



# Economic And Financial Implications of Renewable Energy Adoption in Nigeria: Policy Frameworks, Financing Mechanisms, And Sustainable Growth Outcomes

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## Abstract

*This study examines the economic and financial implications of renewable energy adoption in Nigeria, focusing on the role of policy frameworks, financing mechanisms, and sustainable growth outcomes. Using a mixed-methods approach, data were collected from 300 respondents through structured questionnaires and supplemented with secondary sources. Descriptive and inferential statistical analyses, including Ordinary Least Squares (OLS) and Logistic Regression models, were employed to evaluate the economic benefits of renewable energy, factors influencing adoption, and the effectiveness of financing and policy interventions. Findings reveal that renewable energy adoption significantly enhances economic outcomes, including job creation, cost savings, energy security, and local development. The study identifies access to financing, public awareness, and supportive policy frameworks as critical determinants of adoption, with innovative financing mechanisms such as green bonds and public-private partnerships playing a key role in overcoming financial constraints. Additionally, the results emphasise the importance of targeted government incentives and community engagement initiatives in promoting sustainable energy transition. The study concludes that coordinated efforts among government, private sector, and civil society are essential to maximise the economic and developmental benefits of renewable energy adoption. These insights provide practical guidance for policymakers and stakeholders seeking to leverage renewable energy to drive sustainable economic growth in Nigeria.*

## Original Research Article

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## INTRODUCTION

Nigeria's energy sector occupies a central position in the country's economic development discourse, given its direct link to industrial productivity, employment generation, and social welfare (Ibrahim et al., 2025a). Despite being endowed with abundant fossil fuel resources, Nigeria continues to face persistent electricity shortages, a heavy reliance on diesel- and petrol-powered generators, and significant energy access gaps, particularly in rural areas (Ologbonori et al., 2025). These challenges have constrained economic growth and increased production costs for households and firms. In response, renewable energy has emerged as a strategic alternative capable of diversifying the energy mix, improving energy security, and supporting inclusive economic development (Adenikinju, 2020; International Energy Agency, 2023; Al-Amin et al., 2025).

The adoption of renewable energy technologies such as solar, wind, small hydropower, and biomass—has important economic implications for Nigeria (Umar et al., 2025). Beyond environmental benefits, renewable energy investment has the potential to stimulate job creation, reduce dependence on imported energy, enhance productivity, and lower long-term energy costs (Sadiq et al., 2025). Studies suggest that decentralised renewable systems can significantly improve electricity access for underserved communities, thereby supporting small and medium-scale enterprises and local economic activities (Oyedepo, 2014; World Bank, 2022). Consequently, renewable energy is increasingly viewed not only as an environmental solution but also as a catalyst for sustainable economic growth (Dickson et al., 2025).

Policy frameworks play a critical role in shaping renewable energy adoption outcomes in Nigeria. Government initiatives such as the National Renewable Energy and Energy Efficiency Policy (NREEEP) and the Renewable Energy Master Plan reflect efforts to create an enabling regulatory environment. However, policy inconsistencies, weak enforcement, and regulatory uncertainty have limited large-scale private sector participation. Effective policy design characterised by transparency, incentives, and institutional coordination is therefore essential to unlock the economic and financial benefits of renewable energy deployment (Adewuyi & Awodumi, 2017).

Financing mechanisms represent another major determinant of renewable energy growth in Nigeria. Renewable energy projects are often capital-intensive, requiring long-term financing structures that remain underdeveloped in the domestic financial market. Limited access to credit, high interest rates, currency risks, and inadequate risk mitigation instruments have constrained investment flows into the sector (Magaji et al., 2023). Nonetheless, emerging mechanisms such as green bonds, public-private partnerships, climate finance, and multilateral development funding present new opportunities to scale renewable energy investments and improve project bankability (Ondraczek, Komendantova, & Patt, 2015; Suleiman et al., 2025; Tanko et al., 2025).

Against this backdrop, this study examines the economic and financial implications of renewable energy adoption in Nigeria, with particular emphasis on policy frameworks, financing mechanisms, and sustainable growth outcomes. By integrating economic, institutional, and financial perspectives, the study seeks to provide evidence-based insights for policymakers, investors, and development stakeholders. Ultimately, understanding how renewable energy adoption can be effectively financed and governed is critical for positioning Nigeria on a path toward sustainable, resilient, and inclusive economic growth.

## **LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

### **CONCEPTUAL REVIEW**

#### **ECONOMIC IMPLICATION**

Economics concerns the production, distribution, and consumption of goods and services, and how scarce resources are allocated to meet societal needs. In development studies, the economic dimension emphasises growth, productivity, income generation, employment, and welfare improvement (Enaberue et al., 2024). Within the energy sector, economic analysis examines how energy availability and efficiency affect industrial output, competitiveness, and overall national income. An adequate and affordable energy supply is widely recognised as a prerequisite for economic transformation, particularly in developing economies where energy deficits constrain growth and structural change (Adenikinju, 2020; World Bank, 2021; Inyang et al., 2025).

#### **FINANCIAL IMPLICATION**

The *financial* concept refers to the management, mobilisation, and allocation of monetary resources for investment and operational activities (Ismail et al., 2025). In the context of energy development, finance determines the feasibility, scale, and sustainability of projects through instruments such as credit, equity, bonds, and grants (Igwe et al., 2021; Okoroafor et al., 2018). Financial analysis typically examines capital costs, risk profiles, returns on investment, and access to funding. In emerging economies like Nigeria, financial constraints such as high interest rates, shallow capital markets, and currency risks significantly affect infrastructure and energy investment decisions (Gatti et al., 2018; Beck & Levine, 2004).

#### **RENEWABLE ENERGY**

*Renewable energy* refers to energy derived from naturally replenishing sources such as solar, wind, hydropower, biomass, and geothermal resources. Unlike fossil fuels, renewable energy sources are sustainable and produce minimal greenhouse gas emissions, making them central to global climate change mitigation strategies (Ibrahim et al., 2025b; Abubakar et al., 2025). Beyond environmental advantages, renewable energy contributes to energy security, rural electrification, and decentralised power generation. In Nigeria, abundant renewable resources particularly solar and hydropower present significant opportunities to expand electricity access and support socioeconomic development (Oyedepo, 2014; International Energy Agency, 2022).

#### **POLICY FRAMEWORKS**

*Policy frameworks* encompass the laws, regulations, strategies, and institutional arrangements that guide decision-making and implementation within a sector. In renewable energy development, policy frameworks define market rules, investment incentives, tariffs, licensing procedures, and regulatory oversight. Effective policy frameworks reduce uncertainty, attract private investment, and ensure coordination among stakeholders. Conversely, weak or inconsistent policies can discourage investment and slow sectoral growth. In Nigeria, renewable energy policies aim to diversify the energy mix and promote sustainability, but their effectiveness largely depends on enforcement capacity and institutional coherence (Adewuyi & Awodumi, 2017).

#### **FINANCING MECHANISMS**

*Financing mechanisms* are the tools and structures used to mobilise funds for projects and programs. In renewable energy, these mechanisms include public funding, commercial bank loans, equity financing, public-private partnerships, green bonds, and international climate finance. Given the capital-intensive nature of renewable energy projects, appropriate financing mechanisms are essential to reduce upfront costs and mitigate investment risks. Multilateral development finance institutions and climate funds have increasingly supported renewable energy in

developing countries to bridge financing gaps and improve project viability (Ondraczek, Komendantova, & Patt, 2015).

## **SUSTAINABLE GROWTH OUTCOMES**

*Sustainable growth outcomes* describe long-term economic expansion that balances economic efficiency, social inclusion, and environmental protection. Unlike conventional growth models that prioritise output expansion alone, sustainable growth emphasises resilience, intergenerational equity, and resource conservation (Mansur et al., 2025). Renewable energy adoption is closely linked to sustainable growth outcomes because it supports low-carbon development, enhances energy access, creates green jobs, and reduces environmental degradation. For countries like Nigeria, aligning energy development with sustainability objectives is critical for achieving inclusive growth and meeting global development commitments (United Nations Development Programme, 2020; Stiglitz, Sen, & Fitoussi, 2009).

## **THEORETICAL REVIEW**

### **SUSTAINABLE DEVELOPMENT THEORY**

*Sustainable Development Theory* provides a strong theoretical foundation for examining the economic and financial implications of renewable energy adoption in Nigeria. The theory emphasises development that meets present needs without compromising future generations' ability to meet their own needs by integrating economic growth, social inclusion, and environmental protection. In the context of renewable energy, the theory explains how investments in clean and renewable energy sources can promote long-term economic efficiency, reduce environmental externalities, enhance energy security, and improve social welfare. For Nigeria, adopting renewable energy aligns with Sustainable Development Theory by supporting productive economic activities, attracting green finance, reducing dependence on fossil fuels, and fostering resilient growth pathways. The theory, therefore, justifies the focus of this study on policy frameworks and financing mechanisms as critical instruments for achieving sustainable growth outcomes through renewable energy adoption (Brundtland Commission, 1987; United Nations, 2015).

### **EMPIRICAL REVIEW**

Adeshina (2024) adopted a quantitative research design and examined data drawn from multiple renewable energy projects implemented across Nigeria to evaluate their economic effects. The findings showed that renewable energy initiatives especially solar and wind projects have substantially lowered energy costs, with reductions of up to 30 per cent recorded in some locations. The study further revealed that improved electricity access resulting from these projects supported local economic activities by encouraging the growth of small-scale enterprises. Overall, the evidence highlights the capacity of renewable energy deployment to strengthen economic resilience and enhance living standards

in marginalised and energy-poor communities (Adeshina, 2024).

A report by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ, 2023) employed case-study analysis to examine renewable energy projects in Nigeria, with an emphasis on implementation challenges. The study identified socio-cultural constraints such as limited public awareness and scepticism toward new technologies as significant obstacles to widespread adoption. In addition, the report noted that many financial institutions were hesitant to support renewable energy projects due to high perceived risks. The findings emphasise the need for stronger public sensitisation, stakeholder engagement, and confidence-building measures to address social and institutional barriers to renewable energy development.

Using a comparative analytical approach, the International Renewable Energy Agency (IRENA, 2020) assessed renewable energy financing mechanisms across several countries, including Nigeria. The study underscored the critical role of innovative financing instruments such as green bonds and public-private partnerships in mobilising large-scale investment for renewable energy projects. It concluded that Nigeria has significant potential to attract renewable energy finance if appropriate, context-specific financing structures are developed. The report, therefore, stressed the importance of customised financial solutions to address capital constraints and accelerate renewable energy adoption.

An empirical investigation by the World Bank (2021) analysed renewable energy projects in Nigeria to evaluate the performance of different financing models. The results indicated that projects implemented through public-private partnerships demonstrated higher levels of financial sustainability compared to those funded solely by public resources. The study also highlighted the limited technical capacity of local financial institutions in assessing renewable energy investments, suggesting that targeted capacity-building initiatives are necessary. Overall, the findings underscore the importance of strengthening collaboration between public and private actors to improve the financial performance of renewable energy projects.

A policy-oriented review of Nigeria's Renewable Energy Master Plan (REMP) examined its design and implementation outcomes. The analysis revealed that although the REMP provides a comprehensive strategic direction for renewable energy development, its execution has been undermined by bureaucratic bottlenecks and weak inter-agency coordination. These institutional challenges have reduced the policy's effectiveness in translating strategic objectives into tangible project outcomes, thereby limiting its overall impact on renewable energy expansion.

In a subsequent study, Adeshina (2024) employed a mixed-methods approach, combining quantitative data analysis with qualitative interviews to assess the influence of policy frameworks on renewable energy adoption. The study found

that well-defined and consistent policy instruments, such as feed-in tariffs and fiscal incentives, played a significant role in attracting private sector investment into renewable energy projects. However, the absence of long-term policy continuity created uncertainty and discouraged sustained investor commitment. The study therefore emphasises the importance of stable, predictable, and supportive policy environments in promoting renewable energy investment and sectoral growth in Nigeria.

## RESEARCH GAP

Despite the growing body of empirical literature on renewable energy adoption in Nigeria, significant research gaps remain. Existing studies have primarily examined the economic benefits of renewable energy projects, the effectiveness of financing models, and the role of policy instruments in isolation, with limited integration of these dimensions into a unified analytical framework. While evidence highlights cost reductions, improved electricity access, and the relevance of public-private partnerships and innovative financing, there is insufficient empirical work that simultaneously assesses the combined economic and financial implications of renewable energy adoption alongside policy coherence and long-term sustainability outcomes. Moreover, most studies adopt project-level or case-based approaches, offering limited insights into how national policy frameworks and financing mechanisms interact to influence sustainable economic growth at a macro level. In addition, socio-institutional factors such as investor confidence, policy consistency, and stakeholder coordination are often discussed descriptively rather than tested empirically. Consequently, there is a clear need for a comprehensive study that integrates economic, financial, and policy perspectives to evaluate how renewable energy adoption can be effectively leveraged to achieve sustainable growth outcomes in Nigeria.

## METHODOLOGY

### RESEARCH DESIGN

The research will employ both quantitative and qualitative research methods. This design is chosen to provide a comprehensive understanding of the Economic and Financial Implications of Renewable Energy Adoption in Nigeria: Policy Frameworks, Financing Mechanisms, and Sustainable Growth Outcomes by capturing numerical data and contextual insights.

- i. Quantitative Component: This will involve the collection of numerical data through surveys and secondary data analysis. The quantitative data will be used to assess the economic benefits of renewable energy, such as job creation, cost savings, and investment levels.
- ii. Qualitative Component: This will involve semi-structured interviews and focus group discussions with key stakeholders, including policymakers, industry experts, community leaders, and project developers.

The qualitative data will provide insights into barriers to adoption, community engagement, and the effectiveness of policy frameworks.

### POPULATION OF THE STUDY

The target population for this study includes:

**Policymakers:** Government officials and representatives from relevant ministries and agencies involved in energy policy and renewable energy development.

**Industry Experts:** Professionals working in the renewable energy sector, including project developers, engineers, and consultants.

**Community Leaders:** Local leaders and representatives from communities that have implemented or are affected by renewable energy projects.

**Financial Institutions:** Representatives from banks and financial institutions that provide funding for renewable energy projects.

### SAMPLING TECHNIQUES AND SAMPLE SIZE

The stratified random sampling technique will be used to ensure that different subgroups within the population (e.g., policymakers, industry experts, community leaders) are adequately represented. The population will be divided into strata based on their roles in the renewable energy sector. Also, purposive sampling will be used to select key informants for qualitative interviews. Participants will be chosen based on their expertise, experience, and involvement in renewable energy projects.

### SAMPLE SIZE

For the quantitative survey, a sample size of approximately 300 respondents will be targeted. This size is deemed sufficient to achieve statistical significance and ensure the reliability of the findings. The sample will be distributed across different strata to ensure representation. For the qualitative component, 20-30 key informants will be selected for semi-structured interviews, and 2-3 focus group discussions will be conducted with community members. Each focus group will consist of 6-10 participants, allowing for in-depth discussions.

### THE STUDY AREA

The study will focus on Nigeria, specifically targeting regions with significant renewable energy potential and ongoing projects. Niger state will be used as a case study. This region has substantial solar energy potential due to high solar irradiance levels. Both urban and rural communities across the state will be selected, as they are increasingly adopting off-grid renewable energy solutions, such as solar home systems and mini-grids, to address energy access challenges.

Niger state is one of Nigeria's largest and most populous states, with a diverse population and varying levels of energy access. The state faces significant energy challenges, including frequent power outages, reliance on fossil fuels,

and limited access to electricity in rural areas. The adoption of renewable energy is seen as a critical pathway to addressing these challenges, promoting economic growth, and enhancing energy security.

Cultural factors play a significant role in the acceptance and adoption of renewable energy technologies. Understanding local beliefs, practices, and community dynamics will be essential to engage communities and promote renewable energy initiatives effectively.

**MODEL SPECIFICATION**

In this section, we outline the econometric models to be used to address the study's relevant objectives on the economic and financial impacts of renewable energy adoption in Nigeria. The models will be designed to analyse the relationships between renewable energy adoption and various economic indicators, and to assess the factors influencing the adoption of renewable energy technologies.

**Model 1: Economic Impact of Renewable Energy Adoption**

To assess the economic impact of renewable energy adoption, we will use a multiple linear regression model. This model will help evaluate how the adoption of renewable energy affects key economic indicators, including job creation, energy cost savings, and local economic development.

$$Y_i = \beta_0 + \beta_1 RE_i + \beta_2 X_i + \varepsilon_t \dots \dots \dots 3.1$$

Where:

$Y_i$ : Economic indicator (e.g., job creation, energy cost savings) for region i

$RE_i$ : Renewable energy adoption variable (e.g., installed capacity, number of projects) for region i

$X_i$ : Vector of control variables (e.g., GDP per capita, population, education level, infrastructure quality) for region i

$\beta_0$ : Intercept

$\beta_i$ : Coefficients to be estimated

$\varepsilon_t$ : Error term

**Model 2: Factors Influencing Renewable Energy Adoption**

To analyse the factors influencing the adoption of renewable energy technologies, we will use a logistic regression model. This model is appropriate for binary outcomes, such as whether a community has adopted renewable energy (1) or not (0).

$$\text{logit}(P_i) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots \dots \dots + \beta_k X_k + \varepsilon_t \dots \dots \dots 3.2$$

Where:

$P_i$  Probability of renewable energy adoption in community i

$X_1, X_2 \dots X_k$  Vector of independent variables (e.g., awareness level, income level, access to financing, policy support) for community  $i$

$\beta_0$ : Intercept

$\beta_i$ : Coefficients to be estimated

$\varepsilon_t$ : Error term

**ESTIMATION TECHNIQUES**

**Ordinary Least Squares (OLS) for Model 1**

The multiple linear regression model will be estimated using Ordinary Least Squares (OLS). OLS is suitable for estimating the parameters of the linear regression model, provided that the assumptions of linearity, independence, homoscedasticity, and normality of errors are met.

**Logistic Regression for Model 2**

The logistic regression model will be estimated using maximum likelihood estimation (MLE). MLE is appropriate for estimating the parameters of models with binary outcomes because it maximises the likelihood of the observed data under the specified model.

**Diagnostic Tests**

To ensure the robustness of the econometric models, several diagnostic tests will be conducted:

**For Model 1 (OLS)**

- i. Multicollinearity: Variance Inflation Factor (VIF) will be calculated to check for multicollinearity among independent variables.
- ii. Heteroscedasticity: Breusch-Pagan or White test will be conducted to assess the presence of heteroscedasticity in the residuals.
- iii. Normality of Residuals: The Shapiro-Wilk test or Q-Q plot will be used to check the normality of residuals.

**For Model 2 (Logistic Regression)**

- i. Goodness of Fit: The Hosmer-Lemeshow test will be used to assess the goodness of fit of the logistic regression model.
- ii. Model Specification: The linktest will be conducted to check for model specification errors.

**Variable Description, Measurement, and Sources**

In this section, we outline the key variables used in the econometric models specified earlier, including their descriptions, measurement methods, and data sources. The variables are categorised into dependent, independent, and control variables.

**Dependent Variables**

- i. Model 1: Economic Impact of Renewable Energy Adoption

- Job Creation (Y1): The number of jobs created as a result of renewable energy projects in a specific region.

Measurement: Total number of jobs reported by renewable energy projects (e.g., solar, wind, biomass) within the region.

Source: Project reports from renewable energy companies, government labour statistics, and industry associations.

- Energy Cost Savings (Y2): The reduction in energy costs for households and businesses due to the adoption of renewable energy.

Measurement: Average percentage reduction in energy bills reported by users of renewable energy systems compared to traditional energy sources.

Source: Surveys of households and businesses, utility company reports, and studies from energy research organisations.

## ii. Model 2: Factors Influencing Renewable Energy Adoption

- Renewable Energy Adoption (P): A binary variable indicating whether a community has adopted renewable energy technologies (1) or not (0).

Measurement: Presence of renewable energy systems (e.g., solar panels, wind turbines) in the community.

Source: Surveys conducted in communities, local government records, and project implementation reports.

### Independent Variables

#### i. Model 1: Economic Impact of Renewable Energy Adoption

- Renewable Energy Adoption Variable (RE): The level of renewable energy adoption in the region, measured by installed capacity or number of projects.

Measurement: Total installed capacity (in megawatts) of renewable energy sources in the region.

Source: Reports from the Energy Commission of Nigeria, renewable energy project databases, and industry publications.

#### ii. Model 2: Factors Influencing Renewable Energy Adoption

- Awareness Level (X1): The level of awareness about renewable energy technologies among community members.

Measurement: Measured on a Likert scale (1-5) based on survey responses regarding knowledge of renewable energy benefits and technologies.

Source: Surveys conducted in communities.

- Income Level (X2): The average income level of households in the community.

Measurement: Average monthly income reported by households in the community.

Source: National Bureau of Statistics (NBS) reports and community surveys.

- Access to Financing (X3): The availability of financial resources for investing in renewable energy technologies.

Measurement: Measured as a binary variable indicating whether financing options (e.g., loans, grants) are available (1) or not (0).

Source: Surveys of local financial institutions and community members.

- Policy Support (X4): The extent of government support for renewable energy initiatives in the community.

Measurement: Measured on a Likert scale (1-5) based on survey responses regarding perceived government support and incentives for renewable energy.

Source: Surveys conducted in communities and policy analysis reports.

### Control Variables

- GDP per Capita (C1): The economic output per person in the region, serving as a control for overall economic development.

Measurement: Total GDP of the region divided by the population.

Source: National Bureau of Statistics (NBS) and World Bank data.

- Population (C2): The total population of the region, serving as a demographic control variable.

Measurement: Total number of residents in the region.

Source: National Bureau of Statistics (NBS) and local government records.

- Education Level (C3): The average level of education attained by individuals in the community.

Measurement: Percentage of the population with secondary education or higher.

Source: National Bureau of Statistics (NBS) and community surveys.

- Infrastructure Quality (C4): The quality of infrastructure in the region, which may influence renewable energy adoption.

Measurement: Measured on a Likert scale (1-5) based on survey responses regarding the condition of roads, electricity supply, and communication facilities.

Source: Surveys conducted in communities and local government assessments.

## DATA PRESENTATION AND ANALYSIS OF RESULTS

This section presents the study's empirical findings on the economic and financial implications of renewable energy adoption in Nigeria. The analysis draws on quantitative survey data obtained from 300 respondents, supported by econometric estimation techniques. Emphasis is placed on the economic benefits of renewable energy, financing

mechanisms, policy support, and factors influencing adoption, all of which are critical to achieving sustainable growth outcomes.

### DATA PRESENTATION AND METHOD OF ANALYSIS

Data used for this study were collected through structured questionnaires, interviews, and secondary sources. Quantitative data were analysed using descriptive statistics to summarise respondents' characteristics and perceptions. At

the same time, inferential analysis was conducted using Ordinary Least Squares (OLS) and Logistic Regression models to evaluate economic impacts and determinants of renewable energy adoption. The qualitative information complements the quantitative findings and provides contextual explanations.

### SOCIOECONOMIC CHARACTERISTICS OF RESPONDENTS

*Table 4.1: Descriptive Statistics of Respondents' Socioeconomic Characteristics*

Variable	Category	Frequency (n)	Percentage (%)
<b>Age</b>	18–24	45	15.0
	25–34	135	45.0
	35–44	75	25.0
	45–54	30	10.0
	55 and above	15	5.0
<b>Gender</b>	Male	180	60.0
	Female	120	40.0
<b>Educational Level</b>	No formal education	15	5.0
	Primary education	30	10.0
	Secondary education	75	25.0
	Tertiary education	180	60.0
<b>Occupation</b>	Student	30	10.0
	Public sector	90	30.0
	Private sector	120	40.0
	Self-employed	30	10.0
	Unemployed	30	10.0
<b>Location</b>	Urban	210	70.0
	Suburban	60	20.0
	Rural	30	10.0
<b>Monthly Income</b>	< ₦30,000	60	20.0
	₦30,000–₦60,000	90	30.0
	₦61,000–₦100,000	75	25.0
	₦101,000–₦150,000	45	15.0
	> ₦150,000	30	10.0

Source: Field Survey (2025)

Table 4.1 shows that respondents were predominantly young, educated, and economically active, with 45% aged 25-34 years and 60% holding a tertiary education. This demographic profile suggests a population segment more likely to understand and engage with renewable energy technologies. However, income distribution reveals that a significant proportion earn below ₦60,000 monthly, indicating affordability constraints that could hinder

renewable energy investment. The dominance of urban respondents further suggests disparities in awareness and access between urban and rural areas, reinforcing the need for inclusive policy and financing strategies (World Bank, 2022).

### SURVEY RESPONSES ON RENEWABLE ENERGY ADOPTION

*Table 4.2: Respondents' Perceptions on Renewable Energy Adoption*

Research Focus	Response Category	Frequency (n)	Percentage (%)
<b>Economic Benefits</b>	Job creation	195	65.0
	Cost savings	210	70.0
	Energy security	180	60.0
	Local economic development	150	50.0
<b>Financing Mechanisms</b>	Access to loans	120	40.0
	Government grants	90	30.0
	Community funding	60	20.0
	No access to finance	30	10.0
<b>Public Awareness</b>	High	90	30.0
	Moderate	120	40.0
	Low	90	30.0
<b>Growth Strategies</b>	Government incentives	210	70.0
	Awareness campaigns	180	60.0
	Community engagement	150	50.0
	Improved financing	120	40.0

*Source: Field Survey (2025)*

Table 4.2 indicates strong recognition of renewable energy's economic benefits, particularly cost savings and job creation. However, access to financing remains limited, with 10% reporting no access to any funding source. Public awareness is largely moderate, suggesting gaps in sensitisation and education. Respondents strongly emphasised government incentives and improved financing as critical strategies for

promoting renewable energy adoption, confirming the importance of policy and financial support in achieving sustainable growth outcomes (International Renewable Energy Agency, 2020).

### ECONOMETRIC ANALYSIS

#### Ordinary Least Squares (OLS) Results

*Table 4.3: OLS Regression Results on Economic Impact of Renewable Energy*

Variable	Coefficient	Std. Error	t-value	p-value
Intercept	2.50	0.45	5.56	0.000
Renewable Energy Adoption	0.75	0.10	7.56	0.000
GDP per Capita	0.30	0.05	6.00	0.000

Variable	Coefficient	Std. Error	t-value	p-value
Population	-0.02	0.01	-2.00	0.045
Education Level	0.40	0.08	5.00	0.000
Infrastructure Quality	0.25	0.07	3.57	0.001

$R^2 = 0.65$  /  $F$ -statistic = 32.50 ( $p < 0.01$ )

Source: Author's Computation (2025)

The results in Table 4.3 show that renewable energy adoption has a statistically significant and positive effect on economic outcomes. A 1 percentage-point increase in renewable energy adoption improves economic performance by 0.75 percentage points, underscoring its role in job creation, cost reduction, and local economic development. Education and

infrastructure quality further enhance these benefits, while population pressure slightly reduces per capita gains. The model's high explanatory power underscores the strong economic relevance of renewable energy adoption in Nigeria.

#### Logistic Regression Results

**Table 4.4: Logistic Regression Results on Determinants of Renewable Energy Adoption**

Variable	Coefficient	Std. Error	z-value	p-value
Intercept	-1.20	0.35	-3.43	0.001
Awareness level	0.85	0.20	4.25	0.000
Income level	0.50	0.15	3.33	0.001
Access to financing	1.10	0.25	4.40	0.000
Policy support	0.75	0.18	4.17	0.000

$Pseudo R^2 = 0.45$  |  $LR \chi^2 = 50.00$  ( $p < 0.01$ )

Source: Author's Computation (2025)

Table 4.4 reveals that awareness, income, access to financing, and policy support significantly increase the probability of renewable energy adoption. Access to financing is the strongest determinant, highlighting financial constraints as a significant barrier. The results confirm that policy clarity and

financial inclusion are essential for accelerating renewable energy uptake.

#### Diagnostic Tests

**Table 4.5: Summary of Diagnostic Test Results**

Test	Model	Result	Conclusion
VIF	OLS	< 5	No multicollinearity
Breusch–Pagan	OLS	$p = 0.175$	Homoscedastic
Shapiro–Wilk	OLS	$p = 0.065$	Normal residuals
Hosmer–Lemeshow	Logit	$p = 0.397$	Good model fit
Link Test	Logit	$p = 0.210$	Correct specification

Source: Author's Computation (2025)

Diagnostic results confirm that both econometric models satisfy all required assumptions, strengthening the reliability and validity of the findings.

## DISCUSSION OF FINDINGS

The findings of this study indicate a strong and statistically significant relationship between economic and financial factors and sustainable development outcomes. Specifically, improvements in macroeconomic stability such as controlled inflation, favourable interest rates, and stable economic growth were found to enhance investment confidence and resource allocation toward productive sectors. The data analysis revealed that respondents largely agreed that sound economic conditions promote efficient financial intermediation, increase access to capital, and support long-term development planning. This aligns with existing empirical literature, which emphasises that economic stability is a prerequisite for sustainable growth, as it reduces uncertainty and encourages both domestic and foreign investment.

Furthermore, the study found that renewable energy development and policy frameworks play a critical role in driving sustainability outcomes. The results showed that well-defined policy frameworks, including regulatory incentives, environmental standards, and institutional support, significantly influence the adoption of renewable energy technologies. Respondents indicated that clear, consistent policies enhance private-sector participation and reduce investment risk in the renewable energy sector. This finding corroborates prior studies, which argue that effective policy environments are essential for transitioning from fossil-fuel dependency to cleaner energy systems, thereby supporting environmental sustainability, energy security, and inclusive economic growth.

Lastly, the findings highlight the importance of financing mechanisms in translating policies and economic intentions into measurable, sustainable growth outcomes. The analysis demonstrated that access to diverse financing options, including public funding, private investment, green bonds, and international climate finance, positively affects project implementation and long-term sustainability performance. Inadequate financing was identified as a major constraint limiting the scale and impact of sustainable initiatives. Overall, the study underscores that sustainable growth outcomes are not driven by a single factor but rather by the interaction of economic conditions, financial systems, supportive policies, renewable energy adoption, and effective financing structures working together in a coordinated manner.

## CONCLUSION AND RECOMMENDATION

This study concludes that economic and financial conditions, renewable energy development, policy frameworks, and financing mechanisms jointly play a decisive role in achieving sustainable growth outcomes. The findings demonstrate that macroeconomic stability and a sound financial system enhance investment confidence and resource mobilisation, while supportive and consistent policy frameworks significantly encourage renewable energy

adoption. In addition, the availability of appropriate financing mechanisms is critical for translating policy intentions and economic potential into tangible development outcomes. Overall, the study affirms that sustainable growth is a multidimensional process that depends on the compelling interplay among economic stability, financial capacity, the clean energy transition, and institutional support.

Recommends that policymakers prioritise macroeconomic stability and strengthen financial-sector reforms to improve access to long-term, affordable financing for sustainable development projects. Governments should also develop and enforce clear, consistent, and transparent policy frameworks that incentivise renewable energy investment, reduce regulatory uncertainty, and encourage private sector participation. Furthermore, expanding innovative financing mechanisms—such as green bonds, public-private partnerships, and international climate finance—will help bridge funding gaps and scale up sustainable initiatives. Collectively, these measures will enhance the effectiveness of development strategies and promote inclusive, resilient, and environmentally sustainable growth.

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