



A REVIEW OF THE LEGAL FRAMEWORK ON RENEWABLE ENERGY AND THE DRIVE FOR ENERGY SUSTAINABILITY IN NIGERIA

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Energy and power generation have challenged most developing countries, including Nigeria. For decades, Nigeria's electricity access has been hampered by poor management and lack of infrastructure. Recently, the adverse impacts of climate change and environmental degradation have made transmitting to more renewable energy sources imperative. In addition, using renewables in energy generation provides an opportunity to achieve sustainable development. A robust governance and regulatory framework are significant to Nigeria's renewable and sustainable electricity generation, distribution, and use. Adopting a doctrinal method, the research examines the existing legal and policy framework and its efficacy in addressing the transition to renewable energy sources, energy shortage, and climate-related energy issues. It is argued that positioning Nigeria's energy sector to encourage using renewables to produce energy is essential to ensuring environmental sustainability. Compared to previous research, this research engages a socio-legal perspective in evaluating the effectiveness of energy sustainability in Nigeria. Relying on secondary data such as laws, policies, and statistics, the research finds that a lack of access to electricity still exists in Nigeria, and the Country has been unable to adopt renewable energy options effectively. Findings in this research also show that the legal and policy framework, especially the Electricity Act of 2023, does not sufficiently promote and incentivise the use of renewable energy across stakeholder levels.

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1. INTRODUCTION

Energy security and access in Nigeria remain a challenge as the country experiences an energy crisis despite Nigeria's abundant energy resources, both renewable and non-renewable. Research shows that Nigeria has the lowest energy access rate, with a deficit of 12% of the global total.¹ According to the Energy Progress Report of 2024, over 86 million people across the country do not enjoy access to viable electricity supply.² In addition to erratic access to electricity, some communities have not had access to electricity for almost two decades.³ This energy insecurity has been attributed to various factors ranging from ageing infrastructure,⁴ unstable supply of gas needed to generate electricity,⁵ and poor management of the energy sector. Despite Nigeria's abundant renewable natural resources and prospects for renewable energy,⁶ there remains a high dependence on non-renewable sources. Thus, the country still lags

¹ G Baskaran and S Coste, 'Achieving Universal Energy Access in Africa amid Global Decarbonization' (CSIS Briefs, January 2024) <https://www.csis.org/analysis/achieving-universal-energy-access-africa-amid-global-decarbonization> accessed April 2025.

² Baskaran & Coste (n 1); World Bank, 'Tracking SDG 7: The Energy Progress Report: Access to Electricity—Nigeria' (2023) <https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS?end=2022&locations=NG> accessed April 2025.

³ The Guardian Newspaper, 'Unease over 14 years blackout, power cut in Ondo South' *The Guardian Nigeria News - Nigeria and World News* (Nigeria, 2023) <https://guardian.ng/news/unease-over-14-years-blackout-power-cut-in-ondo-south/> accessed September 2024.

⁴ Baskaran & Coste (n 1).

⁵ Edch, '57% of electricity consumers overcharged with estimated billing' (International Centre for Investigative Reporting, 2023) <https://www.icirnigeria.org/57-of-electricity-consumers-overcharged-with-estimated-billing/> accessed September 2024; Business Day, 'Unmetered electricity consumers cry out over estimated billing' (February 2024) https://businessday.ng/news/article/unmetered-electricity-consumers-cry-out-over-estimated-billing/#google_vignette accessed September 2024.

⁶ AA Mas'ud and others, 'An assessment of renewable energy readiness in Africa: Case study of Nigeria and Cameroon' (2015) 51 *Renewable and Sustainable Energy Reviews* 775–784; SO Oyedepo and others, 'Assessment of Decentralized Electricity Production from Hybrid Renewable Energy Sources for Sustainable Energy Development in Nigeria' (2019) 9(1) *Open Engineering* 72–89.

in transitioning to more sustainable energy production.⁷ This may be attributed to the cost of production of renewable energy resources when compared to costs associated with fossil fuel-based energy. However, research has shown that fossil fuel reserves are ultimately finite and often subject to shortages;⁸ the energy generation from fossil fuels has led to legitimate climate change concerns regarding the emission of greenhouse gases (GHG) and other negative environmental impacts.⁹ The challenges of climate change and environmental degradation associated with fossil fuel energies underscore the importance of renewable energy for environmental and energy sustainability.

The lack of energy security affects the actualisation of various sustainable development goals in Nigeria, including economic growth and access to job opportunities (SDG 1 and 8), access to clean water and sanitation (SDG 6), as almost all households and establishments depend on the availability of electricity to access water from boreholes; affordable and clean energy (SDG 7), safe, equitable and sustainable cities (SDG 11), climate action, including building resilience and reducing social vulnerabilities (SDG 13), and various partnerships to achieve other sustainable development goals (17) (Sustainable Development Goals).¹⁰

While renewable energy may be capital intensive at the inception stage, its benefits include less negative impacts on the environment and viability as a tool for mitigating climate change and actualising sustainable development goals. Sustainability in energy implies that energy is produced, distributed, and consumed in ways that cause the least damage to the environment, ensure low carbon emissions, and engender equitability in that it is sufficiently accessible and affordable. Sustainable energy is a necessary component of environmental sustainability as the demand for energy is continuous, and societal and individual development

⁷ Oyedepo and others (n 6).

⁸ SO Oyedepo, 'Energy and sustainable development in Nigeria: The way forward' (2012) 2(1) *Energy, Sustainability and Society* 15.

⁹ *Ibid.*

¹⁰ United Nations Sustainable Development Goals
<https://www.un.org/sustainabledevelopment/sustainable-development-goals/> accessed April 2025.

is hinged on access to energy and the efficiency of energy.¹¹ Based on this background, this research analyses laws, policies, and other available data to determine the effectiveness of the existing structure in promoting renewable energy in Nigeria.

2.0 OVERVIEW OF ENERGY SUSTAINABILITY

In simple terms, sustainable energy refers to the production and generation of power in a way that has the most minimal effect on the environment, human health, the environment and the functioning of natural systems in terms of production and use.¹² Sustainability of energy acknowledges that renewable energy sources are a better option, not because they do not cause damage or harm to the environment, but because the environmental costs, from production to consumption, are minimal, particularly in terms of waste and environmental damage.¹³ This, according to *Prandecki*,¹⁴ is based on the fact that sustainable energy is derived from the attempts to apply the principles of sustainable development to energy.

In essence, the three standard criteria of sustainable development are imperative in discussing the sustainability of energy, that is, the environmental, economic, and social criteria.¹⁵ Energy sustainability entails considerations for the environment (in terms of air pollution, GHG emissions and land degradation), safeguarding of human systems (equitable access and minimal health hazards), economic viability (in terms of pricing), energy systems (in terms of percentage of renewables in energy generation), consumption and energy security.¹⁶

¹¹ Oyedepo (n 8)

¹² World Commission on Environment and Development (ed), *Our common future* (Oxford University Press 1987).

¹³ K Prandecki, 'Theoretical Aspects of Sustainable Energy' (2014) 2 *Energy and Environmental Engineering* 83–90.

¹⁴ *Ibid.*

¹⁵ *Ibid.*

¹⁶ E Grigoroudis and others, 'Energy sustainability: A definition and assessment model' (2021) 21(3) *Operational Research* 1845–1885; Prandecki (n 13).

As noted above, there is an inherent link between the production, supply, and consumption of energy on the one hand and the environment, economics, and society on the other hand. Thus, energy sustainability extends to the availability of energy for all in a way that is not detrimental to the environment,¹⁷ or the ability of any group of people to access energy at an equitable and sustainable cost.

The significance of energy to all facets of individual well-being and national (social and economic) development makes it essential to be adequately regulated to ensure sustainability. This iterates a fundamental aspect of sustainability, which entails the remediation and reparation for the consequences of specific actions and decisions concerning the environment and societies, hence the role of a viable legal framework in safeguarding common interests and the three elements of sustainability.¹⁸ Several indices must be considered when determining the effectiveness of regulations and policies in promoting energy sustainability. It must be viewed in terms of technical systems, which include the physical infrastructure and primary energy resources; economic stability in terms of cost-effectiveness and affordability; social sustainability, which refers to accessibility in terms of 'spread and financial inclusion'; environmental sustainability speaks to the preservation of natural resources, reduction of pollution and the mitigation of climate change; and finally institutional sustainability which speaks to the management and regulatory structure of the energy system. In line with the SDGs, it speaks to issues of public participation in the energy system.

Given the above discussion, energy sustainability transcends the transition to renewable energy systems. It primarily entails the assessment of policies guiding energy systems within individual nations to ascertain the level of sustainability. While renewable energy sources are largely sustainable, renewable energy does not necessarily mean sustainable, especially regarding production costs, access, demand for energy, and supply.

¹⁷ MA Rosen, 'Energy Sustainability: A Pragmatic Approach and Illustrations' (2009) 1(1) Sustainability Article 1.

¹⁸ World Commission on Environment and Development (n 12).

3.0 POWER GENERATION, THE ENERGY SYSTEM AND STRUCTURE IN NIGERIA

For decades, oil and natural gas have given many countries access to relatively affordable electricity and have aided social and economic development. However, the challenges of climate change and other environmental impacts have shown that it is not sustainable as an energy source. The importance of accessible and affordable energy for development must, therefore, be balanced with its impact and interactions with the natural environment and human systems.¹⁹ Howells and Roehrl²⁰ further highlight the unsustainability of fossil fuel-generated energy due to its interactions with various systems and structures of society. The most prominent are interactions with human systems in terms of negative impacts leading to ailments and sicknesses; interactions with natural systems, such as cases of emissions leading to climate change; and interactions with ecosystems and biodiversity services causing the pollution of the natural environment and depletion of natural resources.²¹

In addition to the above, energy generation using fossil fuels is dependent on fast-depleting reserves of crude oil and natural gas, and due to the large-scale nature, its generation and distribution are inefficient and significantly contribute to carbon emissions in the country. In line with the principles of sustainable development, the government set an objective to engender economic sustainability by seeking alternative energy for households through solar-powered energy.²² Further, due to the poor access to energy in Nigeria, about 80% of operational energy capacity is generated through petrol and diesel-powered generators and plants that also contribute about 12% to the carbon emission in the country.²³

¹⁹ M Howells and RA Roehrl, 'Perspectives on Sustainable Development for the 21st Century (Sustainable Development in the 21st Century (SD21) Project)' (United Nations Department of Economics and Social Affairs, Division for Sustainable Development, 2012)

²⁰ Ibid.

²¹ Ibid.

²² Nigeria's National Development Plan (NDP), 2021 – 2015 (Federal Ministry of Finance, Budget and National Planning)

²³ Power – Nigeria Energy Transition Plan (2022) <https://www.energytransition.gov.ng/> accessed April 2024.

In the light of the indices of energy sustainability iterated above, the challenge of ‘estimated billing’ by electricity distribution companies makes access and energy security unsustainable.²⁴ The estimated bills often far exceed consumption, with consumers having to pay for the power they have not used; these have led to some consumers jettisoning on-grid distribution (even when available) and depending on generator sets.

3.1 Energy System and Structure

Following a chronological order, Nigeria’s energy generation was coal-dependent,²⁵ with coal being discovered in commercial quantity in Nigeria at the beginning of the 20th century.²⁶ Coal-powered energy generation was predominant until the 1960s when Nigeria turned to diesel power plants,²⁷ gas-fired plants and hydro-powered energy generation plants.²⁸

With the establishment of the Nigeria Dam Authority in the 1960s, energy generation in Nigeria became majorly hydro-powered.²⁹ By the 1970s and 80s, there was an increased dependence on gas-powered plants for energy generation.³⁰ However, with the establishment of the Dam Authority, a significant amount of energy was hydro-generated, with hydropower accounting for up to 2,300 MW in the 1990s³¹ and this period also witnessed the creation of the National Electricity Power Authority, a government agency charged with regulating the power sector throughout

²⁴ Nationally Determined Contribution - Nigeria, [UNFCCC Report Update] (Federal Ministry of Environment) https://unfccc.int/sites/default/files/NDC/2022-06/NDC_File%20Amended%20_11222.pdf accessed April 2024; AO Soyemi, IA Samuel, AAO Ayobami & A Akinmeji, ‘The Challenges of Estimated Billing on Electricity Consumers in Nigeria: A Review’ (2021) 730(1) IOP Conference Series: Earth and Environmental Science 012025.

²⁵ JMM Pavanelli and others, ‘An institutional framework for energy transitions: Lessons from the Nigerian electricity industry history’ (2023) 97 Energy Research & Social Science 102994.

²⁶ OI Ogunsola, ‘History of Energy Sources and Their Utilization in Nigeria’ (1990) 12(2) Energy Sources 181–198.

²⁷ Pavanelli and others (n 25).

²⁸ Ogunsola (n 26).

²⁹ Pavanelli and others (n 25).

³⁰ Ibid.

³¹ Ogunsola (n 26).

the country. The agency (NEPA) was solely vested with the power to coordinate and monitor the supply and consumption within and outside Nigeria. It had the power to generate and supply electricity for consumption within and outside Nigeria.³²

By the turn of the Millenium, Nigeria's electricity was mainly hydro and thermal powered (3 hydro-powered and six thermal stations) with the capacity to generate 5906 MW, although NEPA was only able to produce 2400 MW³³ which was insufficient to meet the energy needs of about 123 million people.

In line with policy recommendations to divest NEPA of its monopoly and engender private investment in the power sector, the Electric Power Sector Reform (EPSR) Act established the Nigerian Electricity Regulatory Commission (NERC). In addition to establishing the Agency, the Act divested NEPA of all its assets and functions. It provided for the licensing and regulation of the generation, transmission, distribution and supply of electricity in Nigeria. This led to the establishment of the Power Holding Company of Nigeria which took over the functions of NEPA. Unlike NEPA, which was a government monopoly, PHCN comprises a public-private collaboration of six generation companies (GenCOs), 11 distribution companies (DisCOs) and one transmission company.³⁴

3.2 Continued Challenges within the Power Sector

Despite all of the reforms in the Nigerian electricity sector, the country continues to experience electricity shortage, with about 90 million citizens lacking access to on-grid electricity supply³⁵ and having to rely on off-grid electricity supply from diesel or petrol-powered generating sets. According to Nigeria's Renewable Energy Roadmap, the total energy generated in the country as of 2023 stands at about 13GW, of which the on-grid power generated is about 4.5 Gw and off-grid generation, which

³² National Electric Power Authority Act, 1972.

³³ National Electric Power Policy, Federal Republic of Nigeria 2000.

³⁴ N Edomah and others, 'Energy transitions in Nigeria: The evolution of energy infrastructure provision (1800-2015)' (2016) 9(7) *Energies* 484.

³⁵ Power – Nigeria Energy Transition Plan (n 23).

is a mix of generators and solar energy, accounting for the balance.³⁶ As seen in Figure 2, of the year 2022, gas accounted for about 78.34% of Nigeria’s generated power, while about 21.66% was generated through hydro-power and other renewable sources;³⁷ the Renewable Energy Roadmap puts the figure at 86% generated by natural-gas-powered plants and 14% generated by hydro-powered plants.³⁸

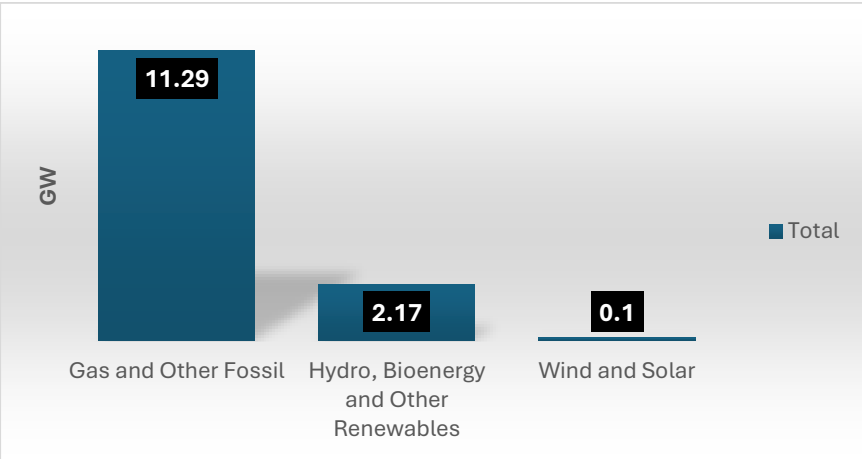


Figure 1: Total energy generated in Nigeria in the year 2022. Data source:³⁹

Figure 1 shows the total energy generated in Nigeria and identifies the various sources. There is still a high reliance on fossil fuels for power generation. For instance, the energy emission stands at 206,452 Gg CO2

³⁶ M Yetano Roche and others, ‘Achieving Sustainable Development Goals in Nigeria’s power sector: Assessment of transition pathways’ (2020) 20(7) Climate Policy 846–865.
³⁷ ‘Africa, Electricity Transition’ (Ember, 2022) <https://ember-climate.org/countries-and-regions/regions/africa/> accessed July 2024.
³⁸ IRENA, *Renewable energy roadmap: Nigeria* (International Renewable Energy Agency 2023).
³⁹ ‘Africa: Electricity Transition’ (n 37).

eq, amounting to about 34% of the total emission in Nigeria.⁴⁰

In addition to the high dependence on fossil-powered electrification, Nigeria continues to experience inefficient power delivery due to technical and infrastructural issues such as “unavailability of gas, machine breakdowns, seasonal water shortages and limited grid capacity”.⁴¹ Other challenges to energy efficiency - include value chain losses (capacity, transmission and distribution losses), limited coverage, and theft and corruption;⁴² insufficient generation and failing distribution infrastructure; management of hydropower for electricity generation, investment risks, and unfavourable investment environments.⁴³

Given Nigeria’s high economic dependence on crude oil, climate policies and action plans must focus on viable energy transitions, as energy portends a severe threat to climate action and sustainable development in general.⁴⁴ The country acknowledges it is imperative to invest in low carbon and renewable energy, a point which was highlighted in the long-term development plan towards the year 2020⁴⁵ and has been reiterated in the 2050-Long Term Vision for Nigeria. The LTV-2050 highlights the need to reduce dependence on energy generated through fossil fuels and begin the economy’s decarbonisation, including the power sector. It aims to halve carbon emissions and increase renewable energy to 50% of the country’s energy mix.⁴⁶ There are, however, challenges to the effective implementation of this plan, the primary one being the lack of a sustainable action plan, which has characterised many government

⁴⁰ Department of Climate Change, *2050 Long-Term Vision for Nigeria (LTV-2050)–Towards the Development of Nigeria’s Long-Term Low Emissions Development Strategy (LT-LEDS)* (2021).

⁴¹ IRENA (n 38).

⁴² D Wijeratne J Pasemann, and S Sircar, ‘Powering Nigeria for the Future’ (PwC, July 2016).

⁴³ Yetano Roche and others (n 36).

⁴⁴ O Akinyemi, A Ogundipe and P Alege, ‘Energy Supply and Climate Change in Nigeria’ (MPRA Paper, 2 May 2012) <https://mpra.ub.uni-muenchen.de/55820/> accessed July 2024.

⁴⁵ National Planning Commission, ‘Nigeria Vision 20-2020: Economic Transformation Blue Print’ (Google Docs, December 2009) https://drive.google.com/file/u/1/d/0B1DAmtM1BcbMUKlnbGgzYjJ4Y1k/view?usp=drivesdk&usp=embed_facebook accessed April 2024.

⁴⁶ Department of Climate Change, LTV-2050 (n 40).

policies. Any significant action to address energy inefficiency and unsustainability and to increase the use of renewable energy sources requires cooperation and participation across levels of state and non-state stakeholders.⁴⁷

4.0 RENEWABILITY AND SUSTAINABLE DEVELOPMENT IN THE POWER SECTOR

Electricity production, supply, and distribution dependent on hydrocarbons and other non-renewable sources result in environmental stress, including pollution, disruptions of natural systems, land degradation, and biodiversity loss. In line with the global agenda on sustainable development, climate change mitigation, and environmental protection, energy generation must ensure environmental well-being, viable production patterns, health and safety, and equitable access.⁴⁸ These goals are not attainable when hydrocarbons are used for electricity generation. Due to the growing population, increasing urbanisation, globalisation, and socio-economic development, the demand for energy is rising, especially in terms of the 90 million people who are estimated as not having access to electricity from the grid.⁴⁹

Sustainability depends on several factors already highlighted, and here, the three most important parameters are reiterated: environmental, social, and economic sustainability.⁵⁰ Links between energy and factors necessary for social and economic well-being, development, and societal advancement have been established,⁵¹ and the high cost of reliance on off-grid backups has been found to inhibit and negatively impact economic growth and livelihoods.⁵² Sustainable energy, including access and security, is

⁴⁷ DD Amobi and T Onyishi, 'Governance and climate change in Nigeria: A public policy perspective' (2015) 9(2) 199–209.

⁴⁸ IAEA (2008).

⁴⁹ IRENA (n 38).

⁵⁰ O Edenhofer and others, 'On the Sustainability of Renewable Energy Sources' (2013) 38(1) *Annual Review of Environment and Resources* 169–200.

⁵¹ Oyedepo (n 8).

⁵² Yetano Roche and others (n 36).

fundamental to all aspirations towards sustainable development.⁵³ As noted by Rosen, every country in modern times has succeeded in substantially reducing poverty by reducing energy poverty and increasing energy availability for social and economic progress.⁵⁴

SDG 7 on actualising “affordable, reliable, sustainable and modern energy for all” calls for action from governments across levels to ensure access to sustainable energy for development. The SDG reiterates other calls for government action on sustainable energy, such as the Johannesburg Plan of Implementation, which highlights the need to increase access to reliable and affordable energy services to achieve sustainable development by focusing

- “reliable, affordable, economically viable, socially acceptable and environmentally sound” energy to engender sustainable development.
- Energy efficiency and transition can only be actualised through international, regional, national and local government cooperation and coalition with civil societies and all actors in the energy sector.
- Come up with a clear and effective regulatory and legal framework to ensure affordable, reliable and sustainable access to energy.

Like many other sub-Saharan countries, Nigeria has not fared well in actualising SDG7, ensuring access to clean and affordable energy for all, a substantial increase in renewable energy, and increasing energy efficiency.⁵⁵ Many developing countries, such as Nigeria, are presented with the dilemma of ensuring infrastructural, social, and economic development on the one hand and ensuring the sustainability of energy

⁵³ A/CONF.216/L.1, *The Future We Want* (2012) Rio+20, Outcome Document of the United Nations Conference on Sustainable Development.

⁵⁴ MA Rosen (n 17).

⁵⁵ UNECA, ‘Policy Brief 18: Achieving SD7 in Africa’ (United Nations Economic Commission for Africa (UNECA), 2018) <https://sdgs.un.org/sites/default/files/2021-05/Policy%20Brief%20on%20Achieving%20SDG7%20in%20Africa.pdf> accessed April 2024.

production and consumption, both in line with global agendas on climate change and sustainable development goals.⁵⁶ Compared to other countries within Sub-Saharan Africa, access to electricity in Nigeria fares slightly better; however, in comparison to South Africa, Ghana and the global access rate, Nigeria has not done well in ensuring access to electricity as an indicator of SDG 7.⁵⁷ Further on the actualisation of SDG 7, Nigeria stands at 10 Watts per Capita, in comparison to Sub-Saharan Africa – 39 Watts per Capita, Ghana – 51 Watts per Capita, South Africa – 175 Watts per Capita, and Global- 424 Watts per Capita.⁵⁸ The paucity of access to electricity and renewables directly affects economic development and sustainable development. As seen in Figure 2, affordable energy is fundamental to realising all other sustainable development goals.

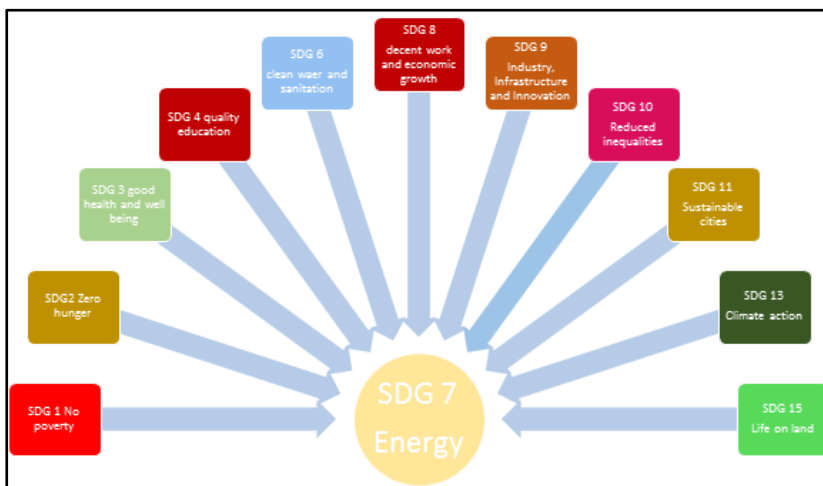


Figure 2: Significance of SDG 7 to other SDGs. Source: Author's construction

⁵⁶ B Sheba and H Bello, 'The Role of Good Governance in Driving and Promoting Sustainable Development in the Provision of Off-Grid Electricity Solutions in Nigeria' in SO Idowu, R Schmidpeter and L Zu (eds), *The Future of the UN Sustainable Development Goals* (Springer International Publishing 2020) 169–185.

⁵⁷ World Bank (n 2).

⁵⁸ Ibid.

This makes the transition to renewable energy more pertinent as it presents an opportunity for economic and infrastructural development across government, corporate, and individual levels. However, the transition to renewability is often unattractive to many developing countries as it involves technical capacity and financing, often beyond what developing countries can afford. The lack of finance and technical capacity and the significance of energy for development indicate that outright abandoning dependence on non-renewable energy sources is impracticable.

While there is a global aspiration to net zero by 2060, which implies jettisoning fossil-generated energy, there have been calls for Africa to follow a differentiated path that allows for balancing access to electricity and social and economic development.⁵⁹ The implication is that Nigeria, as with other developing countries, should focus more on policies that drive energy efficiency for several reasons. First, energy efficiency can be achieved in the short to medium term and is less capital-intensive than a complete migration to renewable energy, which has been established to entail expensive technology.⁶⁰ Secondly, energy efficiency drives provide immediate returns on environmental problems such as pollution by reducing energy demand and consumption.⁶¹ Energy efficiency is also a low-hanging fruit that developing countries like Nigeria can explore as it can drive economic growth, reduce energy waste and increase the country's chances of achieving GHG emission cuts.⁶² Research shows that Nigeria does not fall among the most energy-efficient countries in Africa;⁶³ it, however, is amongst the most energy-efficient countries within the

⁵⁹ African Common Position on Energy Access and Transition (adopted by The Executive Council, July 2022).

⁶⁰ H Kelly, 'Energy Efficiency: An Introduction' in H Kelly, *World Scientific Series in Current Energy Issues* (Vol 06, World Scientific 2020) 1–30; FA Sarpong and others, 'The drivers of energy efficiency improvement among nine selected West African countries: A two-stage DEA methodology' (2022) 43 *Energy Strategy Reviews* 100910.

⁶¹ Ibid.

⁶² IEA, *Africa Energy Outlook 2022* (IEA, 2022) <https://www.iea.org/reports/africa-energy-outlook-2022> accessed September 2024; K Ohene-Asare, EN Tetteh and EL Asuah, 'Total factor energy efficiency and economic development in Africa' (2020) 13(6) *Energy Efficiency* 1177–1194.

⁶³ IEA (n 62); Ohene-Asare and others (n 62).

ECOWAS sub-region.⁶⁴

Despite the policies that outline strategies for energy efficiency in Nigeria, there have been problems with implementation. For instance, the absence of, in terms of clear action plans and incentive strategies across sectors to encourage energy-efficient practices.⁶⁵ Further, the policies on energy efficiency are not backed by law to hold stakeholders accountable for energy efficiency in the Country.⁶⁶ Also, the attitude in Nigeria is still apathetic, with energy efficiency underestimated by public and private institutions, as well as individuals, in terms of energy wastage,⁶⁷ particularly when such energy is generated through alternative means. Nigeria has several policies to ensure that renewable energy transition aligns with the global agenda of transitioning to cleaner energy sources for sustainable development and climate change mitigation. It is here argued that while the transition to renewable energy remains the goal, it is essential for developing countries like Nigeria to focus on energy access and energy efficiency to actualise sustainable development.

5.0 TRANSITION TO RENEWABLE ENERGY AS PART OF CLIMATE ACTION

As seen above, Nigeria's power sector experiences a plethora of infrastructural and management challenges.⁶⁸ These challenges are exacerbated by the adverse impacts of climate change, which highlight the need to adapt and mitigate GHG emissions while trying to ensure social and economic development. All of these challenges have had several implications; on the one hand, it has impeded economic development across levels; on the other hand, it has driven the conversion to more sustainable sources of energy, such as solar energy ⁶⁹as seen in Figure 3.

⁶⁴ Sarpong and others (n 60).

⁶⁵ IEA (n 62).

⁶⁶ IEA (n 62); Sarpong and others (n 60).

⁶⁷ Oyedepo (n 8).

⁶⁸ Nationally Determined Contribution - Nigeria (n 24).

⁶⁹ Ibid.

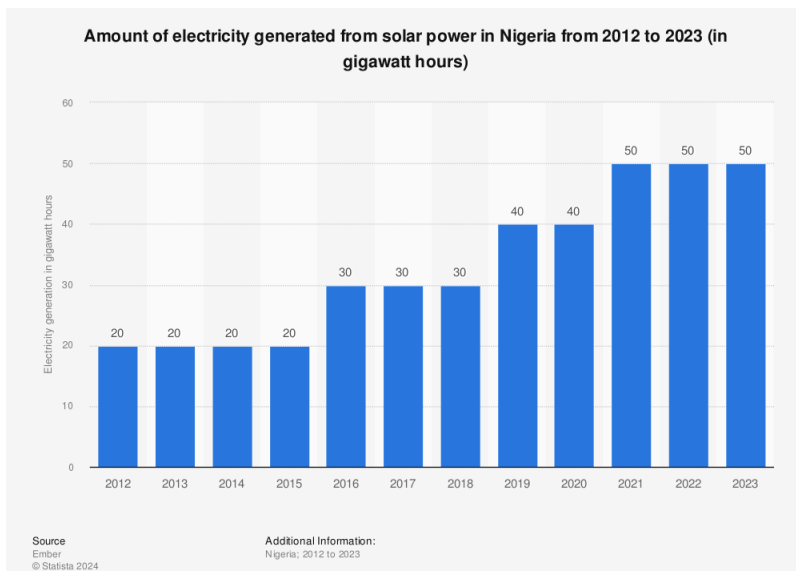


Figure 3 shows Nigeria's solar power generation trends from 2012-23. Source: Ember; Statista

However, Figures 3 and 4 present a contrasting picture when considered together. While there is more dependence on solar-generated energy across individual, corporate and even government establishments, the amount of renewables in the total energy generation remains insignificant.⁷⁰ Solar energy, the leading renewable energy source, is 50 Gigawatt hours, amounting to 0.12% of total power generated in 2023.⁷¹

A transition to cleaner energy sources mainly drives the realisation of sustainable development and climate mitigation.⁷² According to the International Renewable Energy Agency, renewable energy presents an opportunity to cut down on carbon emissions and mitigate climate change in terms of innovations in power generation, heating, and other energy

⁷⁰ Statista, 'Renewable energy in Nigeria' (2024) <https://www.statista.com/study/172462/renewable-energy-in-nigeria/> accessed April 2025.

⁷¹ *ibid.*

⁷² Yetano Roche and others (n 36).

uses.⁷³ As part of state-driven climate action, Nigeria is a party to the Kyoto Protocol and the 2017 Paris Agreement as part of its commitment to GHG emissions mitigation. It also has a national policy to address climate change issues.⁷⁴

The National Policy on Climate Change and Response Strategy (NPCCRS) addresses climate change impacts in Nigeria and outlines the country's obligations and commitments to reduce carbon and greenhouse gas emissions. The NPCCRS iterates the transition from non-renewable energy sources to cleaner and renewable sources that put less pressure on the environment. In addition, the country has come up with a Renewable Energy Action Plan, a long-term low-emission development strategy, and an updated NDC, which commits to a 20% reduction in emissions by the year 2030.⁷⁵

The long-term strategy for low-emission development highlights the country's need to move to low-carbon emissions across sectors, including the energy sector. It reiterates the country's climate action vision -as contained in the National Climate Change Policy- to engender a climate-resilient and low-carbon country and ensure sustainable development across the country through a multistakeholder approach.⁷⁶

The National Climate Change Policy identifies strategic sectors for action due to their contribution to GHG emissions. These are - energy, oil and gas, agriculture and land use, industry and transport, waste, and water.⁷⁷ It highlights the need to decentralise energy generation to ensure efficiency, security and reduction of energy losses because of distribution. The decentralisation of power generation has been argued to be one of the

⁷³ IRENA, 'Renewable energy: A key climate solution' (2017) <https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Nov/IRENA_A_key_climate_solution_2017.pdf?la=en&hash=A9561C1518629886361D12EFA11A051E004C5C98#:~:text=RENEWABLE%20ENERGY:%20KEY%20CLIMATE%20SOLUTION.%20Energy%20decarbonisation%20is%20vital%20to,> accessed July 2024.

⁷⁴ National Policy on Climate Change and Response Strategy, Federal Republic of Nigeria 2011.

⁷⁵ Nationally Determined Contribution - Nigeria (n 24).

⁷⁶ Department of Climate Change, LTV-2050 (n 40).

⁷⁷ National Climate Change Policy of the Federal Republic of Nigeria (NCCP), 2021.

benefits of renewable energy as it enables the generation and distribution of energy outside of established national and central grids, which is obtainable in Nigeria.⁷⁸ The 2050 Long-Term Vision for Nigeria identified renewable energies as a significant step towards reducing emissions, with a projection of renewable energies contributing up to 26% of the energy mix by 2025. It also highlights energy efficiency, especially in distribution, by improving power grids and distribution infrastructure.⁷⁹

Despite these lofty objectives and projections by the 2050-LTV, and although there is increased electricity generation for solar energy, available data shows a decrease in power generated from all renewable energy sources in Nigeria. The renewable energy share in electricity generation, as seen in Figure 4, remains insignificant and has declined in recent years. Also, the power sector in Nigeria continues to experience inefficiencies; for instance, there are episodes of incessant collapse of the national grid, implying that households, industries and corporations must rely on less clean and less efficient alternatives and ultimately contribute to GHG emissions.

⁷⁸ ZA Elum and AS Momodu, 'Climate change mitigation and renewable energy for sustainable development in Nigeria: A discourse approach' (2017) 76 *Renewable and Sustainable Energy Reviews* 72–80.

⁷⁹ Department of Climate Change, LTV-2050 (n 40).

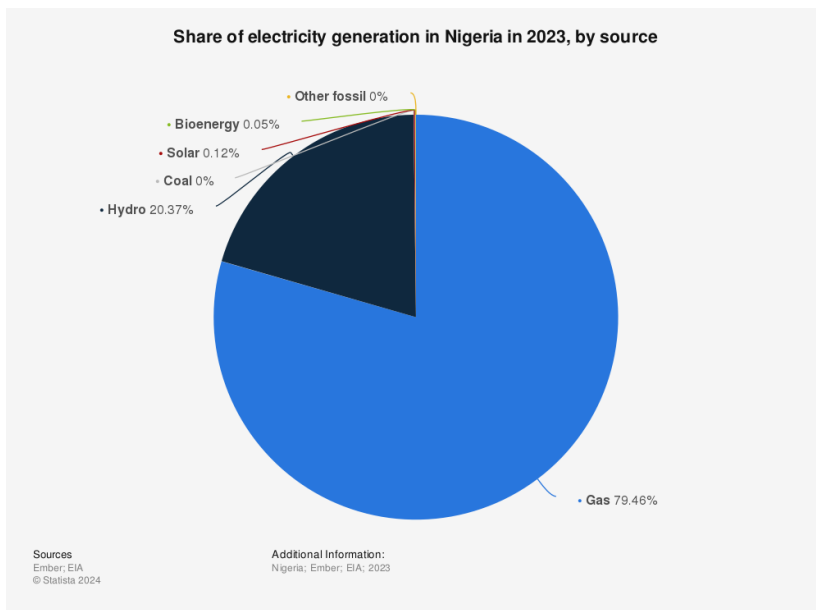


Figure 4: Sources of electricity generated in Nigeria in 2023. Source: Statista& IRENA.

All these policy objectives reiterate the commitment to carbon emission reduction, net-zero emissions by 2050 and the transition to renewable energy sources. However, regarding climate action and mitigation of GHG, the most significant step has been passing the MA of 2023 into law. The Act gives legal and regulatory backing to the policies that are merely state objectives and aspirations.

6.0 THE IMPORTANCE OF A REGULATORY FRAMEWORK

A clear legal and regulatory framework plays a significant role in the energy sector⁸⁰ and the effective use of energy resources.⁸¹ Such a legal framework is essential for the transition to renewable energy on various grounds;⁸² the absence or inadequacy poses a potential challenge to advancing renewable energy in any country, including Nigeria. Laws can either promote or kill renewable energy before it takes off.⁸³ The law plays several roles in regulating the renewable energy sector. It outlines the government's objectives, strategies, and timelines for actualising them.

Fundamentally, the law or body of regulations itemises government incentives and fiscal or market strategies to achieve them.⁸⁴ The role of the Law could be procedural or substantial, as noted by Lucas and Thompson,⁸⁵ to the extent that it highlights public and private liabilities as well as regulatory takings, which may hamper the ease of doing business.⁸⁶

⁸⁰ OV Ojo, 'An Overview of the Legal and Regulatory Framework for Renewable Energy Projects in Nigeria: Challenges and Prospects' (2017) 1(1) *Unilag Law Review*; OJ Olujobi and others, 'Carbon emission, solid waste management, and electricity generation: A legal and empirical perspective for renewable energy in Nigeria' (2022) 22(3) *International Environmental Agreements: Politics, Law and Economics* 599–619.

⁸¹ Ojo (n 80).

⁸² MU Ukponu and others, 'Role of Law in the Energy Transitions in Africa: Case Study of Nigeria's Electricity Laws and Off-Grid Renewable Energy Development' in VR Nalule (ed), *Energy Transitions and the Future of the African Energy Sector* (Springer International Publishing 2021) 141–188.

⁸³ EA Pina and others, 'Assessing the influence of legal constraints on the integration of renewable energy technologies in polygeneration systems for buildings' (2021) 149 *Renewable and Sustainable Energy Reviews* 111382; MM Sokołowski, 'Renewable and citizen energy communities in the European Union: How (not) to regulate community energy in national laws and policies' (2020) 38(3) *Journal of Energy & Natural Resources Law* 289–304.

⁸⁴ ZY Zhao and others, 'How to stimulate renewable energy power generation effectively? – China's incentive approaches and lessons' (2016) 92 *Renewable Energy* 147–156.

⁸⁵ AR Lucas and CB Thompson, *Transition to a Low-Carbon Energy Economy* (Vol 1, Oxford University Press 2018).

⁸⁶ *Ibid.*

The transition to renewable energy, as noted in the Nigerian Energy Transition Plan⁸⁷ cuts across several sectors and stakeholders, it is thus necessary to have in place laws and regulations that take cognisance of the various interests and safeguard them to ensure fairness, transparency and accountability.⁸⁸ A clear regulatory framework on renewable energy is likely to encourage local and foreign investors to partner with the government, especially in renewable energy generation, transmission and distribution. More importantly, the renewable energy drive in Nigeria, as in many other countries, is premised on international agreements and global change. Nigeria has assented to many of these agreements and negotiations, including the UNFCCC, the Paris Agreement, and the SDGs.

Various policy documents, such as the Rural Electrification Agency National Renewable Energy Master Plan (REMP) (2012), National Renewable Energy and Energy Efficiency Policy (NREEEP) 2014, Nigerian Energy Transition Plan, and National Energy Policy (NEP) 2022, highlight Nigeria's renewable energy aspirations. However, as noted by Talus and Aalto, hard laws, that is, legislation, are fundamental to the transition to renewable energy.⁸⁹ In this regard, the Electricity Act was signed into law in March 2023. The law consolidates Nigeria's electricity sector regulations and synergises all previously segmented regulatory frameworks.

Review of the Electricity Act of 2023

The Electricity Act, 2023 (EA,2023), which repeals all preceding laws in the electricity sector, is a comprehensive law on the power sector that provides a regulatory and institutional framework for the generation, transmission, system operation, distribution, and supply of electricity, as well as the enforcement of consumer rights. The Act aims to improve the privatisation of Nigeria's power sector, which was introduced in the

⁸⁷ Nigeria Energy Transition Plan (n 23).

⁸⁸ J Liu, 'Legal systems, national governance and renewable energy investment: Evidence from around the world' (2021) 32(3) *British Journal of Management* 579–610.

⁸⁹ K Talus and P Aalto, 'Energy transitions and the law' in *Routledge Handbook of Energy Law* (Routledge 2020) 549–560.

Electric Power Sector Reform Act of 2005. It also aims at ensuring the security of investment in the power sector and scaling up the generation, distribution and transmission of power in the country to actualise the energy access target within what is referred to as a “reasonable time frame”. Regarding energy transition, the Act makes provisions to promote renewable energy generation, primarily through indigenous efforts.⁹⁰

A fundamental aspect of the Act is that it decentralises the generation, transmission, distribution, and supply of electric power within the federation. By the provisions of section 2, public and private entities are sanctioned to participate in the energy market. Section 63(1) and (7) further decentralises power generation in terms of the grant of licences; it empowers States to grant licences for the generation, transmission, distribution, supply and systems operation of electric power within their jurisdictions/territories. It further engenders individual power generation by providing that a person may generate electricity of up to 1 megawatt without a licence.⁹¹ It also provides that individuals may be granted licences to operate mini-grids within a State but not interstate or transnational.⁹² While not making it compulsory, the generation of power through renewable sources is to be considered in granting licences.⁹³ In a bid to ensure the availability of data on energy power and supply, the Act provides that provides that a licensee shall not supply electricity after the expiration of the date appointed by the Nigerian Electricity Regulatory Commission (NERC) except through the installation of a proper meter in accordance with the relevant regulations made by NERC.⁹⁴

Also significant to the actualisation of SGD7 is Part XVI, which is aimed at promoting electrification and providing affordable and sustainable energy access to rural, unserved, and underserved areas within the Country.⁹⁵ The relevant agency, the Rural Electrification Agency, is to

⁹⁰ Electricity Act 2023, s 1.

⁹¹ Electricity Act 2023, s 63(2)(a).

⁹² Electricity Act 2023, s 63(2)(b).

⁹³ Electricity Act 2023, s 80(2).

⁹⁴ Electricity Act 2023, s 89(1).

⁹⁵ Electricity Act 2023, ss 128, 129.

promote off-grid electrification and encourage the use of renewable energy sources.

While the Act clearly stipulates the continued dependence on fossil fuel-generated electric power, it seeks to engender and increase energy generation through renewable sources. Section 164(a) provides for simplified application processes for licences for services based on renewable energy. The Act further provides for further incentives such as favourable pricing conditions, unobstructed access to the national grid and distribution network, feed-in tariffs for power generation through renewable sources such as would ensure a return of investments, exclusive concessions to service-specific areas, and other concessions to ensure ease of business operations.⁹⁶ Further, section 166 makes specific provisions for tax incentives to promote the generation and consumption of energy from renewable sources. Sections 168-170 make provisions for the rates of feed-in tariffs, which are to be determined by the NERC for a specified duration.

It is noted that such comprehensive legislation did not address issues of energy efficiency, the sustainable use of energy or climate change mitigation, despite the country recently passing the Climate Change Act of 2021. A legally backed position on energy efficiency and sustainability is essential for an effective renewable energy strategy.⁹⁷ Further, though the Act outlines a pathway to renewable energy, this is also not a strong point in the Act. The law ought to serve as a means of advocacy and influence to engender sustainable energy practices amongst the citizenry. As a tool of social engineering, the Law must have a positive social and economic impact on the people in terms of energy security, as well as protect the interests and welfare of the people⁹⁸ in both the short and long term.

The provisions of the new Electricity Act giving powers to the States are commendable, as it is a concrete legislative move to ensure energy security

⁹⁶ Electricity Act 2023, s 164(1).

⁹⁷ J Setiyono and others, 'Renewable Energy Regulatory Urgency in Global Energy Security' (2023) 1270(1) IOP Conference Series: Earth and Environmental Science 012021.

⁹⁸ Ibid.

and promote the transition to renewable energy. It engenders “cooperative federalism”,⁹⁹ and removes the challenges of centrality and a top-to-bottom approach and enables individual states to come up with energy conservation, renewable energy and clean energy initiatives. At the same time, the federal government provides general energy guidelines or framework for the country.¹⁰⁰

7.0 ENDURING CHALLENGES IN THE POWER SECTOR

The EA makes provisions for tax incentives, less stringent licensing requirements and the promotion of local content to encourage investments in renewable energy generation. Despite the Electricity Act, several persist and affect the transition to renewable energy in terms of huge financial implications of renewable energy investments and ease of doing business within the sector, the just implementation of laws and regulations,¹⁰¹ and adherence to good governance principles.¹⁰² These issues reflect post-policy/regulation challenges in various forms. As noted by Obeng-Darko,¹⁰³ there is the challenge of regulatory risks and policy uncertainty on renewable energy investments. At the same time, there have been several legislative and institutional reviews in the past 10 years, and the issue of obsolete infrastructure is yet to be addressed. There are incessant reports of the collapse of the national grid. In the year 2024 alone, it is recorded that the national grid collapsed six times,¹⁰⁴ with over 20 collapses having occurred in the past five years.¹⁰⁵ The collapse in the national grids

⁹⁹ Ukponu and others (n 82).

¹⁰⁰ Lucas & Thompson (n 85).

¹⁰¹ K Löhr and others, ‘Just Energy Transition: Learning from the Past for a More Just and Sustainable Hydrogen Transition in West Africa’ (2022) 11(12) Land 2193.

¹⁰² Sheba & Bello (n 56).

¹⁰³ NA Obeng-Darko, ‘Achieving Sustainable Electricity Through Renewable Energy Development in the Gambia: Regulatory and Policy Considerations’ in A Sayigh (ed), *Sustainable Energy Development and Innovation* (Springer International Publishing 2022) 605–611.

¹⁰⁴ Vanguard News Paper, ‘National grid collapses third time in one week’ (October 2024) <https://www.vanguardngr.com/2024/10/national-grid-collapses-third-time-in-one-week/> accessed April 2025.

¹⁰⁵ Edeh (n 5).

persists despite the significant increase in tariffs and more localised infrastructural problems continue to affect the distribution of electricity to consumers. The ineffectiveness and inconsistencies of the electricity pricing,¹⁰⁶ especially with ‘estimated billing’, also affects the energy sector.¹⁰⁷ Further, despite the unstable supply of power, there have been increases in electricity tariffs, the most recent being in April 2024 with an increase from N68kwh to N225/kwh for 15% per cent of citizens who fall within the Band ‘A’ and ‘B’ consumers.¹⁰⁸

Data on power generated by the Generating Companies and Independent Power Producers indicate that Nigeria is heavily dependent on fossil fuel, and this is not likely to change soon, thereby hampering the country’s abilities to meet nationally determined contributions to mitigating climate change or actualising sustainable development. The country, as of 2022, had about sixty-seven solar power-generating plants,¹⁰⁹ insufficient to make a difference in the incessant power deficit experienced in the country. The power sector’s capital-intensive nature implies a need for significant private sector participation to ensure a difference.

There is the issue of excessively lofty goals towards net zero and transmission to renewable energy.¹¹⁰ The government seems more committed to setting high goals, in line with international targets than tackling the challenges of energy security and access. It is worth mentioning that most of the government’s energy transition policies are designed without consultation with the people most impacted – the local stakeholders and citizens.¹¹¹ Hence, there is no sense of ownership, and sometimes, the language and implementation are undemocratic and inequitable.¹¹² These lofty commitments often inform policies and

¹⁰⁶ Sheba & Bello (n 56).

¹⁰⁷ CPPA and IISD, *A Citizen’s Guide to Energy Subsidies in Nigeria* (2012).

¹⁰⁸ Reuters, ‘Nigeria hikes electricity tariff for bigger consumers in subsidy cut’ <https://www.reuters.com/world/africa/nigeria-hikes-electricity-tariff-bigger-consumers-subsidy-cut-2024-04-03/> accessed July 2024.

¹⁰⁹ R Peters and others, ‘RePP Africa – a georeferenced and curated database on existing and proposed wind, solar, and hydropower plants’ (2023) 10(1) Scientific Data 16.

¹¹⁰ Obeng-Darko (n 103).

¹¹¹ Löhr and others (n 101).

¹¹² Ibid.

unachievable local targets. In addition to the above, Lohr and others itemises several challenges encountered in Nigeria and other West African countries in the transition to renewable energy sources – Internal instability and Insecurity; High Upfront and Costs of Infrastructure; Inconsistency of Policies and Regulations; External Involvement; Lack of Scientific Knowledge and technical Capacities, Absence of Maintenance structures; Corruption, lack of competence, Insufficient Coordination, and Management of Local Stakeholders; Livelihood Issues.¹¹³

On a final note, a major bane of a strong regulatory framework and implementation in most African countries, including Nigeria, is the lack of up-to-date data upon which an effective action plan can be based.¹¹⁴ While carrying out this research, various databases were compared, the latest of which is the RePP Africa.¹¹⁵ Other databases searched include.¹¹⁶

To ensure a truly just implementation of renewable energy towards climate action and sustainable development, the tenets of good governance must be adhered to.¹¹⁷ Primarily, it is essential that there is public participation to ensure a sense of ownership and to ensure that renewable energy enhances livelihood. Further, there must be effective building of local capacity and knowledge exchange with local and Indigenous communities.¹¹⁸ The concept of knowledge exchange is borrowed from Ocean governance and is to the effect that knowledge and capacity building are interdependent between various actors.¹¹⁹ According to Karcher and others,¹²⁰ knowledge exchange gives consideration to interactions between all stakeholders and ensures knowledge is readily

¹¹³ Ibid, 9–13.

¹¹⁴ Yetano Roche and others (n 36).

¹¹⁵ Peters and others (n 109).

¹¹⁶ AEP Database (2018); Africa GIS Catalogue for Energy Planning – Data Tools - IEA; Country Profiles | ECOWREX; Data & Statistics - Energy Browser | AFREC; Nigeria NG: Renewable Energy Consumption: % of Total Final Energy Consumption | Economic Indicators | CEIC; Reports | African Energy.

¹¹⁷ Sheba & Bello (n 56).

¹¹⁸ Löhr and others (n 101); Sheba & Bello (n 56).

¹¹⁹ DB Karcher and others, ‘Knowledge exchange at the interface of marine science and policy: A review of progress and research needs’ (2024) 253 *Ocean and Coastal Management*.

¹²⁰ Ibid.

available and accessible through clear processes to result in a credible social impact.¹²¹

8.0 CONCLUSION

The paper shows the nexus between energy, climate action and sustainable development. It highlights the need for energy sustainability to meet national and international commitments to climate change mitigation and sustainable development, especially SDG 7. The paper examined the unsustainability of power generation, energy access and security in Nigeria, highlighting the major challenges and efforts made through government policies to address them. While government policies and development plans are good steps towards ensuring energy sustainability, the research emphasises the role of laws and regulations to ensure effectiveness. While Nigeria is taking steps to promote renewable sources of energy and sustainable energy production, it is posited that the focus should rather be on first ensuring energy access and security as ways of engendering sustainable development, which will eventually dovetail into energy sustainability through reliance on renewable energy.

In addition to the above, it is essential that Nigeria as a country has a database on the sources and rate of production, demand, supply, consumption, wastes and energy deficiency within the Country. This is particularly essential in light of the provisions of the Electricity Act allowing the State to regulate energy production.

¹²¹ Karcher and others (n 119) 254.