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Harnessing Renewable Energy Resources in Nigeria: The Role of the National Integrated Electricity Policy 2024 in Achieving Sustainable Energy Security

Energy and Natural Resources

Introduction

Energy access remains a central pillar to Nigeria's socio-economic development, yet millions still live without reliable electricity. Renewable energy presents Nigeria with a unique opportunity to bridge its energy access gap while meeting its climate commitments under the Climate Change Act 2021 and Net-Zero Emission Target by 2060. Approved by the Federal Executive Council on 5th May 2025, the National Integrated Energy Policy 2024 (**"NIEP 2024"**) emerged as a policy instrument that seeks to integrate Nigeria's energy planning, harnessing both conventional and renewable energy, while decentralising electricity governance to States in the country.

This article explores the core renewable energy potentials in Nigeria, examines the role of NIEP 2024 in fostering renewable energy deployment, and provides recommendations for enhancing the role of renewables within the country's energy landscape.

Renewable Energy Potentials in Nigeria

The renewable energy potential in Nigeria is quite enormous. Notably, in terms of solar energy, Nigeria receives an average solar radiation of 3.5 to 7.0 kWh/m²/day, making solar photovoltaics (**"PVs"**) one of the most promising renewable energy resources in the country. It is important to mention that the northern region of Nigeria presents favorable conditions for utility-scale solar farms and decentralised off-grid systems.

Similarly, with wind speeds exceeding 5 m/s in areas such as Sokoto and Katsina, wind energy offers a viable means for small to medium-scale power generation. However, limited investment and data gaps continue to impede large-scale wind deployment.

Furthermore, another area of consideration is Nigeria's hydropower potential, which is estimated at 14,000 MW, with only 20% currently exploited. While large hydro projects exist, small and mini-hydro resources remain largely untapped, offering significant potential for rural electrification and off-grid applications. In addition, biomass also presents a great potential as effective management of agricultural residues, municipal waste, and animal waste offers immense biomass and waste-to-energy opportunities.

Challenges Hindering Renewable Energy Development in Nigeria

Notwithstanding the rich renewable energy potential in Nigeria, the development of renewable energy in Nigeria has been hampered by a number of challenges as follows;

1. **Policy and Regulatory Gaps**
   Despite Nigeria having a range of energy-related policies, such as the National Renewable Energy and Energy Efficiency Policy (**"NREEEP"**), the Renewable Electricity Policy Guidelines (**"REPG"**), and more recently the Electricity Act 2023 (**"EA 2023"**) – the country continues to struggle with weak enforcement and regulatory fragmentation. This overlap often results in uncertainty for investors, who may face inconsistent licensing processes, conflicting tariffs, or unclear accountability for dispute resolution. Additionally, the lack of harmonised standards across the States opens the door to regulatory arbitrage, where developers shop for the most lenient or favorable jurisdictions – potentially undermining service quality and consumer protection.

2. **Infrastructure Deficits**
   Nigeria's electricity infrastructure remains grossly inadequate, with an aging and fragile national grid that suffers from frequent system collapses and significant transmission losses. The grid's limited capacity restricts the evacuation of electricity, particularly from remote areas rich in renewable energy resources. Additionally, distribution networks are characterised by inefficiencies, high rates of energy theft, and vandalism, which further degrade supply reliability. In rural and underserved areas, there is an absence of grid infrastructure altogether, leaving large populations disconnected from the national power system. The lack of grid modernisation, smart systems, and energy storage capacity also hampers the integration of intermittent renewable energy sources into the energy mix. These persistent infrastructure deficits continue to act as major bottlenecks in the deployment and scaling of renewable energy projects across Nigeria.

3. **Financing Challenges**
   The Nigerian renewable energy sector faces significant financing challenges that limit project development and scalability. High upfront capital costs associated with renewable energy technologies, such as solar PVs and wind turbines, pose a barrier, particularly in a market where access to affordable, long-term financing is limited. The local financial market remains underdeveloped in terms of offering specialised financial products or credit facilities tailored to renewable energy projects, resulting in a reliance on international financing, which often comes with stringent conditions. Additionally, the perceived high risk of the Nigerian power sector, driven by regulatory uncertainties, weak market liquidity, and the financial instability of the Nigerian Electricity Supply Industry (**"NESI"**), deters both domestic and foreign investors. The sector also struggles with low levels of creditworthiness among off-takers and distribution companies, leading to low/poor payment collection rates and high default risks. This will further compound the reluctance of banks and private investors to commit funds to renewable energy projects.

4. **Lack of Technical Capacity**
   Nigeria's renewable energy sector is significantly constrained by limited technical capacity across all levels of the value chain. There is a shortage of skilled professionals, engineers, and technicians with specialised expertise in renewable energy system design, installation, operation, and maintenance. This gap extends to policymakers and regulators, many of whom lack adequate knowledge and exposure to the complexities of renewable energy technologies, market design, and grid integration. Additionally, training institutions and vocational centers within the country have not kept pace with the evolving technical demands of the renewable en-

ergy industry, resulting in a mismatch between the skills produced and the needs of the sector. This lack of capacity undermines the planning, execution, and sustainability of renewable energy projects, while also slowing down the development of local industries and value chains associated with renewable energy deployment.

5. **Historical Over-Reliance on Fossil Fuels**
   Nigeria's energy sector has historically been dominated by fossil fuels, particularly oil and gas, which have served as the primary sources of energy for power generation, transportation, and industrial activities. This heavy dependence has entrenched a fossil fuel-centric energy infrastructure, policy orientation, and market structure, creating systemic biases against alternative energy sources. Decades of reliance on oil and gas revenues have also shaped investment patterns, institutional frameworks, and energy sector financing mechanisms, which are largely skewed toward hydrocarbon development and neglect the renewable energy sector. Furthermore, subsidies and government interventions in fossil fuel markets have distorted energy pricing structures, making it difficult for renewable energy technologies to compete on a level playing field. This over-reliance has also led to underdevelopment of the renewable energy industry, limited innovation in clean energy technologies, and minimal diversification of Nigeria's energy mix, perpetuating vulnerability to global oil market fluctuations and impeding the country's energy transition efforts.

The National Integrated Electricity Policy NIEP 2024 and Its Role in Renewable Energy Development

In recognition of the varied challenges facing renewable energy technologies in Nigeria and the extant need to integrate renewable energy into it into the Nigeria's energy mix, Nigeria issued the National Integrated Electricity Policy ("**NIEP 2024**"). Set out below are a number of features of the NIEP 2024;

1. **Integrated Resource Planning**
   A major feature of the NIEP 2024 is the adoption of Integrated Resource Planning (**"IRP"**), operationalised through the National Integrated Resource Plan (**"NIRP"**). This framework mandates that all resource planning within the NESI considers an optimised balance of generation resources, incorporating both renewable and conventional energy sources. The IRP ensures that decision-making is guided not only by cost and system reliability but also by environmental sustainability considerations, thus enabling renewable energy to be systematically integrated into Nigeria's energy mix. This structured approach addresses historical imbalances in resource planning and provides a roadmap for scaling renewable energy alongside other generation options to meet both short and long-term demand projections.

2. **Devolution of Electricity Governance to States**
   The NIEP 2024 fully recognises and operationalises the provisions of the EA 2023, which devolves electricity governance to the sub-national level, enabling States to create, regulate, and manage their own electricity markets. This devolution allows States to independently design renewable energy policies, develop projects suited to their unique resource endowments, and regulate intra-State electricity activities without being hindered by federal oversight. Consequently, the NIEP 2024 creates an enabling framework where State governments can take the lead in promoting, financing, and implementing renewable energy programs, thereby accelerating the deployment of clean energy solutions across the country's diverse regions.

3. **Off-grid Market Development**
   In recognition of the vast number of Nigerians living in areas beyond the reach of the national grid, the NIEP 2024 prioritises the development of State-based off-grid electricity markets. This includes the promotion of decentralised renewable energy solutions such as mini-grids, standalone solar home systems, and community-based renewable projects, which are essential for bridging the rural electrification gap. By institutionalising support for off-grid markets, the NIEP 2024 facilitates the scaling of private sector-led renewable energy investments targeted at remote, underserved, and economically marginalised communities, thereby providing a pathway for inclusive energy access driven by clean and sustainable technologies.

4. **Climate and Decarbonisation Commitments**
   The NIEP 2024 explicitly integrates Nigeria's international and domestic climate obligations by aligning with key policy instruments such as the Energy Transition Plan (**"ETP"**) and the Climate Change Act 2021. Through this alignment, the NIEP 2024 sets out clear provisions for renewable energy deployment as part of Nigeria's strategy to meet its nationally determined contributions (**"NDCs"**) and its net-zero emissions target by 2060. The policy ensures that renewable energy development is not treated in isolation, but is anchored within the broader framework of Nigeria's climate resilience, energy transition, and decarbonisation agenda, thereby reinforcing the country's commitment to global sustainability goals.

5. **Human Capital and Local Content Development**
   Recognising the critical role of local capacity in driving the renewable energy sector, the NIEP 2024 places strong emphasis on human capital development and local content enhancement. It advocates for the establishment of skills development programs, vocational training, and partnerships that foster technology transfer and knowledge sharing within the renewable energy space. Additionally, the NIEP 2024 promotes local manufacturing of renewable energy technologies and components, aiming to build domestic supply chains that support the sector's growth. This focus not only addresses skills shortages but also stimulates the creation of sustainable jobs, en-

hances sectoral competitiveness, and supports Nigeria's industrialisation agenda through the renewable energy sector.

How NIEP 2024 Shapes the Strategic Landscape for Renewable Energy

In respect of renewable energy, the NIEP 2024 introduced a number of specific initiatives and efforts tailored towards supporting renewable energy in Nigeria:

1. **Enabling State-led Renewable Energy Initiatives**
   The formal recognition of State-level electricity markets under the EA 2023 by the NIEP 2024 has profound implications for the advancement of renewable energy. With the authority to establish and manage their own electricity sectors, States now have the autonomy to design and implement localised renewable energy programs that reflect their unique resource potentials, energy needs, and socio-economic priorities. This decentralisation also gives States the power to set tariffs, create market rules, and issue licenses, fostering healthy competition, innovation, and the attraction of private sector investments within their jurisdictions. This shift marks a departure from the historically centralised governance model, offering States the flexibility to drive grassroots-level clean energy development independently of federal structures.

2. **Expanding Off-grid Renewable Solutions**
   The clear endorsement of State-based off-grid electricity markets by the NIEP 2024, provides a strategic opening for the expansion of decentralised renewable energy solutions, such as solar mini-grids, solar home systems, and renewable-powered community microgrids. This recognition legitimises off-grid markets as viable, structured components of Nigeria's electricity ecosystem, enabling the private sector to invest in, develop, and operate renewable energy solutions for communities that are not economically feasible for grid extension. This strategic focus supports the closing of Nigeria's rural electrification gap through market-driven, clean energy alternatives that directly target underserved and unserved populations.

3. **Strengthening Renewable Energy Financing Mechanisms**
   The NIEP 2024 lays the groundwork for strengthening renewable energy financing mechanisms by creating a policy environment that supports fiscal incentives, guarantees, and public-private partnerships (**"PPPs"**). These measures are crucial in reducing investment risks traditionally associated with the Nigerian electricity sector, particularly for capital-intensive renewable energy projects. By providing a policy-backed structure for financing and risk mitigation, the NIEP 2024 can facilitate the mobilisation of both domestic and foreign investments, addressing one

of the long-standing bottlenecks to the scaling of renewable energy infrastructure across the country.

4. **Institutionalising Climate Goals into Energy Planning**
   A defining strategic implication of the NIEP 2024 is its integration of Nigeria's climate commitments directly into energy sector planning and policymaking. By aligning with the ETP and the Climate Change Act 2021, the NIEP 2024 ensures that renewable energy development becomes a central pillar of Nigeria's roadmap to achieve its NDCs and long-term net-zero emissions targets by 2060. This integration institutionalises climate resilience and sustainability considerations into all aspects of electricity market design, resource planning, and infrastructure development, ensuring that Nigeria's energy transition is deliberate, inclusive, and environmentally sustainable.

Recommendations for Harnessing Renewable Energy Through NIEP

Whilst the NIEP 2024 contains lofty objectives towards integrating and harnessing renewable energy in Nigeria, it is critical to implement a number of recommendations and initiatives to ensure an effective implementation of the objectives of the NIEP;

1. **Develop State-specific Renewable Energy Strategies**
   States should develop State Integrated Resource Plans (**"SIRPs"**) that align with the overarching NIRP, but reflect the unique renewable energy resource endowments, demand patterns, and socio-economic contexts of each State. These SIRPs will act as roadmaps, guiding States in the identification, prioritisation, and deployment of renewable energy projects, ensuring a coordinated and data-driven approach to clean energy development at the sub-national level.

2. **Establish Dedicated Renewable Energy Funds**
   To address financing challenges that continue to hinder the growth of the renewable energy sector, both the Federal and State governments should establish dedicated renewable energy funds. These funds will provide grants, subsidies, concessional loans, and other innovative financial instruments aimed at de-risking renewable energy projects and bridging existing funding gaps, especially for off-grid, mini-grid, and rural electrification initiatives. By doing so, the funds would serve as critical enablers for crowding in private capital and scaling renewable energy deployment.

3. **Capacity Building at State and Local Levels**
   Given the devolution of electricity market responsibilities to States under the NIEP 2024 and the EA 2023, there is a pressing need for intensive capacity-building programs at the State level. This includes technical training for renewable energy technology deployment, regulatory capacity strengthening, project management skills, and knowledge transfer mechanisms focused on renewable energy market design, financing, and policy formulation. Equipping local actors with these skills will enhance the effectiveness of State electricity markets and improve renewable

energy project development and oversight.

4. **Fast-track Off-grid and Mini-grid Frameworks**
   To accelerate rural electrification and expand energy access through clean technologies, the licensing, permitting, and approval processes for mini-grids, solar home systems, and other decentralised renewable energy solutions should be simplified and streamlined. Creating transparent and efficient regulatory procedures at both national and State levels will ensure faster turnaround times for project approvals, reduce bureaucratic delays, and create a more attractive environment for private sector participation in off-grid renewable energy development.

5. **Strengthen Monitoring and Evaluation**
   Effective monitoring and evaluation (**"M&E"**) systems must be established to track the progress, performance, and impact of renewable energy deployment under the NIEP 2024 at both national and State levels. These systems should incorporate standardised reporting templates, robust data collection processes, and transparent assessment frameworks to provide accurate insights into the effectiveness of renewable energy policies, projects, and investments. A strong M&E structure will enhance accountability, facilitate continuous policy learning, and support evidence-based decision-making for renewable energy development.

Conclusion

The NIEP 2024 offers a transformative framework for Nigeria's electricity sector by institutionalising renewable energy as a critical pathway to achieving energy security, inclusiveness, and climate sustainability. However, its success will depend on pragmatic, disciplined, and inclusive implementation, with deliberate focus on capacity building, state-level readiness, and private sector mobilisation. If Nigeria leverages the NIEP 2024 effectively, it can finally unlock its vast renewable energy potentials, bridging its energy poverty gap and positioning itself as a regional leader in clean energy development.

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