



Photo Credit: The Economist

Research Analysis

April 2024

Navigating a 'Just Transition' Amidst Energy Poverty In Nigeria

Table of Contents



001	Resource Wealth Vs. Energy Poverty
002	Powering Nigeria
003	The Energy Dilemma: To Upgrade or Not To Upgrade?
004	Transition Finance
005	Illuminating The Pathway to Inclusive Energy Systems
006	Sailing Towards A Just Transition For All: Gender, Youth and Social Inclusion
007	Harmonizing Energy and Climate
008	Recommendations and Measures

Executive Summary



Photo Credit: PULSE

Energy Access, Just Transition and Resources Extraction

Despite being Africa's largest oil producer, Nigeria faces significant energy poverty with nearly 71% of the population lacking access to reliable electricity. The mismanagement of the extractive sector over-reliance on fossil fuel and distribution inefficiencies exacerbates the issue, leading to issues such as corruption, environmental degradation, and conflict.

Other key challenges include tensions between the central government and oil-producing states, dominance of patronage networks in the oil and gas sector, as well as social and environmental consequences of resource extraction. Addressing these challenges is pivotal to effecting a sustainable and just transformation that encapsulates the recommendations of implementing incentives and subsidies, enhancing financing mechanisms, capacity building and improving policy and regulatory frameworks. The conversation also underscores the importance of gender, youth, and social inclusion in energy access, highlighting opportunities for empowerment and economic participation. Harmonizing energy and climate policies is essential for Nigeria's sustainable development. By embracing renewable energy sources and addressing social, economic, and environmental challenges, Nigeria can transition towards a more inclusive, resilient, and equitable energy system.



Photo credit: World Economic Forum

Resource Wealth Vs. Energy Poverty

Nigeria, despite being endowed with considerable natural resources, particularly in the realm of oil as Africa's largest oil producer, finds itself in a crucial juncture marked by the coexistence of significant resource wealth and widespread energy poverty¹. Approximately 45% of Nigerians lack access to the national electricity grid, while those connected experience frequent power outages. On the other hand, a substantial portion of Nigeria's export earnings (90%) and government revenues (60%) emanates from the oil and gas sector. Paradoxically, this financial prowess does not translate into universal access to dependable electricity as nearly 71% of the populace grapples with energy poverty, thus resorting to traditional biomass for fundamental energy needs.

This apparent contradiction necessitates a nuanced exploration of the intricate relationship between resource/extractive governance and energy poverty. The mismanagement of the extractive sector, encompassing issues such as corruption, environmental degradation, and conflict, intertwines with the underdevelopment of the energy sector, exacerbating the challenges of energy poverty².

The Governance Tightrope: Nigeria's constitutional structure engenders tensions and conflicts between the central government and oil-producing states, particularly in regions such as the Niger Delta. The allocation and management of resource revenues are contentious due to the federal government's exclusive ownership and control of mineral resources.

Challenges persist as oil-producing states demand a greater share of revenues and increased autonomy. Efforts to mitigate these issues, such as the creation of the Niger Delta Development Commission (NDDC) and the amnesty program for former militants have been marred by corruption, inefficiency, and insecurity.

Political Economy of Patronage: The capture and distribution of resource rents by elites and interest groups within the oil and gas sector pose significant challenges. Dominated by powerful actors like the state-owned Nigerian National Petroleum Corporation (NNPC), multinational oil companies, and influential politicians, the sector experiences a lack of transparency, accountability, and healthy competition. Patronage networks sustained through lucrative

¹ <https://www.iea.org/articles/nigeria-energy-outlook>

² <https://resourcegovernance.org/articles/nigerias-next-government-must-lead-inclusive-cohesive-and-sustainable-energy-transition>

³ Phillips Okolo (eajournals.org)

⁴ <https://www.premiumtimesng.com/news/top-news/81785-missing-20-billion-nnpc-refuses-to-pay-recovered-1-48bn-states-begin-probe.html?tztc=1>

⁵ <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

contracts, subsidies, and licenses impede sector performance, deter investment, and lead to periodic scandals, such as the case of missing \$20 billion from the NNPC accounts in 2014.⁴

Social and Environmental Consequences: Resource extraction has yielded profound social and environmental ramifications, particularly in the oil-producing regions. Widespread pollution, health issues, and human rights violations in the Niger Delta have prompted protests, violence, and militancy. Despite the federal government and oil companies employing a combination of repression and negotiation, underlying issues persist that have manifested as ongoing challenges related to oil spills, gas flaring, land degradation, and water contamination.⁵

Energy diversification landscape: The energy sector's centralized and inefficient grid system is reliant on gas-fired power plants that are suffering with under-supply, bouts of transmission losses, and vandalism. While governmental reforms aimed at addressing the challenges, like the power sector privatization and the establishment of the Rural Electrification Agency (REA), obstacles such as political interference and regulatory uncertainty persist. Meanwhile, the untapped potential of renewable and off-grid energy sources, encompassing solar, wind, hydro, and biomass remains despite their apparent advantages in terms of cost, availability, and sustainability. Diversification and decentralization are at the core of this.⁶

Regional and Global Dynamics of The Energy

Market: As a pivotal player in the global energy market, Nigeria's energy security and foreign policy are influenced by regional and global dynamics. Nigeria's oil and gas exports, constituting a significant portion of African exports, face uncertainties and risks stemming from oil price volatility,

competition from other producers, impact of climate change, and geopolitical tensions in the Gulf of Guinea and the Middle East for example. Balancing interests and obligations as a producer, consumer, and regional leader poses continuous challenges in Nigeria's energy strategy and foreign policy pursuits.⁷

Powering Nigeria

ENERGY GENERATION

Since 1990, there has been a notable evolution in the landscape of energy generation in Nigeria. Hydroelectric power sources and the country's vast natural gas deposits have been the mainstays of its electrical generating capabilities. Independent power producers (IPPs), privatized generation businesses, and the National Integrated Power Project (NIPP) make up Nigeria's energy generation industry at the moment. With the addition of thermal and hydroelectric units, the total number of grid-connected generating plants is 23 (operational). To oversee the NIPPs, the federal government established the Niger Delta Power Holding Company (NDPHC) in 2004.

Power generation in Nigeria is mostly based on fossil fuels, particularly natural gas, although renewable energy sources are making strides.⁸ From 2012 to 2022, solar energy capacity increased significantly due to the government's strong promotion of renewable energy adoption.⁹ The generating industry is still struggling to fully utilize its existing capacity due to issues like gas supply interruptions, infrastructure inadequacies, and financial restrictions, notwithstanding these efforts.

⁶ <https://www.siemens-energy.com/mea/en/news/magazine/decentralizing-nigerias-power-sector.html>

⁷ <https://oxfordbusinessgroup.com/reports/nigeria/2022-report/energy>

⁸ <https://www.statista.com/topics/11022/energy-sector-in-nigeria/#topicOverview>

⁹ <https://ourworldindata.org/energy/country/nigeria>

TRANSMISSION CHALLENGES

In Nigeria, the transmission network serves as the conduit connecting the generation and distribution sectors. The Transmission Company of Nigeria (TCN) is under the management of the Federal Government of Nigeria, which was incorporated in November of 2005, and issued a transmission license on July 1st, 2006.¹⁰ Its operations consist of the transmission, trading, and operation of the electricity system. The electricity produced by the generation firms is conveyed to the distribution firms via the transmission infrastructure. Insufficient infrastructure and technical malfunctions have afflicted this network, resulting in recurrent power disruptions and voltage instability. In pursuit of its Energy Transition Plan, the Nigerian government is actively engaged in enhancing the transmission infrastructure in an effort to reach universal energy access by 2030, granting energy security to its 71% population in energy poverty.

DISTRIBUTION REALITIES

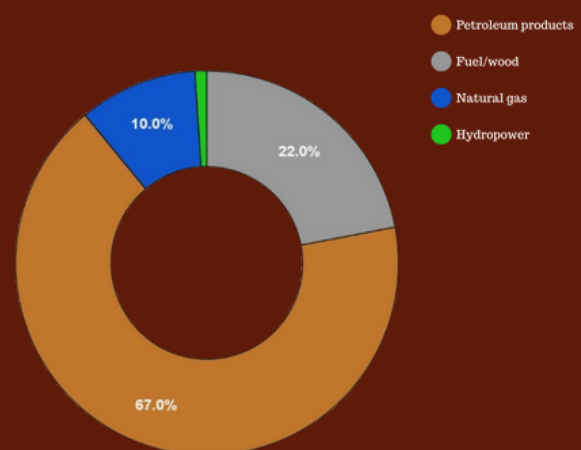
The management of energy distribution in Nigeria is entrusted to distribution corporations (DisCos) that bear the responsibility of supplying power to consumers. Nigeria has a total of 11 distribution corporations, sometimes known as DISCOs. The companies include Kaduna DISCO, Kano DISCO, Yola DISCO, Jos DISCO, Abuja DISCO, Ibadan DISCO, Ikeja DISCO, Eko DISCO, Benin DISCO, Port Harcourt DISCO, and Enugu DISCO.

In 2020, just more than 55% of Nigerians had access to electricity, indicating a substantial segment of the population that still lacks adequate service.¹³ The distribution industry faces issues like energy theft, billing errors, and the necessity for metering to enhance revenue collection and service provision.

CONSUMPTION PATTERNS

Nigeria's energy consumption habits are indicative of its classification as a developing country, characterized by an expanding economy and population. Nigeria's over reliance on non-renewable energy sources for electricity generation may be detrimental to the country's objectives for power generation. The figure below depicts a comprehensive graphic illustrating the consumption trends of various energy sources in Nigeria. The data indicates that fuelwood accounts for the largest proportion of energy use in Nigeria. Fuelwood is commonly utilized in rural communities that have little or no access to electricity.

In 2022, the electricity consumption reached 32.1 terawatt-hours, continuing the rising trend witnessed since 2020.¹⁴ Nevertheless, the per capita energy consumption remains low, with a notable dependence on biomass and trash for cooking and heating, particularly in rural regions.¹⁵



Energy Consumption Rate in Nigeria¹⁶

¹⁰ <https://doi.org/10.1016/j.heliyon.2023.e14416>

¹¹ <https://www.energytransition.gov.ng/wp-content/uploads/2022/05/Investing-in-Nigeria-Energy-Transition.pdf>

¹² <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

¹³ <https://doi.org/10.1016/j.heliyon.2023.e14416>

¹⁴ <https://www.statista.com/topics/11022/energy-sector-in-nigeria/#topicOverview>

¹⁵ <https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC?locations=NG>

¹⁶ <https://doi.org/10.1016/j.heliyon.2023.e14416>

ALTERNATIVE SOURCES

Diversifying its energy mix and lowering its carbon footprint are two goals of Nigeria's exploration of alternative energy sources. Numerous projects have been constructed around the country to harness solar energy, making it the most popular renewable source. Even though wind power is still in its infancy, several areas have already witnessed the construction of wind farms¹⁷, though the nation's grid continues to rely on hydropower supplied by a number of dams¹⁸. Another use for biomass and biogas is the energy production from organic waste, which is common in agricultural regions²⁰.

The Nigerian government is taking action to ensure a sustainable energy future by reducing emissions of greenhouse gasses, increasing the use of renewable energy sources, and improving energy efficiency. As part of its growth plan and pledges under global climate accords, the nation is working towards upgrading its energy infrastructure to be more environmentally friendly.

One key outcome of this pledge is the Electricity Act of 2023 aimed at liberalizing the country's electricity sector, decentralizes power generation, transmission, and distribution, empowering states, companies, and individuals to participate in these activities. States are granted the authority to issue licenses to private investors for operating mini-grids and power plants within their territories. However, interstate and transnational electricity distribution are restricted under the Act.

Clear guidelines are established for licensing, monitoring, and supervising market participants to prevent anti-competitive practices and ensure fair competition. The Act further introduces mechanisms like feed-in tariffs and tax incentives to incentivize investment in renewable energy projects.

This aims to create a level playing field for all industry players. The Act goes further to guarantee asset protection and provides rights for licensees to sell or transfer their undertakings in case of license revocation. In instances of forceful takeover in the interest of national security, compensation is assured.²¹

Powering Nigeria: The Risks

TECHNICAL RISKS

Nigeria's energy infrastructure is confronted with several technical obstacles, including obsolete equipment, insufficient maintenance, and a dearth of contemporary technologies. Specifically, the gearbox section has challenges due to outdated gearbox lines and equipment, resulting in inefficiencies and power losses. Additional technical dangers encompass insufficiency in infrastructure, limitations in the transmission system, and overburdened transmission lines. These problems result in frequent occurrences of power outages and fluctuations in voltage, which negatively impact the dependability of the electrical supply. Another example is the national grid, which is known for its inadequate voltage profile and minimal control infrastructure, leading to significant technical losses²², not to mention the potential to cause damage to property.

17 https://www.energy.gov.ng/papers/Combating%20Energy%20Poverty%20and%20Climate%20Change_NAEE_July2021.pdf

18 <https://energysustainsoc.biomedcentral.com/articles/10.1186/2192-0567-2-15>

19 <https://blog.myshelta.com/sources-renewable-energy-nigeria-benefits/>

20 <https://cvcnigeria.org/nigerians-universities-embrace-alternative-power-sources/>

21 <https://dx.doi.org/10.2139/ssrn.4560855>

22 <https://csaafrica.org/wp-content/uploads/2019/09/CSEA-Electricity-Project-Nigeria-draft-report.pdf>

23 https://energypedia.info/wiki/Key_Challenges_and_Opportunities_in_the_Nigeria_Energy_Sector#References

In Lagos State, the economic center of Nigeria, there is significant disparity between the demand for energy and its supply, resulting in regular power outages that impact both companies and citizens. Similarly, in Kano State, industries frequently encounter power supply troubles caused by technological inefficiencies in the grid.²⁴ Internationally, nations allocate resources towards the modernization of power networks, integration of intelligent technology, and development of highly trained workers to effectively reduce these risks.

FINANCIAL CHALLENGES

The financial risks stem from a generous deficiency of investment, inadequate power generation, insufficient infrastructure, and substantial levels of energy poverty. The privatization of the generation and distribution parts of power supply has not completely remedied these concerns, as the problem of finance still persists.²⁵ In states such as Delta, where oil and gas play a significant role in the energy sector, the financial risks are intensified by the unpredictable, and often volatile changes in global oil prices. These fluctuations have a direct impact on the State's revenue and its ability to allocate funds towards energy infrastructure development.

In order to diversify energy sources and enhance infrastructure, the energy sector requires substantial investment, as well as the presence of cost-effective tariffs. Sub-Saharan Africa earned a meager share of less than 1.5% of global investment in energy transition technologies from 2000 to 2020. This highlights the urgent requirement for stronger coordination between the government and the business sector.

REGULATORY LANDSCAPE

Regulatory risks encompass the potential consequences of policy enforcement, ambiguity around regulatory decisions and alterations in market regulations.

These factors can result in government funding corruption, economic misperception, and unchecked escalation in energy consumption mostly driven by exports rather than local domestic demand.²⁷ The energy industry has experienced several policy alterations, which can result in volatility and impact investor confidence.

SOCIAL RISKS

The consequences of not having access to energy, such as health problems, limited educational opportunities, and hindered economic progress, clearly demonstrate the social hazards involved. Approximately 71% of Nigeria's population lacks access to contemporary energy services, resulting in substantial adverse consequences. In places such as Borno, the insurgency has caused significant damage to energy infrastructure, worsening the socio-economic problems associated with accessing energy.²⁸ The absence of electricity also impedes the functioning of healthcare institutions and schools, hence affecting the overall quality of life and future opportunities for the residents.²⁹ Energy supply is also impacted by insecurity, including acts of vandalism on the infrastructure and conflict in places like the Niger Delta. Addressing these challenges requires active involvement of the community and ensuring that energy projects provide social advantages, as demonstrated by participatory governance models used globally.³⁰

ENVIRONMENTAL FOOTPRINT

The environmental hazards are demonstrated by the utilization of natural resources and their consequences on ecosystems. The Niger Delta region has seen environmental deterioration as a result of oil spillage and gas flaring, which have exhibited detrimental impacts on the health and lives of the local population.³¹

24 <https://cseafrica.org/wp-content/uploads/2019/09/CSEA-Electricity-Project-Nigeria-draft-report.pdf>

25 <https://cseafrica.org/wp-content/uploads/2019/09/CSEA-Electricity-Project-Nigeria-draft-report.pdf>

26 <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

27 <https://www.mdpi.com/2071-1050/8/8/829>

28 <https://www.eurasiareview.com/14072020-nigerias-energy-security-dilemma-analysis/>

29 <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

30 <https://www.iea.org/reports/world-energy-outlook-2022/the-global-energy-crisis>

31 <https://www.sciencedirect.com/science/article/pii/S2405844021004357>



Photo credit: Global Energy World

The pursuit of energy security and economic prosperity has frequently resulted in compromising environmental sustainability, giving rise to issues such as deforestation, erosion, pollution, and in some cases communal uprisings. Nigeria's susceptibility to climate change is heightened by the energy crisis and the environmental repercussions that follow suit, emphasizing the need for a concentrated effort on public governance to address climate action. Utilizing environmental impact assessments and implementing sustainable resource management strategies can effectively reduce the ecological footprint of energy projects.

The Energy Dilemma: To Upgrade or Not To Upgrade?

Energy infrastructure plays a pivotal role in driving economic growth, ensuring social development, and enhancing the overall quality of life. In Nigeria, the energy sector faces challenges stemming from outdated infrastructure, insufficient capacity, and reliance on fossil fuels. Evaluating the costs and benefits of maintaining versus upgrading the current energy infrastructure is crucial for sustainable development and as such, necessitates assessing various factors, including operational, maintenance and investment costs, as well as revenues, profits, and subsidies.

OPERATIONAL COSTS

Maintained scenario	Upgraded scenario
<p>The current energy infrastructure runs-up significant operational costs due to inefficiencies and outdated technology. Aging power plants and transmission lines lead to higher fuel consumption and operational inefficiencies.</p>	<p>Upgrading to modern, efficient technologies can reduce operational costs materially over the long term. Investing in renewable energy sources like solar and wind can harness Nigeria's abundant natural resources while reducing reliance on costly fossil fuels.</p>
<p>States like Lagos with high population density and industrial activity incur substantial operational costs to meet the electricity demand and continuous power supply.</p>	<p>Kano State with its overabundance of sunlight, stands to benefit significantly from solar energy investments to mitigate operational costs associated with traditional fossil fuel-based electricity generation.</p>

MAINTENANCE COSTS

Maintained scenario	Upgraded scenario
<p>Nigeria's aging infrastructure requires frequent maintenance, leading to escalating costs. The need for frequent repairs and replacements due to outdated equipment, infrastructure, transmission and distribution networks prone to breakdowns, contribute greatly to the ever escalating maintenance expenses.</p>	<p>While upgrading/modernization will require large upfront investment, it can lead to long-term cost-saving by reducing maintenance requirements. For instance, implementing smart grid technologies can enhance reliability and reduce frequent maintenance needs.</p>
<p>States like Kaduna and Enugu with older power plants and transmission networks, incur substantial maintenance costs. These States often struggle to keep up with maintenance demands, leading to frequent breakdowns and service disruptions.</p>	<p>States with rural populations, such as Ogun or Edo, can benefit from modernizing distribution networks to improve efficiency and reduce substantial maintenance costs associated with power losses and system failures.</p>

INVESTMENT COSTS

Maintained scenario	Upgraded scenario
<p>Continued reliance on outdated infrastructure may seem cost-effective initially, but it drastically impedes economic growth and development opportunities. Inadequate investment in new power generation for example, stifles industrial expansion and economic diversification efforts.</p>	<p>Upgrading Nigeria's energy infrastructure requires significant upfront investment but offers the promise of many long-term benefits. For instance, investing in renewable energy projects can create jobs, attract foreign investment, and reduce environmental externalities associated with fossil fuel combustion.</p>
<p>States like Sokoto and Adamawa with limited access to electricity require significant investments to expand infrastructure and improve service delivery. Modernizing the energy infrastructure in these states would require substantial upfront investment but can yield long-term benefits to economic development and improved living standards.</p>	<p>States like Kaduna with vast agricultural potential can leverage renewable energy investments to enhance energy access in rural areas and support agro-industrial development.</p>

REVENUES, PROFITS & SUBSIDIES

Maintained scenario	Upgraded scenario
<p>Revenues from electricity sales in Nigeria may be stable, but profits are often eroded by inefficiencies and low reliability of the energy infrastructure. Government subsidies, in addition, are prevalent to offset losses and ensure affordability, which further strain finances.</p>	<p>Upgrading infrastructure can lead to increased revenues and profits through improved efficiency and reliability. While government subsidies may be necessary initially, long-term benefits such as reduced health costs and environmental damage can outweigh these costs.</p>
<p>States with large urban populations such as Abuja, Lagos and Enugu face challenges in revenue generation due to electricity theft and non-payment, thereby undermining financial sustainability.</p>	<p>States like Cross River, endowed with significant hydroelectric potential, can capitalize on renewable energy investments to enhance revenue generation, support sustainable development, and mitigate climate change impacts.</p>

While maintaining the current energy infrastructure may appear cost-effective in the short term, upgrading offers substantial long-term benefits in terms of efficiency, reliability, and sustainability. Each state in Nigeria faces unique challenges and opportunities, necessitating tailored approaches to energy infrastructure development.

Managing The Risky Business of Energy Transition: Recommendations & Criteria

RISK ASSESSMENT

- 1. Risk Identification:** As solutions are not a one size fits all, the different States in Nigeria should prioritize conducting various comprehensive risk assessments to identify possible financial, technical, environmental, and social hazards connected with the energy transition.³² This involves evaluating the creditworthiness of investors, analyzing the possibility of liquidity and refinancing problems, and considering the effects of fluctuating currency rates and inflation.
- 2. Impact Evaluation:** The efforts above should be paired with stringent evaluations that comb through the possible effect of each risk on the energy sector, taking into account elements such as the probability of occurrence and the seriousness of the repercussions.
- 3. Risk & Magnitude Assessment:** Economists, financial experts, engineers and analysts can be roped in to apply optimum assessment methodologies and techniques, such as scenario analysis and probabilistic modeling, to measure the probability and possible consequences of each risk on energy infrastructure projects.
- 4. Stakeholder Perspective:** The state governments should also look to smoothen collaborative efforts between many stakeholders, including government agencies, energy firms, local communities, and environmental groups, to collect a wide range of viewpoints and understandings of potential hazards and their consequences.

MITIGATION STRATEGIES

- 1. Policy Stability and Social Risks:** Officials at the helm of policymaking and regulatory checks need to work towards bolstering policy stability and ensuring transparent regulations to minimize political risks and create a conducive environment for investment in energy infrastructure projects.³³ This could be taken a step further to foster community engagement and resource allocation that addresses challenges of a social nature whilst enhancing participation and ownership.
- 2. Investment and Economic Risks:** State governments, public and private sectors can work together to develop robust business models and secure financing structures to mitigate investment risks, alongside the implementation of policies that work towards stabilization of exchange rates and inflation.
- 3. Capacity Building:** The Nigerian government prioritizing the investing in human capital development and capacity building initiatives will go a long way to equip local communities and energy sector professionals with the skills and knowledge needed to manage transition risks effectively.
- 4. Enhancing Infrastructure Resilience:** State governments should also encourage the strengthening of energy infrastructure to withstand the impacts of climate change, such as extreme weather events and rising sea levels, by retrofitting existing infrastructure and integrating climate risk assessments into project planning.
- 5. Technology Innovation:** Implementation of proactive State measures as needed, such as early warning systems and emergency response plans to mitigate the impact of natural disasters and infrastructure failures. This can be done in addition to fostering advancements in clean energy technologies, energy storage, and grid modernization to enhance the efficiency, reliability, and affordability of energy services.

ADAPTATION MEASURES

1. **Policy Coherence:** Nigerian States should ensure that adaptation plans are in accordance with Nigeria's Nationally Determined Contributions and other national efforts. This can go in concert with the establishment of consistent and reliable regulatory systems and actively participate in discussions on policies to predict and address regulatory modifications.³⁴
2. **Capacity Building:** Government institutions should double down on their implementation efforts to strategically plan and allocate resources for initiatives that enhance resilience to the consequences of climate change. In addition, implementation of initiatives to empower local communities and professionals in the energy sector with the necessary expertise and abilities to effectively handle risks associated with transitions is also crucial to adaptation.³⁵
3. **Adaptive Infrastructure Planning:** Embracing a flexible and adaptable strategy for planning and developing infrastructure to suit shifts in market dynamics, technology breakthroughs, and policy goals by each respective State.
4. **Community Involvement:** Promotion of community involvement and inclusive decision-making procedures that ensure energy infrastructure projects align with the requirements and preferences of local communities, while working to reduce social and environmental disputes. This can be done hand-in-hand by State governments and their various local communities.

DIVERSIFICATION STRATEGIES

1. **Energy Diversification:** State governments can invest in renewable energy sources like solar, wind, and hydroelectricity to diversify the energy mix and decrease reliance on fossil fuels.³⁶ This can also be further made appealing by providing subsidies or incentives from credit institutions and MFIs.
2. **Economic diversification:** The Nigerian government can also look into boosting agriculture and manufacturing - 2 areas that contribute to economic growth while reducing dependence on energy.³⁷
3. **Technology Diversification:** To lower emissions and increase efficiency, the promotion of low-carbon technology systems and adoption should be integrated into planning and infrastructure development of each State.³⁸
4. **Energy Mix Optimization:** Various State governments can work with experts in the public and private sectors to find the sweet spot where the different energy sources may coexist in terms of deployment, taking into account factors like cost, environmental impact, and availability.
5. **Legal Diversification:** State laws can also be erected that necessitate commercial activities inculcate diversified energy mix and incorporation of emission reduction measures.
6. **Regional Integration:** Make it easier for clean energy resources to be traded across borders, increase energy security, and take advantage of economies of scale by integrating energy markets at the regional level.

³⁴ <https://africapol.org/climate-change-adaptation-in-nigeria-strategies-initiatives-and-practices>

³⁵ <https://www.unep.org/gan/news/press-release/nigeria-launches-national-adaptation-plan-project>

³⁶ <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

³⁷ <https://theenergyyear.com/articles/in-nigeria-economic-strength-in-diversification/>

³⁸ https://www.researchgate.net/publication/369305533_ENERGY_TRANSITIONS_IN_NIGERIA_THE_ROLE_OF_POLICIES_FOR_THE_ADOPTION_OF_LOW-CARBON_TECHNOLOGIES_AND_SYSTEM_INTEGRATION

TRANSITION FINANCE

- 1. Government Budget Allocation:** Money designated expressly for energy transition projects could be taken from the government's budget. This could involve money from different finance, energy, environmental ministries or departments.
- 2. International Aid and Grants:** Nigerian energy transition initiatives may be supported by grants or concessional loans from international organisations, foreign governments, or development banks. These monies might be channeled to support the development of a newly established National Energy Transition Fund (NETF), or similar funding entities.
- 3. Private Sector Investments:** a funding entities may receive funds from private investors, both local and abroad, in the form of loan financing, equity investments, or public-private partnerships. This could be in the form of contributions to energy transition initiatives or direct investments made in energy-related enterprises.
- 4. Philanthropic Organisations:** Initiatives related to Nigeria's energy transformation may be supported by grants or donations from nonprofit groups or philanthropic foundations.

Some of the aforementioned strategies have been put to work in a few states already. Rivers State, for example, has prioritized gas flare reduction and intensified investment efforts in gas-to-power project so as to crack down harder on environmental impacts, and diversification of energy portfolio. Nigeria can establish a more sustainable and resilient energy future by efficiently prioritizing and managing the transition risks associated with its energy infrastructure, through strict adherence to these guidelines and standards. It is critical to emphasize that these strategies ought to be customized to suit the particular requirements and circumstances of distinct regions throughout the nation.

Illuminating The Pathway to Inclusive Energy Systems Through Decentralized Solutions

In the quest to illuminate the path towards energy inclusivity within Nigeria's complex socio-economic landscape, one must consider the multifaceted nature of its energy infrastructure. The country, bedevilled by a labyrinth of obstacles ranging from dilapidated grid systems to the spectre of energy poverty, stands at a crossroads. The potential for decentralized and off-grid solutions to serve as a beacon of hope cannot be overstated.



Photo credit: ESI-Africa

Decentralized Solutions

MINI GRIDS

Akin to a quilt woven from various local energy sources, mini-grids offer a bespoke solution tailored to the unique needs of remote communities. These systems, often solar-powered, can operate autonomously or in concert with the national grid to provide resilient and scalable energy supply. With hundreds of investment-ready locations identified by the Nigerian Rural Electrification Agency (REA), mini-grids have a lot of promise in Nigeria.³⁹

Deep dive assessments have uncovered several areas in states like Ogun and Cross River that are prepared for the deployment of mini-grids of various sizes. The revolutionary potential of mini-grids to provide electricity access to Nigeria's outlying areas is immense. Renewable energy networks at the community level can help lift people out of energy poverty by connecting them to renewable power sources like solar, wind, or hydro.

Consider the mountainous region of Taraba State, where the installation of mini-grids in communities like Bali and Gembu might bring much-needed light to those who have been living in darkness for far too long.

Alas, inadequate financing, technological limitations, and regulatory impediments are only a few of the many reasons why previous attempts to construct mini-grids have frequently failed. There have been cases where mini-grid programs have failed due to a lack of consistent government backing and coherent community involvement, which has left communities feeling disappointed and discouraged. However, even in the midst of failure, there are opportunities to grow and find salvation. If all parties involved listen to the rallying cry for coordinated effort, we can learn from our mistakes and create a better future.

SOLAR HOME SYSTEM

A ray of hope, solar home systems (SHS) stand as solitary sentinels, harnessing the sun's bounty to bring light and power to the most secluded of dwellings. These systems, which can be as basic as a light fixture or as high tech as a power plant for a full home, thrive in the hot, sunny climate of Nigeria.⁴⁰ Offering a sustainable and cost-effective alternative to traditional energy sources, SHS has been attracting more and more rural and distant populations to its adoption. With the introduction of solar household systems, a new age in energy access has begun, one that goes beyond the limitations of the old grid and illuminates even the most remote rural areas of Nigeria. Microfinance efforts and pay-as-you-go (PAYG) schemes are two examples of creative financing mechanisms that make inexpensive solar solutions available to even the most disadvantaged families, allowing them to participate in this brilliant change.

State-specific initiatives exist: In the verdant expanses of Edo State, solar-powered mini-grids could empower local artisans and small businesses, liberating them from the erratic embrace of the national grid.⁴¹ Realizing the revolutionary power of these solutions, the Nigerian government has set lofty goals to attain universal energy access by 2030.⁴² There is a patchwork of laws and programs that all work together to back this goal of a green energy transformation, which are centered around decentralized and off-grid systems.⁴³ Finally, off-grid and decentralized solutions in Nigeria have the potential to show limitless creativity in the face of adversity. Nigeria may take bold steps towards a future where everyone has access to electricity by utilizing solar power and the strength of community. A country driven by clean, sustainable, and inclusive energy is within grasp, but getting there will be no picnic.

Sailing Towards a Just Transition for All: The Significance of Gender, Youth and Social Inclusion

Historically, from an evidence based analysis, women have faced challenges in accessing energy resources, which has impacted their economic and social empowerment. For instance, women's traditional roles in household management often mean they are more affected by energy poverty, thus limiting their opportunities for economic activities and advancement.⁴⁴

Recent initiatives, however, show a positive trend towards inclusivity. The Nigerian government's recognition of the need for diversity and inclusion has led to programs like Power Africa's training for Gender Equality and Social Inclusion (GESI) Champions, aiming to foster inclusivity in the public sector workforce and programming. Moreover, policy briefs suggest that equitable access to energy can significantly contribute to women's health, well-being, and economic participation. Despite these efforts, there is still a need for continuous improvement. The energy sector must strive to understand and integrate the different priorities of men and women to ensure that budget allocations and program designs are impactful for all.

40 https://www.researchgate.net/publication/336591606_Adoption_of_Solar_Energy_Systems_in_Remote_and_Rural_Communities_of_Nigeria_A_Review

41 <https://pmnewsnigeria.com/2021/02/24/edo-community-gets-100kw-solar-hybrid-minigrd-after-60-years/>

42 <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

43 <https://rea.gov.ng/theagency/off-grid-electrification-strategy/>

44 https://link.springer.com/chapter/10.1007/978-3-031-04911-8_4

THE BALANCING ACT: OPPORTUNITIES VS. CHALLENGES

In fostering empowerment through employment, women and youth stand to simultaneously benefit from opportunities for gainful employment and development within the energy sector, while fostering inclusivity.⁴⁵

Adding to that, encouraging leadership roles for women facilitates equitable representation in policy-making and program implementation.⁴⁶ Moreover, providing education and training in energy-related fields equip women and youth with essential skills that nurture their sense of belonging in the sector. However, numerous challenges hinder progress. Cultural barriers entrenched in traditional gender roles impede women's participation.⁴⁷

HARMONIZING ENERGY AND CLIMATE

The integration of energy and climate policies in Nigeria is a complex process with far-reaching implications and impacts. Said integration is a crucial step not just to energy security, creation of jobs and bolstering resilient communities, but also towards the achievement of global climate commitments, such as Net Zero Emissions by 2060. However, this advancement towards a sustainably carbon low future that encapsulates the masses in an energy secure bubble is a herculean task.

Additionally, limited access to finance hampers investments in energy start-ups or businesses, particularly for women and youth.⁴⁸

Furthermore, the absence of robust policies catering to the specific needs of these groups, especially those marginalized, poses a significant obstacle. Thus highlighting the urgent need for comprehensive policy reform. By embracing these opportunities and facing their challenges, Nigeria can create an energy sector that is more inclusive, equitable, and supportive of the empowerment of all its citizens.

⁴⁵ <https://www.powerforall.org/insights/technologies/meet-unsung-heroes-women-forefront-of-scaling-energy-access>

⁴⁶ <https://www.powerforall.org/insights/technologies/meet-unsung-heroes-women-forefront-of-scaling-energy-access>

⁴⁷ <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

⁴⁸ <https://powerafrica.medium.com/energizing-gender-equality-and-social-inclusion-in-nigeria-5d73673e217c>

THE GIVE AND TAKE

Costs and Benefits: The transition to a green energy economy requires substantial investment. As it stands, Nigeria requires an estimated whopping \$410 billion to achieve net zero by 2060 and unlock other benefits the likes of energy security, job creation, poverty alleviation, desertification pollution and overall reduced environmental degradation.⁴⁹ Numerous investment opportunities also arise where solar energy, electric vehicles and hydrogen are concerned as part of the transition.⁵⁰

Risks and Opportunities: Numerous risks also abound such as insufficient power generation and infrastructure challenges that lead to energy poverty, while opportunities lie in diversifying the sources of energy, job creation and up-take in the number of private sector investments.⁵¹

Winners and Losers: Nigeria's energy transition also runs the course of a double edge sword as it stands to benefit the urban populace with better access to clean energy, while leaving the rural to lag behind from a lack of viable targeted policies. In other words, the oil and gas sector might see downsizing due to job losses from reduced fossil fuel demands, conversely having net job creation hike up in cooking, power and other green sectors.⁵²

RECOMMENDATIONS & MEASURES

The integration of energy and climate policies in Nigeria is a critical aspect of the country's efforts to address climate change while ensuring sustainable energy development and access. To ensure this is done in a productive fashion that carries everyone along, the following avenues are proposed:

Enhancing Policy Co-ordination: Establish clear action plans with targets and timelines for energy transition plan to ensure proper monitoring and goal achievement. Nigeria can establish an Inter-Ministerial Committee on Energy and Climate Change comprising of representatives from relevant ministries such as the Ministry of Environment, Power, Petroleum Resources, and Finance. This committee would coordinate efforts to ensure coherence between energy and climate policies, aligning them with national development objectives.

Policy Implementation and Harmonization: Emphasize the strengthening of legal frameworks which support implementation of the National climate Change Policy, Climate Change Act and the likes.⁵³ Other benefits also stem from aligning national energy policies with international climate agreements and local development plans.⁵⁴ Efforts are underway to harmonize policies like Climate Change Act 2021 and align Nigeria's NDCs with a Net Zero pathway.⁵⁵

Monitor and Evaluate Policy Implementation: Nigeria could establish a dedicated monitoring and evaluation unit within the Ministry of Environment, strike a partnership with the Bureau of Statistics, or set-up an independent agency that is tasked with tracking progress on energy and climate goals. This unit would collect and analyze data on key indicators such as GHG emissions, renewable energy capacity, energy access, and climate resilience. Regular reports and evaluations would inform policymakers about the effectiveness of current policies and identify areas for improvement.

⁴⁹ <https://www.seforall.org/our-work/initiatives-projects/energy-transition-plans/nigeria>

⁵⁰ <https://www.energytransition.gov.ng/>

⁵¹ <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>

⁵² <https://spacesforchange.org/energy-transition-in-nigerias-oil-rich-communities/>

⁵³ <https://leap.unep.org/en/countries/ng/national-legislation/national-climate-change-policy-nigeria-2021-2030>

⁵⁴ <https://www.seforall.org/our-work/initiatives-projects/energy-transition-plans/nigeria>

⁵⁵ <https://www.energytransition.gov.ng/>

References

- Butu, Ekeke, & Okereke. (2022, October 10). Climate Change Adaptation in Nigeria: Strategies, Initiatives, and Practices. *afripoli.org*. Retrieved February 19, 2024, from <https://afripoli.org/climate-change-adaptation-in-nigeria-strategies-initiatives-and-practices>
- Chinery, & George-Ikoli. (2023, August 1). Nigeria's Next Government Must Lead an Inclusive, Cohesive and Sustainable Energy Transition. Natural Resource Governance Institute. Retrieved January 26, 2024, from <https://resourcegovernance.org/articles/nigerias-next-government-must-lead-inclusive-cohesive-and-sustainable-energy-transition>
- Edomah, N., Foulds, C., & Jones, A. (2016, August 22). The Role of Policy Makers and Institutions in the Energy Sector: The Case of Energy Infrastructure Governance in Nigeria. *Sustainability*, 8(8), 829. <https://doi.org/10.3390/su8080829>
- Electric power consumption (kWh per capita) - Nigeria*. (2014). World Bank Open Data. Retrieved January 24, 2024, from <https://data.worldbank.org/indicator/EG.USE.ELEC.KH.PC?locations=NG>
- Energy: Nigeria 2022*. (2022). Oxford Business Group. Retrieved February 11, 2024, from <https://oxfordbusinessgroup.com/reports/nigeria/2022-report/energy>
- Energy In Planning: Combatting Energy Poverty and Climate Change. (2021, July). In *Energy Gov Ng*. Retrieved February 10, 2024, from https://www.energy.gov.ng/papers/Combating%20Energy%20Poverty%20and%20Climate%20Change_NAEE_July2021.pdf
- ENERGY TRANSITION IN NIGERIA'S OIL-RICH COMMUNITIES - Spaces for Change*. (2022, December 9). *spacesforchange.org*. Retrieved March 16, 2024, from <https://spacesforchange.org/energy-transition-in-nigerias-oil-rich-communities/>
- Ezekwesiri, E., Ogini, F., & Adeyemo, I. (2023, October 13). A Review of the Electricity Act, 2023 - Impact and Major Issues Arising. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4560855>
- Here's how Nigeria is tackling the barriers to its green energy transition*. (2023, December 29). World Economic Forum . Retrieved March 21, 2024, from <https://www.weforum.org/agenda/2023/05/how-nigeria-is-tackling-barriers-to-its-green-energy-transition/>
- Ibileke, N. (2021, February 24). *Edo community gets 100KW Solar hybrid minigrig after 60 years*. PM NEWS. Retrieved March 13, 2024, from <https://pmnewsigeria.com/2021/02/24/edo-community-gets-100kw-solar-hybrid-minigrig-after-60-years/>
- Investing In Nigeria's Energy Transition Opportunity. (2022, March). In *Energy Transition Nigeria*. Retrieved February 9, 2024, from <https://www.energytransition.gov.ng/wp-content/uploads/2022/05/Investing-in-Nigeria-Energy-Transition.pdf>
- Isah Samaila Nitte, & Tope Muslihudeen Salahudeen. (2023, March 17). Energy Transitions In Nigeria: The Role of Policies For The Adoption of Low-Carbon Technologies and System Integration. *EPRA International Journal of Research & Development (IJRD)*, 128-139. <https://doi.org/10.36713/epra12666>
- K. (2019, October 10). *Nigerians Universities Embrace Alternative Power Sources*. The Committee of Vice Chancellors of Nigerian University (CVCNU). Retrieved February 8, 2024, from <https://cvcnigeria.org/nigerians-universities-embrace-alternative-power-sources/>
- Key Challenges and Opportunities in the Nigeria Energy Sector - energypedia*. (n.d.). *energypedia.info*. Retrieved March 19, 2024, from https://energypedia.info/wiki/Key_Challenges_and_Opportunities_in_the_Nigeria_Energy_Sector
- McDowell. (2020, July 13). *Nigeria's Energy Security Dilemma - Analysis*. *Eurasia Review*. Retrieved February 2, 2024, from <https://www.eurasiareview.com/14072020-nigerias-energy-security-dilemma-analysis/>
- Meet the Unsung Heroes: Women at the forefront of scaling energy access*. (2021, March 25). Power for All. Retrieved February 27, 2024, from <https://www.powerforall.org/insights/technologies/meet-unsung-heroes-women-forefront-of-scaling-energy-access>
- Muhammad Wuye. (2016, January). Adoption of Solar Energy Systems in Remote and Rural Communities of Nigeria (A Review). *The International Journal of Science & Technology*. https://www.researchgate.net/publication/336591606_Adoption_of_Solar_Energy_Systems_in_Remote_and_Rural_Communities_of_Nigeria_A_Review

References

National Climate Change Policy for Nigeria: 2021-2030. | UNEP Law and Environment Assistance Platform. (2021, January 1). climatechange.gov.ng. Retrieved February 12, 2024, from <https://leap.unep.org/en/countries/ng/national-legislation/national-climate-change-policy-nigeria-2021-2030>

Nigeria Energy Outlook – Analysis - IEA. (2019, November 8). IEA. Retrieved March 15, 2024, from <https://www.iea.org/articles/nigeria-energy-outlook>

Nigeria Energy Transition Plan. (2022). energytransition.gov.ng. Retrieved January 21, 2024, from <https://www.energytransition.gov.ng/>

Nigeria Energy Transition Plan. (2022). seforall.org. Retrieved February 3, 2024, from <https://www.seforall.org/our-work/initiatives-projects/energy-transition-plans/nigeria>

Nigeria launches National Adaptation Plan project | Global Adaptation Network (GAN). (2021, December 2). unep.org. Retrieved March 16, 2024, from <https://www.unep.org/gan/news/press-release/nigeria-launches-national-adaptation-plan-project>

OFF GRID ELECTRIFICATION STRATEGY – Rural Electrification Agency. (2024). Rural Electrification Agency. Retrieved February 15, 2024, from <https://rea.gov.ng/theagency/off-grid-electrification-strategy/>

Ogunyemi, K., Atanya, O., & Bursal, V. (2022, November 16). Management and Leadership for a Sustainable Africa, Volume 1. Springer Nature. http://books.google.ie/books?id=pGcEAAAQBAJ&pg=PR6&dq=978-3-031-04910-1&hl=&cd=1&source=gbs_api

Okoh, A. I. S. (2020, March 10). AN ANALYSIS OF NIGERIA'S NATIONALLY DETERMINED CONTRIBUTION (NDC) IN THE TRANSITION TO A LOW CARBON ECONOMY. *Open Journal of Social Science and Humanities (ISSN: 2734-2077)*, 1(1), 42–60. <https://doi.org/10.52417/ojsssh.v1i1.67>

Okolo. (2014, March). NNDC, Conflict,Peace-building and community Development, In The Niger Delta Region . *European Centre for Research Training and Development* , 2(1), 36–54. <https://ejournals.org/wp-content/uploads/NDDC-Conflict-Peace-Building-and-Com>

Oni, A. (2024, February 28). *Political Risks In The Nigerian Energy Sector: Analysis And Mitigation Mechanisms*. Mondaq. Retrieved March 19, 2024, from <https://www.mondaq.com/nigeria/oil-gas--electricity/1429704/political-risks-in-the-nigerian-energy-sector-analysis-and-mitigation-mechanisms>

Onyekwena, Ishaku , & Akanonu. (2017, October). Electrification in Nigeria: Challenges and Way Forward. In *cseaafrica.org* . Retrieved February 7, 2024, from <https://cseaafrica.org/wp-content/uploads/2019/09/CSEA-Electricity-Project-Nigeria-draft-report.pdf>

Oyedepo, S. O. (2012, July 23). Energy and sustainable development in Nigeria: the way forward. *Energy, Sustainability and Society*, 2(1). <https://doi.org/10.1186/2192-0567-2-15>

Pona, Xiaoli, Ayantobo, & Tetteh. (2021, March 23). Environmental health situation in Nigeria: current status and future needs. *Heliyon*, 7(3). <https://doi.org/10.1016/j>

Ritchie, H., Roser, M., & Rosado, P. (2022, October 27). Energy. Our World in Data. Retrieved January 25, 2024, from <https://ourworldindata.org/energy/country/nigeria>

Smyth. (2021, August 21). In Nigeria, economic strength in diversification - The Energy Year. The Energy Year. Retrieved February 13, 2024, from <https://theenergyyear.com/articles/in-nigeria-economic-strength-in-diversification/>

The global energy crisis – World Energy Outlook 2022 – Analysis - IEA. (2022). IEA. Retrieved March 1, 2024, from <https://www.iea.org/reports/world-energy-outlook-2022/the-global-energy-crisis>

The Off-Grid Opportunity In Nigeria - Upscaling minigrids for least cost and timely access to electricity Action Learning Event. (n.d.). In *esmap.org*. REA. Retrieved February 21, 2024, from https://www.esmap.org/sites/default/files/Presentations/REA_Damilola-Off-Grid%20Opportunity_03122017_web.pdf

Topic: Energy sector in Nigeria. (2023, December 21). Statista. Retrieved January 30, 2024, from <https://www.statista.com/topics/11022/energy-sector-in-nigeria/#topicOverview>

Udo. (2015, April 21). Missing \$20 billion: NNPC refuses to pay recovered \$1.48bn, states begin probe. *Premiumtimesng.com*. Retrieved January 21, 2024, from <https://www.premiumtimesng.com/news/top-news/181785-missing-20-billion-nnpc-refuses-to-pay-recovered-1-48bn-states-begin-probe.html?tztc=1>

Written By

**Dr. Bilkisu Hadejia - Research & Outreach Associate,
Surge Africa**

Proofread & Edited by

Nasreen Al-Amin - Director, Surge Africa

About Surge Africa

Surge Africa designs and implements innovative measures that improve approaches to climate adaptation through policy, media and resilient development.

Our policy work is centered around some of the key issues that must be addressed when dealing with concepts of climate governance that intersect development gaps, adaptation and resilience, energy justice, transition finance, and income inequality.

We conduct research, policy and data analysis, capacity building, and convene a community of practices in an effort to review, analyze and recommend innovative political and diplomatic measures to be taken to respond to the climate crisis.

Contact:

Info@surgeafrica.org

www.surgeafrica.org

Office Address

U11, Zainab Plaza, Lawan Dambazau Rd, Kano, Nigeria



**SURGE
AFRICA**
organisation