



Clean Technology Hub
energy innovation centre

Advancing a Just Energy Transition in Nigeria: Balancing Sustainable Development & Social Equity

Curated by Clean Technology Hub, Abuja

Written by Victor I. Fagorite, PhD and Juliet Kyaw

(October, 2024)

1. Introduction

Nigeria, Africa's largest economy and most populous country, stands at a critical juncture in its energy sector. With a Gross Domestic Product (GDP) of \$514 billion in 2021, Nigeria's economic landscape is deeply intertwined with its energy resources, particularly oil and gas, which account for approximately 90% of its export earnings and over 50% of government revenue according to the [World Bank](#)¹. However, this heavy reliance on fossil fuels poses significant challenges for sustainable development and social equity.

Despite being an energy-rich nation, Nigeria faces substantial energy poverty, with around 43% of its 206 million people lacking access to electricity as of 2020². This energy deficit impedes economic growth and exacerbates social inequalities, particularly in rural areas where electrification rates are even lower¹. The need for a transition to a more sustainable and equitable energy system is pressing.

Advancing a just energy transition in Nigeria involves navigating the complex interplay between sustainable development and social equity. According to the International Renewable Energy Agency (IRENA)³, the country is endowed with vast renewable energy potential, including solar, wind, and hydropower, which remain largely untapped. Leveraging these resources can not only reduce greenhouse gas emissions but also provide affordable and reliable energy to underserved communities, fostering inclusive economic growth.

However, this transition must be managed carefully to ensure that it does not disproportionately impact vulnerable populations who depend on the traditional energy sector for their livelihoods. Balancing economic development with environmental sustainability and social justice requires comprehensive policies and robust investment in green technologies, infrastructure, and workforce retraining programs.

By addressing these challenges head-on, Nigeria can pave the way for a more resilient and equitable energy future, contributing to the global fight against climate change while promoting sustainable economic growth and social equity.

With a Gross Domestic Product (GDP) of \$514 billion in 2021, Nigeria's economic landscape is deeply intertwined with its energy resources, particularly oil and gas, which account for approximately **90%** of its export earnings and over **50%** of government revenue according to the World Bank.



¹ <https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=NG>

² IEA (2021). Energy system of Nigeria. <https://www.iea.org/countries/nigeria>

³ IRENA (2023). Renewable Energy Roadmap. International Renewable Energy Agency, Abu Dhabi. https://energy.gov.ng/reports/IRENA_REMap_Nigeria_2023.pdf



2. Principles of a Just Energy Transition

A just energy transition encompasses a holistic approach to shifting from fossil fuels to renewable energy sources, ensuring that the process is equitable, inclusive, and sustainable. The key principles of a just energy transition (See Fig. 1) include:



Social Inclusivity and Equity:

Ensuring the economic, social, and environmental benefits of the energy transition are shared equitably among all communities, especially marginalized and vulnerable groups, is paramount⁴. This involves addressing energy poverty, guaranteeing access to clean energy for all, and preventing any community from bearing disproportionate burdens. Inclusive participation is crucial, involving all stakeholders—workers, communities, civil society organizations, and indigenous groups—in decision-making processes to ensure diverse perspectives are considered and policies reflect the needs and aspirations of all affected parties.



Economic Diversification and Resilience:

Promoting job creation and economic opportunities in the renewable energy sector and related industries is essential⁵. This includes ensuring fair wages, safe working conditions, and opportunities for career advancement. In addition, comprehensive support for workers and communities affected by the decline of the fossil fuel industry is necessary, including retraining programs, financial assistance, and the development of alternative livelihoods to ensure a smooth transition.



Environmental Sustainability:

Prioritizing the reduction of greenhouse gas emissions to mitigate climate change and its impacts is critical, as emphasized by the [United Nations Development Programme \(UNDP\)](#). This requires increasing the share of renewable energy in the energy mix, improving energy efficiency, and implementing sustainable practices across all sectors. Additionally, renewable energy projects must be designed and implemented to protect local ecosystems and biodiversity, making environmental impact assessments and sustainable land-use practices essential components.

⁴ Carley, S., & Konisky, D. M. (2020). The justice and equity implications of the clean energy transition. *Nature Energy*, 5(8), 569-577. <https://www.nature.com/articles/s41560-020-0641-6>

⁵ Altenburg, T., & Assmann, C. (Eds.). (2017). *Green Industrial Policy. Concept, Policies, Country Experiences*. Geneva, Bonn: UN Environment; German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE). https://www.greenindustryplatform.org/sites/default/files/downloads/resource/Green%20Industrial%20Policy_Concept,%20Policies,%20Country%20Experiences.pdf



Fig. 1. Principles of a Just Energy Transition



Equitable Energy Access:

Striving to provide affordable, reliable, and sustainable energy access to all populations, particularly those in underserved and remote areas, is essential as emphasised by the [World Bank Group](#). This can be achieved through decentralized renewable energy solutions such as off-grid solar systems and mini-grids. Moreover, ensuring that the transition does not lead to increased energy costs for consumers, particularly low-income households, is crucial, with policies and programs aimed at making clean energy affordable and accessible to everyone.



Community Empowerment:

Encouraging local ownership and control of energy resources and infrastructure is vital. Community-led renewable energy projects can foster local economic development, create jobs, and ensure that the benefits of energy projects remain within the community^{6,7}. Investing in education, training, and capacity-building initiatives to empower communities and individuals to actively participate in and benefit from the renewable energy transition is also important.

⁶ IEA (2023), *Empowering people – the role of local energy communities in clean energy transitions*, IEA, Paris <https://www.iea.org/commentaries/empowering-people-the-role-of-local-energy-communities-in-clean-energy-transitions>

⁷ Van Der Waal, E. C. (2020). Local impact of community renewable energy: A case study of an Orcadian community-led wind scheme. *Energy Policy*, 138, 111193. <https://doi.org/10.1016/j.enpol.2019.111193>



Policy Coherence and Coordination:

Developing coherent and integrated policy frameworks that align energy transition goals with broader social, economic, and environmental objectives is crucial⁸. This requires coordination across different government levels and sectors to ensure policy consistency and effectiveness. Establishing clear and supportive regulatory environments that facilitate the deployment of renewable energy technologies and the phase-out of fossil fuels is also necessary, including incentives for renewable energy investments, streamlined permitting processes, and the removal of fossil fuel subsidies.

By adhering to these principles, a just energy transition can be achieved, ensuring that the shift to renewable energy is not only environmentally sustainable but also socially equitable and economically inclusive. This approach helps build a resilient and fair energy system that benefits all members of society.

3. Current Energy Challenges in Nigeria

Nigeria faces a myriad of challenges in its quest for a just energy transition, reflecting the complexities of balancing sustainable development with social equity. To mention a few, the following are some prevalent issues:



Energy Poverty:

Despite being a major oil producer, Nigeria struggles with significant energy poverty. In June 2023, the World Bank reported that 45 percent of the population lacked access to electricity⁹. Moreover there is a wide urban-rural divide; only 26 percent of rural areas have access to electricity compared to 84 percent of urban areas¹⁰. While Nigeria has a total installed power generation capacity of 14,000 MW, on most days the existing electricity grid can dispatch around 4000 MW, which is insufficient for 195 million people¹¹. The estimated energy demand is 98,000 MW per day¹². This energy gap hinders economic activities, limits access to essential services, and exacerbates social inequalities.

⁸ IRENA (2023). *World Energy Transitions Outlook 2023*. Vol. 1. <https://www.irena.org/Digital-Report/World-Energy-Transitions-Outlook-2023>

⁹ The World Bank Approves Additional Financing to Consolidate the Gains of Nigeria's Power Sector Recovery Program. (2023, September 5). World Bank.

<https://www.worldbank.org/en/news/press-release/2023/06/09/the-world-bank-approves-additional-financing-to-consolidate-the-gains-of-nigeria-s-power-sector-recovery-program>

¹⁰ Ibid

¹¹ Off-Grid Energy Business Report. (2024). All-ON and Nextier, page 5,

https://thenextier.com/wp-content/uploads/2024/05/All-On_Off-Grid_Business-Report.pdf?fbclid=IwZXhobgNhZWoCMTAAARoCOUz_ZnZ-dZ-j4v7N3DfHDneAkm7JRKIs-Y486MHRb4jGM9wbCq1Vfz8_aem_AWHzHTBYnn8l9do_-xYhRCh9OwrZKSY4EAbB9Lt3BkDl7l9garFj9NoKtv3tFOwcrMoBfWA1a2FSVg9mG-2ehRel

¹² Off-Grid Energy Business Report. (2024). All-ON and Nextier, page 6,

https://thenextier.com/wp-content/uploads/2024/05/All-On_Off-Grid_Business-Report.pdf?fbclid=IwZXhobgNhZWoCMTAAARoCOUz_ZnZ-dZ-j4v7N3DfHDneAkm7JRKIs-Y486MHRb4jGM9wbCq1Vfz8_aem_AWHzHTBYnn8l9do_-xYhRCh9OwrZKSY4EAbB9Lt3BkDl7l9garFj9NoKtv3tFOwcrMoBfWA1a2FSVg9mG-2ehRel



Infrastructure Deficit:

Nigeria's energy infrastructure is outdated and inadequate. Frequent power outages and grid failures are common, leading to a reliance on expensive and polluting diesel generators. At the Ministerial Summit on Integrated National Electricity Policy and Strategy Implementation Plan¹³, the Minister of Power Adebayo Adedun stated that Nigeria generates 40,000 megawatts of electricity from fossil-fuel-powered generators¹⁴. The lack of reliable infrastructure forces a significant amount of wages into buying fuel for generators and diverts these resources away from government taxes, savings and discretionary spending.



Financial Constraints:

Transitioning to a sustainable energy system requires substantial investment, which Nigeria currently struggles to secure. S&P Global reports that one of the reasons why the country faces financial constraints is stagnating oil revenues in 2020 due to oil thefts, pipeline leaks, facilities maintenance or shutdowns, and limited investment¹⁵. Another reason is high interest on external government debt which takes up a large amount of government revenue¹⁶. In the first financial quarter of 2024, interest and principal payments on debt amounted to 74 percent of federal revenue which is 1.31 trillion naira¹⁷. Nigeria is currently not progressing as needed on the goal to raise \$10 billion a year to reach net zero by 2060¹⁸.



Policy and Regulatory Challenges:

Nigeria's energy sector is hampered by regulatory uncertainties and policy inconsistencies. A comprehensive energy transition should have a fossil fuel phaseout plan and a renewable energy phase-in plan. However, Nigeria's fossil fuel phaseout policy is yet to be seen^{19,20}. Moreover, Nigeria has several competing policies on energy transition (see Table 1). APRI's Policy Brief published in September 2023 states that there are "internal inconsistencies" and "competition among line agencies for control over different policy aspects"²¹. Finally, there is pushback from top officials against renewable energy adoption; the Minister of State for Environment declared at COP28 that Nigeria will not be phasing out fossil fuels²².

¹³Oyebanjo. (2023, December 12). *THE INTEGRATED NATIONAL ELECTRICITY POLICY & STRATEGIC IMPLEMENTATION PLAN – MATTERS ARISING*. The Nigerian Power System. <https://nigerianpowersystem.wordpress.com/2023/12/12/the-integrated-national-electricity-policy-strategic-implementation-plan-matters-arisng/>

¹⁴Nnodim, O. (2023, December 13). *Nigeria gets 40,000MW power from generators, says FG*. Punch Newspapers. <https://punchng.com/nigeria-gets-40000mw-power-from-generators-says-fg/>

¹⁵S&P Global Ratings. (n.d.). <https://disclosure.spglobal.com/ratings/en/regulatory/article/-/view/type/HTML/id/3120907>

¹⁶Ibid

¹⁷Tunji, S., & Tunji, S. (2024, July 22). *Debt service costs gulp 74% of FG's revenue in Q1 2024*. *Nairametrics*. <https://nairametrics.com/2024/07/22/debt-service-costs-gulp-74-of-fgs-revenue-in-q1-2024/>

¹⁸Guidebook on Nigeria's Energy Transition. (2024, February). *Natural Resource Governance Institute*, page 9, <https://resourcegovernance.org/publications/guidebook-nigeria-energy-transition>

¹⁹Okafor, C. (2023, December 13). *COP28: Nigeria rejects call to phase out fossil fuels*. *Premium Times*. Retrieved August 1, 2024, from <https://www.premiumtimesng.com/news/top-news/651155-cop28-nigeria-rejects-call-to-phase-out-fossil-fuels.html?tztc=1>

²⁰Buhari, M. (2020). *CLIMATE TRANSPARENCY REPORT 2020 NIGERIA*. <https://www.climate-transparency.org/wp-content/uploads/2021/01/Nigeria-CT-2020.pdf>

²¹Animashaun, N. (2023, September 8). *Nigeria's Energy Transitions in a Political Transition*. APRI. <https://afripoli.org/nigerias-energy-transitions-in-a-political-transition>

Table 1: Overlapping Policies on Climate Change and Renewable Energy Adoption in Nigeria^{23, 24}

Note: this table expanded on the policy comparison table in NREGI's publication

Policy/Plan	Source	Misalignment
Nationally Determined Contribution (NDC)	Federal Ministry of Environment	2030 is the goal and the time horizon is short. Establishes a baseline using the National Energy Balance 2019 report from the International Renewable Energy Agency (IRENA).
Energy Transition Plan (ETP) 2021	Energy Transition Office supported by Sustainable Energy for All	A scenario driven by the NDC that prioritizes gas and has an aggressive aim for renewable energy. Comparatively speaking, ETP baseline numbers are substantially smaller.
LowTerm Low Emissions Development Strategy (LT-LEDS)	Federal Ministry of Environment	Waste and agriculture are included in addition to energy. makes use of local data; Baseline data comes from the Central Bank of Nigeria.
Nigerian Energy Emissions Calculator (NECAL2050)	Energy Commission of Nigeria	energy-focused, but not compatible with ETP and LT-LEDS more ambitious renewables scenarios
National Renewable Energy Action Plans (NREAP) 2015	Federal Ministry of Power Works and Housing	Limited implementation framework Inadequate funding Insufficient stakeholder engagement
Nigeria's Long-Term Low Emission Strategy 2023	National Climate Change Council	Lack of integration with short-term policies Inadequate consideration of local realities and challenges
Energy Transition Plan 2022	Energy Transition Office	Overlapping responsibilities with other energy policies Insufficient clarity on the transition timeline and milestones
Nigeria Agenda 2050	National Planning Commission	Broad and ambitious targets without clear actionable steps Lack of synchronization with current economic policies

²² Okafor, C. (2023, December 13). COP28: Nigeria rejects call to phase out fossil fuels. *Premium Times*. Retrieved August 1, 2024, from <https://www.premiumtimesng.com/news/top-news/651155-cop28-nigeria-rejects-call-to-phase-out-fossil-fuels.html?tztc=1>

²³ Guidebook on Nigeria's Energy Transition.(2024, February).*Natural Resource Governance Institute*, page 17, <https://resourcegovernance.org/publications/guidebook-nigeria-energy-transition>

²⁴ NIGERIA'S LONG-TERM LOW-EMISSION DEVELOPMENT STRATEGY – 2060. (2023). *National Climate Change Council*. https://unfccc.int/sites/default/files/resource/Nigeria_LT-LEDS_01122023_240425_094617.pdf

National Development Plan (2021-2025)	Ministry of Finance Budget and National Planning	Short-term focus not aligning with long-term sustainability goals Potential conflicts with other sectoral policies
National Climate Change Policy (2021-2030)	Federal Ministry of Environment	Fragmented approach to climate change mitigation Overlapping with existing climate action plans
Climate Change Act 2021	Federal Government	Enforcement challenges Duplication with existing environmental regulations
Nigeria Economic Sustainability Plan (NESP) 2020	Federal Government	Short-term economic recovery focus may conflict with long-term climate goals Overlapping initiatives with other economic policies
National Action Plan on Gender and Climate Change (NAPGCC)	Federal Ministry of Women Affairs and Social Development	Lack of integration with broader climate policies Insufficient funding and resources for implementation



Social and Economic Inequities:

A just energy transition must consider the socioeconomic implications for communities dependent on the fossil fuel industry and communities that will adopt renewable energies. The oil and gas sector is a significant employer in Nigeria, and a rapid shift away from fossil fuels could lead to higher prices for basic goods, job losses and economic displacement. Ensuring a fair transition involves creating a safety net for low-income households, alternative livelihoods and retraining programs for affected workers. Currently, there is no holistic legal framework for a Just Energy Transition and there must be a greater push for communities to steer energy system changes.



Environmental Degradation:

Nigeria's heavy reliance on oil has led to severe environmental degradation, including oil spills, gas flaring, and deforestation. These environmental issues have not only harmed ecosystems but also affected the health and livelihoods of local communities. It is imperative to tackle these effects in light of the global energy transition movement, which may involve resource extraction for the manufacturing of renewable technology. Currently, large deposits of lithium have been discovered in five states: Kwara, Ekiti, Kogi, Nasawara and Cross River²⁵.

²⁵ Shemang, B., & Kaledzi, I. (2023, October 20). Nigeria taps into the global lithium market. *DW News* <https://www.dw.com/en/nigeria-taps-into-the-global-lithium-market/a-67135006>



Technological and Tariff Barriers:

Nigeria's adoption of renewable energy technologies is hindered by a lack of technical expertise and local manufacturing capabilities. Nigeria's solar off-grid market is highly dependent on Chinese-made products²⁶. Currently, there is no import fee on solar panels; however, when solar panels are imported as a bundle with other components such as lamps, fans, and TVs, the tariff duty might be between 5 and 20 percent²⁷. Finally, there is an abundance of low-quality imports from China due to weak product quality regulations²⁸.



Corruption and Governance Issues:

Corruption remains a significant challenge in Nigeria's energy sector, affecting everything from project approvals to the allocation of resources. BudgIT, a civic tech organization, has reported that Nigeria's 2024 budget has allocated N 732.5 billion for vague empowerment projects²⁹. Empowerment project spendings are difficult to track and have been used to channel funds to party followers³⁰. Weak governance and opaque financial handlings undermine efforts to allocate funding for sustainable energy projects and erode public trust.

By tackling these challenges, Nigeria can make significant strides toward a just energy transition, ensuring that sustainable development goes hand-in-hand with social equity. This requires coordinated efforts from the government, private sector, and international community to create a resilient and inclusive energy future.

²⁶ *Achieving Economies of Scale in the Nigerian Solar Value Chain: Opportunities and Benefits of Upstream Localization*. (2021). Page 18, <https://www.seforall.org/system/files/2021-02/Solar-Value-Chain-Project-SEforALL.pdf>

²⁷ *Achieving Economies of Scale in the Nigerian Solar Value Chain: Opportunities and Benefits of Upstream Localization*. (2021). Page 24, <https://www.seforall.org/system/files/2021-02/Solar-Value-Chain-Project-SEforALL.pdf>

²⁸ *Achieving Economies of Scale in the Nigerian Solar Value Chain: Opportunities and Benefits of Upstream Localization*. (2021). Page 18, <https://www.seforall.org/system/files/2021-02/Solar-Value-Chain-Project-SEforALL.pdf>

²⁹ Nwite, S. (2024, July 9). BudgIT Reveals N732.5 Billion Allocation for Vague Empowerment Projects in the 2024 Budget - Tekedia. *Tekedia*. <https://www.tekedia.com/budgit-reveals-n732-5-billion-allocation-for-vague-empowerment-projects-in-the-2024-budget/>

³⁰ Ibid



4. Opportunities for Renewable Energy in Nigeria

Despite the challenges, Nigeria possesses significant opportunities for advancing renewable energy, which can play a pivotal role in achieving sustainable development and social equity. Key opportunities include:



Abundant Renewable Resources:

Nigeria is endowed with vast renewable energy resources. The country has high solar irradiance, with an average of 5.5 kWh/m²/day, making it ideal for solar power generation (IRENA). An annual average of 1.804 × 10¹⁵ kWh of incident solar energy is recorded in Nigeria. The country's entire conventional energy resources are around 27 times more in energy units than this annual solar energy insolation estimate. This implies that Nigeria has plenty of potential to use solar energy for energy.³¹ In 2023, the Nigeria Sovereign Investment Authority (NSIA), in partnership with the Federal Government, Kano State Government and Kumbotso Local Government Area, has completed a 10 MW solar power plant in the Challawa Industrial Area³². In May 2024, NSIA and North South Power Company agreed to co-invest in a 20 MW Solar Hydro Hybrid project in Niger state³³. Additionally, Nigeria has substantial

³¹Off-Grid Energy Business Report. (2024). All-ON and Nextier, page 9, https://thenextier.com/wp-content/uploads/2024/05/All-On_Off-Grid_Business-Report.pdf?fbclid=IwZXhobgNhZWoCMTAAARoCOUz_ZnZ-dZ-j4v7N3DfHDneAkm7JRKIs-Y486MHRb4jGM9wbCq1Vfz8_aem_AWhzHTBYnn8l9do_xYhRCh9OwrZKSY4EAbB9Lt3BkDl7l9garFj9NoKtv3tFOwcrMoBfWA1a2FSVg9mG-zehRel

³²Kano Solar Project - NSIA. (2024, July 16). NSIA. <https://nsia.com.ng/portfolio/kano-solar-project/>

³³Rdmh. (2024, March 26). NSIA & NSP Sign Joint Venture Agreement to Co-invest in Nigeria's Pioneer 20MW on-grid Solar Hydro Hybrid Project. NSIA. <https://nsia.com.ng/the-nigeria-sovereign-investment-authority-and-north-south-power-company-limited-sign-joint-venture-agreement-to-co-invest-in-nigerias-pioneer-20mw-on-grid-solar-hydro-hybrid-project/>

wind energy potential, particularly in the northern regions, and untapped hydropower resources in its numerous rivers. The Niger River, Benue River, and Lake Chad Basin are the principal water resources with considerable hydropower potential³⁴. Given that geothermal energy may be produced in the Chad Basin, Ikogosi, Biu Plateau, and Jos Plateau, geothermal energy is one of the practical solutions available in Nigeria.³⁵



Economic Diversification:

Investing in renewable energy offers a pathway for Nigeria to diversify its economy away from oil dependence. By developing the renewable energy sector, Nigeria can create new industries, attract foreign investment, and foster economic resilience against global oil price fluctuations. Some of the investments in renewable energy are in hydrogen, biofuels, and solar power plants. Hydrogen Development in Nigeria is spearheaded by GIZ and two large-scale pilot projects have been launched in Akwa Ibom State and Ondo State. Metikon Engineering plans to build a decentralized green hydrogen project called Nsofang Hybrid Power Plant phase 2, which includes a mobile hydrogen power plant in Akwa Ibom State³⁶. Dunatos Technology Limited is developing a 50KWp Hybrid Solar PV, battery and hydrogen-based energy storage system at Araromi Seaside community of Ondo State³⁷. In Lagos state, Biodiesel Nigeria Limited, Avatar Energy Limited and Canrex Biofuel Limited refines biodiesel for three Mobile Network Service providers in Nigeria³⁸. The Global Energy Association reports in 2023 that Kaduna River will power Zungeru hydropower plant that has 700 MW total capacity³⁹. The other two equally impressive hydrogen power plants are 760 MW Kainjii located on the Niger River and 600 MW Shiroro located on the Kaduna River⁴⁰. Power generation from hydropower is 14.5 percent of the country's power generation in 2021⁴¹. Last but not least, the

³⁶ Nweke-Eze, C., & Gorre, J. (2023). *Green Hydrogen for Decentralised Energy Applications in Nigeria*, page 14, Retrieved August 1, 2024, from https://www.linkedin.com/posts/giz-nigeria-ecowas_h2upppnigeriadecentralizedenergyadvisoryreport-activity-7156302559828160513-BMKH/

³⁷ Ibid

³⁸ Hassan, A. B., & Ayodeji, O. V. (n.d.). Benefits and Challenges of Biodiesel Production in West Africa. *Nigerian Journal of Technology*, 38(3), 621–627. <https://doi.org/10.4314/njt.v38i3.12>

http://repository.futminna.edu.ng:8080/jspui/bitstream/123456789/4909/1/cvpp39_BenefitsandChallengesof%20Biodiesel.pdf

³⁹ Nigeria puts 700 MW Hydropower Plant into Operation. (2023, October). *Global Energy*. Retrieved August 1, 2024, from

<https://globalenergyprize.org/en/2023/10/20/nigeria-puts-700-mw-hydropower-plant-into-operation/>

⁴⁰ Ibid

⁴¹ Attabo, A. A., Ajayi, O. O., Oyedepo, S. O., & Afolalu, S. A. (2023). Assessment of the wind energy potential and economic viability of selected sites along Nigeria's coastal and offshore locations. *Frontiers in Energy Research*, 11. <https://doi.org/10.3389/fenrg.2023.1186095>

³⁴ Off-Grid Energy Business Report. (2024). *All-ON and Nextier*, page 10,

https://thenextier.com/wp-content/uploads/2024/05/All-On_Off-Grid_Business-Report.pdf?fbclid=IwZXhobgNhZW0CMTAAARoCOUz_ZnZ-dZ-j4v7N3DfHDneAkm7JRKls-Y486MHRb4jGM9wbCq1Vfz8_aem_AWhzHTBYnn8l9do_-xYhRCh9OwrZKSY4EAbB9Lt3BkDl7l9garFj9NoKtv3tFOwcrMoBfWA1a2FSVg9mG-2ehRel

³⁵ Okolie, S. T. A., Ozuor, O., Fakehinde, O., Ongbali, S. O., Fayomi, O. S. I., & Agu, F. A. (2019). Study of Nigeria geothermal energy resources' viability, brief production techniques and transportation. *Energy Procedia*, 157, 1475-1485.

<https://www.sciencedirect.com/science/article/pii/S1876610218312852/pdf?md5=667f60c6ed50afd75caaf87850aa0fea&pid=1-s2.0-S1876610218312852-main.pdf>

Rural Electrification Agency (REA) has launched the Renewable Energy Service Companies (RESCOs) model⁴². The RESCO model is providing a platform to developers who have the capacity to evolve into utility companies, attract investments and deploy solar mini grids⁴³. During the 2024 Energy Access Investment Forum (EAIF), REA and Husk Energy signed a partnership to deliver 250 MW of energy from decentralised renewable energy systems to underserved rural communities⁴⁴.



Job Creation:

The renewable energy sector has the potential to generate significant employment opportunities. From manufacturing and installation to maintenance and research, renewable energy projects can create jobs across various skill levels. This can help mitigate the economic impact of transitioning away from fossil fuels, particularly for communities reliant on the oil and gas industry. Power for All's Job Census in 2022 shows that the decentralized renewable energy sector (DRE) is expected to create 50,000 jobs in Nigeria⁴⁵.



Improved Energy Access:

Renewable energy technologies, such as off-grid solar systems and mini-grids, can provide affordable and reliable electricity to rural and remote areas. Expanding access to electricity through renewable energy can enhance the quality of life, improve healthcare and education, and stimulate local economies. A 2021 study of All-ON and Bain quantified how much healthcare, education and food security can benefit from improved energy access⁴⁶. Primary healthcare centers with solar power will reduce vaccine waste by 40 to 60 percent⁴⁷. Public secondary schools with rooftop solar systems studied 90 to 130 percent more at night compared to the control group and reported improved academic scores⁴⁸. Finally, farmers can reduce up to 80 percent of post harvest loss if they had solar-powered cold storage solutions⁴⁹.

In June 2024, the Rural Electrification Agency announced that it has completed 50kW solar hybrid systems for 100 healthcare centers across the country and completely handed over the systems to

⁴² REA Signs MoU with Five Renewable Energy Companies to Scale Up Electricity Access In Nigeria — Rural Electrification Agency. (2024, July 4). Rural Electrification Agency. <https://rea.gov.ng/rea-signs-mou-five-renewable-energy-companies-scale-electricity-access-nigeria/>

⁴³ Ibid

⁴⁴ REA Seals 250 MW Deal With Husk Energy to Delivery Sustainable Energy to Underserved Communities. (2024, May). Rural Electrification Agency. <https://rea.gov.ng/rea-seals-250mw-deal-husk-energy-deliver-sustainable-electricity-underserved-communities/>

⁴⁵ Skierka, K. (2022). Powering Jobs Census 2022: The Energy Access Workforce. PowerForAll. Page 28, <https://www.powerforall.org/application/files/3016/6324/8657/Powering-Jobs-Census-2022-914.pdf>

⁴⁶ Socio-economic case for Deploying Off-Grid Solar PV in Nigeria. (n.d.) All-ON.

https://www.all-on.com/media/publications/_jcr_content/par/textimage_1526415615_925717370.stream/1638346992149/eb7c154019eb5e6263180ff88dd7370d58373b3c/abridged-socio-economic-case-for-deploying-off-grid-solar-pv-in-nigeria.pdf

⁴⁷ Socio-economic case for Deploying Off-Grid Solar PV in Nigeria. (n.d.) All-ON. Page 27.

https://www.all-on.com/media/publications/_jcr_content/par/textimage_1526415615_925717370.stream/1638346992149/eb7c154019eb5e6263180ff88dd7370d58373b3c/abridged-socio-economic-case-for-deploying-off-grid-solar-pv-in-nigeria.pdf

⁴⁸ Socio-economic case for Deploying Off-Grid Solar PV in Nigeria. (n.d.) All-ON. Page 31.

https://www.all-on.com/media/publications/_jcr_content/par/textimage_1526415615_925717370.stream/1638346992149/eb7c154019eb5e6263180ff88dd7370d58373b3c/abridged-socio-economic-case-for-deploying-off-grid-solar-pv-in-nigeria.pdf

⁴⁹ Socio-economic case for Deploying Off-Grid Solar PV in Nigeria. (n.d.) All-ON. Page 52.

https://www.all-on.com/media/publications/_jcr_content/par/textimage_1526415615_925717370.stream/1638346992149/eb7c154019eb5e6263180ff88dd7370d58373b3c/abridged-socio-economic-case-for-deploying-off-grid-solar-pv-in-nigeria.pdf

three hospitals⁵⁰. REA plans to hand over the solar hybrid systems to 83 more health facilities in the future⁵¹.



Environmental Benefits:

Transitioning to renewable energy can significantly reduce greenhouse gas emissions and other pollutants, addressing environmental issues such as air pollution and climate change. This shift can also help preserve Nigeria's biodiversity and natural ecosystems, which are currently threatened by fossil fuel extraction activities. However, there is burgeoning worry about land rights, animal welfare, ecosystem damage, human welfare when building large scale solar farms, wind farms, and hydropower dams.



Technological Advancements:

Global advancements in renewable energy technologies have made them more efficient and cost-effective. Nigeria can leverage these technological innovations to deploy renewable energy solutions at scale. Additionally, local research and development can drive innovation and adaptation of technologies suited to Nigeria's specific conditions. Currently, Nigeria's startup ecosystem are hard at work mentoring entrepreneurs in the clean energy space with the most notable ones being CcHub, Wenvovation Hub, Greenhouse Capital, 8th Gear Hub, Venture Garden Group, Adaverse, ARM Lagos Techstars Accelerator, Trium, Enspire, and Orange Corners Nigeria⁵².



International Support and Financing:

There is growing international support for renewable energy development, with various financial mechanisms and grants available from organizations such as the World Bank, African Development Bank, and Green Climate Fund. Natural Resource Governance Institute (NGRI) lists the traditional funds available to Nigeria after signing the Paris Agreement: COP 15 \$100 Billion Annual Goal, COP 27 Loss and Damage Fund, and Green Bonds⁵³. The financing options outside of these traditional models are Just Energy Transition Partnerships (JETPs), Debt-for-climate swaps, and carbon taxes⁵⁴. In addition, there are initiatives by H2 Diplomacy by GIZ, Venture Capitalist Cross Boundary Energy Access, and the World Bank DARES program. Nigeria can tap into these resources to fund renewable energy projects and infrastructure development.

⁵⁰(N.d.). Addressing Nigeria's Public Health Issues through Solar Hybrid Systems – Nigeria Electrification Project. Rural Electrification Agency. <https://nep.rea.gov.ng/addressing-nigerias-public-health-issues-through-the-provision-of-solar-hybrid-systems/>

⁵¹ibid

⁵²Georgewill, U. (n.d.). *Top 10 Startup Incubators and Accelerators in Nigeria*. <https://startupgraveyard.africa/blog/top-10-startup-incubators-and-accelerators-in-nigeria>

⁵³Guidebook on Nigeria's Energy Transition.(2024, February).Natural Resource Governance Institute, page 10, <https://resourcegovernance.org/publications/guidebook-nigeria-energy-transition>

⁵⁴ Ibid



Government Initiatives and Policies:

The Nigerian government has introduced initiatives like the National Renewable Energy and Energy Efficiency Policy (NREEEP) and the Renewable Energy Master Plan (REMP) to boost renewable energy's share in the country's energy mix and attract investment. However, the implementation of these policies has been insufficient, hindering their intended impact.



Private Sector Participation:

There is increasing interest from the private sector in investing in Nigeria's renewable energy market. Public-private partnerships can drive the growth of the renewable energy sector, bringing in capital, expertise, and innovative business models to scale up renewable energy deployment. Starting in 2021, Stanbic IBTC financed \$100 million to local renewable energy companies over the course of the following three years⁵⁵. In May 2022, Sterling Bank launched [Imperium](#), an online platform that connects customers and solar power providers⁵⁶. On this platform, consumers can directly purchase, lease-to-own or buy solar power at a fixed monthly rate⁵⁷.



Capacity Building and Education:

Investing in capacity building and education can enhance the technical skills required for the renewable energy sector. Establishing training programs, vocational courses, and university degrees focused on renewable energy can develop a skilled workforce ready to support and sustain the industry's growth. Energypedia's 2022 list of institutions that offer training on off-grid systems in Nigeria contains twelve institutions⁵⁸.

By capitalizing on these opportunities, Nigeria can pave the way for a robust and sustainable renewable energy sector that promotes economic growth, social equity, and environmental stewardship. This transition can serve as a model for other countries in the region and contribute to global efforts to combat climate change.

⁵⁵Stanbic Bank lines up \$100m to fund renewables in Nigeria - Businessday NG. (2021, May 28). *Businessday NG*. <https://businessday.ng/energy/power/article/stanbic-bank-lines-up-100m-to-fund-renewables-in-nigeria/>

⁵⁶Petrova, V. Sterling Bank Launches Platform to Facilitate Solar Power Access. (2022, May) *Renewables Now*. <https://renewablesnow.com/news/nigerias-sterling-bank-launches-platform-to-facilitate-solar-power-access-786552/>

⁵⁷ Ibid

⁵⁸List of training institutions and material - energypedia. (n.d.). Energypedia. https://energypedia.info/wiki/List_of_training_institutions_and_material



5. Policy Recommendations

To achieve a just energy transition in Nigeria, it is imperative to implement policies that comprehensively address the intricate interplay of social, economic, and environmental factors. Based on a rigorous analysis, the following key policy recommendations are proposed:



Strengthen Regulatory Frameworks and their Implementation

- **Comprehensive Energy Policy:**

Develop and enforce a comprehensive national energy policy that integrates renewable energy targets, energy efficiency measures, and social equity considerations. This policy should align with international climate commitments and Sustainable Development Goals (SDGs).

- **Clear and Consistent Regulations:**

Establish clear, consistent, and supportive regulations for the renewable energy sector. This includes simplifying the permitting process for renewable energy projects, ensuring regulatory stability to attract long-term investments and setting up clear standards on renewable energy equipment imported into the country.

- **Implementation:**

Enforce the policies and regulations while transparently tracking implementation.



Promote Financial Mechanisms and Incentives

- **Financial and Tax Incentives:**

Provide financial and tax incentives such as Tax Holidays, Low Interest Loans, Subsidies, and Feed-in Tariffs⁵⁹ for renewable energy projects, particularly for solar, wind, and small-scale hydroelectric power. This can encourage private sector investment and lower the cost of renewable energy technologies.

- **Green Financing:**

Facilitate access to green financing through partnerships with international financial institutions, development banks, and private investors. Implement innovative financial instruments such as green bonds, grants, and concessional loans to support renewable energy projects.

⁵⁹APRI. (2024, July 30). *Energizing Africa – Enabling Private Sector Development in Renewable Energy* [Video]. Youtube. Retrieved July 30, 2024, from <https://www.youtube.com/live/kHZpRNoHyDk>



Invest in Infrastructure and Technology

- **Grid Modernization:**

Invest in modernizing and expanding the national grid to accommodate renewable energy sources and improve reliability. This includes upgrading transmission and distribution infrastructure and developing smart grid technologies.

- **Off-Grid Solutions:**

Promote off-grid and mini-grid solutions to extend electricity access to remote and rural areas. Support the deployment of decentralized renewable energy systems such as solar home systems and community-based mini-grids.



Support Workforce Development and Retraining:

- **Skill Development Programs:**

Establish training and retraining programs to equip workers with the green skills needed for the renewable energy sector. Collaborate with educational institutions, technical schools, and vocational training centers to develop curricula focused on renewable energy technologies.

- **Job Transition Assistance:**

Provide comprehensive support for workers transitioning from the fossil fuel industry to renewable energy. This includes job placement services, career counseling, and financial assistance during the transition period.



Enhance Community Participation and Empowerment

- **Community Involvement:**

Ensure that local communities are actively involved in the planning and implementation of renewable energy projects. This includes conducting consultations, obtaining community consent, honoring their land rights, and incorporating local knowledge and preferences.

- **Local Ownership Models:**

Promote community-owned renewable energy projects to ensure that the economic benefits stay within the community. Support cooperatives, local enterprises, and other community-led initiatives in the renewable energy sector.



Implement Environmental and Social Safeguards

- **Environmental Protection:** Enforce strict environmental regulations to minimize the ecological impact of renewable energy projects. Conduct thorough environmental impact assessments and promote sustainable land-use practices.

- **Social Safeguards:** Develop social safeguard policies to protect vulnerable populations and ensure that the transition does not exacerbate existing inequalities. This includes measures to address displacement, ensure fair compensation, and protect the rights of local communities.



Foster Research and Innovation

- **R&D Investment:**

Increase investment in research and development (R&D) to drive innovation in renewable energy technologies. Establish research centers and collaborate with universities and international partners to advance renewable energy solutions tailored to Nigeria's context.

- **Local Manufacturing:**

Support the development of local manufacturing capabilities for renewable energy components, such as solar panels and wind turbines. This can reduce dependence on imports, lower costs, and create local jobs.



Strengthen Institutional Capacity

- **Capacity Building:**

Enhance the capacity of government institutions to design, implement, and monitor renewable energy policies and projects. Provide training and resources to relevant ministries, regulatory bodies, and local governments.

- **Interagency Coordination:**

Foster coordination among various government agencies, departments, and stakeholders involved in the energy transition. Establish a central body or task force to oversee and streamline efforts across different sectors.



Promote Public Awareness and Education

- **Public Awareness Campaigns:**

Launch awareness campaigns to educate the public about the benefits of renewable energy and the importance of a just energy transition. Highlight success stories and best practices to build public support.

- **Educational Programs:**

Integrate renewable energy topics into school curricula and higher education programs. Encourage initiatives that promote environmental stewardship and sustainable energy practices among the youth.



Leverage International Cooperation

- **Global Partnerships:**

Engage in international cooperation to share knowledge, technology, and best practices. Participate in global initiatives and agreements aimed at promoting renewable energy and addressing climate change.

- **Technical Assistance:**

Seek technical assistance and capacity-building support from international organizations, donor agencies, and countries with advanced renewable energy sectors.

By implementing these policy recommendations, Nigeria can advance a just energy transition that promotes sustainable development, economic diversification, and social equity. This comprehensive approach ensures that the benefits of renewable energy are accessible to all segments of society, fostering a resilient and inclusive energy future.

6. Call to Action

As Nigeria stands on the verge of an energy revolution, it is crucial for all stakeholders—government, businesses, communities, and international allies—to unite for a fair and sustainable energy transition. This requires making renewable energy available, affordable, and beneficial for all Nigerians.

Investments in upgrading energy systems, improving regulations, and building strong public-private partnerships are essential. This approach will provide reliable and clean energy, create jobs, protect the environment, and ensure fairness for everyone.

The Nigerian government must implement a clear plan for this transition. Businesses should invest in innovative renewable energy projects that will drive a sustainable future. Involvement of communities and civil society groups is necessary to ensure the transition is inclusive and supports everyone, particularly the most vulnerable.

A collective effort can transform Nigeria's energy landscape, creating a prosperous, sustainable, fair, and just future for all Nigerians. Now is the time to act, utilize abundant renewable resources, and lead the way to a greener, more equitable future.