Available online at: http://jurnal.uns.ac.id
Yustisia Jurnal Hukum
| ISSN (Print) 0852-0941 | ISSN (Online) 2549-0907 |

Gauging the Nexus of Policy and Regulatory Framework on Environmental Sustainability and Renewable Energy in Nigeria

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Article Information

Submitted : January 2, 2024
Reviewed : April 10, 2024
Revised : September 25, 2024
Accepted : December 25,2024

Keywords: *Environmental Sustainability*; *Regulatory Framework; Renewable Energy*

Doi:10.20961/yustisia.v13i3.82449

Abstract

Nigeria has a renewable energy strategy and regulatory framework for optimal usage that ensures environmental sustainability and economic progress. This study analyses Nigeria's renewable energy regulatory framework and environmental sustainability. The article used doctrinal and empirical research. The Nigerian renewable energy regulatory system was qualitatively analysed using the doctrinal method. World Bank 2002–2021 data was used for the empirical technique. Renewable Energy Consumption significantly impacts environmental sustainability. As GDP is high, renewable energy usage and environmental sustainability are more linked. Introducing a new renewable energy strategy and regulatory framework improved renewable energy use. This study will assist Nigerian and international authorities like the World Bank modify and adopt regulations to promote renewable energy usage and environmental quality.

I. Introduction

The need for energy subsidies from the environment intensified as the Industrial Revolution began. With each individual on the planet requiring more energy every day, the world is becoming a global village at an alarming pace. Unfortunately, the current state of our Earth cannot accommodate this demand.

As people's overall well-being and progress are increasingly dependent on access to energy and related services, it has become vital to consider renewable sources to combat climate change while meeting future generations' needs for energy (Owusu & Asumadu-Sarkodie, 2016; Sebestyén, 2021). Thus, Renewable Energy Consumption (hereinafter written in REC) is crucial in all economic sectors, including manufacturing, construction, oil and gas and agriculture (Owusu & Asumadu-Sarkodie, 2016).

Environmental scientists and economists in industrialized and developing nations are increasingly concerned about the environment. These environmental sustainability-related worries result from anthropogenic (human-caused) economic expansion and natural reasons. Energy has a crucial role in boosting productivity, encouraging economic growth and development, and enhancing revenue creation and employment, according to the predominant opinion of worldwide experts. As a result, the expansion of economic activities is heavily dependent on energy (Iorember et al., 2020). Compared to 2008, the global energy consumption in 2018 increased by 18.45% to 13864.9. The growth rate over the previous year was 2.9%. Data show that oil continued to be the primary energy source in 2017 (33,6%), followed by coal (27,2%), natural gas (23,9%), and nuclear energy (4,4%). 10.8% of the energy was from renewable sources, with hydropower making up 6.8% (Sebestyén, 2021). The United Nations's SGD 7 ensures everyone can access modern, sustainable, cheap energy. Access to inexpensive and clean energy is required for advancing business, communications, agriculture, education, healthcare, and transportation, as well as Goal 7. The actualization of Goal 7 is supported by Nigeria's policy and regulatory framework for renewable energy. Thus, in response to the adoption of SDGs by the UN, Nigeria swiftly issued the National Renewable Energy and Energy Efficiency Policy (the Policy) 2015 (FAO, 2015) and recently signed into law the Electricity Act administered by the Nigerian Electricity Regulatory Commission being the regulatory institution.

One of the major objectives of the Policy and the Act is to promote the generation and consumption of renewable energy. One of the major targets of SDG Goal 7 is to enrich international collaboration to simplify access to clean energy research and knowledge, comprising renewable energy, energy efficiency, cutting-edge and cleaner fossil fuel technology, and encouraging investment in clean energy infrastructure. Renewable energy in Nigeria has a lot of promise and might help reduce the country's huge energy gaps in rural areas, particularly in northern Nigeria. As new grid technologies, like concentrated solar power, are positioned as competitors to conventional power generation, the scope of the opportunities is just beginning to become obvious. With Africa's most populous and thriving economy, Nigeria's rapidly growing population drives the energy demand required to sustain further economic progress. This situation offers a prime prospect for capitalizing on abundant renewable resources and fostering emissions-conscious expansion that supports sustainability initiatives. Nigeria may use renewable energy to meet its energy demands, drive sustainable economic growth, create jobs, and advance global climate and sustainable development goals (Aguda, 2023; Bala et al., 2024).

Lately, Nigeria has in place a few regulatory frameworks for renewable energy, such as the Renewable Electricity Policy Guidelines, 2006, the National Energy Master

Plan (NEMP) (Final Draft Report), 2014 and the National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015 (FAO, 2015). This study is set to examine the influence of the policy and regulatory framework of renewable energy consumption on environmental sustainability in Nigeria and how this influence is moderated by economic growth.

II. Conceptualization

A. Regulatory Framework on Renewable Energy

Although Renewable Energy (hereinafter written in RE) has been a significant energy source for centuries, its share of the world's primary energy supply is minimal. This circumstance may be attributed to several factors, including the absence of an enabling regulatory framework. For example, until 2023, Nigeria did not have legislation regulating renewable energy generation and consumption but several policies. The first policy directly related to renewable energy was the Renewable Electricity Policy Guidelines, 2006. The policy's target was for a minimum of 5% contribution by renewables to power on the grid and a minimum of 5TWH of electricity production (excluding large hydropower) by 2016, followed by the National Energy Master Plan (NEMP) (Final Draft Report), 2014 and now the National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015 (FAO, 2015).

However, several nations have begun to set up infrastructure to generate power using renewable energy sources (Heshmati et al., 2015). Advanced economies have fairly older regulatory framework on renewable energy. A good example are the Renewable energy policy and regulation are currently derived from English statutes and residual EU law, with particular obligatory obligations to (McClean & Pedersen, 2023). Therefore, switching to RE source is essential for a sustainable future since it improves energy security, lessens its impact on the environment, and fosters social and economic progress.

Depending on the nation and region, laws governing renewable energy sources differ significantly. Nonetheless, the following are a few typical laws and guidelines: Standards for Renewable Portfolios (RPS): According to these rules, utilities must generate or obtain a specific proportion of their electricity from renewable sources. In the case of Nigeria, one of the cardinal objectives of the NREEEP is to ensure the development of the nation's energy resources, with diversified energy resource options, for the achievement of national energy security and an efficient energy delivery system with an optimal energy resource mix the tune of 12,500 Mega Watts on renewable energy alone between the years 2012 to 20230. This renewable energy target is based on the 7% GDP Growth supply projections. Nigeria signed the new Electricity Act in 2023 to actualise the above projection. An objective of the Act that relates to renewable energy states the Act is to provide a framework to stimulate the development and utilisation of renewable energy sources and create an enabling environment to attract investment in renewable energy sources to increase the contribution of renewable energy to the energy mix.

In the case of the United Kingdom, however, by 2020, the government was obligated to a legislative framework to guarantee that renewable energy accounted for 15% of the UK's overall energy mix (McClean & Pedersen, 2023). Other existing laws relating to RE include the Feed-in Tariffs: These laws encourage the production and

investment of renewable energy by offering a guaranteed payment for renewable energy supplied into the lattice. Similarly, net metering has been used in different countries. With net metering, people or companies with solar panels or other renewable energy systems can sell their excess energy back to the grid at retail prices.

Tax incentives are another framework that promotes RE usage: Many nations provide tax breaks or credits to people or companies who invest in renewable energy technologies. Renewable Energy Certificates (RECs) are tradable certificates that can be sold to organizations aiming to reach renewable energy targets. They indicate the environmental qualities of producing renewable energy. These regulations have been implemented in different countries in the world (Chisale & Lee, 2023; Chung et al., 2024; Dönmez, 2023; Narula, 2013; Shrestha & Kakinaka, 2023). Consequently, these regulations aim to improve energy security, lower greenhouse gas emissions, and encourage the development and use of RE sources. Reflect that this is only a broad summary and that precise legislation may vary depending on the jurisdiction.

Like its other African counterparts, Nigeria is preparing for its energy shift by enacting frameworks for legislation and policy that address the energy crisis and the need for a decentralized, renewable energy supply that complies with climate change and Paris Agreement commitments. An overview of the steps taken by the governments of Egypt, Ghana, Kenya, Morocco, Namibia, Nigeria, South Africa, Tanzania, and Uganda to address the pressing need to harness renewable power has been provided by lawyers ahead of the United Nations Climate Change Conference (COP 27) in Egypt in November 2022. It is assumed that these initiatives would offer investors in the African energy sector with favourable hopes (Cantarero, 2020; Gbomagba et al., 2023).

B. Regulatory Framework on Environmental Sustainability

The Environmental Regulatory Framework Index, as described by Bala et al. (2023), Ja'afar et al. (2021) and Shaheen et al. (2023), assesses countries' participation in significant multilateral environmental accords and their domestic laws related to the environment while also evaluating institutional, legal, and governance aspects that influence their implementation of policies. The World Bank International Development Association launched a yearly exercise called Country Policy Institutional Assessment in 1970 to identify nations with strong environmental policy contributions using the CPIA's four clusters consisting of sixteen criteria which focus on economic management, structural policies, social inclusion/equitable policies/public sector management/institutions for evaluation.

Over time, this has shifted away from macroeconomic difficulties towards wider sets characterised by higher-level sustainability variables such as efficient development aid deployment/implementation/sustainable development when assessing how much each country's regulatory framework supports them appropriately.

Also noted is Nigeria's commitment to safeguarding natural resources/environmental sustainability utilizing an act known widely like National Environment Standards & Regulations Enforcement Agency Act - NESREA dealing mainly around waste/biodiversity preservation/pollution control matters giving recommendations alongside passing judgments ensuring proper guidelines being

followed properly or not all though it relies majorly upon NESERA regulation agency itself implying its reliance on top officials at head who could undermine Authority given any sorta reasoning arising thereby bringing forth potential conflict if present between personal interest vs serving people first accordingly outlined law/rules embracing better transparency throughout Implementations under strict monitoring protocols concerning misuse/offenses against existing ones can mitigate mismatched outcomes problematically affecting general welfare positively putting public good above parochial concerns reflected into both benefitting local community largely efficiently.

III. Theoretical Framework, Empirical Review and Hypothesis development

Olawuyi (2015) argued that although there are several environmental theories, it appears that the theories are at the forefront. These theories include the Anthropocentric theory and the Eco-centric theory. The Anthropocentric theory posits that the goal of environmental protection is to preserve the abilities of humans to enjoy the environment and its resources. This theory focuses on the pains and pleasures of human beings as the reasons for environmental regulations. On the other hand, the Eco-centric posits that the environment should be protected for its intrinsic value and its own sake rather than preserving it for man's use. The Eco-centric theory was driven by the eco-sophy or ecological philosophy, whose philosophical outlook centres on environmental regulation should be nature-centred instead of a human-centred system of values for the environment as posited by the Anthropocentric. This article theorized about the anthropocentric theory of the environment. The reason for selecting the Anthropocentric is that the paper aims to assess the impact of the regulatory framework on the generation and consumption of renewable energy in Nigeria and, by extension, the contribution of renewable energy to the Nigerian GDP. The postulation of the Anthropocentric school, therefore, perfectly aligned with the objectives of the regulatory framework, which are meant to advance human well-being from the use of environment (renewable) energy.

Obinna (2023) examined the Nigerian's drive for energy transition from 2021. The article looked at some policy documents on the energy transition to guide the implementation of the Climate Change Act of 2021. The documents are the 2021 updated Nationally Determined Contributions (NDC) Report, the Nigerian Energy Transition Plan (NETP) launched in 2022 and the National Renewable Energy and Energy Efficiency Policy, 2015. NETP lists the likely benefits that energy transition may bring to Nigeria, especially in bridging the energy deficit gap, creating new jobs, attracting new investments, and regulating climate change. However, the two initial actions (NDC and NETP) appear to be very good documents and could not factor in some important points crucial to Nigeria's domestic or local realities. According to the article, Nigeria faces serious social and economic challenges caused by many factors. Chiefly among them is the decline in oil revenue due to the shrinking global oil market. Also, the extant instruments do not seem to have critically analysed Nigeria's clean technology strategy. They recommend that the action documents be reviewed to factor in the current social and economic realities of Nigeria in the same manner that Great Britain and Norway did because of the energy shortfall caused by the Russian and Ukraine war.

Daudu (2021) examined renewable energy's status, which is still in its infancy, with particular emphasis on the policies for renewable development to find out how relevant and effective they have been in the Nigerian energy mix. The paper finds that implementing the policies is not fully due to certain constraints, such as a lack of supporting legislation and the institution to administer the same and inadequate funding for the development of renewable energy in the country. When the article was written, there was no renewable energy legislation in the country, and only policies existed. The paper recommended renewable energy legislation and a renewable energy agency to enforce it for the rapid development and growth of renewable energy utilisation in Nigeria. The nation now has legislation that caters to renewable energy regulations, such as the Nigeria Electricity Act of 2023. Our aim, therefore, is to examine how effective the legislation has been in the promotion of renewable energy consumption in Nigeria.

The National Renewable Energy Action Plan is a document for developing Nigeria's renewable energy production under Section 4 of the ECOWAS Renewable Energy Policy (EREP). This is the key document of the Federal Government's national promotion of renewable energies and supports its policy objectives of security of supply, climate protection, competitiveness, promotion of technology and innovation, as well as securing and providing electricity access to the populace of Nigeria. The Action Plan sets targets for 2010, 2020, and 2030 generation capacity and recommends funding to implement the necessary infrastructure to meet the target. This paper aims to examine how far has the Action Plant has promoted renewable energy generation and consumption since it was formulated.

Olanrele (2021) noted that as at 2021 nonrenewable energy sources accounted for 80% energy generation in Nigeria. The paper then set to access how active policies could moderate the underlying political economy of renewable electricity integration in Nigeria for sustainability. The National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015 aimed at increasing electricity security and system and regulate climate change (FAO, 2015). The policy aimed at increasing renewable energy supplies to 8,188 Megawatts (MW) by 2020 and 23,135 MW by 2030 respectively. The paper however noted that by 2019 the total renewable electricity capacity of 2,152 MW was 74% less than the 2020 medium-term projection of 8,188MW. Consequently, the paper found that renewable electricity generation fell short of the projection thus; the policies make no positive dent in renewable energy development in Nigeria. The paper recommends for an improved government support mechanisms to accelerate the integration of renewables for sustainable electricity generation. The aim of this paper is to examine whether anything has change in the implementation of the policies.

Dioha et al. (2019) reviewed Nigeria's geographical set-up and renewable energy generation potential. The paper noted that Nigeria formulated the NREEEP to harness these potentialities, wherein certain targets were set. For the targets mentioned in the NREEEP to become a reality, these potentials must be converted to renewable energy power plants. The paper argued for lack of funds; there is a need to mobilise funds both within and outside to invest in the power sector. Consequently, the government needs to bring in new actors into the game. The private sector will have to play a significant role in all the chains of electricity production in Nigeria.

Gungah et al. (2019) examined the policies for the Nigeria's renewable energy projects and noted that, Nigeria's renewable energy policies are not effective and lacks elements for of a good policy design with no specific time bound objectives. They call for the policies amendments and creation of an institution to implement the policy. The current paper holds a contrary view. The policies particular NREEEP has time bound targets of 2010, 2020 and 2030 respectively. The current empirically studies the impact the policies have on RE generation and consumption in relation to the nation's GDP.

The theoretical foundations of a research are elucidated through a theoretical framework, which is derived from one or more hypotheses or theories. In this study, the variable will be grounded in environmental economic theory and stakeholder theory. Environmental economic theory accentuates how preserving natural resources plays an influential role within the economy as well as the ecosystem structure. Environmental economics is a field of research that combines environmental science and economics. The ecology is imperilled and is damaged more than ever as industrialisation proceeds apace. Consequently, this has increased people's awareness of the need to safeguard the environment. Hence, corporate development and environmental conservation can be trade-offs with the help of environmental economics theory. Specifically, to ensure sustainable development while minimizing the negative effects of economic activity on the environment (Agyemang et al., 2020; Zhang et al., 2022).

According to stakeholder theory, an organization would disclose environmental information in response to stakeholder pressure. It will address the demands and worries of influential stakeholders, with some of those reactions taking the form of strategic disclosures. Stakeholders in the context of a business include the general public, owners, creditors, staff members, clients, and suppliers who may be interested in the company's social and environmental initiatives. These organizations are referred to as "stakeholders." Different stakeholders have varying levels and types of influence over a company's operations. So, to sustain a successful working environment, "organizations are responsible to these stakeholders and rely upon their continued approval." (Freeman & Dmytriyev, 2017; Marcon-Nora et al., 2023).

IV. Hypothesis Development

The need for energy subsidies from the environment intensified as the Industrial Revolution got underway (Cuker et al., 2019; Fakher et al., 2023). According to (Cuker et al., 2019) initially, this societal upheaval was propelled by wind, water, and biomass burning. Regardless of the harm that is done to the environment during the production, processing, transportation, and consumption of fossil fuels, hydrocarbons are ultimately a limited resource and are thus intrinsically unsustainable. Therefore to power a sustainable future, society must turn to clean, renewable sources of energy. Various studies have shown that renewable energy has a constructive influence on environmental sustainability. According to the study conducted by (Fakher et al., 2023), there is a direct connection between environmental sustainability and the policies and the regulatory framework of the energy industry. Countries that rely on fossil fuels must move to renewable energy because renewable energy is thought to be more environmentally friendly due to the negative effects of energy on our

environment. There is a direct connection between environmental sustainability and the policies of the energy industry. Countries that rely on fossil fuels must move to renewable energy because renewable energy is thought to be more environmentally friendly due to the negative effects of energy on our environment. In view of the above, it hypothsesised that:

HI Renewable energy has a positive influence on environmental sustainability

Along with other production elements, energy has been seen as the defining factor for economic development, and its significance has steadily grown. Due to the increased need for energy as a result of rapid economic expansion and industrialisation, the energy sector interacts more with other economic sectors. Past studies have shown that economic growth causes environmental pollution because of the scale effect, which drives up production needs generally at the expense of the environment. In view of the above, it hypothsesised that:

H2 Renewable energy has a greater influence on environmental sustainability when there is high GDP

V. Methodology

Data for this study, spanning 30 years from 1992 to 2021, was provided by the World Bank. The researchers used a unit root test to determine their best prediction for the investigation. The best estimate for the analysis was determined to be an autoregressive distributed lag (ARDL) based on the test outcomes above. Environmental sustainability was the dependent variable, renewable energy consumption (REC) was the independent variable, and GDP per capita was the moderating variable. The variables and their definitions are detailed in Table 1.

Table 1. Variable Measurements.

Variable Name	Acronym	Variable Measurement	Source
Environmental sustainability	ENVSUS	policy and regulatory framework for environmental sustainability(1=low to 6=high)	Data-World Bank
Renewable energy consumption	REC	Percentage of total final energy consumption)	Data-World Bank
Gross Domestic Product	GDPPC	Natural log of GDP per capita	Data-World Bank

Source: Compiled by Authors

A. Model Specification

To assess the effect of renewable energy on the sustainability of the environment, we employed the ARDL model. The ARDL model is among the most dynamic and unrestricted models in the literature on econometrics. It uses a broad-to-explicit methodology, which increases the likelihood that it will be able to address a variety of econometric issues such serial correlation and misspecification and create the best estimation model. An ARDL (1, 1) model is viewed as we consider an ARDL (1, 1) model as

$"Yt = \beta 0 + \beta 1Xt + \beta 2Xt-1 + \beta 3Yt-1 + \varepsilon yt"$---------- **(i)**

"$\beta 0$ = Intercept, $\beta 2 = \beta 3 = 0$ Static regression",

"$\beta 1 = \beta 2 = 0$ First order autoregressive process",

"$\beta 3 = 1, \beta 1 = -\beta 2$ Equation in first difference",

"$\beta 2 = 0$ Partial adjustment equation"

Thus, the study's model two is as follows.

$$\mathbf{ENVSUS_t = \beta_O + \beta_1 REC_t + \beta_2\ GDPPC_t + \varepsilon_t} \text{.....(ii)}$$

By including the moderator, the study provides the following model in equation three.

$$\mathbf{ENVSUS_t = \beta_O + \beta_1 REC_t + \beta_2\ GDPPC_t + \beta_2\ REC*GDP + \varepsilon_t} \text{.....(iii)}$$

Where,

ENVSUS$_t$= Environmental sustainability, REC = Renewable energy consumption **GDPPC** = Natural log of GDP per capita, β_O to β_2 = regression confidents ε_t = error term and t = time.

B. Analysis and Interpretation

We performed a stationarity test utilizing the "Augmented Dickey-Fuller test and Philip Perron test" as a preliminary examination (Table 3). It was found that several variables had their integration at the orders of one and zero. Thus, to estimate the long-run association, we used the ARDL testing method.

C. Descriptive Analysis

The descriptive data for the study variables are shown in Table 2. To illustrate the nature of the data, mean, maximum, minimum, and standard deviation were employed. The Table shows that ENVSUS has an average score of 2.843, with minimum and highest values of 2 and 3.5, respectively. On average, the REC is 4.44, with the smallest and largest values respectively, being 4.39 and 4.49. From 9.11 to 13.62 is the range for the GDP per capita whilst 11.98 is the average GDP per capita.

Table 2. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ENVSUS	30.00	2.84	0.59	2.00	3.50
REC	30.00	4.44	0.03	4.39	4.49
GDPPC	30.00	11.98	1.35	9.11	13.62
REC*GDP	30.00	1334133.00	1186138.00	40469.22	3629885.00

Source: Compiled by authors from Stata Outcome

The Table 4 and Table 5 show the long run and short run estimates of all the variables without moderation. The findings from Table indicates the strong long-run relationship between ENVSUS, GDPPC and GDPPC and the in both long run and short run. The values of the long run and short run coefficients indicate that REC is significant at 5% level of significance in snowballing ENVSUS. This implies that an increase REC, increases the environmental sustainability in Nigeria.

Table 3. Stationarity Test

	Level		First difference	
	ADF	**PP**	**ADF**	**PP**
ENVSUS	-0.190	-1.594*	-2.992**	-2.625*
REC	-3.736	-12.628**	-1.1623*	-7.234*
GDPPC	-3.723**	-0.443	-3.930*	-2.480**

Source: Compiled by authors from Stata Outcome. ***Note:*** ** and ** indicate 10% and 5% significance level, respectively.*

The results support our prior expectation enclosed in the *H1 which assumes that the policy and regulatory framework on renewable energy consumption has an influence on environmental sustainability.* Similarly, the values of the long run and short run coefficients show that GDPPC is significant at 1% level of significance in enhancing the ENVSUS. This further implies that a higher GDPPC will lead to a higher the environmental sustainability rating in Nigeria. From the legal perspective, several legislative and regulatory frameworks provide by-laws that enforce strict limits on emanations thereby motivating a transition to clean energy sources. For instance, carbon levies add a cost on pollution thus, making REC a more striking option. These laws or regulations motivate companies and consumers to opt for renewable energy sources which in return reduce their carbon footpaths and encourage the adoption of sustainable goals.

Table 4. Long Run Estimates

	Direct Model		
Variables	**Coeff.**	**t-stat.**	**Prob. (*p*-value)**
ENVSUS	0.949	5.220***	0.000
REC	5.586	2.800**	0.014
GDPPC	0.444	12.970***	0.000

Source: Compiled by authors from Stata Outcome. ***Note:*** **** and ** indicate 1% and 5% significance level, respectively.*

Moreover, Table 6 and 7 reveal the moderation models of both the long run and short run relationship between the interaction variable REC*GDP and ENVSUS. The values of the long run and short run coefficients indicate that REC*GDP is significant at 10% and 1% level of significance in improving ENVSUS. This implies that a higher GDPPC improves the long run and short run relationship between REC and ENVSUS. The results support our prior expectation contained in the *H2 which states renewable energy consumption has a greater influence on environmental sustainability when there is high GDP.* The legal implication of this finding is that laws and regulations in higher GDP nations might prioritize the groping of renewable energy projects thru favourable legal frameworks thereby enabling these countries to attain higher green sustainability.

Table 5. Short Run Estimates

Direct Model			
Variables	**Coeff.**	**t-stat.**	**Prob. (*p*-value)**
ENVSUS	0.297	1.920*	0.074
REC	4.847	3.510**	0.003
GDPPC	1.351	3.550**	0.003

Source: Compiled by authors from Stata Outcome. ***Note:*** ** and ** indicate 10% and 5% significance level, respectively.*

Table 6. Long Run Estimates

Moderation Model			
Variables	**Coeff.**	**t-stat.**	**Prob. (*p*-value)**
ENVSUS	0.953	5.120***	0.000
REC	5.585	4.30***	0.001
GDPPC	0.400	10.140***	0.000
REC*GDP	9.530	1.790*	0.098

Source: Compiled by authors from Stata Outcome. ***Note:*** ****, ** and * indicate 1% 5% and 10% significance level, respectively.*

Table 7. Short Run Estimates

Moderation Model			
Variables	**Coeff.**	**t-stat.**	**Prob. (*p*-value)**
ENVSUS	0.481	2.890**	0.013
REC	7.124	4.410***	0.001
GDPPC	1.438	3.910***	0.001
REC*GDP	0.402	10.421***	0.000

Source: Compiled by authors from Stata Outcome. ***Note:*** **** and ** indicate 1% and 5% significance level, respectively.*

VI. Conclusion

Renewable Energy (RE) is crucial in all economic sectors, including manufacturing, construction, oil and gas and agriculture. It significantly improves the environmental quality of both developed and developing nations. This study investigates the influence of the policy and regulatory framework on renewable energy (RE) and its effect on environmental sustainability in Nigeria. It was concluded that the RE significantly affects environmental sustainability in Nigeria using "the Autoregressive Distributed Lag". When the nation's GDP is high, the

connection between RE and environmental sustainability is more noticeable. The Nigerian government's policymakers will find this study helpful in improving environmental quality. As they reform and draft laws to advance REC practice and environmental quality, Nigerian regulatory bodies and foreign regulators like the World Bank will also benefit from the study's findings.

Furthermore, the legal frameworks governing REC constructively influence ecological sustainability. This condition is because a well-designed regulation increases the shift to clean energy usage, mitigates environmental damage and promotes long-run ecological balance. Therefore, it is recommended that consistent review, supervision and enforcement of laws are pivotal in ensuring that renewable energy meaningfully contributes to the international sustainability goals.

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