Energy Poverty Eradication Strategies, Labor Rights in Extractives, and Policy Frameworks: A Multidimensional Analysis of Nigeria's Energy Transition

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Abstract

This article examines the complex interplay between energy poverty eradication strategies, labor rights in extractive and transition industries, and energy policy frameworks in Nigeria. As Africa's largest economy and most populous nation, Nigeria presents a critical case study of the tensions and synergies between climate goals, development imperatives, and social justice considerations. Through analysis of policy documents, stakeholder reports, and empirical studies, this research investigates Nigeria's commitment to carbon neutrality by 2060 while simultaneously addressing pervasive energy poverty that affects approximately 85 million citizens. The multidimensional framework integrates energy justice principles with transition theory to evaluate how labor rights, particularly in mining and extractive sectors, are being reconfigured in the clean energy shift. Findings reveal significant governance challenges in balancing rapid renewable energy deployment with inclusive development, especially for marginalized groups including women, persons with disabilities, and artisanal miners. The study concludes with policy recommendations for a more equitable transition pathway that aligns climate action with poverty reduction and human rights protection in Nigeria's energy future.

Keywords

Energy Transition, Energy Poverty, Labor Rights, Extractive Industries, Energy Justice, Energy Governance

1.Introduction

Nigeria stands at a critical juncture in its development trajectory, facing the dual challenge of addressing pervasive energy poverty while simultaneously navigating a global shift toward low-carbon economies. With a population exceeding 220 million, of which approximately 85 million lack access to electricity , Nigeria exemplifies the complex interplay between energy access, development imperatives, and climate responsibilities. The country's response to this challenge through its Energy Transition Plan (ETP) represents one of Africa's most comprehensive roadmaps for achieving carbon neutrality by 2060 while tackling energy deprivation. This article examines the multifaceted dimensions of Nigeria's energy transition, with particular focus on energy poverty eradication strategies, labor rights in extractive and transitioning industries, and the overarching policy frameworks that shape these processes.

The conceptual framework of this research draws from energy justice and just transition literatures, which emphasize the equitable distribution of benefits and burdens, meaningful participation in decision-making, and recognition of diverse needs and identities in energy system transformations (McCauley & Heffron, 2018). These frameworks are particularly relevant in the Nigerian context, where historical inequalities in resource distribution, regional development disparities, and exclusion of vulnerable groups from governance processes complicate the transition pathway. The study applies these conceptual lenses to analyze how Nigeria's energy policies address the needs of marginalized communities, workers in declining and emerging energy sectors, and populations at risk of being left behind in the clean energy shift.

Nigeria's energy landscape is characterized by stark contrasts. As Africa's largest oil producer and holder of substantial natural gas reserves, the country has historically relied on fossil fuel revenues, which constitute approximately 90% of foreign exchange earnings and 60% of government revenue (NNPC, 2023). Yet, this resource wealth has not translated into universal energy access or economic security for much of the population. The energy access deficit disproportionately affects rural communities, where electrification rates can fall below 25%, perpetuating cycles of poverty and limiting access to education, healthcare, and economic opportunities. At the same time, Nigeria faces severe climate vulnerabilities, evidenced by desertification in the north, flooding in central regions, and coastal erosion in the south , making climate action an urgent imperative.

The research methodology for this study employs a qualitative case study approach, drawing on document analysis of policy frameworks, institutional reports, and stakeholder analyses. Data sources include Nigeria's Energy Transition Plan and related policy documents, reports from international organizations working on Nigeria's energy sector, academic literature, and media reports on implementation progress. The analysis focuses particularly on five key sectors identified in the ETP: power, cooking, transport, industry, and oil and gas. The study also examines the labor dimensions of the transition, with specific attention to extractive industries and emerging renewable energy sectors, through the lens of energy justice.

The article proceeds as follows. Section 2 analyzes Nigeria's energy poverty landscape and the strategic framework for addressing it through the Energy Transition Plan. Section 3 examines labor rights and challenges in extractive industries, with particular focus on marginalized groups. Section 4 assesses energy policy frameworks and investment mechanisms. Section 5 presents a multidimensional analysis of energy justice considerations in Nigeria's transition. Section 6 discusses findings and presents policy recommendations, followed by a conclusion summarizing key insights and future research directions.

2. Energy Poverty and Transition Framework in Nigeria

2.1 The Energy Access Deficit and Its Implications

Nigeria faces a staggering energy access challenge that fundamentally constrains its development prospects. With over 85 million citizens without electricity access and millions more suffering from unreliable supply , the country accounts for a significant portion of the global energy poverty burden. This energy deficit manifests differently across geographic and socioeconomic dimensions. Rural communities experience the most severe forms of exclusion, with grid extension often hampered by infrastructural constraints and economic viability concerns. Urban areas, while generally better served, face chronic reliability issues that force households and businesses to depend on expensive backup generators that consume an estimated $14 billion annually in fuel costs [1].

The socioeconomic implications of energy poverty permeate multiple dimensions of human development. In the health sector, clinics in underserved areas struggle to maintain vaccine cold chains and perform essential medical procedures, often resorting to candlelight or diesel generators that are both costly and polluting. Educational outcomes are compromised when children lack lighting for evening study, and schools cannot utilize educational technologies. From an economic perspective, small and medium enterprises face higher production costs, reduced competitiveness, and limited growth potential without reliable power. The agricultural sector, which employs approximately 35% of the workforce, suffers post-harvest losses due to inadequate refrigeration and limited processing capabilities, undermining both food security and farmer incomes.

The gendered dimensions of energy poverty warrant particular attention. Women and girls disproportionately bear the burden of energy collection, spending significant time gathering firewood for cooking-time that could otherwise be devoted to education, income generation, or leisure. Indoor air pollution from traditional biomass use for cooking contributes to respiratory illnesses that primarily affect women and children. The World Health estimates that approximately 78,000 deaths annually in Nigeria can be attributed to household air pollution from solid fuel use, highlighting the urgent need for cleaner cooking solutions [2].

2.2 Nigeria's Energy Transition Plan: Strategic Framework

In response to these challenges, Nigeria has developed a comprehensive Energy Transition Plan (ETP) that aims to simultaneously address energy poverty and climate commitments. Officially launched at COP26 in 2021 and subsequently reinforced through the Climate Change Act, the ETP outlines a pathway to achieve carbon neutrality by 2060 while pursuing universal energy access. The plan represents a significant evolution from earlier approaches by explicitly acknowledging the need to merge economic development with climate action, aiming to achieve what government documents describe as "one of the world's first true just transitions".

The ETP adopts a sectoral approach to decarbonization, focusing on five key sectors: power, cooking, transport, industry, and oil and gas. Each sector has specific emissions reduction targets and transition pathways tailored to technological feasibility, social acceptability, and economic considerations. The power sector, which accounts for approximately 42Mt CO_2e annually, is expected to reduce emissions by nearly 100% through solar expansion and phase-out of diesel/petrol generators. The cooking sector, currently dominated by traditional biomass, aims for a 98% emissions reduction through a transition to LPG in the short term, followed by electric cookstoves and biogas systems in the longer term. Transport (45Mt CO_2e) and industry (14Mt CO_2e) sectors target 97% reductions through electric mobility and industrial fuel switching respectively [3].

Table 1. Nigeria's Sectoral Emissions Reduction Targets in Energy Transition Plan

Sector	Current Emissions (Mt CO_2e)	Target Reduction	Primary Transition Strategies
Power	42	~100%	Solar expansion, generator phase-out, gas as transition fuel
Cooking	2.3	~98%	LPG transition, then electric/biogas systems
Transport	45	~97%	Electric vehicle adoption in passenger transport
Industry	14	~97%	Fuel switching, efficiency improvements
Oil & Gas	Not specified	~87%	Reduced flaring, electrification, efficiency

Table 1 illustrates that Nigeria is implementing an energy transition plan aimed at significantly reducing carbon emissions and achieving low-carbon development. The power sector has the highest emissions reduction target (approximately 100%), signifying Nigeria's plan to completely move away from fossil fuels. The transformation in the cooking and transportation sectors emphasizes the use of alternative energy sources such as liquefied petroleum gas (LPG), electric vehicles, and biogas. Meanwhile, the industrial and oil and gas sectors focus on improving energy efficiency and reducing waste (e.g., reducing natural gas combustion). Overall, this reflects Nigeria's national strategy towards clean energy, a diversified energy structure, and improved energy efficiency.

The implementation architecture of the ETP involves multiple governance entities, with the Energy Transition Office (ETO) housed within the Vice President's office playing a coordinating role across ministries and agencies. This institutional arrangement reflects the high-level political commitment to the transition while attempting to address the cross-cutting nature of energy system transformation. The ETO supports implementation through stakeholder engagement, investment mobilization, and policy coordination, working with partners including Sustainable Energy for All (SEforALL) and the Global Energy Alliance for People and Planet (GEAPP).

2.3 Investment Requirements and Socioeconomic Co-benefits

Achieving Nigeria's energy transition ambitions requires substantial financial resources that exceed domestic public financing capacities. The updated Energy Transition Plan estimates that achieving Net Zero by 2060 would require approximately $500 billion in capital investment above business-as-usual spending. This investment, however, is projected to yield significant economic returns, with fuel savings of $686 billion anticipated, demonstrating the economic case for ambitious climate action. More immediately, the government estimates that over $23 billion will be needed to expand energy access and connect millions of Nigerians currently living in energy poverty [4].

The socioeconomic co-benefits of the transition represent a central pillar of the government's narrative around the ETP. Job creation projections suggest the potential for up to 340,000 new jobs by 2030 and 840,000 by 2060, primarily in the power, cooking, and transport sectors. These employment opportunities span various skill levels, from manufacturing and installation to maintenance and support services. The poverty reduction potential is similarly significant, with projections suggesting that 100 million people could be lifted out of poverty by 2060 through improved energy access and associated economic opportunities.

The investment mobilization efforts to date have yielded some promising results, with the Energy Transition Office reporting over $3.6 billion in secured investment commitments. More recently, at the inaugural Nigerian Renewable Energy Innovation Forum in 2025, Vice President Kashim Shettima announced that more than $400 million in new investment commitments were being mobilized into Nigeria's renewable energy manufacturing value chain, including solar panels, smart meters, battery storage, and recycling facilities. These investments are projected to create over 1,500 direct jobs across multiple states, reflecting growing confidence in Nigeria's clean energy industrialization drive [5].

3. Labor Rights in Extractive Industries and Transition Challenges

3.1 Discrimination and Exclusion in Mining Sector

The extractive industries in Nigeria, particularly mining, present complex challenges for labor rights and inclusive development that have significant implications for the energy transition. Currently, only 6.4% of workers in Nigeria's mining sector are women, reflecting significant gender disparities in employment patterns. For women with disabilities, the situation is even more dire, as they face multiple forms of discrimination stemming from both cultural norms and regulatory frameworks. Nigeria's labor laws explicitly prohibit women from working underground in mines and from working night shifts in any public or private establishment, with limited exceptions that do not apply to women with disabilities. These legal restrictions reinforce stereotypes and cultural beliefs about the appropriate roles and capabilities of women, particularly those with disabilities.

The cultural and economic barriers to inclusion in the mining sector are deeply entrenched. Prevalent societal stigmas often define persons with disabilities as "physically unable to work" and "weak," perceptions that are especially pronounced in Nigeria where disability discrimination remains widespread across all facets of life. These attitudes translate into practical exclusion from mining activities, with women with disabilities often restricted to petty trading in many mining communities. As noted in a report by the British Council's Nigeria Stability and Reconciliation Programme, gender and disability intersect with other aspects of identity-including age, ethnicity, poverty, and geographical location-to further restrict access to opportunities.

The economic cost of this exclusion is substantial. According to analyses cited by the International Monetary Fund, Nigeria could increase its gross domestic product by 23% by 2025 if women were to participate in the labor force at the same rate as men. This suggests that addressing labor discrimination is not merely a matter of rights and equity but also of economic efficiency and development potential. Other African countries, such as Kenya and South Africa, have implemented specific provisions in their mining laws to foster the inclusion of women, offering potential models for Nigeria to emulate in reforming its regulatory framework [6].

3.2 Artisanal and Small-Scale Mining: Informality and Vulnerability

The artisanal and small-scale mining (ASM) sector in Nigeria represents a significant portion of mining activities, characterized by informality, minimal machinery usage, and limited regulatory oversight. While ASM provides an important source of income for many economically marginalized communities, it also presents substantial labor rights challenges and safety concerns. The informal nature of ASM operations often leaves workers without formal contracts, social protection, or recourse for labor violations. These vulnerabilities are compounded for already marginalized groups, including women, persons with disabilities, and children.

The health and environmental impacts of artisanal mining further exacerbate labor vulnerabilities. Miners in ASM operations are frequently exposed to hazardous conditions without adequate protective equipment or safety protocols. In gold mining communities, for instance, workers face exposure to mercury and other toxic substances used in mineral processing. These risks are particularly acute for persons with disabilities, who may have limited mobility in emergency situations or difficulty accessing safety information. The environmental degradation associated with ASM-including land degradation and water pollution-has downstream effects on community health and livelihoods, creating a vicious cycle of vulnerability [7].

Recent initiatives led by international organizations have sought to address these challenges. In February 2025, the International Labour Organization (ILO), through its ACCEL Africa Project, conducted workshops in Niger and Osun States focused on eliminating child labor and promoting occupational safety and health in artisanal small-scale gold mining. These workshops equipped stakeholders, including government officials, worker organizations, and community leaders, with strategies to enforce Community Action Plans and safeguard children from hazardous work environments. As Hauwa Zakariyya, Controller of the Federal Ministry of Labour and Employment in Niger State, emphasized: "Occupational safety and health is everyone's business. We must prevent incidents like those in Kuchiko, where mining accidents claimed lives, including children".

3.3 Energy Transition Impacts on Labor Forces

The shift from extractive industries to renewable energy systems presents both opportunities and challenges for workers in Nigeria's traditional energy sectors. As the country transitions toward cleaner energy sources, workers in oil, gas, and mining may face displacement without adequate retraining opportunities or social protection measures. The skills mismatch between traditional energy jobs and emerging renewable energy occupations represents a significant barrier to ensuring a just transition for affected workers. Without proactive policies to facilitate workforce transition, the clean energy shift could exacerbate unemployment and underemployment in regions dependent on extractive industries [8].

Conversely, the employment potential of renewable energy and associated value chains offers significant opportunities for job creation. The Nigeria Energy Transition Plan projects that up to 340,000 jobs could be created by 2030 and 840,000 by 2060, primarily in the power, cooking, and transport sectors. These positions span various segments of the renewable energy value chain, including manufacturing, installation, operation, and maintenance. The distributed nature of many renewable energy technologies also creates possibilities for localized job creation in rural and underserved areas where traditional formal employment opportunities may be limited.

The inclusive employment challenge lies in ensuring that these new energy jobs are accessible to workers displaced from traditional sectors, as well as to historically marginalized groups. This requires targeted workforce development programs, skills training initiatives, and deliberate inclusion policies in emerging renewable energy industries. As the government pursues its "Nigeria First" industrial strategy, which aims to anchor Africa's renewable energy supply chains domestically, there is potential to integrate inclusion considerations into the design of these new industries. From solar panel assembly lines in Lagos to battery recycling hubs along industrial corridors, Nigeria has an opportunity to build not just a cleaner energy system but a more equitable one [9].

Table 2. Labor Challenges and Transition Opportunities in Nigeria's Extractive and Energy Sectors

Sector	Current Labor Challenges	Transition Impacts	Inclusion Opportunities
Mining	Gender discrimination, disability exclusion, informality in ASM	Workforce displacement, skills mismatches	Reskilling programs, inclusive hiring in renewables
Oil & Gas	Potential job losses from decarbonization	Sectoral decline, need for workforce transition	Transferable skills in geothermal, hydrogen, CCS
Renewable Energy	Emerging sector, skills gaps	Job creation potential (840k by 2060)	Targeted training for marginalized groups

Table 2 illustrates the social and workforce impacts of Nigeria's energy structure transition:

• Traditional industries (such as mining and oil and gas) will face job losses and skills mismatches during the transition to a low-carbon economy, requiring retraining and skills transfer programs to mitigate the impact.

- The emerging renewable energy sector offers new job growth opportunities but also requires substantial support from specialized skills and training systems.
- Inclusive development is emphasized as a key strategy, aiming for a just transition by focusing on gender equality, disability participation, and training for vulnerable groups.

4. Energy Policy and Investment Frameworks

4.1 Governance Architecture and Policy Evolution

Nigeria's energy policy landscape has evolved significantly in recent years, with the Climate Change Act of 2021 providing a foundational framework for mainstreaming climate considerations into national development planning. The Act established a statutory basis for climate action, including mechanisms for carbon budgeting, climate reporting, and coordination across governmental levels. This legislative foundation was strengthened by the official launch of the Energy Transition Plan in August 2022, which provided a detailed roadmap for achieving Nigeria's dual objectives of energy access and climate neutrality.

The governance architecture for implementing the energy transition involves multiple tiers of institutional arrangements. The Energy Transition Office (ETO), housed within the Office of the Vice President, plays a coordinating role across ministries and agencies, facilitating policy alignment and implementation monitoring. This high-level institutional placement reflects the cross-cutting nature of energy transition and the need for coordinated action across traditional sectoral silos. The ETO supports implementation through stakeholder engagement, investment mobilization, and policy coordination, working with partners including Sustainable Energy for All (SEforALL) and the Global Energy Alliance for People and Planet (GEAPP) [10].

In 2024, the Energy Transition Plan underwent a periodic update to incorporate recent data and policy developments, reflecting an adaptive approach to planning based on evolving realities and assumptions. This process involved collaboration and sector-specific consultations with key stakeholders, providing critical insights that informed the review and refinement of the plan's assumptions and priorities. Such iterative planning processes are essential for navigating the complex and rapidly changing energy transition landscape, allowing for course correction based on implementation experience and changing circumstances.

4.2 Investment Mobilization and Financing Mechanisms

The financing requirements for Nigeria's energy transition are substantial, with the updated Energy Transition Plan estimating a need for approximately $500 billion in capital investment above business-as-usual spending through 2060. To address this challenge, the Nigerian government has pursued a multi-pronged strategy for investment mobilization, combining public resources, private capital, and international climate finance. These efforts have yielded some significant successes, with the Energy Transition Office reporting over $3.6 billion in secured investment commitments to date.

The investment case for Nigeria's energy transition is strengthened by the significant economic returns projected in the form of fuel savings. The ETP estimates $686 billion in fuel savings under the net-zero pathway, representing a compelling economic rationale for ambitious climate action. Beyond these direct savings, the transition offers broader economic benefits through job creation, reduced health costs from air pollution, and enhanced energy security through decreased reliance on imported fuels.

Recent investment mobilization efforts have focused particularly on developing domestic manufacturing capacity in renewable energy technologies. At the inaugural Nigerian Renewable Energy Innovation Forum in 2025, Vice President Kashim Shettima announced that more than $400 million in new investment commitments were being mobilized into Nigeria's renewable energy manufacturing value chain, including solar panels, smart meters, battery storage, and recycling facilities [11]. These investments are projected to create over 1,500 direct jobs across multiple states and reflect growing confidence in Nigeria's clean energy industrialization drive. The government is complementing these efforts with policy reforms aimed at "enhancing incentives for local manufacturing, streamlining regulatory frameworks, and deepening collaboration with State Governments, investors, and development partners to de-risk private capital and accelerate the emergence of a self-sustaining renewable energy market".

4.3 Renewable Energy Deployment and Access Expansion

The renewable energy deployment targets in Nigeria's Energy Transition Plan are ambitious, reflecting the scale of transformation required. The plan outlines the need for a total installed power capacity of 277 GW by 2060, emphasizing greater reliance on renewable energy and energy efficiency compared to earlier projections. This represents a substantial increase from current installed capacity of approximately 13 GW, of which only about 4 GW is typically operational due to various infrastructural and maintenance challenges.

The technology mix for achieving these targets includes significant investments in energy storage and emerging technologies. Battery energy storage systems are projected to need 137 GW of capacity, while hydrogen infrastructure would require 36 GW. This emphasis on enabling technologies reflects a sophisticated understanding of the requirements for integrating high shares of variable renewable energy into the power system. The plan also anticipates a

phased transition, with gas playing an important role as a transition fuel in the short to medium term, particularly for establishing baseload capacity and integrating renewables [12].

For energy access expansion, the strategy involves both grid extension and decentralized renewable energy solutions. The government plans to connect millions of Nigerians who currently live in energy poverty, with over $23 billion estimated as necessary for access expansion. Distributed renewable energy systems are expected to play a crucial role in reaching remote and underserved communities where grid extension may be economically challenging. The Rural Electrification Agency has been actively promoting mini-grid and standalone solar systems as part of this comprehensive approach to access expansion.

5. Multidimensional Energy Justice Analysis

5.1 Distributional Justice: Benefits and Burdens Allocation

The distributional dimension of energy justice concerns the equitable allocation of benefits and burdens associated with energy systems and transition processes. In Nigeria's context, this involves assessing how the costs and benefits of the energy transition are distributed across different regions, socioeconomic groups, and communities. Historically, the benefits distribution from Nigeria's energy resources has been highly uneven, with oil-producing regions in the Niger Delta experiencing severe environmental degradation without commensurate economic development, giving rise to persistent conflicts and grievances.

The energy transition risks reproducing or exacerbating these inequalities if not carefully managed. For instance, the phase-out of diesel and petrol generators, which currently provide significant backup power for households and businesses, could disproportionately affect populations without reliable grid access unless alternative solutions are simultaneously deployed. Similarly, the transition to electric cooking, while beneficial from emissions and health perspectives, could create energy affordability challenges for low-income households if not accompanied by targeted support mechanisms.

The geographical distribution of renewable energy investments also raises distributional considerations. Nigeria's solar resources are most abundant in the northern regions, while wind and hydropower potential varies across different zones. Ensuring that renewable energy development benefits all regions requires deliberate spatial planning and investment coordination. The government's commitment to lifting 100 million people out of poverty by 2060 through the energy transition represents an explicit acknowledgment of the need to link climate action with poverty reduction, though the mechanisms for ensuring this equitable distribution of benefits require further elaboration [13].

5.2 Procedural Justice: Participation in Decision-Making

Procedural justice concerns the processes through which energy decisions are made, emphasizing inclusive participation, transparency, and access to information. Nigeria's energy transition governance exhibits both advances and persistent challenges in this dimension. The establishment of the Energy Transition Office and its facilitation of stakeholder consultations, such as the Data Stakeholders' Engagement session in July 2023 , represents progress toward more inclusive governance. Similarly, the 2024 update of the Energy Transition Plan involved sector-specific consultations with key stakeholders, providing inputs for refining the plan's assumptions and priorities.

However, meaningful participation of marginalized communities remains limited in practice. The technical complexity of energy planning, coupled with language and literacy barriers, often excludes vulnerable groups from substantive engagement. The continued underrepresentation of women in energy decision-making positions further constrains the incorporation of gendered perspectives into transition planning. As noted in research on Nigeria's mining sector, "openly discriminatory laws such as these can hinder the advancement of women and women with disabilities in the extractive sector" , highlighting how legal frameworks can institutionalize procedural exclusion.

The implementation gap between policy commitments and practical implementation also poses challenges for procedural justice. While Nigeria has developed increasingly sophisticated energy transition planning documents, the translation of these plans into concrete actions that reflect stakeholder inputs remains inconsistent. As Professor Uchenna Emelonye argued in a United Nations Business & Human Rights Panel Discussion, there is a need for "a mandatory Human Rights Impact Assessment for all businesses that will embed rights into the design, implementation and closure phases of business projects". Such mechanisms could strengthen procedural justice by ensuring ongoing assessment and responsiveness to human rights concerns throughout project cycles [14].

5.3 Recognition Justice: Acknowledging Diverse Needs and Identities

Recognition justice involves acknowledging and respecting the diverse experiences, identities, and needs of different groups in energy system design and governance. In Nigeria's energy transition, the principle of recognition necessitates particular attention to historically marginalized populations, including women, persons with disabilities, rural communities, and indigenous groups. The multiple forms of discrimination faced by women with disabilities in sectors like mining illustrate the compounded exclusion that can occur when intersectional identities are not recognized in policy frameworks.

The cultural dimensions of energy use also require recognition in transition planning. Traditional cooking practices, for instance, involve not merely technical aspects of food preparation but cultural significances that shape technology acceptance and adoption. The ETP's cooking transition pathway, which moves from traditional biomass to LPG and eventually to electric and biogas systems , must therefore engage with these cultural dimensions to develop solutions that are both clean and culturally appropriate.

The recognition perspective also highlights the importance of context-specific transition pathways that reflect Nigeria's unique developmental circumstances. As a resource-rich but economically developing nation, Nigeria's transition timeline and strategy necessarily differ from those of industrialized economies. The extension of Nigeria's net-zero target from 2050 to 2060 reflects recognition of the "significant financial, social and technological requirements" that necessitate a longer transition horizon. This differentiated responsibility approach aligns with principles of climate justice that acknowledge varying national circumstances and capacities [15].

5.4 Restorative Justice: Addressing Historical Harms

Restorative justice in energy transitions focuses on repairing past harms caused by energy systems and addressing the legacies of historical injustices. In Nigeria, this dimension has particular relevance for oil-producing communities in the Niger Delta that have experienced decades of environmental degradation, health impacts, and economic marginalization despite contributing substantially to national wealth. The restorative approach would involve targeted remediation efforts, compensation mechanisms, and inclusive development initiatives in these historically affected regions.

The concept of "just transition" inherently incorporates restorative elements through its emphasis on ensuring that workers and communities dependent on fossil fuels are not left behind in the shift to cleaner energy systems. For Nigeria, this includes developing comprehensive transition plans for regions and workers currently dependent on oil and gas extraction, with appropriate retraining programs, social protection measures, and economic diversification strategies. The projected creation of up to 840,000 jobs by 2060 through the energy transition offers potential for offsetting employment losses in declining sectors, but targeted policies are needed to ensure that these benefits reach affected communities [16].

The legal and accountability frameworks for restorative justice remain underdeveloped in Nigeria's energy transition governance. As Professor Emelonye noted, "When you take a closer look at the mining sector, you will notice that communities, which host these mining activities, are usually left in ruins after the operations of the mining companies. This is not supposed to be so if human rights are part and parcel of the life circle of the project". Establishing stronger accountability mechanisms, including mandatory impact assessments and community restitution provisions, would strengthen the restorative dimension of Nigeria's energy transition.

6. Discussion and Policy Recommendations

6.1 Integrating Energy Justice into Transition Governance

The analysis reveals significant governance gaps in addressing energy justice dimensions within Nigeria's transition framework. While the Energy Transition Plan acknowledges the importance of a "just and equitable" transition , the operationalization of justice principles in implementation mechanisms remains underdeveloped. To address this disconnect, we recommend the institutionalization of justice assessments throughout the policy cycle, including ex-ante impact evaluations, ongoing monitoring during implementation, and ex-post evaluations of distributional outcomes. These assessments should explicitly consider differential impacts across gender, disability status, geographic location, and socioeconomic position.

The coordination challenges in Nigeria's energy governance also require attention. With responsibilities fragmented across multiple ministries and agencies, a coherent approach to energy justice remains elusive. We recommend strengthening the mandate and capacity of the Energy Transition Office to enforce justice considerations across sectoral implementations, potentially through a cross-cutting approval mechanism for transition projects that evaluates their alignment with energy justice principles. This mechanism could draw from the Human Rights Impact Assessment approach advocated by Professor Emelonye , adapting it specifically to energy transition contexts [17].

6.2 Targeted Inclusion Strategies for Marginalized Groups

The persistent exclusion of marginalized groups, particularly women and persons with disabilities, from energy and extractive sectors necessitates targeted intervention strategies. Based on our analysis, we recommend the following priority actions:

- Legal reform: Amend discriminatory provisions in labor laws that prohibit women from working underground in mines or from night shifts , replacing them with safety-protective regulations that apply to all workers regardless of gender.

- Inclusion quotas: Implement proportional inclusion requirements in emerging renewable energy industries, particularly for projects receiving public support or incentives, with specific targets for women and persons with disabilities.

• Capacity building: Develop targeted skills training programs for marginalized groups to participate in renewable energy value chains, combining technical instruction with business development support.

• Accessible technologies: Promote the development and deployment of assistive technologies and accessible designs in clean energy solutions to ensure usability by persons with disabilities.

The economic case for inclusion strengthens the ethical imperative. As noted in our analysis, Nigeria's GDP could grow by 23% by 2025 with gender parity in labor force participation , suggesting that inclusion strategies are not merely cost items but investments in national economic development.

6.3 Financing Mechanisms for Equitable Access

The financing gap for energy access and transition represents a critical implementation challenge. While substantial investments are being mobilized, their distribution does not necessarily align with equity considerations. We recommend the following financial innovations to address this challenge:

• Establishment of a Just Transition Fund specifically dedicated to addressing historical energy injustices and ensuring equitable distribution of transition benefits, with initial capitalization from fossil fuel revenues and international climate finance.

• Development of targeted subsidy mechanisms for clean energy access among low-income households, potentially delivered through direct benefit transfers or results-based financing for distributors serving disadvantaged communities.

• Integration of energy access criteria into investment decision-making processes, prioritizing projects that expand access to underserved populations while advancing decarbonization objectives.

The investment mobilization efforts should also focus on developing domestic manufacturing and value chain capabilities in renewable energy technologies. As Vice President Shettima emphasized, "From solar panel assembly lines in Lagos to battery recycling hubs along our industrial corridors, Nigeria must not only participate in this revolution but lead it". This approach not only enhances economic benefits but also builds more resilient and sustainable energy transition pathways.

6.4 Strengthening Labor Rights in Transition Industries

The protection and enhancement of labor rights across both declining and emerging energy sectors represents a critical component of a just transition. Based on our analysis of challenges in extractive industries and transition risks, we recommend:

• Extension of social protection to workers in informal artisanal and small-scale mining through innovative registration and contributory mechanisms that facilitate access to healthcare, pensions, and unemployment benefits.

• Development of comprehensive skills transition programs for workers moving from fossil fuel to renewable energy sectors, recognizing prior learning and providing bridging training for competency gaps.

• Strengthening of occupational safety and health standards in emerging renewable energy industries, learning from best practices and pitfalls in traditional energy sectors.

• Promotion of social dialogue in transition planning through tripartite mechanisms involving government, employers, and workers' representatives to negotiate transition pathways that protect workers' interests.

The ILO's work in promoting occupational safety and health in artisanal small-scale gold mining offers valuable lessons for approaches that could be scaled across the extractive and energy sectors. Combining regulatory enforcement with community-based monitoring and support mechanisms appears particularly promising for contexts with limited institutional capacity.

7. Conclusion

This article has examined the complex interplay between energy poverty eradication, labor rights protection, and energy policy frameworks in Nigeria's ongoing energy transition. Our analysis reveals both significant challenges and promising opportunities for aligning climate action with development and justice objectives. Nigeria's comprehensive planning framework, embodied in the Energy Transition Plan, represents an important advance in conceptualizing the simultaneous addressing of energy poverty and climate change. However, the implementation gap between policy aspirations and practical realities remains substantial, particularly regarding inclusion of marginalized groups and distribution of transition benefits.

The multidimensional energy justice analysis presented highlights the interconnected nature of distributional, procedural, recognition, and restorative justice considerations in Nigeria's context. Addressing historical injustices in extractive regions while building inclusive future energy systems requires deliberate integration of justice principles into transition governance. The labor rights dimensions further complicate this picture, necessitating targeted strategies for workers in both declining and emerging energy sectors.

Nigeria's energy transition presents a critical test case for just transition principles in a resource-rich developing economy. The country's success or failure in navigating this complex transformation will have implications beyond its borders, potentially influencing transition pathways across Africa and other resource-dependent economies. By placing energy justice at the center of its transition governance, Nigeria has the opportunity to demonstrate how climate action can be reconciled with development imperatives and rights protection.

Future research should focus on implementation monitoring of justice outcomes as Nigeria's transition accelerates, particularly regarding the distribution of benefits and burdens across different population segments. Comparative studies with other resource-rich developing economies could yield valuable insights into effective governance mechanisms for just transitions. Additionally, more granular research is needed on context-specific transition pathways that reflect Nigeria's diverse regional circumstances and development priorities.

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