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Climate Finance and Environmental, Social, and Governance (ESG) Dimensions: Implications for Renewable Energy and Energy Efficiency in Nigeria

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Abstract

This study investigates the role of climate finance and Environmental, Social, and Governance (ESG) considerations in advancing renewable energy and energy efficiency in Nigeria. Using a mixed-methods approach, the study analyses time-series data on climate finance inflows and renewable energy deployment from 2010 to 2024, complemented by semi-structured interviews with key stakeholders. Descriptive and regression analyses reveal that climate finance has a significant positive effect on renewable energy adoption, while macroeconomic instability and weak institutional mechanisms undermine progress. Qualitative findings highlight critical barriers, including limited access to credit from commercial banks, weak ESG compliance, and inadequate attention to social equity. Anchored in Sustainable Finance Theory and Stakeholder Theory, the study concludes that climate finance and ESG adoption are vital enablers of Nigeria's energy transition; however, systemic challenges constrain their transformative potential. The paper recommends strengthening governance frameworks, de-risking renewable investments, and ensuring inclusivity in energy access. The findings contribute to the growing discourse on sustainable finance by contextualising global best practices within Nigeria's financial and energy systems.

Keywords: Climate finance; ESG dimensions; Renewable energy; Energy efficiency; Sustainable finance; Stakeholder theory; Nigeria; Energy transition; Social equity

Introduction

The accelerating impacts of climate change have reinforced the urgency for countries to adopt sustainable pathways toward low-carbon development (Suleiman, 2025). For Nigeria, Africa's largest economy and most

populous nation, the challenge of balancing rapid production for export to achieve economic growth, energy security, and environmental sustainability is particularly acute (Magaji et al., 2022). The country remains heavily dependent on fossil fuels, especially oil and natural gas, which account for the majority of government revenue and foreign exchange earnings (Magaji et al., 2025). At the same time, over 40 per cent of the population still lacks access to reliable electricity, underscoring the pressing need for transformative energy solutions (International Energy Agency [IEA], 2022). Renewable energy technologies and energy efficiency measures thus present critical avenues for Nigeria to simultaneously address energy poverty, reduce greenhouse gas emissions, and foster sustainable economic growth.

In recent years, climate finance has emerged as a pivotal enabler for accelerating renewable energy deployment in developing countries. Defined as financial resources and investments directed toward climate mitigation and adaptation initiatives, climate finance facilitates the mobilisation of both public and private capital for low-carbon transitions (United Nations Framework Convention on Climate Change [UNFCCC], 2021). Nigeria, like many sub-Saharan African countries, faces considerable barriers to financing renewable energy and energy efficiency initiatives, including high upfront costs and limited access to long-term credit (Magaji et al., 2023), as well as perceived investment risks (Adebayo et al., 2022). Climate finance, therefore, offers a pathway for bridging the financing gap and aligning national energy strategies with global climate commitments such as the Paris Agreement and the Sustainable Development Goals (SDGs).

Parallel to the climate finance agenda is the growing relevance of Environmental, Social, and Governance (ESG) considerations in shaping corporate practices, investment flows, and sustainability outcomes. ESG principles provide a framework for integrating non-financial risks and opportunities into investment and business decision-making, with growing recognition that they significantly influence firm performance, investor confidence, and long-term value creation (Friede et al., 2015; Krueger et al., 2020). In Nigeria, where governance challenges, social inequalities, and environmental degradation persist, ESG adoption offers opportunities to strengthen corporate accountability, mitigate sustainability risks, and attract responsible investments that align with global best practices (Okorie & Mordi, 2022).

The intersection of climate finance and ESG dimensions has profound implications for Nigeria's renewable energy and energy efficiency transition. On the one hand, international climate finance initiatives such as the Green Climate Fund and concessional loans from multilateral development banks create new opportunities for financing large-scale clean energy projects. On the other hand, the rising emphasis on ESG compliance among investors and financial institutions ensures that capital is increasingly directed toward projects that meet robust sustainability criteria (Zhang & Bell, 2021). This dual dynamic not only enhances Nigeria's capacity to meet its Nationally Determined Contributions (NDCs) but also strengthens its positioning in global financial markets where sustainable investments are rapidly expanding.

However, challenges remain. Nigeria's institutional capacity for mainstreaming ESG standards is still evolving, and regulatory frameworks for green finance are in their formative stages (Central Bank of Nigeria [CBN], 2021). Moreover, the risk of "greenwashing" and limited domestic investor awareness of ESG principles could undermine progress (Eregha & Mesagan, 2021). These gaps highlight the need for evidence-based research to examine the role of climate finance and ESG adoption in advancing renewable energy and energy efficiency within the Nigerian context.

This paper, therefore, investigates the implications of climate finance and ESG dimensions for Nigeria's renewable energy and energy efficiency drive. By integrating insights from global frameworks and local realities, the study contributes to the discourse on sustainable finance, energy transition, and policy innovation in emerging economies. The findings are expected to provide policymakers, investors, and development practitioners with critical knowledge for accelerating Nigeria's clean energy transformation while promoting inclusive and sustainable growth.

Literature Review

Conceptual Definitions

Climate Finance:

Climate finance refers to financial resources mobilised from public, private, and multilateral sources to support climate change mitigation and adaptation efforts. The United Nations Framework Convention on Climate Change (UNFCCC, 2021) defines climate finance as "local, national or transnational financing drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions." In the Nigerian context, climate finance is increasingly directed toward renewable energy deployment, energy efficiency projects, and climate-resilient infrastructure; however, significant constraints remain.

One of the most pressing barriers is limited access to credit for renewable energy and green projects. Commercial banks in Nigeria have traditionally favoured short-term, high-yield lending such as oil and gas, trade finance, and government securities, due to perceived lower risks and higher returns (Okoroafor et al., 2018). Renewable energy projects, by contrast, often require long-term capital with relatively high upfront costs and extended payback periods, which many banks are unwilling to underwrite (Magaji, 2004). This financing mismatch discourages small and medium-sized enterprises (SMEs) and community-based initiatives from accessing affordable loans for clean energy ventures. In addition, interest rates in Nigeria remain among the highest in Africa (Magaji et al.,2019), limiting the feasibility of debt-financed renewable energy investments (Adenle, 2020). Weak credit infrastructure, absence of tailored green financing products, and inadequate guarantees exacerbate the financing gap, leaving climate finance in Nigeria heavily reliant on international donors, multilateral institutions, and development finance mechanisms (Tanko et al., 2025).

Environmental, Social, and Governance (ESG) Dimensions
Environmental, Social, and Governance (ESG) dimensions represent a set of standards for corporate behaviour and investment decisions. The "environmental" component emphasises climate impact, emissions reduction, and sustainable resource use; the "social" dimension focuses on labour standards, community relations, and social equity; while the "governance" aspect underscores corporate ethics, transparency, and accountability (Friede et al., 2015; Krueger et al., 2020).

Of particular importance in the Nigerian context is the social equity dimension. Social equity refers to fairness in the distribution of resources, opportunities, and benefits of economic growth, ensuring that marginalised and vulnerable groups are not excluded from development processes (Muhammed et al., 2025). In relation to renewable energy and energy efficiency, social equity implies that low-income households, rural dwellers, and women—who are disproportionately affected by energy poverty—should have equitable access to affordable, clean, and reliable energy services (World Bank, 2022). However, inequities persist: urban elites and multinational corporations often dominate access to renewable energy technologies, while rural and peri-urban communities remain underserved. Integrating ESG social equity principles into investment and policy frameworks can help correct these disparities by promoting inclusive financing mechanisms, local job creation, and community participation in clean energy projects (Okorie & Mordi, 2022). This underscores the necessity of embedding ESG considerations into Nigeria's energy transition agenda to foster not just sustainability, but also fairness and inclusiveness.

Renewable Energy and Energy Efficiency:

Renewable energy refers to energy generated from natural resources that are replenishable and environmentally friendly, such as solar, wind, hydropower, and biomass. Energy efficiency, on the other hand, entails reducing energy consumption while maintaining or improving service output (International Energy Agency [IEA], 2022). Both concepts are central to Nigeria's transition to a low-carbon economy, given the country's over-reliance on fossil fuels and the prevalence of energy poverty. Climate finance and ESG adoption are increasingly recognised as catalysts for scaling renewable energy and enhancing efficiency measures in the Nigerian energy sector (Akinyemi & Salisu, 2023).

Theoretical Framework

This study is anchored on two interrelated theories that provide a conceptual foundation for understanding the dynamics of climate finance, ESG adoption, and Nigeria's energy transition: Sustainable Finance Theory and Stakeholder Theory.

1. Sustainable Finance Theory

Sustainable finance theory posits that investment decisions should not be driven solely by financial returns. However, it should also integrate environmental, social, and governance (ESG) considerations as core determinants of value creation. It suggests that channelling capital toward projects that address climate change, social equity, and governance accountability generates long-term benefits while reducing systemic risks associated with unsustainable development practices (Sullivan & Mackenzie, 2020). Unlike traditional finance, which prioritises short-term profitability (Chinedu et al., 2021), sustainable finance emphasises a triple-bottom-line approach—balancing people, planet, and profit (Elkington, 1998).

In the Nigerian context, this theory is highly relevant, as the energy sector faces significant structural challenges, including overdependence on fossil fuels (Odenu et al., 2025), limited access to finance for renewable energy projects, and exposure to climate-related risks (Yakubu et al, 2025). By applying sustainable finance principles, investments can be directed towards projects that foster renewable energy deployment, improve energy efficiency, and reduce greenhouse gas emissions, while also addressing social needs such as job creation, poverty reduction, and energy access in underserved communities (Eregha & Mesagan, 2021). Furthermore, climate finance instruments such as green bonds, concessional loans, and blended finance mechanisms can be structured to de-risk renewable energy investments in Nigeria's high-risk environment, thereby aligning financial flows with the Sustainable Development Goals (Central Bank of Nigeria [CBN], 2021).

From a theoretical standpoint, sustainable finance underscores the argument that capital allocation is not value-neutral; instead, it has moral, social, and environmental implications. In this sense, Nigeria's adoption of renewable energy technologies and energy efficiency measures can be accelerated if financial institutions and investors embed ESG metrics into their investment decisions. This reflects a paradigm shift from "profit-maximisation" toward responsible investment practices that foster resilience, inclusiveness, and sustainability.

2. Stakeholder Theory

Stakeholder theory, advanced by Freeman (1984), argues that organisations have responsibilities not only to shareholders but also to a broader range of stakeholders, including employees, customers, communities, governments, and the natural environment. The central idea is that sustainable corporate performance and long-term success depend on maintaining positive relationships and balancing the often-competing interests of diverse stakeholders (Donaldson & Preston, 1995).

In relation to ESG dimensions, stakeholder theory provides a strong justification for why organisations should incorporate non-financial considerations into their decision-making processes. For example, the environmental component aligns with the interests of future generations and global society; the social component reflects the needs of employees, communities, and vulnerable groups; and the governance component addresses accountability to regulators, investors, and the broader public (Krueger et al., 2020).

In Nigeria, stakeholder theory is particularly relevant given the country's complex socio-economic and political landscape. The transition to renewable energy and energy efficiency requires collaboration among multiple actors: government regulators who set enabling policies, financial institutions that mobilise capital, private investors who take risks, communities that host projects, and civil society groups that demand accountability. For instance, the Central Bank of Nigeria's Sustainable Banking Principles, the issuance of sovereign green bonds, and donor-driven renewable energy programs demonstrate the critical role of multi-stakeholder partnerships in mainstreaming ESG standards and climate finance initiatives (CBN, 2021).

Moreover, stakeholder theory emphasises the importance of a just transition—ensuring that the shift to clean energy does not disproportionately disadvantage vulnerable groups, such as low-income households, women, or communities dependent on fossil fuel-related livelihoods. By prioritising inclusiveness, accountability, and

responsiveness to multiple stakeholder needs, Nigeria can ensure that its renewable energy transition is not only environmentally sound but also socially equitable and politically feasible.

Together, sustainable finance theory and stakeholder theory provide a robust analytical lens for this study. While sustainable finance explains how aligning financial flows with ESG dimensions can drive renewable energy investment, stakeholder theory highlights the necessity of broad-based collaboration and accountability in achieving an equitable energy transition.

Empirical Evidence

Global evidence

A growing body of empirical research documents a positive association between sustainable finance/ESG integration and increased flows into renewable energy. Survey and portfolio-level studies indicate that institutional investors are increasingly considering climate risk and ESG factors as material to financial performance, and many now employ engagement and risk-management strategies rather than wholesale divestment. This approach directs capital to firms and projects aligned with decarbonization objectives (Krueger et al., 2020).

Macro-level and cross-country analyses further indicate that the maturation of green finance instruments (green bonds, green loans, and blended finance facilities) and clearer disclosure standards are correlated with higher private investment in renewable energy projects in emerging markets (Nedopil, 2021; Zhang & Bell, 2021). Blended concessional instruments and credit enhancements have been shown in several studies to lower perceived project risk and mobilise follow-on private finance for capital-intensive clean energy infrastructure.

Evidence from Africa and regional dynamics

Africa's share of global climate finance has historically been small relative to needs. However, recent CPI reporting notes material growth in aggregate flows (from roughly USD 29.5 billion in 2019/20 to about USD 43.7 billion in 2021/22), indicating progress while also stressing persistent shortfalls for adaptation and large-scale mitigation projects (Climate Policy Initiative, 2022; CPI, 2024). The CPI reporting documents that adaptation finance has remained a significant share of Africa's climate flows and that private sector participation is comparatively low, underscoring a demand-side financing gap.

Empirical case studies in countries such as Kenya and South Africa demonstrate that concessional loans, donor guarantees, and blended finance structures have been instrumental in scaling utility-scale wind and solar projects and in supporting distributed renewable energy solutions. These mechanisms reduce financing costs and currency/tenor risks that otherwise deter commercial banks and private investors (Convergence; IFC/DFI joint reports). Nevertheless, weak regulatory environments, currency volatility, and limited local capital markets continue to constrain the replicability and speed of scale-up across the continent.

Evidence and examples from Nigeria

Nigeria presents a nuanced picture: policy innovations and some successful capital market experiments have coexisted with persistent financing frictions that limit the broad-scale adoption of renewable energy. Notable policy/instrument evidence includes Nigeria's sovereign green bond program, first launched in 2017 and followed by subsequent tranches, which demonstrated the capacity to mobilise domestic investor interest in labelled green sovereign debt and to direct proceeds toward solar and other eligible green projects (DMO/FMDQ green bond reports). These issuances offer proof of concept that capital markets can be used for climate investments in Nigeria.

At the same time, empirical and policy analyses highlight serious barriers in the banking and finance ecosystem. The Central Bank of Nigeria's Nigerian Sustainable Banking Principles (NSBP) and related guidance aim to mainstream environmental and social risk management in bank lending, yet implementation has been uneven. Empirical reviews and sector diagnostics indicate that commercial banks tend to prefer short-term, liquid assets and government securities, and remain cautious about long-term lending to renewable energy projects due to perceived risks associated with technology, policy, and off-taker risks (CBN NSBP documentation; World Bank country diagnostics). This preference contributes to a persistent limited access to credit problem for renewable

energy developers, especially SMEs and community energy initiatives that lack collateral or track records acceptable to banks.

Blended finance and concessional instruments have been applied in Nigeria to address these frictions, with mixed but instructive results. Development finance institution (DFI) programs and donor-supported blended vehicles have helped de-risk some projects and improved bank willingness to lend, but empirical evaluations show that such interventions must be carefully designed—addressing currency risk, creating standardised documentation, and building local bank capacity—to achieve scalable private mobilisation (IFC/DFI reports; WRI analysis of local private capital barriers).

Beyond financial instruments, the empirical literature also highlights governance and market-readiness issues. Studies of Nigerian firms' sustainability practices reveal that formal ESG reporting and integrated ESG management remain nascent; corporate activity often centres on CSR rather than systematic ESG disclosure or risk integration, which limits investor confidence and transparency needed to attract large-scale ESG-focused funds (Okorie & Mordi, 2022). At the same time, recent innovations—such as more frequent green bond issuances, the emergence of sustainability reporting guidance, and CBN/Bankers Committee stewardship—suggest institutional progress that could lower informational and governance barriers over time. Synthesis and gaps

Taken together, empirical evidence suggests a conditional optimism: climate finance instruments and ESG integration can and do mobilise investment for renewable energy and efficiency when accompanied by credible policy frameworks, blended de-risking mechanisms, transparent reporting standards, and active DFI/technical support (Krueger et al., 2020; CPI, 2024; IFC/Convergence reports).

However, multiple structural barriers persist in Nigeria—limited access to long-term credit, conservative commercial bank lending behaviour, high interest rates, currency and policy risk, and the relative immaturity of ESG reporting and verification—which together hinder the scaling of projects from pilot to portfolio level. These empirical findings reinforce the need for research that (a) evaluates which blended finance and policy mixes most effectively mobilise domestic capital in Nigeria's particular macro-financial context, and (b) isolates the governance and disclosure interventions necessary to translate labelled-green instruments into sustained private investment at scale.

Methodology

This study adopts a mixed-method research design, combining both quantitative and qualitative approaches to provide a comprehensive analysis of the role of climate finance and ESG integration in advancing renewable energy development in Nigeria. The choice of a mixed-methods framework is informed by the need to capture not only measurable trends in financial flows and renewable energy investments but also contextual insights on institutional barriers, stakeholder perspectives, and policy implementation gaps. By triangulating numerical data with qualitative evidence, the study ensures both breadth and depth of analysis.

The quantitative component involves the collection and analysis of secondary data on climate finance flows, renewable energy deployment, and ESG adoption in Nigeria. Data will be sourced from institutions such as the Central Bank of Nigeria (CBN), the Debt Management Office (DMO), the Nigerian Electricity Regulatory Commission (NERC), the International Energy Agency (IEA), and the Climate Policy Initiative (CPI). Time-series data covering the period 2010–2024 will be compiled to examine trends in climate finance inflows, renewable energy capacity additions, and ESG-related corporate disclosures. Descriptive statistics will be employed to highlight patterns. At the same time, inferential statistical tools—such as regression analysis—will be used to test the relationship between climate finance variables (e.g., green bonds, concessional loans) and renewable energy growth indicators (e.g., installed solar and wind capacity, energy efficiency adoption).

The qualitative component is designed to capture stakeholder perceptions and institutional dynamics that cannot be fully represented in quantitative terms. Semi-structured interviews will be conducted with key actors, including officials from regulatory agencies, financial institutions, renewable energy developers, and civil society organisations. The interviews will explore issues such as limited access to credit, risk perceptions of commercial banks, ESG compliance challenges, and the social equity implications of renewable energy projects. Qualitative

data will be analysed using thematic analysis to identify recurring themes, contradictions, and unique insights that complement the quantitative findings.

A triangulation strategy will be employed to strengthen the validity of the study. Quantitative findings on climate finance flows and renewable energy adoption will be compared with qualitative evidence from stakeholder narratives to confirm or challenge observed patterns. This process ensures a robust interpretation of results and reduces the risk of bias associated with reliance on a single methodological approach. Furthermore, reliability will be enhanced by using multiple data sources for cross-verification and by adopting a transparent coding procedure for qualitative analysis.

Finally, ethical considerations will be strictly adhered to throughout the research process. Interview participants will be informed of the study's purpose and assured of confidentiality and anonymity. Data from official sources will be cited appropriately, and findings will be presented objectively to avoid misrepresentation. The methodological choices in this study are therefore intended not only to provide empirical rigour but also to capture the multifaceted realities of climate finance, ESG adoption, and renewable energy transition in Nigeria.

Data and Results

Descriptive Analysis

Table 1 presents descriptive statistics on climate finance inflows and renewable energy adoption in Nigeria between 2010 and 2024. The results show that while climate finance has increased over time, averaging USD 1.3 billion annually, the figure remains low compared to Nigeria's estimated USD 10 billion annual requirement for energy transition (Climate Policy Initiative, 2022). Renewable energy capacity additions are modest, with solar energy growing more significantly than wind or biomass. However, energy efficiency measures, such as improved grid infrastructure and deployment of smart meters, remain limited to pilot schemes in urban centres.

Table 1. Descriptive Statistics of Climate Finance and Renewable Energy (2010–2024)

Variable	Mean	Std. Dev.	Min	Max	Observations
Climate finance inflows (USD bn)	1.3	0.75	0.4	3.2	15
Installed solar capacity (MW)	420	110	180	620	15
Installed wind capacity (MW)	30	12	10	55	15
Energy efficiency projects (#)	12	6	3	21	15

Source: CBN 2021, IEA 2022, NERC, 2024, author's compilation.

Regression Results

A regression model was estimated to examine the relationship between climate finance inflows and renewable energy capacity additions, controlling for GDP growth, exchange rate volatility, and inflation. The results (Table 2) indicate that climate finance has a statistically significant positive effect on renewable energy adoption ($\beta = 0.41$, $p < 0.05$). Specifically, a one-unit increase in climate finance inflows is associated with a 41 per cent increase in installed renewable energy capacity. However, macroeconomic instability, measured by exchange rate volatility, exerts a negative and significant effect ($\beta = -0.28$, $p < 0.10$), suggesting that economic uncertainty undermines investor confidence in renewable projects.

Table 2. Regression Estimates of Climate Finance and Renewable Energy Adoption

Variable	Coefficient (β)	Std. Error	t-statistic	Significance
Climate finance inflows	0.41	0.18	2.28	0.03
GDP growth	0.22	0.15	1.47	0.15

Variable	Coefficient (β)	Std. Error	t-statistic	Significance
Exchange rate volatility	–0.28	0.14	–2.01	*0.08*
Inflation	–0.11	0.10	–1.10	0.28
Constant	3.12	0.95	3.28	0.01
R^2	0.61			

Dependent variable: Installed renewable energy capacity; N = 15.

These findings suggest that climate finance is an important driver of Nigeria's renewable energy development, but is significantly hindered by macroeconomic challenges and weak financial markets.

Qualitative Insights

The quantitative findings were complemented by evidence from semi-structured interviews with stakeholders in the energy and financial sectors. Three key themes emerged:

1. Limited Access to Credit: Respondents from commercial banks admitted that renewable energy projects are often perceived as high-risk, partly due to long payback periods and uncertainties in regulatory enforcement. One banker noted:

"Our institutions are hesitant to lend because renewable energy projects lack the collateral value of traditional industries like oil and gas."

2. ESG and Social Equity Gaps: Civil society organisations highlighted that ESG reporting in Nigeria is still fragmented, with firms focusing narrowly on philanthropy rather than integrated sustainability strategies. A community leader emphasised:

"Solar farms are being set up, but poor communities still cannot afford access to the electricity they generate. Equity is missing in the conversation."

3. Policy and Institutional Weaknesses: Regulators acknowledged that while green bonds and sustainable banking principles exist, weak enforcement mechanisms reduce their effectiveness. An official from NERC explained:

"Policies are in place, but institutional capacity and political will to drive implementation remain inadequate."

Triangulated Findings

The triangulation of data shows a consistent pattern: climate finance and ESG adoption contribute positively to renewable energy development, but systemic financial, institutional, and equity-related constraints slow Nigeria's transition. Quantitative data revealed the measurable impact of finance flows. At the same time, qualitative evidence highlighted barriers such as risk perceptions in commercial banks, weak ESG integration, and limited inclusivity in renewable energy access. Together, the findings underscore the urgent need for stronger institutional frameworks, innovative financial instruments, and equity-focused policies to unlock Nigeria's renewable energy potential.

Discussion of Results

The findings of this study confirm that climate finance and ESG considerations play a significant role in shaping Nigeria's renewable energy and energy efficiency trajectory. The regression analysis demonstrated that climate finance inflows have a positive influence on renewable energy adoption, consistent with Zhang and Bell (2021), who observed similar effects in emerging markets. However, the adverse effect of macroeconomic instability on renewable energy deployment reflects Nigeria's vulnerability to financial shocks, which erode investor confidence.

The qualitative evidence further revealed that commercial banks' reluctance to extend credit to renewable energy projects constrains private sector participation. This aligns with the Sustainable Finance Theory, which emphasises the importance of integrating long-term sustainability metrics into capital allocation (Sullivan & Mackenzie, 2020). Without mechanisms to de-risk investments, Nigeria risks locking into fossil-based energy systems, undermining its long-term climate commitments.

Stakeholder Theory also finds strong support in the results. The interviews underscored that stakeholders—including communities, regulators, and investors—are not adequately engaged in ensuring equitable access to renewable energy. While ESG frameworks exist, they are mainly limited to corporate social responsibility, falling short of the robust accountability and transparency required to balance diverse stakeholder interests (Freeman, 1984; Donaldson & Preston, 1995). The finding that poor communities remain excluded from renewable energy benefits reinforces the importance of embedding equity considerations within the just energy transition agenda.

In sum, the results validate the theoretical expectation that both financial flows and stakeholder collaboration are critical to achieving sustainable energy transitions. However, Nigeria's structural barriers—macroeconomic instability, weak governance, and inequitable energy access—dilute the transformative potential of climate finance and ESG integration.

Conclusion

This study examined the implications of climate finance and ESG integration for renewable energy and energy efficiency in Nigeria. Empirical results show that while climate finance significantly enhances renewable energy deployment, progress remains slow due to systemic barriers such as financial sector risk aversion, macroeconomic volatility, and weak institutional enforcement. Qualitative insights highlighted gaps in stakeholder engagement, particularly in addressing social equity and inclusiveness. The study concludes that climate finance and ESG adoption are indispensable enablers of Nigeria's low-carbon transition. However, their success depends on robust governance frameworks, innovative financial mechanisms, and deliberate efforts to ensure equity in energy access.

Recommendations

1. Strengthen Policy and Regulatory Frameworks: The Nigerian government should enhance enforcement of green finance policies, such as the Sustainable Banking Principles and sovereign green bonds, while reducing bureaucratic bottlenecks.

2. De-risk Renewable Investments: Financial institutions should adopt blended finance instruments, public-private partnerships, and credit guarantees to mitigate perceived risks and encourage private investment in renewable energy.

3. Enhance ESG Adoption: Corporations and investors should move beyond philanthropy to adopt integrated ESG reporting standards that emphasise accountability, transparency, and sustainability in operations.

4. Promote Social Equity in Energy Access: Renewable energy projects must deliberately target underserved communities through subsidies, concessional tariffs, and community-based energy cooperatives to ensure inclusivity.

5. Address Macroeconomic Instability: Stabilising exchange rates, tackling inflation, and ensuring policy consistency will be critical to creating an enabling environment for long-term renewable energy investments.

Contribution to Knowledge

This study makes a significant contribution to the literature in four major ways. First, it provides empirical evidence on the relationship between climate finance and renewable energy adoption in Nigeria using both quantitative and qualitative data. Second, it contextualises global sustainable finance and ESG debates within Nigeria's unique socio-economic and institutional realities. Third, it integrates Sustainable Finance Theory and Stakeholder Theory to explain not only the financial dimensions but also the equity and governance implications

of renewable energy transitions. Finally, it highlights the importance of social equity in climate finance discourse, offering insights that extend beyond economic and environmental considerations.

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