to electricity supply safely and reliably, right to be correctly connected to an operational meter. Right to be adequately notified on electricity service, right to clear and comprehensive electricity invoice, and right to be supplied with electricity bills in compliance with the Nigeria Electricity Regulatory Commission estimated billing procedure where such customer is not provided with the meter.

The right to be informed in writing in advance of an interruption with the electricity service by the Electricity Distribution Companies serving the customer by the Nigeria Electricity Regulatory Commission's Regulations. Right to reimbursement when overcharged. Right to report any grievances and right to a swift probe of grievances. Right to send all grievances on electricity supply and other invoicing problems to the closest Electricity Distribution Companies office to the customer. Right to shoot up the problems, when not suitably tackled by the Business Unit of the Electricity Distribution Companies to the Nigeria Electricity Regulatory Commission's Forum Office within the area of the Electricity Distribution Companies. Right to appeal the resolution of the Nigeria Electricity Regulatory Commission's Forum Office by petitioning the Nigeria Electricity Regulatory Commission. Right to challenge any electricity charge. Any unmetered customer who is contesting his or her estimated bill has the right not to pay the contentious charge, however, pay only the previous acknowledged bill as the contested charge goes through the dispute resolution

process of the Nigeria Electricity Regulatory Commission. It is not the obligation of the electricity customer or community to acquire, substitute or overhaul electricity transformers, rods, and other associated apparatus utilized in the supply of electricity.

Customer's grievances concerning infringement of electricity rights can be redressed by lodging a complaint to the Electricity Distribution Companies' Customer Complaints Unit in the event of a violation of their rights as an electricity customer; the petition or grievance shall first be conveyed to the Customer Complaints Unit of the Nigeria Electricity Regulatory Commission in charge of providing electricity to the concerned customer's vicinity. Contravention of right to the Nigeria Electricity Regulatory Commission's Consumer Forum. The commission has a Consumer Forum, which is set up to respond to electricity customers who are dissatisfied with the outcome of the electricity customer's complaints by the Customer Complaints Unit or where the Customer Complaints Unit delays or fails to handle the electricity customer's complaints. The customer may report the decision of the Nigeria Electricity Regulatory Commission's Consumer Forum to Nigeria Electricity Regulatory Commission. Where an electricity customer is dissatisfied with the decision of the Nigeria Electricity Regulatory Commission Consumer Forum, the electricity customer is entitled to submit a petition to the Nigeria Electricity Regulatory Commission. Customers in the R2 and C1 tariff categories with complaints related to estimated billing after February 2020 are expected to report the infringement directly to the Nigeria Electricity Regulatory Commission (NERC) by filling out an online Complaints Form and attaching a copy of the bill.<sup>89</sup>

### **3.0.6 Comparative Legal Framework on Renewable Energy in China, Spain, Germany, and Nigeria**

The conventional energy sources are not sustainable. Nigeria is vulnerable to the threat of an energy crisis despite the country's enormous energy potential.<sup>90</sup> Therefore, the comparative analysis provides an overview of the policies and regulatory framework that needs to be put in place to promote energy efficiency through renewable energy utilization and draw lessons from the related initiatives in selected countries. The countries were chosen because they have a range of initiatives and incentives for renewable energy producers. The countries have much-desired energy needs that stimulate stable electricity in their countries and meet their

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<sup>89</sup>A. Adetuyi, N., Williams, Understanding Your Rights as An Electricity Customer in Nigeria, available at <https://brooksandknights.com/wp-content/uploads/2020/06/understanding-your-rights-as-an-electricity-customer-in-nigeria.pdf> (accessed October 25, 2021).

<sup>90</sup>Y., Oke, Nigerian Energy Resources Law and Practice Oil and Gas Law, Practice Cases and Theories, (Princeton & Associates Publishing Co. Ltd, Ikeja, Lagos, 2019),640-648.

socio-economic development needs. Nigeria can adopt an insight from its energy policies and strategies.

<b>S/N</b>	<b>Countries</b>	<b>Legal Framework</b>	<b>Population</b>	<b>Remarks</b>
<b>1.</b>	<b>China</b>	<p><b>Renewable Energy Law 2006</b> promotes the development and utilization of renewable energy, improves energy structure, diversifies energy supplies, safeguards energy security, and protects the environment for sustainable development of the country's economy and society.</p> <p>The law decentralized the implementation of renewable energy use among the various national and local agencies. Energy Authorities of the State Council regulate and manage renewable energy development.</p>	<b>1,446,599,87509</b>	<p>The law is very simple and apt; details of the law are provided in the regulations with stringent sanctions for non-compliance. Decentralization of Nigeria's energy structure will promote electricity stability.</p>
<b>2.</b>	<b>Spain</b>	<p>Spanish's Royal Decree-Law 1/2012 terminates all renewable energy installations subsidies that aim to combat tariff deficit.</p> <p>Energy plan outlines the Spanish Government's energy needs. The aim is to promote sustainable development in the countryside, renewable energy technology, and energy security.</p>	<b>46,778,444</b>	<p>Spain has a robust legal framework for renewable energy, which Nigeria can replicate.</p>

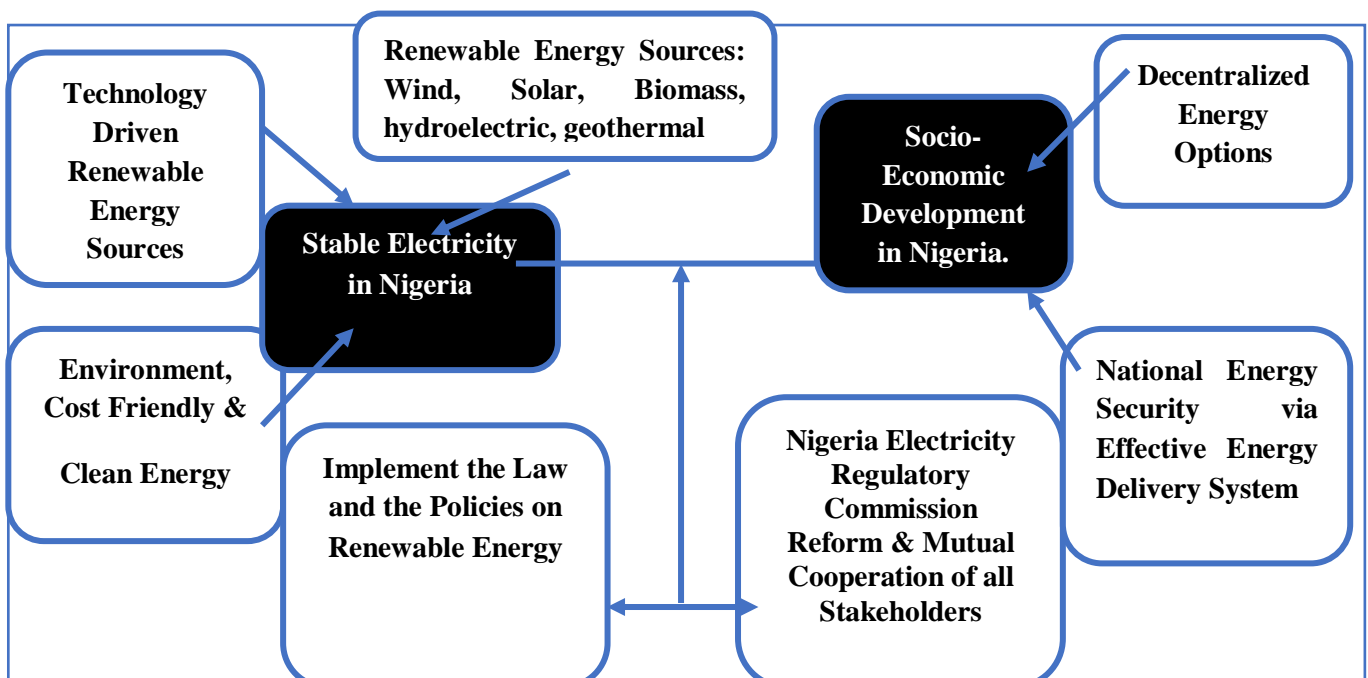
3.	<b>Germany</b>	<p>German Renewable Sources Act 1998 and German Electricity Regulation relied on a mix of public and private law.</p> <p>The Renewable Energy Sources Act 2000 objective is to encourage Germany's renewable energy products and technologies. Electricity produced from renewable energy was prioritized for grid connection, namely wind, solar, biomass, geothermal energy, landfill, pit, and sewage gas.</p>	<b>84,134,677</b>	<p>The legal framework prioritized renewable energy sources of energy in the country. Electricity produced from renewable energy was prioritized for grid connection which Nigeria can replicate with suitable technical know-how to guarantee energy security.</p>
4.	<b>Nigeria</b>	<p>The Nigerian Electricity Regulatory Commission (NERC) is to facilitate electricity generation in Nigeria through conventional and renewable energy sources for sustainable electricity in the country.</p> <p>National Energy Policy encourages renewable energy sources, but it has not translated to a matter of national priority for sustainable electricity.</p>	<b>212,823,072</b>	<p>There is a need for redirecting renewable energy law and policy in conformity with global trends in attaining the objective of energy sufficiency and stable electricity in Nigeria.</p>

#### 4.0 Findings and Analysis

- a. Nigeria is endowed with abundant renewable energy resources, for instance, hydroelectric, solar, wind, tidal, and biomass. There is a need to utilize these resources and design a new energy future for Nigeria. Hence, the Federal Government must make renewable energy accessible and affordable to all Nigerians.
- b. Nigeria lacks an enforceable legal and regulatory framework to govern and manage renewable energy utilization for the country's national growth and socio-economic development.
- c. The development of renewable energy for rural communities through solar cannot be overemphasized though regrettably, there is no specific legal framework for solar energy in Nigeria. However, the Policy Guidelines on Renewable Electricity in Nigeria itemized solar as one of the principal sources of the government's renewable electricity policy and guidelines, but weak enforcement due to the absence of the political has been the challenge.
- d. Low level of investments in the renewable energy industry, and most foreign lenders are withdrawing their support for investments in fossil fuels to support clean sources of energy

##### 4.0.1 Figure 1: Hybrid Model Designed to Facilitate Adoption of Renewable Energy as Alternative Sources of Energy in Nigeria for Stable Electricity in the Country

The study designs a hybrid model to facilitate the adoption of renewable energy as an alternative energy source in Nigeria for stable electricity in the country.



**Source: The Author Created the Figure**

### **Conclusion and Policy Implications**

Renewable energy generation is significant for sustainable development and climate stabilisation. Nigeria will benefit from renewable energy interventions; it will decrease the local air pollution and combat greenhouse gas emissions. Many fundamentals that are indispensable and appropriate to address the shift to a sustainable energy future have been examined, such as full exploitation and support for renewable energy resources, energy efficiency practices, and the application of energy conservation measures in various sectors. The current energy policy is not suitable for sustainable renewable energy growth in Nigeria. More significantly, renewable energy developments are not backed by any legally binding instrument, spelling out the sanctions for non-compliance with renewable energy generation and utilization for electricity supply.

Globally, many countries are transitioning to cleaner sources of energy. Similarly, international oil companies are shifting their focus to renewable and environmentally friendly energy sources. Nigeria cannot afford to lag in ending the epileptic supply of electricity to consumers in the country. The Federal Government must enact a comprehensive law on renewable energy sources and utilization in compliance with its international obligation of Decarbonisation called “Net Zero in the year 2030.

### **Recommendations**

To achieve sustainable energy in Nigeria, it is recommended that the country do the following: Improve the supply of contemporary reasonable energy services to Nigerians while preserving ecological integrity and social harmony. Furthermore, an advantageous fusion of energy sources such as fossil fuel and renewable energy sources for efficiency will be required to sustain the growing demand for alternative energy services in Nigeria. Renewable energy technological development, decentralized non-grid networks, diverse energy-supply systems, and the provision of affordable and accessible energy services that are environmentally friendly are imperative to meeting the Nigerian's energy demands.

There is a need for a holistic approach toward decentralizing the energy structure governance with the multiplication of the means of energy production to guarantee sustainable energy utilization, management, energy availability, and affordability of energy in the country. Grid-

based renewable electricity is crucial in promoting the development and utilization of electricity through the diversification of sources of electricity supplies to strengthen energy security, expand electricity access and improve the environment by formulating policies on energy efficiency and harmonise them into the current energy policies. A detailed and coherent energy policy is indispensable in guiding Nigerians towards a cost-effective utilization of renewable energy resources. Create awareness of renewable energy utilization and energy efficiency through biofuels as a transport fuel in Nigeria. There is a need to encourage and support research and development centres and technology development institutions on renewable energy sources.

The Nigerian Electricity Regulatory Commission must monitor the activities of all participants in the electricity market and ensure that all rules, regulations, and codes are enforced in a fair, transparent, and equitable way. It is also crucial to institutionalize and improve the relevant legal and administrative framework regulating renewable energy sources, including establishing a serious commitment to developing and enforcing standards, regulations, and codes for renewable energy technologies, systems, and utilization. The provision of fiscal incentives can address financial barriers to the development of renewable energy sources, tax exemptions on imported renewable energy equipment, tax holidays on generation incomes, tax incentive policies, import duty/excise duty concession, value-added tax concession, tax credit, production tax concession, and tax holiday on incomes generated from the utilization of renewable energy sources to enhance energy security and stability in Nigeria.