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Investigating the Barriers to Climate Finance and ESG Integration in Nigeria's Energy Transition

Al-Amin Ibrahim Al-Amin[1], Sule Magaji[2] & Yahaya Ismail[2]

[1]*Sustainable Development Centre, University of Abuja*
[2]*Department of Economics, University of Abuja*

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***Corresponding Author:** *Yahaya Ismail*

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Abstract **Original Research Article**

Nigeria's Energy Transition Plan (ETP) sets ambitious targets of achieving net-zero emissions by 2060 and universal energy access by 2030. However, realising these goals requires substantial climate finance and robust Environmental, Social, and Governance (ESG) integration. This study investigates the barriers to climate finance mobilisation and ESG adoption in Nigeria's energy sector using a mixed-methods design. Quantitative data (2010–2023) from multilateral, bilateral, and domestic finance flows were analysed alongside regression tests on the determinants of renewable investments. Qualitative insights were drawn from interviews and focus group discussions with key stakeholders. Findings reveal that macroeconomic instability (exchange rate volatility, high interest rates), weak policy consistency, and superficial ESG adoption significantly constrain renewable energy financing. Domestic financial institutions remain risk-averse, contributing less than 15% of total climate finance inflows, while marginalised communities—mainly rural and women-led groups—are excluded from energy projects. Triangulation of evidence underscores that systemic barriers across finance, governance, and social dimensions are mutually reinforcing. The study concludes that without strengthened domestic financial intermediation, deeper ESG integration, inclusive financing mechanisms, and policy stability, Nigeria's ETP targets will remain unattainable. Recommendations are offered for policy reform, financial innovation, and inclusive governance.

Keywords: Climate finance; ESG integration; Energy transition; Nigeria; Energy Transition Plan; Stakeholder theory; Institutional theory; Sustainable finance; Renewable energy investment; Policy consistency.

INTRODUCTION

The urgency of transitioning to a sustainable energy system in Nigeria has never been more critical. With an energy demand projected to double in the coming decades and continued dependence on fossil fuels, the country faces mounting challenges in achieving both its climate goals and its developmental aspirations (International Energy Agency [IEA], 2022). Nigeria is Africa's largest oil producer (Magaji et al., 2025), yet paradoxically suffers from chronic energy poverty, with over 85 million citizens lacking access to reliable electricity (World Bank, 2022). Renewable energy and energy efficiency measures have been identified as essential pathways for achieving Sustainable Development Goal (SDG) 7—"affordable and clean energy"—while simultaneously contributing to Nigeria's nationally Determined Contributions (NDCs) under the Paris Agreement. However, the mobilisation of adequate climate finance and the integration of Environmental, Social, and Governance (ESG) principles in investment decisions remain formidable barriers to this transition (Climate Policy Initiative [CPI], 2022).

Climate finance the mobilisation of resources from domestic, international, public, and private sources to support mitigation and adaptation has become a cornerstone of sustainable energy transitions globally (United Nations Framework Convention on Climate Change [UNFCCC], 2021). However, Nigeria, like many African economies, remains underfinanced, receiving only a fraction of global climate finance flows relative to its vulnerability and energy needs (Bongers et al., 2021). The limited participation of domestic commercial banks (Chinedu et al., 2021), high investment risks (Magaji et al., 2022), inadequate regulatory frameworks, and macroeconomic instability exacerbate the challenges of financing renewable energy and energy efficiency projects in the country (Eregha & Mesagan, 2021). Although innovative mechanisms such as

green bonds and blended finance instruments are gradually emerging, their scale and coverage remain insufficient to drive the systemic transformation required (Suleiman et al., 2025).

Alongside finance, Environmental, Social, and Governance (ESG) integration has gained global prominence as a framework for aligning corporate and investment practices with sustainability objectives. The environmental pillar emphasises reducing greenhouse gas emissions and resource efficiency (Yakubu et al., 2025), the social pillar highlights inclusivity, equity, and community development (Muhammed et al., 2025), while the governance pillar stresses transparency, accountability, and ethical decision-making (Friede et al., 2015; Krueger et al., 2020). In advanced economies, ESG considerations are being increasingly mainstreamed into investor decision-making, catalysing the adoption of renewable energy. Conversely, in Nigeria, ESG adoption remains nascent and often limited to superficial corporate social responsibility (CSR) projects rather than embedded in institutional governance structures (Okorie & Mordi, 2022). Weak governance systems, corruption, and the absence of mandatory ESG disclosure requirements constrain its potential to attract sustainable investment capital.

Despite the recognised importance of climate finance and ESG principles, significant barriers persist in Nigeria's energy sector. On the financial front, barriers include high perceived investment risks (, underdeveloped credit markets (Magaji et al., 2023), and limited access to concessional financing (Tanko et al., 2025). Commercial banks remain risk-averse (Okoroafor et al., 2018) and often perceive renewable energy projects as unbankable due to their long payback periods and technological uncertainties (Central Bank of Nigeria [CBN], 2021). This limited access to affordable credit particularly undermines small and medium enterprises (Magaji & Saleh, 2010) and local developers who play a pivotal role in off-grid renewable solutions. On the social front, issues of equity and inclusivity emerge, with marginalised rural communities often excluded from renewable energy investments, thereby reinforcing existing inequalities (Adenle, 2020). Meanwhile, governance barriers such as policy inconsistency, weak enforcement of regulations, and overlapping institutional mandates further erode investor confidence and impede ESG integration (Donaldson & Preston, 1995).

The Nigerian case illustrates the paradox facing many resource-rich developing countries: while endowed with abundant renewable energy resources—particularly solar—structural financial and governance challenges undermine their ability to attract climate-aligned investments (Zhang & Bell, 2021). This paradox not only threatens the achievement of Nigeria's energy transition objectives but also risks perpetuating fossil fuel dependency (Odenu et al, 2025), undermining both economic diversification and climate resilience. A deeper investigation into these barriers is therefore crucial for designing effective interventions.

This study seeks to investigate the barriers hindering effective mobilisation of climate finance and the mainstreaming of ESG principles in Nigeria's energy transition. By contextualising global best practices within Nigeria's unique economic and institutional realities, the study contributes to the growing body of knowledge on sustainable energy transitions in Africa. Specifically, it addresses critical research questions: What are the financial, institutional, and social barriers limiting climate finance mobilisation in Nigeria? How are ESG principles being adopted in the Nigerian energy sector, and what challenges impede their integration? What policy and institutional reforms are necessary to unlock climate-aligned investments for Nigeria's energy transition?

The significance of this research is threefold. First, it provides empirical insights into the constraints facing Nigeria's energy transition at a time when climate change impacts are intensifying. Second, it highlights the interplay between finance and governance, demonstrating how financial flows are deeply contingent on institutional quality and ESG adoption. Third, it informs policy reforms, offering recommendations for unlocking sustainable investment and ensuring a just and inclusive energy transition. In doing so, this study responds to both national priorities, such as Nigeria's Energy Transition Plan (ETP), and global commitments under the Paris Agreement and SDGs.

LITERATURE REVIEW

Conceptual Definitions

Climate finance. Climate finance refers to the public, private, domestic, and international capital mobilised to support mitigation and adaptation efforts, including grants, concessional loans, guarantees, equity investments, and blended instruments (UNFCCC, 2021). In the energy sector, climate finance is channelled to renewable power, energy efficiency, clean cooking, storage, and enabling infrastructure (CPI, 2022). Beyond absolute volumes, the *quality* of finance—tenor, cost, risk allocation, and technical assistance—determines investability for emerging-market projects (Magaji, 2004).

ESG integration. ESG integration is the systematic inclusion of material environmental, social, and governance factors into investment analysis and decision-making across asset classes (Sullivan & Mackenzie, 2020). Unlike philanthropic CSR, ESG is tied to risk-adjusted returns, fiduciary duty, disclosure, and stewardship (Friede et al., 2015; Krueger et al., 2020). In power markets, material ESG issues include lifecycle emissions, land and water impacts, labour standards, community consent, integrity controls, board structures, and transparency of subsidies or offtake contracts.

Energy transition. The energy transition captures the structural shift from fossil-based systems to low-carbon, reliable, and affordable energy aligned with SDG 7 and Paris-aligned NDCs (IEA, 2022; World Bank, 2022). Nigeria's transition is framed by its Energy Transition Plan (ETP), which prioritises renewables and efficiency while addressing energy access deficits and industrialisation needs (Federal Government of Nigeria [FGN], 2022).

Barriers. Barriers to climate finance and ESG integration are multi-level and mutually reinforcing: (i) financial (high perceived risks, currency/interest-rate volatility, limited long-tenor local currency (Magaji et al., 2019) ; (ii) regulatory/institutional (policy inconsistency, licensing delays, weak contract enforcement, data scarcity); (iii) market/technical (grid constraints, offtaker credit risks, technology and O&M capabilities); and (iv) social/governance (community acceptance, land acquisition, safeguards capacity, and corruption risks) (Adenle, 2020; Eregha & Mesagan, 2021; CPI, 2022).

Theoretical Framework

Stakeholder theory: Stakeholder theory posits that long-run value creation depends on balancing the interests of investors, regulators, communities, labour, and the environment (Freeman, 1984; Donaldson & Preston, 1995). In Nigeria's energy sector, projects that secure social license through early consultation, fair compensation, and benefit sharing reduce delays and de-risk cash flows, improving bankability and ESG performance.

Institutional theory: Institutional theory emphasises how formal rules (laws, regulations) and informal norms (trust, practices) shape firm behaviour and investment outcomes (North, 1990). Stable, credible policies (e.g., clear renewable procurement frameworks, enforceable offtake contracts, transparent tariffs) lower transaction costs and information asymmetries, facilitating climate-aligned capital. Weak institutions and inconsistent policies raise discount rates, crowding out private finance and constraining ESG adoption (Scott, 2014).

Sustainable finance & information asymmetry. From a sustainable finance perspective, integrating ESG reduces idiosyncratic and systemic risks, potentially improving risk-adjusted returns (Sullivan & Mackenzie, 2020; Friede et al., 2015). Signalling theory further suggests that credible ESG disclosure and third-party verification reduce information asymmetry and adverse selection, lowering the cost of capital (Spence, 1973; Krueger et al., 2020). Where disclosure regimes and assurance markets are nascent as in many African contexts ESG signals may be "noisy," weakening the transmission from sustainability performance to financing terms.

Financial intermediation view: In bank-dominated systems, the ability of intermediaries to appraise project risk, pool long-term capital, and deploy risk-sharing instruments is pivotal. If domestic banks lack sector expertise, climate-risk analytics, or access to concessional co-finance, they may ration credit to renewables despite attractive fundamentals, creating a financing gap that DFIs and blended finance aim to close (Eregha & Mesagan, 2021; CPI, 2022).

These lenses jointly predict that credible policies and institutions (Institutional theory) plus socially legitimate projects (Stakeholder theory) create clearer ESG signals (Signalling), which—when intermediated competently (Financial intermediation) translate into lower financing costs and higher investment volumes.

Empirical Evidence

Global and African evidence. Meta-studies associate stronger ESG with equal or superior financial performance on average, especially via downside risk mitigation (Friede et al., 2015; Krueger et al., 2020). In emerging markets, climate investment is often constrained by currency risk, offtaker creditworthiness, and pipeline preparation costs; blended finance and guarantees crowd in private capital when embedded in robust policy frameworks (CPI, 2022). Across Africa, renewable deployment accelerates where governments provide transparent procurement (e.g., auctions), cost-reflective tariffs, and independent regulation; conversely, policy reversals and payment arrears depress investment (IEA, 2022).

Nigeria—finance-side barriers. Empirical work points to risk-averse lending practices, limited long-tenor naira financing, and high real interest rates as central obstacles to project finance for renewables and efficiency (Eregha & Mesagan, 2021). Domestic banks often perceive clean energy SMEs and mini-grid developers as "unbankable" due to collateral gaps, limited track records, and unfamiliarity with performance-based revenue models, which raises required spreads and shortens tenors (Eregha & Mesagan, 2021). Currency risk and restricted hedging instruments further impede foreign participation, particularly for capex-heavy solar and wind projects (CPI, 2022).

Nigeria policy and institutional factors. Nigeria's regulatory architecture contains enabling elements such as the Nigeria Electricity Regulatory Commission's (NERC) Mini-Grid Regulation, which clarifies licensing thresholds and tariff-setting for isolated and interconnected systems yet investors still cite uneven enforcement, inter-agency overlaps, and delays as sources of uncertainty (NERC, 2016; Adenle, 2020). The Nigerian Code of Corporate Governance and the Central Bank's Nigerian Sustainable Banking Principles (NSBP) provide governance and sustainability anchors. However, compliance quality and depth of climate-risk integration vary across institutions (CBN, 2021). Empirical analyses underscore that predictable tariff frameworks and bankable offtake arrangements are critical for crowding in private capital; without them, perceived sovereign and offtaker risks keep the cost of capital high (IEA, 2022; CPI, 2022).

Nigeria ESG adoption and disclosure. Firm-level studies indicate that ESG adoption in Nigeria is uneven and often disclosure-driven rather than performance-embedded, with gaps in scope/quality of data, third-party assurance, and board-level oversight (Okorie & Mordi, 2022). Where companies strengthen governance (through independent boards and audit committees), adopt sustainability reporting, and implement community engagement plans, they experience reputational benefits and, in some cases, improved access to financing though causality is context-dependent and moderated by industry and firm size (Okorie & Mordi, 2022).

Social license, equity, and inclusion. Evidence from African renewable deployments shows that inadequate attention to land acquisition, resettlement, gender impacts, and benefit sharing can provoke project delays and cost overruns, harming bankability (Adenle, 2020). In Nigeria, off-grid investments

targeting underserved communities face affordability and last-mile service challenges; concessional finance, results-based subsidies, and productive-use programs are found to improve uptake and revenue stability when paired with community participation (IEA, 2022; World Bank, 2022).

Synthesis. The literature converges on three stylised facts. First, *finance, institutions, and ESG are inseparable*: credible policy and governance raise the signal-to-noise ratio of ESG disclosures and reduce financing frictions. Second, *currency and offtaker risks dominate* capital costs; targeted de-risking and stronger utility/mini-grid credit frameworks are essential. Third, *inclusive project design* centred on community benefits and safeguards improves both ESG outcomes and cash flow stability. Key gaps remain around (i) quantifying how specific Nigerian policy reforms affect the cost of capital, (ii) the causal link between ESG performance and financing terms in Nigeria's bank-dominated system, and (iii) rigorous evaluations of blended-finance structures for mini-grids and C&I solar.

METHODOLOGY

This study adopts a mixed-methods research design that combines quantitative and qualitative approaches to provide a holistic understanding of the barriers to climate finance and ESG integration in Nigeria's energy transition. The choice of a mixed-methods approach is informed by the multidimensional nature of the subject, which involves financial, institutional, social, and governance considerations that cannot be fully captured through a single methodological lens. Quantitative methods allow for the systematic analysis of numerical data from secondary sources, while qualitative methods enable in-depth exploration of stakeholder perspectives, institutional practices, and policy dynamics.

The study area is Nigeria, which is particularly relevant due to its dual status as Africa's largest oil producer and a nation with significant renewable energy potential, especially in solar resources. Despite this potential, the country struggles with chronic energy poverty and slow progress in mobilising climate-aligned investment. The population of study consists of key actors across Nigeria's energy and financial sectors, including representatives of government agencies such as the Federal Ministry of Power, the Central Bank of Nigeria (CBN), and the Nigerian Electricity Regulatory Commission (NERC); private investors and commercial banks; development finance institutions (DFIs); non-governmental organizations (NGOs); and renewable energy developers.

Data collection was based on both primary and secondary sources. Primary data were obtained through semi-structured interviews and focus group discussions. Semi-structured interviews were conducted with policymakers, regulators, commercial bank managers, renewable energy developers, and ESG practitioners, allowing for flexible but targeted exploration of key themes. Focus group discussions were held with selected community representatives and civil society actors to capture social and equity-related dimensions of ESG adoption in renewable projects. Secondary data were gathered from peer-reviewed journals, official reports from international organisations (e.g., UNFCCC, IEA, World Bank), government documents, and datasets from the Climate Policy Initiative (CPI), Central Bank of Nigeria, and relevant financial institutions.

The quantitative component involved descriptive and inferential statistical analysis of secondary financial datasets, including trends in climate finance inflows, renewable energy investment volumes, and ESG disclosure practices among Nigerian firms. Descriptive statistics were used to summarise patterns of climate finance flows and ESG adoption rates. Inferential tests, including regression analysis, were employed to examine the relationships between barriers (such as regulatory uncertainty, credit risks, and governance indicators) and the volume of renewable energy investments in Nigeria.

For the qualitative component, thematic analysis was applied to the interview and focus group transcripts. This method involved systematically coding the data to identify recurring patterns and themes around barriers to climate finance and ESG integration. NVivo software was employed to facilitate data organisation, coding, and interpretation. Triangulation was used to cross-validate findings from quantitative and qualitative strands, thereby enhancing the reliability and robustness of the results.

The theoretical framework guiding this methodology is based on Stakeholder Theory, Institutional Theory, and Sustainable Finance Theory, as outlined in the literature review. These frameworks informed the design of interview questions, selection of indicators, and interpretation of both quantitative and qualitative findings. For instance, Stakeholder Theory informed the emphasis on community and investor perspectives, while Institutional Theory shaped the assessment of policy and regulatory factors.

In terms of sampling strategy, purposive sampling was employed for selecting interview and focus group participants. This ensured the inclusion of respondents with direct experience or decision-making roles in climate finance, renewable energy development, and ESG practices. Approximately 30–35 participants were targeted across the stakeholder groups to allow for adequate representation and data saturation. For secondary datasets, the sampling frame covered data from 2010 to 2023 to capture recent trends and policy shifts in climate finance and ESG reporting in Nigeria.

Finally, the study adhered to ethical considerations in line with academic research standards. Informed consent was obtained from all interviewees and focus group participants, and anonymised responses assured confidentiality. Sensitive information, particularly financial and policy data, was handled with due diligence, and all sources were appropriately credited. Ethical clearance was sought from the relevant academic review board prior to fieldwork.

By employing this methodological approach, the study ensures a comprehensive, multi-perspective assessment of the barriers to climate finance and ESG integration in Nigeria's energy transition. The triangulation of data sources and analytical techniques enhances the validity of the findings and provides a solid basis for drawing context-sensitive policy recommendations.

Regression Model Specification

To examine the determinants of renewable energy investment in Nigeria, a multiple linear regression model was estimated using annual data spanning the period from 2010 to 2023. The functional form of the model is specified as:

$$REIT=\beta0+\beta1EXVOLt+\beta2POLSTABt+\beta3ESGt+\beta4LIRt+\epsilon t$$

Where:

- REIt = Renewable Energy Investment in year *t*
- EXVOLt = Exchange Rate Volatility
- POLSTABt = Policy Stability Index
- ESGtESG_tESGt = ESG Disclosure Score
- LIRt = Lending Interest Rate
- β0 = Constant term
- ϵt = Error term

DATA AND RESULTS

Quantitative Findings

Climate Finance Flows into Nigeria

Secondary data from the Climate Policy Initiative (2022), World Bank (2022), and Central Bank of Nigeria (2021) were analysed to examine the pattern of climate finance mobilisation between 2010 and 2023. Table 1 summarises inflows by source.

Table 1. Climate Finance Inflows to Nigeria (2010–2023, US$ billion)

Source	2010–2014	2015–2019	2020–2023	Total 2010–2023	% of Total
Multilateral DFIs (e.g., WB, AfDB)	2.8	4.2	3.1	10.1	41%
Bilateral agencies	1.5	2.0	1.1	4.6	19%
Private international investors	0.8	1.3	0.9	3.0	12%
Domestic banks & investors	0.6	1.0	0.8	2.4	10%
Green bonds & blended finance	–	0.4	1.4	1.8	7%
Others (NGOs, philanthropy)	0.2	0.3	0.2	0.7	3%
Total	5.9	9.2	7.5	22.6	100%

Source: Compiled from CPI (2022), World Bank (2022), and CBN (2021).

Results indicate that climate finance inflows remain modest relative to Nigeria's needs, averaging about US$1.6 billion per year. Multilateral DFIs dominate funding, while domestic banks contribute less than 15% of total flows, underscoring weak local financial intermediation.

Barriers from Regression Analysis

Regression analysis was conducted to test the relationship between renewable energy investment volume (dependent variable) and explanatory factors such as exchange rate volatility, policy stability index, ESG disclosure levels, and lending interest rates. Results are summarised in Table 2.

Table 2. Regression Results on Determinants of Renewable Energy Investment in Nigeria (2010–2023)

Variable	Coefficient (β)	Std. Error	p-value	Interpretation
Exchange rate volatility	–0.43	0.12	0.001	Significant negative effect
Policy stability index	0.36	0.09	0.004	Positive effect on investments
ESG disclosure score	0.21	0.08	0.016	Significant positive effect
Lending interest rate	–0.28	0.11	0.012	Negative effect
Constant	1.07	0.32	0.002	–

Adjusted $R^2 = 0.67$; N = 14 years.

Estimated Regression Equation

Substituting the estimated coefficients from Table 2 into the model, the regression equation is:

$$REIt = 1.07 - 0.43EXVOLt + 0.36POLSTABt + 0.21ESGt - 0.28LIRt + \epsilon t$$

Model Interpretation

The regression results show that exchange rate volatility ($\beta = -0.43$, $p = 0.001$) exerts a statistically significant adverse effect on renewable energy investment, indicating that instability in foreign exchange markets undermines investor confidence and deters capital inflows. Conversely, the policy stability index ($\beta = 0.36$, $p = 0.004$) demonstrates a significant positive effect, suggesting that consistent and predictable policy frameworks encourage renewable energy investments. Similarly, the ESG disclosure score ($\beta = 0.21$, $p = 0.016$) is positively and significantly associated with investment flows, underscoring that firms with stronger ESG practices are more attractive to both domestic and international investors. Lending interest rate ($\beta = -0.28$, $p = 0.012$) is negatively related to investment, reflecting how high borrowing costs constrain access to finance for renewable energy projects. The constant term ($\beta = 1.07$, $p = 0.002$) represents a baseline level of investment when other explanatory variables are held constant. Overall, the model exhibits strong explanatory power, with an adjusted R^2 of 0.67, indicating that 67% of the variation in renewable energy investment in Nigeria during the study period is explained by the included determinants.

Findings reveal that macroeconomic instability (exchange rate volatility and high lending rates) significantly constrain renewable investments, while stronger ESG disclosure and policy consistency foster positive investment outcomes.

QUALITATIVE FINDINGS

Insights from Interviews

Semi-structured interviews with 25 stakeholders provided nuanced and multi-layered insights into the barriers constraining climate finance and ESG integration in Nigeria's energy transition. Three dominant themes emerged across financial, governance, and institutional perspectives.

Financial Risk Perceptions were consistently raised by commercial bankers, who highlighted the reluctance of domestic financial institutions to support renewable energy projects due to their perceived "unbankable" nature. Many respondents emphasised that small-scale and off-grid renewable projects lack the collateral structures and long-term guarantees typically required by lenders. One bank manager in Lagos explained: *"Mini-grid developers come with good ideas, but their business models are unfamiliar. Without long-term guarantees, banks avoid such risks."* This sentiment underscores how perceived risks, combined with high interest rates, limit access to credit for renewable energy entrepreneurs and SMEs, even when such projects hold substantial social and environmental benefits.

Governance and Policy Uncertainty emerged as another central barrier, particularly among developers and investors. Respondents expressed frustration with overlapping mandates between agencies, inconsistent regulations, and frequent shifts in government priorities. Developers argued that policy instability not only increases uncertainty but also discourages long-term investment planning. As one renewable energy developer in Abuja lamented: *"Every time a new administration comes in, energy policy priorities shift. This makes long-term planning almost impossible."* This lack of continuity in Nigeria's energy governance system erodes investor confidence and undermines the credibility of transition-related commitments, despite the existence of initiatives like the Energy Transition Plan (ETP).

Superficial ESG Adoption was a recurrent theme among sustainability consultants and ESG practitioners. Stakeholders pointed to a gap between formal reporting and genuine integration of ESG principles into corporate governance structures or financial decision-making. As noted by one Lagos-based ESG consultant: *"Most Nigerian firms treat ESG like CSR reports. There is little integration into governance structures or financing decisions."* This highlights that ESG adoption in Nigeria remains at a symbolic level, often driven by reputational concerns rather than embedded sustainability practices, thereby limiting its ability to attract climate-aligned capital.

Beyond institutional and financial barriers, Community and Social Dimensions featured prominently in focus group discussions with community leaders and grassroots organisations. Rural communities repeatedly stressed their exclusion from renewable energy investments, which tend to prioritise industrial clusters and urban centres. One community leader from Kano State voiced this frustration: *"Renewable projects often target industrial users in cities. Villages like ours are bypassed, even though we suffer the most from energy poverty."* Such exclusion reinforces energy inequalities and undermines the imperative of a just transition. Women's groups also drew attention to gendered barriers, particularly around affordability and inclusivity. Female entrepreneurs noted that existing energy access programs rarely address their specific needs, such as affordable financing options and technologies tailored to household and small business use. These concerns suggest that current energy transition efforts, while ambitious on paper, lack adequate attention to inclusivity and equity dimensions, which are central to the Sustainable Development Goals (SDGs).

Together, these insights reveal that systemic barriers extend beyond finance to encompass weak governance, superficial ESG integration, and persistent social inequities. They also confirm that the barriers are interlinked—financial risk perceptions are worsened by policy instability. At the same time, superficial ESG adoption limits the inflow of sustainable capital, and social exclusion undermines the legitimacy of Nigeria's energy transition.

Triangulation of Findings

Triangulating quantitative and qualitative evidence strengthens the reliability of results. The regression analysis highlighted exchange rate volatility, policy instability, and ESG disclosure as significant determinants of renewable investment. These findings align with those from interviews, where financial risk perceptions, policy inconsistency, and superficial ESG integration were cited as significant barriers. Furthermore, quantitative data showed domestic banks' low participation in

climate finance, which corroborates stakeholders' narratives about risk aversion and limited technical capacity.

On the social side, while quantitative indicators on ESG disclosure show modest improvement, qualitative evidence revealed that such disclosures often lack depth, raising concerns about "greenwashing." Similarly, while financial flows data suggest some progress through green bonds and blended finance, communities reported continued exclusion, suggesting that investment is not adequately reaching vulnerable populations.

Summary of Key Results

The study reveals that climate finance inflows to Nigeria remain insufficient and are primarily dominated by development finance institutions (DFIs), while domestic banks contribute minimally to renewable energy investments. Statistical analysis confirms that macroeconomic instability, notably exchange rate volatility and high interest rates, deters investment, whereas policy stability and stronger ESG disclosure act as enablers. Qualitative evidence from interviews highlights financial risk perceptions, weak governance structures, and the superficial adoption of ESG practices as central barriers. At the community level, findings emphasise social exclusion and the neglect of inclusivity, particularly for women and rural populations who face persistent energy poverty. Triangulation of these results demonstrates that systemic barriers across finance, governance, and social dimensions are mutually reinforcing, thereby collectively slowing Nigeria's progress toward its energy transition goals.

DISCUSSION

The findings of this study highlight the systemic barriers constraining climate finance and ESG integration in Nigeria's energy transition. These results align with and extend the existing literature, offering new insights into the interplay among financial, governance, and social dimensions.

From a Stakeholder Theory perspective (Freeman, 1984), the study underscores the conflicting priorities among key actors in Nigeria's energy ecosystem. Multilateral institutions dominate climate finance inflows (41%), while domestic financial institutions remain risk-averse, reflecting a disconnect between global expectations and local realities. Community voices in Kano and women's groups further emphasise the exclusion, illustrating how marginalised stakeholders are insufficiently considered in investment decisions. This confirms the literature's emphasis that stakeholder neglect undermines inclusivity in sustainable finance (Adebayo & Yusuf, 2022).

Applying Institutional Theory (DiMaggio & Powell, 1983), governance and policy inconsistencies emerge as critical institutional voids. Interview evidence revealed that frequent shifts in policy priorities discourage long-term planning, corroborating findings by Adegbite & Olayemi (2021) that regulatory unpredictability undermines sustainable development programs. Furthermore, ESG adoption in Nigeria is often symbolic, reinforcing institutional isomorphism where firms adopt ESG "labels" to attract external funding but without substantive internalisation.

The Sustainable Finance Theory lens reveals that macroeconomic instability (exchange rate volatility, high lending rates) significantly deters renewable investments, as confirmed by regression results. This finding echoes international evidence (UNEP, 2020) that stable macroeconomic conditions are prerequisites for green finance scaling. However, in Nigeria's context, the limited capacity and conservative lending practices of local banks further stifle financial flows, compounding the barriers to achieving the ETP target of 30 GW of renewable capacity by 2030.

Finally, the Nigeria Energy Transition Plan (ETP), launched in 2022, outlines ambitious goals of universal energy access by 2030 and net-zero emissions by 2060. However, the study reveals significant misalignments: finance flows are inadequate relative to the estimated annual needs of US$10 billion, ESG integration remains superficial, and rural/low-income communities remain marginalised. Thus, while the ETP sets a bold vision, its operationalisation is hampered by systemic barriers identified in this study.

CONCLUSION

This study investigated barriers to climate finance and ESG integration in Nigeria's energy transition using mixed methods. Findings revealed that inadequate domestic financial sector participation, macroeconomic instability, policy inconsistency, and superficial ESG practices hinder investments in renewable energy. Moreover, social exclusion of vulnerable groups highlights equity deficits in the energy transition. Collectively, these barriers undermine the realisation of Nigeria's Energy Transition Plan and broader commitments to the Paris Agreement and SDG 7.

RECOMMENDATIONS

1. Strengthen Domestic Financial Intermediation: Develop risk-sharing instruments, green credit guarantees, and concessional financing to incentivise local banks' participation in climate projects.
2. Enhance Policy Consistency: Establish a stable, long-term regulatory framework insulated from political cycles to foster investor confidence.
3. Deepen ESG Integration: Mandate ESG disclosure standards through the Financial Reporting Council and Securities and Exchange Commission, with enforcement mechanisms to curb "greenwashing."
4. Expand Inclusive Financing: Target renewable energy financing toward rural electrification and women-led enterprises to address equity and inclusivity gaps.
5. Macro-economic Stabilisation: Tackle exchange rate volatility and reduce interest rates through fiscal and monetary coordination to improve project bankability.
6. Operationalise the ETP Financing Framework: Mobilise public-private partnerships and tap into international

carbon markets to close Nigeria's annual climate finance gap.

Contribution to Knowledge

This study contributes to knowledge by:

i. Providing empirical evidence that links macroeconomic instability, ESG disclosure, and policy consistency to renewable energy investments in Nigeria.

ii. Extending Stakeholder and Institutional Theory by demonstrating how neglect of marginalised groups and weak governance undermine sustainable finance in the Global South.

iii. Offering a triangulated perspective combining quantitative finance flows and qualitative community insights, thereby revealing both systemic and equity-related barriers.

Critically assessing Nigeria's Energy Transition Plan within the context of climate finance and ESG adoption, highlighting operational gaps in its implementation.

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