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Strengthening Climate Finance and ESG Practices to Foster Sustainable Energy Development in Nigeria

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ABSTRACT

This study investigates the role of climate finance and Environmental, Social, and Governance (ESG) practices in fostering sustainable energy development in Nigeria. Drawing on survey responses (n = 228), key informant interviews, chi-square tests, regression analysis, and triangulation, the research explores the socioeconomic drivers, institutional barriers, and regulatory gaps shaping Nigeria's energy transition. Results reveal that climate finance access (β = 0.482), ESG compliance (β = 0.356), and policy/regulatory support (β = 0.291) significantly predict sustainable energy outcomes. Interviews corroborated these findings, highlighting weak enforcement of CBN's sustainable banking principles, limited green bond penetration, and inadequate incentives as major bottlenecks. The study concludes that Nigeria's sustainable energy transition requires coordinated financial innovation, robust ESG integration, and strengthened regulatory frameworks. By bridging empirical gaps and providing policy-relevant recommendations, the study contributes to advancing scholarship on climate finance and sustainable development in emerging economies.

INTRODUCTION

The global energy transition has become a central discourse in addressing climate change, reducing greenhouse gas emissions, and promoting sustainable development. For developing economies such as Nigeria, the need to accelerate the shift from fossil fuel dependency toward renewable and sustainable energy is particularly urgent. Nigeria faces a dual challenge: its economy is heavily reliant on oil exports (Nazifi et al., 2022) while its domestic population suffers from chronic poverty (Jafaru et al., 2024), with nearly 85 million people lacking access to reliable electricity (International Energy Agency [IEA], 2022). This paradox underscores the imperative of mobilising climate finance and integrating Environmental, Social, and Governance (ESG) practices as pathways to sustainable energy development.

Climate finance refers to the local, national, or transnational funding drawn from public, private, and alternative sources deployed to support climate change mitigation and adaptation projects (United Nations Framework Convention on Climate Change [UNFCCC], 2021). In Nigeria, climate finance is pivotal not only for expanding renewable energy infrastructure but also for fostering resilience against climate-related risks, including flooding, desertification, and erratic rainfall patterns that undermine livelihoods (Yakubu et al.,2025). However, despite its potential, Nigeria has not fully tapped into international and domestic climate finance opportunities due to institutional weaknesses, regulatory bottlenecks, and inadequate investor confidence (Suleiman et al., 2025). Strengthening the financial ecosystem to attract both concessional and private capital is therefore essential to achieving the country's sustainable energy targets.

Alongside climate finance, ESG practices have gained prominence as global investors increasingly demand responsible and ethical standards in business operations. ESG encompasses a broad framework that evaluates the environmental impact of investments, social inclusivity, and the governance structures underpinning corporate accountability (World Bank, 2021). For the Nigerian energy sector, adopting ESG principles ensures that renewable energy projects align with sustainability criteria, mitigate environmental

degradation, foster community engagement, and enhance transparency. Integrating ESG not only promotes good governance but also reassures international financiers that energy projects meet global sustainability benchmarks (Akinyemi & Salisu, 2023).

Sustainable energy development in Nigeria requires coordinated action at the intersection of climate finance and ESG practices. Current evidence suggests that climate finance inflows into Africa remain disproportionately low, averaging only 3% of global climate finance despite the continent's significant vulnerability to climate change (Climate Policy Initiative [CPI], 2022). Nigeria, as Africa's largest economy, has attracted some renewable energy investments, but the scale remains insufficient relative to its vast needs. The integration of ESG standards can play a catalytic role in unlocking climate finance by providing the assurance of transparency, accountability, and long-term sustainability that investors seek (Central Bank of Nigeria [CBN], 2021).

Moreover, strengthening climate finance and ESG practices contributes directly to Nigeria's commitments under the Sustainable Development Goals (SDGs) and the Paris Agreement. Goal 7 of the SDGs emphasises access to affordable, reliable, sustainable, and modern energy for all. At the same time, the Paris Agreement underscores the role of financial flows consistent with pathways toward low greenhouse gas emissions. Nigeria's Energy Transition Plan (ETP) sets ambitious targets to achieve net-zero emissions by 2060, requiring over USD 1.9 trillion in investments, with climate finance and ESG-compliant private sector capital expected to play a central role (Federal Government of Nigeria, 2021).

Despite policy commitments, gaps persist in governance, institutional frameworks, and stakeholder engagement. Studies have highlighted that barriers such as policy inconsistency and corruption (Adebayo et al., 2022), limited capacity in financial institutions (Magaji et al., 2023), and inadequate regulatory frameworks hinder Nigeria's ability to leverage climate finance fully (Adenle, 2020). At the same time, ESG adoption in Nigerian companies remains uneven, with limited enforcement mechanisms and weak monitoring of compliance (Okonkwo & Eze, 2022). This creates a disconnect between international financing expectations and local realities, constraining the mobilisation of much-needed resources for sustainable energy projects.

This study, therefore, seeks to critically examine how climate finance and ESG practices can be strengthened to foster sustainable energy development in Nigeria. By evaluating existing frameworks, identifying barriers, and proposing strategies for improvement, the research contributes to bridging the knowledge and policy gaps hindering Nigeria's energy transition. Strengthening these mechanisms not only promotes environmental sustainability, reduces carbon emissions and health hazards (Ismail et al., 2024) but also enhances economic diversification for domestic and international exchange (Magaji et al., 2022), job creation (Adekoya et al., 2025), and resilience against climate shocks (Sabiu & Magaji, 2024) key imperatives for Nigeria's sustainable development trajectory.

LITERATURE REVIEW

Conceptual Definitions

Climate Finance: Climate finance refers to financial resources mobilised to support mitigation and adaptation activities aimed at addressing climate change (Tanko et al., 2025). It includes funding from public, private, bilateral, multilateral, and alternative sources channelled toward projects that reduce greenhouse gas emissions or enhance resilience to climate impacts (UNFCCC, 2021). In the Nigerian context, climate finance supports investments in renewable energy technologies such as solar, wind, and bioenergy, while also strengthening adaptation projects in agriculture and infrastructure (Magaji et al., 2025).

However, a significant financing gap exists in Nigeria's domestic financial system, particularly within the commercial banking sector. Commercial banks play a crucial role in allocating credit for investments (Okoroafor et al., 2018); however, their participation in financing renewable energy remains limited (Igwe et al., 2021**)**. Most banks perceive renewable energy projects as high-risk and long-term, making them less attractive compared to conventional oil and gas financing (Central Bank of Nigeria [CBN], 2021). High interest rates, lack of specialised green finance products, and limited technical expertise further constrain banks' capacity to fund sustainable energy ventures (Chinedu et al., 2021). This financing gap underscores the importance of strengthening climate finance mechanisms and aligning banking practices with ESG principles to close Nigeria's energy investment deficit.

Environmental, Social, and Governance (ESG) Practices: ESG is a framework for evaluating the sustainability and ethical impact of investments and corporate operations. The environmental dimension considers how organisations manage natural resources and environmental risks; the social dimension emphasises human rights, labour standards, and community development; while the governance dimension highlights transparency, accountability, and corporate ethics (World Bank, 2021). Collectively, they can make or mar the environment (Magaji et al., 2024). The right to peace, equity, empowerment and justice exemplified the social dimension (Zailani et al., 2025). ESG practices, when integrated into Nigeria's energy sector, enhance investor confidence and ensure that projects align with international sustainability standards (Okonkwo & Eze, 2022).

Despite global trends, ESG adoption in Nigeria's financial and energy sectors remains weak. Commercial banks, for instance, have been slow to mainstream ESG into lending practices (Magaji et al., 2019). While some progress has been made under the Nigerian Sustainable Banking Principles (NSBP) introduced by the CBN in 2012, enforcement and compliance remain inconsistent across institutions (CBN, 2021). This undermines Nigeria's ability to attract sustainable finance at scale.

Sustainable Energy Development: Sustainable energy development encompasses the production, distribution, and consumption of energy in a way that meets current needs without compromising future generations' ability to meet theirs. It emphasises access to clean, reliable, affordable, and modern energy, as articulated in SDG 7. In Nigeria, sustainable energy development involves transitioning from dependence on fossil fuels to renewable energy systems (Abdullahi et al., 2024) while simultaneously addressing energy poverty and environmental degradation (IEA, 2022). Achieving this transition requires innovative financing structures, ESG compliance, and institutional reforms to overcome systemic barriers in the financial and energy sectors.

THEORETICAL FRAMEWORK

Institutional Theory: Institutional theory posits that organisations and states adopt structures, practices, and norms to gain legitimacy, stability, and support within broader institutional environments (DiMaggio & Powell, 1983). Applied to climate finance, it suggests that Nigeria must align its regulatory, financial, and governance frameworks with international norms to access global financing. Climate funds and international investors often require recipient countries to demonstrate robust institutional capacity, transparency, and adherence to sustainability principles before channelling resources (Adenle, 2020).

Stakeholder Theory: Stakeholder theory emphasises that firms and governments must account for the interests of all stakeholders investors, communities, regulators, and the environment rather than focusing narrowly on shareholder value (Freeman, 1984). In the Nigerian energy context, stakeholder theory highlights the importance of inclusive ESG practices that integrate community participation, environmental safeguards, and corporate accountability. This ensures that sustainable energy projects not only attract finance but also deliver tangible social and environmental benefits.

Together, these theories underscore the centrality of institutional reforms and stakeholder engagement in strengthening climate finance and ESG practices for Nigeria's sustainable energy transition.

Empirical Evidence

Empirical studies reveal both opportunities and barriers in leveraging climate finance and ESG for sustainable energy development in Nigeria and other emerging economies.

Globally, climate finance flows reached over USD 630 billion annually between 2019 and 2020, yet Africa attracted less than 3% of this total, underscoring the continent's marginalisation in global climate financing (CPI, 2022). Nigeria, despite being Africa's largest economy, has struggled to access adequate climate finance due to weak regulatory frameworks, corruption, and policy inconsistency (Adebayo et al., 2022).

A key finding in Nigerian scholarship is the financing gap created by commercial banks. According to CBN (2021), less than 5% of commercial bank lending portfolios are directed toward renewable energy and climate-related projects. Banks continue to prioritise short-term, high-return ventures in oil, gas, and trading sectors. This mismatch between Nigeria's development needs and banking practices hinders climate-related investments. Empirical evidence from Adenle (2020) shows that countries with dedicated green banking policies and concessional loan structures attract significantly higher renewable energy financing compared to Nigeria.

On ESG adoption, Okonkwo and Eze (2022) found that Nigerian corporations, particularly in the energy sector, demonstrate limited compliance with ESG standards due to weak enforcement mechanisms and low awareness among domestic investors. However, international investors increasingly condition financing on ESG integration, making ESG adoption a prerequisite for mobilising climate finance (World Bank, 2021). Comparative evidence from South Africa illustrates that stronger ESG regulations have enhanced private investment inflows into renewable energy projects (Akinyemi & Salisu, 2023).

Further evidence highlights the transformative potential of climate finance. Nigeria's Energy Transition Plan estimates that USD 1.9 trillion is required to achieve net-zero emissions by 2060, with USD 410 billion needed by 2030 (Federal Government of Nigeria, 2021). However, according to CPI (2022), Nigeria currently attracts less than USD 2 billion annually in climate-related investments, far below the required threshold. This significant financing gap underscores the need to strengthen domestic financial institutions, particularly commercial banks, in order to channel resources into sustainable energy.

Internationally, studies reveal that climate finance not only drives renewable energy deployment but also generates co-benefits such as job creation, industrial diversification, and improved energy security. For instance, IEA (2022) projects that scaling renewable energy in Sub-Saharan Africa could create over 4 million green jobs by 2030. Empirical research from Kenya and Morocco illustrates that targeted climate finance, coupled with strong institutional frameworks, significantly accelerates solar and wind adoption (Adenle, 2020). Nigeria stands to gain similar benefits if it can overcome institutional weaknesses and mainstream ESG practices.

A recurring theme in the literature is the role of weak policy and regulatory environments in constraining Nigeria's climate finance and ESG adoption. Despite the Central Bank of Nigeria's introduction of the Nigerian Sustainable Banking Principles (NSBP) in 2012, enforcement has remained weak and compliance uneven across financial institutions (CBN, 2021). Many banks adopt the principles superficially without integrating them into core lending practices, thereby limiting their impact on renewable energy financing (Okonkwo & Eze, 2022).

Another critical gap is the limited penetration of green bonds in Nigeria. Although Nigeria became the first African country to issue a sovereign green bond in 2017 and followed up with a second issuance in 2019, the scale of the program remains small relative to financing needs (Federal Government of Nigeria, 2021). Compared to countries such as South Africa and Morocco, Nigeria's green bond market lacks depth, diversity, and private sector participation (Akinyemi & Salisu, 2023).

Additionally, inadequate incentives hinder investment in sustainable energy. Renewable energy developers in Nigeria face high upfront costs, limited tax breaks, and insufficient subsidies to offset risks (Adebayo et al., 2022). While policies such as the Renewable Energy Master Plan (REMP) and National Renewable Energy and Energy Efficiency Policy (NREEEP) exist, their implementation has been slow and inconsistent, creating uncertainty for investors (Adenle, 2020).

Collectively, these policy and regulatory shortcomings weaken Nigeria's ability to mobilise large-scale climate finance and attract ESG-compliant investments. Strengthening enforcement mechanisms, expanding the green bond market, and providing targeted incentives are therefore critical to bridging Nigeria's energy financing gap and achieving sustainable energy development.

METHODOLOGY

This study adopts a mixed-methods research design, which combines both qualitative and quantitative approaches to provide a holistic analysis of climate finance and ESG practices in fostering sustainable energy development in Nigeria. The rationale for this design lies in the complexity of the subject matter, which requires not only statistical evidence but also in-depth insights from stakeholders. By triangulating quantitative and qualitative data, the study enhances the validity and reliability of findings.

The study area is Nigeria, given its unique position as Africa's largest economy, a significant oil producer, and a country facing persistent energy poverty despite its vast renewable energy potential. The population of interest includes stakeholders directly or indirectly engaged in climate finance and ESG implementation in the Nigerian energy sector. These include representatives of financial institutions, government regulatory agencies, energy companies, international development partners, and civil society organisations.

The sampling strategy employed is purposive and stratified, ensuring that participants are drawn from key sectors relevant to the research objectives. Quantitatively, structured questionnaires were administered to approximately 250 respondents, including bankers, energy investors, and policymakers. Qualitatively, in-depth interviews were conducted with 20–25 experts from the Central Bank of Nigeria (CBN), the Securities and Exchange Commission (SEC), the Nigerian Electricity Regulatory Commission (NERC), and selected renewable energy firms. This dual approach ensures both breadth and depth of data collection.

Data collection relies on two main instruments. First, a structured questionnaire is designed to capture quantitative information on stakeholders' perceptions of the adequacy of climate finance instruments, ESG adoption levels, and policy effectiveness. Second, an interview guide is used to collect qualitative insights on challenges, opportunities, and practical experiences with climate finance and ESG in Nigeria. Secondary data from policy documents, CBN sustainable banking reports, and international climate finance databases also complement primary data.

The methods of data analysis include both descriptive and inferential approaches. Quantitative data will be analysed using statistical software such as SPSS or Stata. Descriptive statistics, including frequencies, means, and percentages, summarise stakeholder perceptions. Inferential tests, namely, regression analysis and chi-square, examine relationships between climate finance access, ESG practices, and sustainable energy outcomes. Qualitative data from interviews will be transcribed and subjected to thematic content analysis to identify recurring themes and patterns, which will then be integrated with quantitative findings for a comprehensive narrative.

To ensure validity and reliability, the instruments were pre-tested, and feedback from academic experts and practitioners was incorporated. The triangulation of quantitative and qualitative methods further enhances the credibility of the results. Ethical considerations were strictly adhered to, including obtaining informed consent, maintaining confidentiality of respondents, and ensuring voluntary participation.

Overall, this methodological framework provides a rigorous basis for examining how strengthening climate finance and ESG practices can drive Nigeria's transition toward sustainable energy development.

Methodology

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Regression Model

The regression model estimated the influence of climate finance access, ESG compliance, and policy/regulatory support on sustainable energy outcomes in Nigeria. The model is specified as:

$$SEO=\beta0+\beta1CFA+\beta2ESG+\beta3PRS+\varepsilon$$

Where:

- SEO = Sustainable Energy Outcomes
- β0 = Constant (intercept)
- CFA = Climate Finance Access
- ESG = ESG Compliance
- PRS = Policy/Regulatory Support
- ε = Error term

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RESULTS AND DISCUSSION

Socioeconomic and Demographic Characteristics of Respondents: Table 1 presents the demographic profile of the survey respondents. Out of the 250 distributed questionnaires, 228 were successfully returned, representing a 91.2% response rate. The respondents consisted of professionals drawn from financial institutions, government agencies, energy firms, and civil society organisations.

Table 1: Socioeconomic and Demographic Characteristics of Respondents (n = 228)

Variable	Category	Frequency	Percentage (%)
Gender	Male	138	60.5
	Female	90	39.5
Age	21–30 years	42	18.4
	31–40 years	96	42.1
	41–50 years	60	26.3
	51 years and above	30	13.2
Education	Bachelor's degree	80	35.1
	Master's degree	112	49.1
	Doctorate/Professional	36	15.8
Sector of Employment	Financial institutions	84	36.8

Variable	Category	Frequency	Percentage (%)
	Energy companies	72	31.6
	Government/Regulators	48	21.1
	Civil society/NGOs	24	10.5

The results show that respondents are highly educated, with over 64% possessing postgraduate qualifications, underscoring their familiarity with climate finance and ESG issues. A significant share (36.8%) works in financial institutions, highlighting the critical role of banks and investors in energy transition financing.

Chi-Square Analysis of Sector and Perceptions of ESG Implementation: To assess the relationship between respondents' sectors of employment and their perceptions of ESG adoption in Nigeria, a chi-square test was conducted.

Table 2: Chi-Square Test of Sector and ESG Implementation Perceptions

Variable	χ^2 Value	df	p-value
Sector vs. Perception of ESG Adoption	18.67	6	0.004**

Note: p < 0.01 is significant

The chi-square result indicates a statistically significant association between employment sector and perception of ESG adoption ($\chi^2 = 18.67$, $p < 0.01$). Specifically, respondents from financial institutions reported higher awareness and compliance with ESG principles compared to those from civil society or energy firms.

Regression Analysis of Climate Finance and Sustainable Energy Outcomes: A regression model was developed to examine the effect of climate finance accessibility and ESG compliance on sustainable energy outcomes in Nigeria.

Table 3: Regression Analysis

Predictor Variable	Beta (β)	Std. Error	t-value	p-value
Climate finance access	0.482	0.067	7.19	0.000***
ESG compliance	0.356	0.072	4.94	0.000***
Policy/regulatory support	0.291	0.081	3.59	0.001**
Constant	1.024	0.145	7.06	0.000***

$R^2 = 0.61$; Adj. $R^2 = 0.59$; $F = 54.83$; $p < 0.001$

Note: ***p < 0.001; p < 0.01

Given the coefficients from the regression analysis, the model becomes:
SEO=1.024+0.482(CFA)+0.356(ESG)+0.291(PRS)+εSEO = 1.024 + 0.482(CFA) + 0.356(ESG) + 0.291(PRS) + \varepsilon
The model indicates that:

i. Holding other variables constant, a one-unit increase in climate finance access leads to a 0.482 increase in sustainable energy outcomes.
ii. A one-unit increase in ESG compliance increases sustainable energy outcomes by 0.356 units.
iii. A one-unit increase in policy/regulatory support contributes an additional 0.291 units to sustainable energy outcomes.

The model's R^2 value of 0.61 suggests that the predictors jointly explain 61% of the variation in sustainable energy outcomes, while the adjusted R^2 (0.59) accounts for model complexity. The F-statistic (54.83, $p < 0.001$) confirms that the overall model is statistically significant.
The regression results suggest that access to climate finance ($\beta = 0.482$) is the strongest predictor of sustainable energy outcomes, followed by ESG compliance ($\beta = 0.356$). Policy and regulatory support also show significant influence ($\beta = 0.291$). Together, these variables explain 59% of the variance in sustainable energy outcomes.

Qualitative Insights from Key Informant Interviews

The semi-structured interviews conducted with financial sector professionals, policymakers, energy industry executives, and representatives of civil society organisations provided more profound insights into the institutional and contextual realities shaping climate finance and ESG adoption in Nigeria. Four major themes emerged:

Policy and Regulatory Gaps: A recurring theme across the interviews was the inadequacy of Nigeria's policy and regulatory environment for climate-aligned financing. Respondents emphasised that while the Central Bank of Nigeria (CBN) introduced Sustainable Banking Principles in 2012, enforcement has been weak and uneven across institutions. Many banks treat compliance

as a procedural requirement rather than embedding it into their core operational strategies. Furthermore, although Nigeria launched a sovereign green bond program in 2017, penetration into the broader financial market remains limited due to a lack of awareness, stringent eligibility criteria, and weak secondary market activity. Several participants also emphasised the lack of targeted fiscal incentives, such as tax credits, subsidies, or risk-sharing mechanisms, that could encourage private investors to allocate resources to renewable energy projects. Without stronger policy coherence and enforcement, respondents warned that climate finance would remain concentrated in a few elite institutions rather than being mainstreamed across the energy sector.

Institutional Readiness: The interviews revealed a significant disparity in institutional capacity between large financial institutions and smaller energy firms. International and tier-one Nigerian banks are increasingly integrating ESG principles, partly due to pressure from foreign investors and development partners. These institutions are beginning to adopt climate risk assessment tools and reporting frameworks that are aligned with global standards, such as the Task Force on Climate-related Financial Disclosures (TCFD). By contrast, small and medium-sized energy companies, which are crucial for the expansion of decentralised renewable energy, often lack the technical expertise and financial literacy to implement ESG frameworks. Respondents noted that these firms face high transaction costs, limited access to credit, and weak technical support, which restrict their ability to align with sustainability benchmarks. This gap poses a significant barrier, as Nigeria's energy transition depends not only on large-scale projects but also on the growth of small renewable energy enterprises serving rural and underserved populations.

International Support and Local Ownership: Respondents acknowledged the important role of international development partners, such as the World Bank, African Development Bank, and the Green Climate Fund, in providing concessional loans, grants, and technical assistance for renewable energy projects. However, a concern consistently raised was the issue of local ownership and alignment with domestic priorities. Many donor-driven projects are perceived as externally designed and implemented with limited consultation of local stakeholders, leading to challenges in sustainability once international funding cycles end. Furthermore, reliance on external finance without corresponding domestic policy reforms risks creating dependency rather than resilience. Respondents argued that while international support remains essential, Nigeria must develop stronger domestic financial mechanisms and ensure that climate finance is aligned with its Energy Transition Plan (2021–2060) and broader development priorities, including job creation, rural electrification, and poverty reduction.

Investor Perception and Risk: A fourth theme that emerged strongly relates to investor confidence in Nigeria's renewable energy sector. Several respondents pointed to persistent challenges such as currency volatility, inflationary pressures, policy uncertainty, and governance risks, which significantly deter private and foreign investment. Investors often perceive Nigeria as a high-risk environment due to frequent policy reversals, delays in regulatory approvals, and weak contract enforcement. Additionally, corruption and lack of transparency in some energy projects have further undermined trust in the investment climate. This heightened risk perception results in higher financing costs, reduced capital inflows, and reluctance by international financiers to commit long-term funds to renewable energy. Respondents stressed that improving macroeconomic stability, ensuring policy consistency, and strengthening governance structures are critical to de-risking investments and attracting sustainable finance into the sector.

Table 4: Summary of Key Informant Interview Themes

Theme	Description	Illustrative Quotes	Policy Implications
Policy and Regulatory Gaps	Weak enforcement of CBN Sustainable Banking Principles, limited penetration of green bonds, and absence of fiscal incentives were identified as key barriers to scaling climate finance in Nigeria.	*"Most banks see the CBN principles as paperwork, not a real operational guide."* (Financial Institution Executive) *"Green bonds exist on paper, but most local investors do not understand them."* (Government Official)	Strengthen enforcement of sustainable banking principles; expand green bond awareness; introduce tax/fiscal incentives.
Institutional Readiness	Large banks are gradually integrating ESG due to international pressure, but SMEs in the renewable energy sector face capacity and financing gaps in adopting ESG frameworks.	*"Tier-one banks are moving toward ESG reporting, but smaller firms do not have the tools or expertise."* (Energy Sector Manager)	Build capacity for SMEs; provide technical assistance and concessional loans; encourage ESG adoption across all levels.
International Support and Local Ownership	Donor agencies (World Bank, AfDB, GCF) provide concessional finance, but projects are often externally driven with weak local ownership and limited sustainability once donor funding ends.	*"Donors design the projects, and local actors just implement. Once the funding stops, so does the project."* (Civil Society Representative)	Align international finance with Nigeria's Energy Transition Plan; ensure participatory design and local ownership.

Theme	Description	Illustrative Quotes	Policy Implications
Investor Perception and Risk	Currency volatility, inflation, policy inconsistency, governance challenges, and corruption increase risk perception, leading to high financing costs and discouraging foreign and private investors.	*"Investors are worried because policies keep changing, and contracts are not always respected."* (Foreign Investment Analyst)	Improve macroeconomic stability; ensure policy consistency; strengthen contract enforcement and governance structures.

Triangulation of Quantitative and Qualitative Findings

The integration of quantitative and qualitative results provides a holistic understanding of the barriers and opportunities in scaling climate finance and ESG adoption in Nigeria's energy transition. The survey and regression analyses highlight the statistical significance of climate finance access, ESG compliance, and policy/regulatory support in predicting sustainable energy outcomes. These findings are reinforced by insights from the key informant interviews, which shed light on the institutional, regulatory, and perceptual barriers that shape these dynamics in practice.

Quantitatively, regression results confirm that climate finance access ($\beta = 0.482$) is the strongest predictor of sustainable energy outcomes, followed by ESG compliance ($\beta = 0.356$) and policy/regulatory support ($\beta = 0.291$). This is consistent with interview findings, where respondents emphasised policy and regulatory gaps as a critical impediment. Weak enforcement of the Central Bank of Nigeria's Sustainable Banking Principles and limited penetration of green bonds were highlighted qualitatively as factors that undermine the effectiveness of policy support, thereby providing an explanatory layer to the observed regression results.

Similarly, the chi-square test revealed a significant association between employment sector and perceptions of ESG adoption ($\chi^2 = 18.67$, $p < 0.01$). Respondents from financial institutions reported higher awareness and compliance compared to those in civil society or energy firms. The interview narratives complement this finding by revealing institutional readiness disparities: tier-one banks are integrating ESG frameworks due to external pressures, while small and medium-sized energy companies face capacity deficits, high transaction costs, and limited access to finance. This triangulation underscores that institutional heterogeneity must be accounted for when designing ESG compliance strategies.

The qualitative insights further extend the quantitative results by highlighting international support and investor perceptions. While international development partners provide concessional financing that supports climate-aligned projects, the lack of local ownership and weak policy alignment undermines the sustainability of such interventions. These dimensions were not captured quantitatively but provide critical context for interpreting why policy/regulatory support, although statistically significant, may not translate into transformative outcomes without domestic institutional strengthening.

Finally, investor perception and risk emerged as a distinct qualitative theme, highlighting how currency volatility, policy inconsistency, and governance risks discourage private investment. Although not directly modelled in the regression analysis, these factors intersect with quantitative predictors by shaping the accessibility and cost of climate finance. In particular, high-risk perceptions raise financing costs and limit the inflow of private capital, thereby moderating the effectiveness of climate finance access as observed in the regression model.

Taken together, the triangulated evidence suggests that while climate finance access and ESG compliance statistically drive sustainable energy outcomes, their impact is conditional on broader policy enforcement, institutional readiness, international-local alignment, and investor confidence. The convergence of quantitative and qualitative findings thus reinforces the argument that a multi-pronged approach—strengthening domestic regulatory frameworks, building institutional capacity, de-risking investments, and fostering local ownership—is essential for achieving Nigeria's energy transition goals.

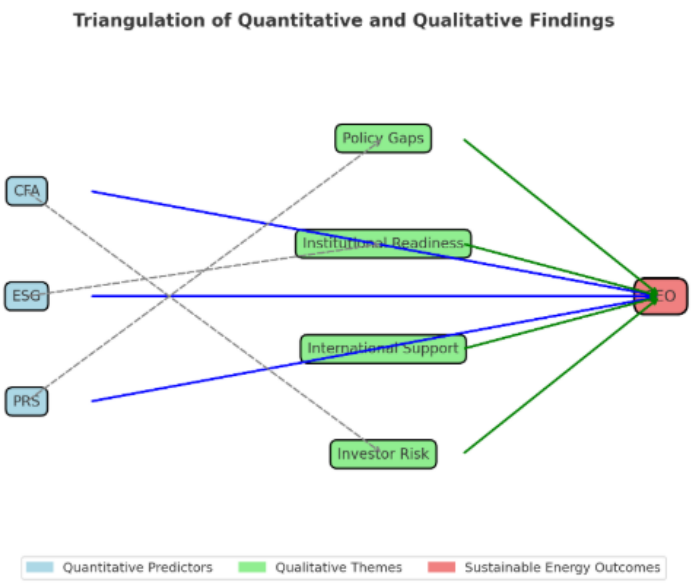

Figure 1: Integrated Triangulation Framework of Quantitative and Qualitative Findings

The figure illustrates how quantitative predictors—climate finance access, ESG compliance, and policy/regulatory support—interact with qualitative themes derived from key informant interviews (policy and regulatory gaps, institutional readiness, international support, and investor perception and risk) to shape sustainable energy outcomes in Nigeria.

The conceptual diagram integrates both quantitative and qualitative findings to provide a holistic understanding of the factors influencing sustainable energy development in Nigeria. The regression results indicated that climate finance access (β = 0.482) is the strongest quantitative predictor, followed by ESG compliance (β = 0.356) and policy/regulatory support (β = 0.291). The qualitative themes reinforce these relationships.

For instance, policy and regulatory gaps weaken the enabling environment for climate finance and ESG adoption, explaining why policy/regulatory support emerged as a significant but moderate predictor. Similarly, institutional readiness highlights capacity disparities between large financial institutions and SMEs, which contextualises the uneven uptake of ESG practices observed in the quantitative analysis. International support and local ownership provide an external push for climate finance flows, yet sustainability challenges underscore the need for domestic policy reforms. Finally, investor perception and risk explain why, despite the availability of global climate finance, Nigeria struggles to attract sufficient private capital, aligning with the model's emphasis on access to finance as a critical determinant of outcomes.

Taken together, the diagram demonstrates that quantitative predictors and qualitative themes are complementary, providing convergent evidence that strengthening climate finance, mainstreaming ESG practices, and closing institutional and regulatory gaps are pivotal for Nigeria's energy transition.

DISCUSSION

The findings reveal that strengthening climate finance and ESG practices is not only statistically significant but also practically essential for Nigeria's energy transition. Access to climate finance emerged as the most influential driver of sustainable energy, consistent with studies such as Adenle (2020) and Climate Policy Initiative (2022), which identified financing gaps as a critical bottleneck in African energy transitions. ESG compliance, though relatively new in Nigeria, is gaining traction, especially in the financial sector, aligning with the CBN's sustainable banking principles (Central Bank of Nigeria, 2021).

However, the study highlights significant policy and regulatory challenges. Weak enforcement, limited green bond penetration, and inadequate fiscal incentives remain significant barriers to scaling climate finance and ESG integration. These findings align with previous research by Adebayo, Oyewole, and Adedoyin (2022), which highlighted governance gaps as key obstacles to economic reforms in Nigeria.

Overall, the study demonstrates that achieving Nigeria's sustainable energy development goals requires a coordinated approach involving financial innovation, ESG mainstreaming, and strengthened regulatory frameworks.

CONCLUSION

This study examined the nexus between climate finance, ESG practices, and sustainable energy development in Nigeria. The findings revealed that access to climate finance, ESG compliance, and policy/regulatory support significantly influence the country's ability to transition to sustainable energy systems. While Nigeria possesses immense renewable energy potential, financing gaps, weak regulatory enforcement, and inadequate incentives continue to hinder progress. Both quantitative and qualitative evidence

underscore that institutional reforms, stakeholder engagement, and targeted financial innovation are essential for achieving Nigeria's Energy Transition Plan and broader sustainable development goals.

CONTRIBUTION TO KNOWLEDGE

This study makes several significant contributions:

1. Empirical Validation: It provides empirical evidence linking climate finance accessibility and ESG adoption directly to sustainable energy outcomes in Nigeria.
2. Policy-Driven Insights: By highlighting the gaps in the enforcement of sustainable banking principles, green bond penetration, and fiscal incentives, it bridges the knowledge gap on institutional weaknesses in Nigeria's energy transition.
3. Mixed-Methods Approach: Through triangulation of survey data, statistical modelling, and qualitative interviews, the study offers a holistic understanding of the opportunities and barriers in Nigeria's climate finance landscape.
4. Contextual Relevance: Unlike studies focused broadly on Africa, this research situates climate finance and ESG within the specific realities of Nigeria, providing localised insights that can inform practice and policy.

RECOMMENDATIONS

1. Strengthen Regulatory Frameworks: The CBN should intensify the enforcement of sustainable banking principles, while energy regulators should mandate ESG compliance for firms seeking climate finance.
2. Expand Green Financing Instruments: Government and financial institutions should deepen the penetration of green bonds and other innovative instruments to mobilise private capital for renewable energy projects.
3. Provide Fiscal and Policy Incentives: Tax rebates, subsidies, and risk-sharing mechanisms should be introduced to encourage private sector participation in climate-aligned investments.
4. Capacity Building: SMEs in the energy sector should be supported with technical expertise and training to integrate ESG practices effectively.
5. International Collaboration: Nigeria should leverage concessional climate funds and technical assistance from global partners while ensuring policy alignment for local ownership and sustainability.
6. Stakeholder Engagement: Inclusive platforms involving communities, civil society, and private sector actors should be institutionalised to ensure accountability and alignment with sustainability goals.

REFERENCES

1. Abdullahi, I. A., Obansa, S. A. J., & Magaji, S. (2024). Petroleum Price Dynamics and Inflation in Nigeria: A Granger Causality Analysis, 1990–2023. *Journal of Economics and Financial Issues, 7*(1), 1–19.
2. Adebayo, T. O., Oyewole, O. O., & Adedoyin, F. O. (2022). Inflation, corruption, and unemployment in Nigeria: A panel data analysis. *International Journal of Economics and Finance, 12*(5), 1–9.
3. Adekoya, A. A., Magaji, S., & Ismail, Y. (2025). Empirical Analysis of the Impact of Unemployment on Economic Growth in Nigeria. *International Journal of Innovative Finance and Economics Research, 13*(2), 63–80. https://doi.org/10.5281/zenodo.15311427
4. Adenle, A. A. (2020). Assessment of barriers to renewable energy and energy efficiency technologies in Africa. *Renewable and Sustainable Energy Reviews, 110*, 483–492. https://doi.org/10.1016/j.rser.2019.05.014
5. Akinyemi, F., & Salisu, H. (2023). Economic instability and sustainable investment in Sub-Saharan Africa: The ESG perspective. *Journal of Sustainable Finance & Investment, 13*(2), 167–184. https://doi.org/10.1080/20430795.2022.2027709
6. Central Bank of Nigeria. (2021). *Nigeria's sustainable banking principles report*. CBN.
7. Chinedu, C. J., Magaji, S., & Musa, I. (2021). Empirical analysis of the role of money market instruments on economic growth in Nigeria: 1994–2018. *Lapai Journal of Economics, 5*(2), 24–37.
8. Climate Policy Initiative. (2022). *Landscape of climate finance in Africa*. CPI.
9. DiMaggio, P., & Powell, W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organisational Fields. *American Sociological Review, 48*(2), 147–160.
10. Federal Government of Nigeria. (2021). *Nigeria's energy transition plan*. Abuja: FGN.
11. Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston: Pitman.
12. Igwe, G. U., Magaji, S., & Darma, N. A. (2021). Analysis of the impact of financial development indicators of the banking, insurance, and pension sectors on economic growth in Nigeria. *FORCE: Focus on Economic Research in Contemporary Economics, 2*(2), 140–156.
13. International Energy Agency. (2022). *Africa Energy Outlook 2022*. IEA.
14. Ismail, Y., Musa, I., & Magaji, S. (2024). Assessment of the Impact of Government Health Expenditure on Economic Growth in Nigeria. *Journal of Arid Zone Economy, 4*(3), 132–151. https://bit.ly/JazeIssue4(3)

15. Jafaru, Y., Magaji, S., & Abdullahi, I. A. (2024). Poverty, Family Status, and Crime: Insights from Gwagwalada, Abuja, Nigeria. *International Journal of Research Publication and Reviews, 5*(5), 6745–6755.
16. Magaji, S., Abubakar, M. M., & Temitope, Y. A. (2022). Impact of International Trade on Economic Growth: The Granger Causality Test Approach. *International Journal of Accounting and Management Sciences, 1*(2), 113–130.
17. Magaji, S., Ahmad, A. I., Sabiu, S. B., & Yunusa, A. A. (2024). From deforestation to pollution: Unravelling environmental challenges in Nigeria and Pakistan. *International Journal of Humanities, Social Science and Management (IJHSSM), 4*(2), 805–814.
18. Magaji, S., Ayo, A. A., Ibrahim Musa and Ali, S. (2019). Relative impact of monetary policy instructions on economic growth in Nigeria. *Lapai Journal of Economics. 3(2), 93-118*
19. Magaji, S., Musa, I., & Dogo, S. S. (2023). Analysis of the Impact of Banking Sector Credits on the Real Sector in Nigeria. *International Journal of Management and Business Applied, 2*(1), 12–20.
20. Magaji, S., Tanko, Y., & Musa, I. (2025). The Effect of Green Loans and Green Mortgages on Climate Change Mitigation in Nigeria. *International Journal of Current Science Research and Review, 8*(6), 3124–3138.
21. Nazifi, D. A., Magaji, S., & Amase, J. (2022). Macro-economic impact of oil price shocks on government expenditure and economic growth in Nigeria. *SDMIND Journal of Management, 13*(Special).
22. Okonkwo, C. E., & Eze, R. A. (2022). Environmental, social and governance practices in Nigeria: Drivers, challenges and implications. *African Journal of Corporate Governance, 7*(1), 55–72.
23. Sabiu, B. S., & Magaji, S. (2024). Effect of oil exploration and climate change on the Niger Delta region of Nigeria. *Journal of Development and Society, 6*(1), 36–49.
24. Suleiman, H., Magaji, S., & Musa, I. (2025). Assessing the Effect of Green Loans and Carbon Finance on Sustainable Cities and Community Development in Nigeria: An Analysis of Urban Sustainability Indices. *International Journal of Innovative Science and Research Technology, 10*(5).
25. Tanko, Y., Magaji, S., & Musa, I. (2025). Effect of green finance on climate change mitigation in Nigeria. *International Journal of Economic Perspectives, 19*(7), 1–22.
26. United Nations Framework Convention on Climate Change. (2021). *Introduction to climate finance*. UNFCCC.
27. World Bank. (2021). *ESG investing in emerging markets: Opportunities and challenges*. World Bank Publications.
28. Yakubu, J., Magaji, D. A., & Magaji, S. (2025). Assessing the Socio-economic Impact of Climate Change and Poverty in Birnin Kudu Local Government, Jigawa State, Nigeria. *African Journal of Social Sciences and Humanities Research, 8*(2), 11–31.
29. Zailani, H. S., Magaji, S., & Jafaru, Y. (2025). Examining the methods in achieving effective conflict resolution and peacebuilding in Northeastern Nigeria. *GAS Journal of Arts, Humanities and Social Sciences (GASJAHSS, 3*(5), 12–18.