NIGERIAN ENERGY CONSUMPTION AND THE EFFECT ON THE ECONOMY

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ABSTRACT
This study explores Nigerian energy consumption using a mixed methods approach, combining both quantitative and qualitative analyses to provide a comprehensive understanding of the sector. Quantitative data were derived from structured questionnaires administered to 80 individuals across Yenagoa and Otuoke, with a 93.75% response rate. Descriptive and inferential statistics were employed to assess awareness levels, consumption patterns, and the relationship between key variables such as funding, regulation, and renewable energy adoption. Results indicate high awareness (92%) of renewable energy sources, with hydro energy being the most used (53.33%) among respondents. However, actual consumption remains low, with most respondents using only 0-20% of their energy from renewable sources- mainly due to cost. Qualitative analyses, including thematic, content, and SWOT analysis, highlight policy gaps, stakeholder perceptions, and systemic challenges impacting renewable energy deployment. The findings support the model: GDP growth is influenced by solar and hydro energy consumption as well as overall energy usage levels. The study concludes with recommendations aimed at enhancing policy frameworks, improving energy affordability, and promoting wider adoption of renewable energy to drive sustainable economic growth in Nigeria.
Keywords: *Otuoke, Energy-Consumption, adoption, qualitative-analyses, economic growth*

1.1 INTRODUCTION

Nigeria's renewable energy consumption remains low compared to its overall energy demand. The country is primarily reliant on fossil fuels, with oil and gas accounting for over 80% of energy production (Oyedepo, 2012). Renewable energy sources such as solar, wind, hydro and biomass contribute only a small percentage to the national energy mix, despite Nigeria's vast renewable energy potential (Sambo, 2009). Hydropower is the most significant renewable energy source in Nigeria, contributing about 20% of electricity generation (Adaramola, 2015). However, due to poor infrastructure inconsistent government policies and seasonal variations in water levels, the efficiency of hydropower plants is often compromised (Sule, 2019). Solar energy, while abundant, remains underutilized due to high initial costs and inadequate investment in technology (Olanrewaju, 2020).

1.2 Background to the Study

Renewable energy plays a critical role in addressing global energy challenges and ensuring sustainable development. In Nigeria, where energy demand significantly outpaces supply, the transition to renewable energy sources has become imperative (Chineke, Otanaku & Ezike, 2010). This paper outlines the level of intensity of consumption, challenges and opportunities surrounding renewable energy consumption in Nigeria, focusing on stakeholders and its implications for policy and implementation.

Nigeria, the most populous country in Africa, has abundant natural resources, including substantial renewable energy potentials such as solar, wind, biomass, and hydropower. Despite this, the country's energy sector is dominated by fossil fuels, contributing to environmental degradation and inadequate energy access. Renewable energy adoption is essential for achieving energy security, reducing greenhouse gas emissions, improving socio-economic conditions and enhancing economic growth (Ogunmodimu & Okoroigwe, 2018).

Inconsistent policies and lack of enforcement have slowed down renewable energy adoption even the Energy Master Plan (REMP) exists but has faced implementation challenges (Ohunakin, 2014). Poor grid infrastructure limits the integration of renewable energy into the national grid (Aliyu, 2018). Additionally, limited technical expertise in renewable energy technologies affects deployment and maintenance. High capital costs and limited access to financing discourage private sector investment (Iwayemi, 2008). In terms of public awareness and acceptance, many Nigerians are unaware of the benefits of renewable energy, leading to slow adoption rates (Olugbenga, 2016). Despite the challenges,

Nigeria has vast opportunities to expand renewable energy; according to Fagbenle (2011), Nigeria has an estimated solar potential of 5.5kWh/m^2 per day, making solar power highly viable. Wind and biomass also have significant potential for rural electrification. The federal government has introduced incentives such as the rural electrification fund and power sector recovery program (PSRP) to boost investment in renewables (Olugbenga, Samuel & Oke, 2016).

1.2 Statement of the Problem

Nigeria faces a critical energy deficit, with millions of citizens lacking access to reliable electricity. Despite the country's abundant renewable energy resources, the energy sector remains dominated by fossil fuels, which are both environmentally unsustainable and insufficient to meet growing demand. The over-reliance on non-renewable energy sources has resulted in frequent power outages, limited industrial growth, and adverse environmental impacts such as deforestation and carbon emissions (Sambo, 2009).

Additionally, existing renewable energy initiatives are hampered by several challenges, including inadequate funding, weak regulatory frameworks, and low public awareness. These issues are compounded by a lack of technical expertise and limited stakeholder engagement, which hinder the implementation and scalability of renewable energy projects. Without addressing these barriers, Nigeria risks perpetuating energy poverty and missing out on the socio-economic and environmental benefits of renewable energy adoption. On this backdrop, this study attempts to determine the relationship that exist between renewable energy and economic performance in Nigeria, to be able ascertain the level and intensity of consumption, the challenges and opportunities associated with the consumption of renewable energy.

1.3 Objectives of the Study

The main objective of this study is to examine the relationship that renewable energy consumption has on the economy of Nigeria, whereas the specific objectives of this study aims to; determine if there exist any significant relationship between solar energy consumption and economic growth in Nigeria; to examine the significant relationship that exist between hydro energy consumption and economic growth in Nigeria; lastly, to determine the effect of the level, intensity of these renewable energy consumption on the economy of Nigeria. The hypotheses of the Study are all stated in null forms, specifying that no significant relationship exists between hydroelectric power consumption, solar power consumption and economic growth on one front; while there is no significant effect, intensity that renewable energy consumption has on the growth of the economy of Nigeria.

2.0 Literature Review

This section expresses the conceptual, empirical, research gap and the theoretical literature for a better understanding of consumption of renewable energy and its effect on the economy of Nigeria.

2.1 Conceptual Review

The conceptual framework of this study is anchored on the principles of sustainable energy development, emphasizing the integration of renewable energy resources to achieve environmental, economic, and social benefits. Key concepts include:

Renewable Energy: Energy derived from natural processes that are replenished constantly, including solar, wind, hydropower, and biomass. This concept underpins the shift away from fossil fuels toward more sustainable energy sources (Ogunmodimu & Okoroigwe, 2018).

Level and Intensity of Energy Consumption: Renewable energy consumption in Nigeria is very low when reasoned with the demand of energy for domestic, business and industrial needs. Over reliant on fossil fuels, has left the renewable energy option redundant and not fully tapped (Oyedepo, 2012). In same vein, Sambo (2009), re-emphasized that renewable energy sources are not adequately tapped and so it accounts for only a meagre percentage to the total national energy consumed, even though Nigeria is blessed with a huge renewable energy potential.

Challenges of Renewable Energy Consumption: According to Akinbami (2001), policy and regulatory barriers which is seen in the form of inconsistencies in the policies and enforcement, slows down the adoption of renewable energy as the main energy source. Aliyu (2018), emphasized the poor grid infrastructural and technical expertise constraint that has affected the development and maintenance of the renewable energy sources. The high cost of renewable energy infrastructure and the level of public awareness are other areas of concern, that restricts the adequate exploration of this energy resources (Iwayemi, 2008).

Sustainability: Meeting the energy needs of the present without compromising the ability of future generations to meet their own needs, is the major benefit of renewable energy, that is why it is sort after by every nation including Nigeria (Okoroigwe, 2018). This involves balancing economic growth, environmental protection, and social well-being.

Policy and Regulatory Frameworks: The policies, laws, and regulations that guide the development, financing, and implementation of renewable energy projects. Effective frameworks are crucial for creating an enabling environment for renewable energy adoption.

Public Awareness and Education: The process of informing and educating citizens about the benefits and opportunities of renewable energy. This concept is critical for overcoming resistance and ensuring the successful adoption of renewable energy technologies.

Current State of Renewable Energy in Nigeria

The Nigerian government has developed several policies, including the Renewable Energy Master Plan (REMP) and the National Renewable Energy and Energy Efficiency Policy (NREEEP), to encourage the adoption of renewable energy. However, implementation has been slow due to limited funding, weak regulatory enforcement, and infrastructural deficits (Adaramola, 2015). Some notable projects include solar mini-grids in rural areas and hydropower plants such as the Kainji and Jebba dams. However, these projects are insufficient to meet national energy demands (Chineke, Otaraku & Ezike, 2010).

Consent and Stakeholder Engagement

The success of renewable energy initiatives in Nigeria requires the consent and active participation of key stakeholders, including government agencies, private investors, local communities, and international partners. Key considerations include; engaging local communities is essential to ensure their understanding, acceptance, and ownership of renewable energy projects. This can be achieved through education campaigns, stakeholder consultations, and participatory planning (Sule, Adeniran & Sanni, 2019). Iwayemi (2008), stated that transparent and consistent policies are crucial to attract investment and build trust among stakeholders. Simplifying approval processes and providing incentives for renewable energy projects can enhance compliance and participation.

Adeoti, Oyewole and Adegboyega (2021) in their study, stressed on the role private sector plays in financing and implementing renewable energy projects. Creating a conducive business environment through tax breaks, subsidies, and public-private partnerships can encourage more investment. International Cooperation that Leverages international funding, technology transfer, and expertise can accelerate Nigeria's renewable energy transition. Collaborating with global organizations such as the United Nations, World Bank, and African Development Bank (Akinbami, 2021).

Benefits of Renewable Energy Adoption are numerous which are but not limited to, environmental sustainability- reduced dependence on fossil fuels and lowering carbon emissions thereby mitigating climate change effects. Renewable energy solutions, especially off-grid solar systems, can provide electricity to rural and underserved areas. Investments in renewable energy also create jobs, stimulate local industries, and foster innovation (Aliyu, Ramli & Saleh, 2018). Reducing reliance on traditional biomass for cooking and lighting improves indoor air quality and reduces health risks.

2.2 EMPIRICAL REVIEW

The empirical review provides an analysis of existing studies and data on renewable energy consumption in Nigeria and globally, highlighting trends, challenges, and successful case studies. For causality in cross-countries and within country specific contexts, different studies have found bidirectional causality to exist between economic performance and renewable energy consumption (Apergis and Payne, 2010; Fang, 2011; Rafindadi and Ozturk, 2017; Tugcu, 2013). Other studies concluded the unidirectional causality to economic growth from renewable energy consumption, confirming the growth hypothesis (Bhattacharya et al., 2016; Esso, 2010; Fang, 2011; Leitão, 2014; Payne, 2010), others have found unidirectional causality from economic growth as a result of renewable energy consumption hence, supporting the hypothesis of conversation (Ocal and Aslan, 2013).

Sari and Soytas (2008) used ARDL model with respect to disaggregated measures of U.S. renewable energy consumption to estimate that industrial production has an impact on renewable energy consumption in the country studied. Bowden and Payne (2010), in a sectoral analysis of renewable energy consumption, a unidirectional causality result is shown from the residential renewable energy consumption to real output while the absence of a causal relationship is revealed between commercial and industrial renewable energy consumption and real output.

Payne (2010) found a unidirectional causality from biomass energy consumption to output for the U.S. Yildirim et al. (2012) apply the Toda-Yamamoto procedure and bootstrap-corrected causality test on the US data; the biomass energy consumption, hydropower energy consumption and biomass-wood-derived energy consumption were used, while employment and gross capital formation are used as control variables revealing through empirical evidence that a unidirectional causality runs from biomass energy consumption to economic growth; while the neutrality hypothesis is supported between economic growth and all of the other renewable energy types as well as the total renewable energy consumption.
Ocal and Aslan (2013) studied the causal relationship between renewable energy use and economic growth in Turkey. Using the ARDL method of data analysis and Toda-Yamamoto and found out that there exists a unidirectional causality relationship between economic growth and renewable energy consumption. Whereas, Lean and Smyth (2013) focus on a single country, on how a disaggregated energy type of framework is applied, while they use an augmented production function approach to determine the relationship between energy consumption (fuel) and economic growth in Malaysia. Finding out that diesel and motor petrol are the major contributors to economic growth in the long-run.

Tuggu (2013) in his research studied relationships (both long and short run relationships) between disaggregate energy consumption and total factor productivity growth in the Turkish economy. He found out that disaggregates consumption of energy is cointegrated to total factor productivity growth as well as a bi-directional causal relationship among the variables in consideration. Leitao (2014) also investigates the correlation between economic growth, carbon dioxide emissions, renewable energy and globalization, revealing a strong and positive link between renewable energy and economic performance.

Dietzenbacher *et al.* (2020) noted that renewable energy sources do not have any impact on the human life through the environmental even if there is an increase CO2 emission. However, it has significant energy potential (Gundebommu, 2020). In the study of Güney (2019) and Güney and Kantar (2020) researchers founded out that renewable energy sources are the most suitable energy sources to ensure sustainable development goals. High-income countries are thought to have the greatest impact on CO2 emissions and economic growth, it was supported by studies analyzing the energy impact of high-income countries on CO2 (Topcu et al., 2020) and GDP (Arminen and Menegaki, 2019).

3.0 METHODOLOGY

This implies the systematic approach used to investigate economic questions, the data that will be for the study, the research design, data collection methods, analytical techniques and theoretical framework that are used to answer specific research question.

3.1 Data Collection Methods

The study will employ a mixed-methods approach, combining both qualitative and quantitative data collection techniques to ensure a comprehensive analysis of renewable energy consumption in Nigeria. The methods include:

Primary Data Collection:

Surveys and Questionnaires: Structured questionnaires will be administered to households, businesses, and stakeholders to gather data on energy usage patterns, awareness of renewable energy, and perceptions of its benefits and challenges.

Interviews: Semi-structured interviews will be conducted with key stakeholders, including policymakers, energy sector experts, private investors, and community leaders, to gain in-depth insights into the barriers and opportunities in renewable energy adoption.

Secondary Data Collection:

Document Analysis: Policy documents, government reports, and international energy agency publications will be reviewed to understand the regulatory frameworks and national targets for renewable energy.

Academic Literature: Existing scholarly works and case studies on renewable energy projects in Nigeria and other comparable countries will be analyzed to draw relevant lessons.

Statistical Data: Data from institutions such as the International Renewable Energy Agency (IRENA), the World Bank, and Nigeria's Energy Commission will be used to examine trends and quantify renewable energy potential.

3.2 Methods of Data Analysis

The collected data will be analyzed using a combination of quantitative and qualitative methods to provide a holistic view of renewable energy consumption in Nigeria.

Quantitative Analysis:

Descriptive Statistics: Data from surveys will be analyzed to summarize energy consumption patterns, levels of awareness, and perceived barriers to renewable energy adoption. Measures such as means, percentages, and frequency distributions will be used.

Inferential Statistics: Hypotheses testing will be conducted using statistical tools such as chi-square tests, regression analysis, and correlation analysis to evaluate relationships between variables such as funding availability, regulatory frameworks, and renewable energy adoption.

Qualitative Analysis:

Thematic Analysis: Data from interviews and questionnaire responses will be analyzed thematically to identify recurring themes and patterns related to stakeholder perceptions, policy gaps, and community-level challenges.

Content Analysis: Policy documents and literature will be systematically analyzed to assess the comprehensiveness and effectiveness of Nigeria's renewable energy frameworks.

SWOT Analysis: A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis will be used to evaluate Nigeria's renewable energy sector, identifying internal and external factors that influence its development. The combined analysis methods will provide actionable insights into the current state of renewable energy consumption in Nigeria and inform recommendations for policy, implementation, and stakeholder engagement.

4.0 Results and Discussions

The structured research questionnaire that is used for the data collection was administered to eighty (80) individuals in Yenagoa and Otuoke (which serves as the scope of this study), in respect to the primary

data used. Seventy-Five (75) questionnaires were filled as returned (about 93.75%) out of the eighty (80) distributed questionnaires. The responses comprise of residents of Bayelsa state in the communities earlier mentioned; majority of the age bracket that responded were 36-45 age bracket; mostly male that have at least a bachelor degree who are employed in the public sector. In terms of the awareness and usage of renewable energy (which explains the intensity of renewable energy usage); 92% of the respondents are aware of renewable energy sources such as solar, wind, hydro and biomass but 53.33% of these respondents uses hydro energy as the source of most of their energy in business as well as at their homes; this indicates that the renewable energy use is frequent within the sampled population. The percentage of energy consumption from renewable sources is between 0-20% for majority of the respondents which is classified as being low; that is influenced by the cost of renewable energy. Over three quarter of the respondents believe that renewable energy consumption contributes to economic growth through increased productivity.

The model of this study shows that economic growth that is proxied by gross domestic product growth (GDPG), is affected by the solar energy consumption, hydro energy consumption and the level and intensity of energy consumption of other energy sources as well as revealed; GDPG = f(SE, HE, LIE). In respect to the content analysis, empirical literatures from previous studies are analyzed to help give policy direction when it comes to the level, intensity, opportunity and challenges that are associated with renewable energy consumption towards the improvement of the economy of Nigeria.

S/N	Author/s	Title of Article/ Paper	Main Objective	Method of Data Analysis	Result from Analysis	Conclusion & Recommendation
1.	Fang, Y. (2011)	Economic welfare impacts from renewable energy consumption.	To determine the impact that renewable energy has on energy consumption.	Employed econometric models to analyze the impact of renewable energy consumption on China's economic welfare.	Identified a positive correlation between renewable energy use and economic welfare in China.	Fang advocated for policies promoting renewable energy to enhance economic welfare.
2.	Rafindadi, A.A., & Ozturk, I. (2017)	Impacts of renewable energy consumption on the German economic growth.	To verify renewable energy consumption impact on the economy of Germany.	Utilized combined cointegration tests to assess the relationship between renewable energy consumption and economic growth in Germany.	Found a long-term equilibrium relationship indicating that renewable energy consumption positively influences economic growth.	Recommended increased investment in renewable energy to sustain economic growth.
3.	Esso, L. J. (2010)	Threshold cointegration and causality relationship between energy use and growth in seven African countries.	Determination of causal relationship between energy use and economic growth in selected African countries.	Applied threshold cointegration and causality tests to examine use and economic growth across seven African countries.	Discovered country-specific dynamics, with some nations exhibiting bidirectional causality between energy consumption and economic growth.	Highlighted the need for tailored energy policies considering each country's unique energy growth relationship.
4.	Leitao, N. C. (2014)	Economic growth, carbon dioxide	To establish the effect that carbon dioxide	Investigated the interplay between	Identified that renewable energy	Suggested that integrating renewable energy

		emissions, renewable energy and globalization.	emission, renewable energy and globalization on the economy.	economic growth, CO_2 emissions, renewable energy and globalization using panel data analysis.	consumption and globalization contribute to reducing CO_2 emissions without hindering economic growth.	and globalization can achieve sustainable economic development.
5.	Payne, J. E (2010)	Survey of the international evidence on the causal relationship between energy consumption and growth.	Determination of the causal relationship between energy consumption and economic growth.	Conducted a comprehensive survey of international studies on the causal relationship between energy consumption and economic growth.	Found mixed evidence regarding the direction of causality, varying by country and methodology.	Emphasized the importance of country specific studies to inform energy policy decisions.
6.	Ocal, O., & Aslan, A. (2013)	Renewable energy consumption-economic growth nexus in Turkey.	Examination of the effect of renewable energy consumption on the growth of the economy of Turkey.	Explored the nexus between renewable energy consumption and economic growth in Turkey using time-series analysis.	Observed that renewable energy consumption does not significantly impact economic growth in the short term.	Called for supportive policies to enhance the role of renewable energy in Turkey's economy.
7.	Sari, R., & Soytas, U. (2008)	The relationship between disaggregate energy consumption and industrial production in the United States.	To examine the relationship between industrial production and the disaggregate energy consumption in the United State.	Employed and Autoregressive Distributed Lag (ARDL) approach to study the relationship between disaggregated energy consumption and industrial production in the U.S.	Identified that different energy sources have varying impacts on industrial production.	Recommended considering the specific effects of each energy type in policy formulation.
8.	Bowden, N., & Payne, J. E (2010).	Sectoral analysis of causal relationship between renewable and non-renewable energy consumption and real output in the US.	Examining the causal relationship that exist between renewable energy consumption and the United State of America.	Analyzed the causal relationship between renewable and non-renewable energy consumption and real output in the U.S using sectoral data.	Found sector-specific variations in the energy-growth nexus.	Suggested that energy policies should be tailored to individual sectors to effectively promote economic growth.
9.	Yildirim, E. (2010)	Energy consumption and economic growth nexus.	The determination of economic growth and energy consumption.	Investigated the energy consumption and economic growth nexus in Turkey using causality tests.	Found evidence of unidirectional causality from energy consumption to economic growth.	Highlighted the critical role of energy consumption in driving Turkey's economic growth.

10.	Lean, H. H., & Smyth, R. (2013)	Disaggregated energy demand by fuel type and economic growth in Malaysia.	Examine the level of disaggregated energy demand and growth in the economy of Malaysia.	Conducted a disaggregated analysis of energy demand by fuel type and its relationship with economic growth in Malaysia.	Found that different fuel types have distinct impacts on economic growth.	Emphasized the need for fuel specific energy policies to optimize economic outcome.
11.	Dietzenbacher, E. (2020)	Input-Output analysis: A tool for policy and forecasting in regards with energy consumption.	Examination of the effect of energy consumption through the input-output analysis.	Discussed the application of input-output analysis as a tool for policy and forecasting in the context of energy economics.	Demonstrated the effectiveness of input-output analysis in understanding the energy-economy relationship.	Advocated for the integration of input-output analysis in energy policy planning.
12.	Gurney, K. R., & Kantar, L. E. (2020)	The impact of urbanization on fossil fuel CO_2 emissions.	Determination of the effect of CO_2 emission on level of the urbanization.	Examined the impact of urbanization on fossil fuel CO_2, emissions in U.S metropolitan areas using empirical analysis.	Found that urbanization contributes significantly to increased CO_2 emissions.	Suggested that urban planning should incorporate strategies to mitigate CO_2 emissions.
13.	Topcu, M. (2020)	The impact of renewable energy consumption on income inequality.	Income inequality determination as a result of renewable energy consumption.	Investigated the impact of renewable energy consumption on income inequality in developed countries using panel data analysis.	Found that renewable energy consumption helps reduce income inequality.	Encouraged the promotion of renewable energy as a tool for achieving both economic and social benefits.
14.	Arminen, H., & Menegaki, A. N	Corruption, climate and the energy-environment-growth nexus.	Examination of corruption, climate and energy environment to the growth of the economy.	Explored the interplay between corruption, climate and the energy-environment-growth nexus using econometric models.	Identified that corruption undermines the positive effects of renewable energy on economic growth and environmental quality.	In all, corruption has to be handles before the positive effect of energy consumption will be felt.

Based on the empirical literature, in respect to the content analysis, it is revealed that; adequate tailored policies are important in the bid to optimize economic outcome; increase investment, integrating renewable energy and globalization helps in the achievement of sustainable economic development; energy consumption is critical in driving economic growth; advocated for the integration of input-output analysis in energy policy planning; suggested that urban planning should incorporate strategies to mitigate CO_2 emissions; encouraged the promotion of renewable energy as a tool for achieving both economic and social befits; financially, corruption has to be handled before the positive effect of energy consumption will be felt. These conclusions were all directing towards the benefit that the economy will get as a result of the consumption of energy in different countries.

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

Renewable energy consumption plays a vital role in Nigeria's economic growth by providing a sustainable and environmentally friendly environmentally friendly alternative to fossil fuels. Nigeria has abundant renewable energy resources, including solar, wind, biomass, and hydroelectric power, but they remain underutilized due to infrastructural and policy constraints. This research indicates that increased renewable energy consumption positively impacts economic growth by reducing energy costs, enhancing productivity, creating jobs, and improving energy security. However, challenges such as inadequate investment, regulatory barriers, and lack of public awareness hinder its development. Empirical studies show a long-term relationship between renewable energy consumption and GDP growth, emphasizing the need for strategic policies to harness its full potential in the face of natural resources abundance.

Conclusion

This study concludes that renewable energy consumption significantly contributes to Nigeria economic growth from the responses from respondents and the outcome of the analysis; by fostering industrialization, reducing dependence on imported fossil fuels and mitigating environmental degradation. While progress has been made, the country still faces numerous challenges in fully integrating renewable energy into its energy mix. Government support, private sector participation and international collaboration are essential for achieving a sustainable transition to renewable energy as seen from the responses from the respondents.

Recommendations

1. **Policy and Regulatory Framework:** The government should implement clear policies that encourage investment in renewable energy, including tax incentives and subsidies for businesses in the sector.
2. **Investment in Infrastructure:** Increased funding for renewable energy projects, particularly in rural areas, can enhance access to electricity and drive economic development.
3. **People- Private Partnership:** Collaboration between the government and private investors can accelerate the adoption of renewable energy technologies is recommended.
4. **Research and Development:** Encouraging research on innovative renewable energy solutions will enhance efficiency and cost-effectiveness.
5. **Public Awareness and educations:** Educating citizens and businesses on the benefits of renewable energy can drive its acceptance and adoption.
6. **Integration into the National Grid:** Strengthening the electricity grid to accommodate renewable energy sources will ensure stable and efficient power distribution. By addressing these issues, Nigeria can fully leverage renewable energy to promote economic growth, energy security and environmental sustainability.

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