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The Nigeria's Energy Poverty: Challenges and Perspectives

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Abstract
Energy poverty remains one of the most pressing challenges to Nigeria's economic development, with profound implications for industrialization, social equity, production costs, and human capital formation. Despite being Africa's largest oil and gas producer, Nigeria paradoxically suffers from chronic electricity shortages, with approximately 45% of its population lacking access to grid power (World Bank, 2023) [32]. Previous research highlights that the shortcomings lie in Nigeria's inability to fully harness its readily available resources; there is a stark contrast in energy demand, which exceeds 19,798 MW, compared to the existing transmission capacity of 8,500 MW and its installed generation capacity of 14,000 MW, highlighting a clear disparity between demand and supply. This paper investigates the structural and institutional factors perpetuating energy poverty, including systemic corruption, infrastructure decay, and over-reliance on fossil fuels. Drawing on empirical data from the Nigerian Electricity Regulatory Commission (NERC), this study employs a mixed-methods approach to analyze the socioeconomic consequences of energy deprivation. The findings reveal that energy poverty exacerbates industrial inefficiency, constrains educational attainment, and deepens gender disparities. The paper concludes with policy recommendations aimed at fostering renewable energy adoption, enhancing grid decentralization, and strengthening governance in the power sector.

Keywords: Nigerian Electricity Regulatory Commission (NERC), Trillion Cubic Feet (TCF), Russia

Introduction

There is no universally acceptable meaning for energy poverty. According to the World Economic Forum (2010, as cited by Habitat for Humanity, n.d.), it is the lack of access to sustainable modern energy services and products. Beyond sustainability: energy poverty can be found in all conditions where there is a lack of adequate, affordable, reliable, quality, safe, and environmentally sound energy services to support development. Hence, this definition takes a holistic approach that extends beyond availability to the core of human well-being; to be energy poor falls within this bracket.

Nigeria's energy poverty remains a paradox because it has abundant natural resources, yet widespread energy shortages exist, highlighting the contradictions of underdevelopment in resource-rich economies. With proven natural gas reserves of approximately 210.54 trillion cubic feet (TCF), ranking within the top ten globally, and significant oil deposits (see Fig 1), Nigeria has the potential to be a global energy powerhouse (EIA, 2022) [7]. Yet, the country struggles with an electricity access rate of just 60.5% (see Fig 2), leaving over 90 million citizens without reliable power (IEA, 2023) [16]. This energy poverty stifles economic productivity, undermines social services, and perpetuates inequality, posing a significant threat to Nigeria's developmental aspirations.

In as much as scholarly discourse on energy poverty in Nigeria has largely focused on infrastructural deficits and policy failures (Adenikinju, 2008 [4]; Oseni, 2017). Fewer studies have systematically examined the intersection of governance failures, fossil fuel dependency, and their cascading effects on human development. This paper fills that gap by adopting a political economic framework, interrogating how institutional weaknesses and resource mismanagement perpetuate energy deprivation. The study also explores the gendered dimensions of energy poverty, highlighting how women and rural communities bear the brunt of this crisis.

Research Methodology

This study employs a mixed-methods research design, integrating quantitative data analysis with qualitative insights to provide a comprehensive understanding of Nigeria's energy poverty crisis.

- **Quantitative Data:** The research draws on secondary data from the World Bank, the Nigerian Energy Commission, the International Energy Agency (IEA), and the National Bureau of Statistics (NBS) to analyze trends in electricity access rates, power generation capacity, and energy consumption patterns. The Nigerian Electricity Regulatory Commission (NERC)'s annual reports (2015-2023) [20] were particularly instrumental in assessing grid performance and transmission losses.
- **Qualitative Insights:** Leveraging on existing sources, including journals, published papers, and academic resources to examine the localized effects of energy poverty. The first looks at Lagos, Nigeria's commercial capital, where urban energy disparity is reflected in striking differences between rich areas and informal settlements. The second focuses on rural Kano, where off-grid solar initiatives have shown that renewable energy can help bridge the electricity gap.
- **Theoretical Framework:** The study is anchored in Sovacool and Dworkin's (2014) [28] "Energy Justice" framework, which emphasizes equitable access, affordability, and sustainability. Additionally, the "Resource Curse" theory (Auty, 1993) [5] is applied to explain how Nigeria's oil wealth has paradoxically hindered its energy sector development.
- **Limitations:** The study acknowledges limitations, including data inconsistencies in government reports and the politicization of energy access statistics. Nevertheless, triangulation of multiple data sources mitigates these challenges.

Energy Poverty Situation in Nigeria

Nigeria's energy sector is diverse, but energy prices continue to grow due to poor supply; even with substantial energy resources and oil, importation is required to meet demand, as seen in Fig 3. In Nigeria, households and businesses spend over 10% of their income in trying to meet up with energy demand; be it cooking, road fuels electricity etc. Energy prices have been proportionately higher for industries and have direct impact on costs and competitiveness, especially for transport companies and energy intensive industries. Every economy, both developed and emerging depends solely on energy for effectiveness. The tariff by communication companies, cost of transportation, electricity to light up buildings and almost the cost of all economic activities has gone very high due to direct or indirect impact of cost of fuels to power economic activities (Obafemi & Ifere, 2014) [25].

According to the United Nations estimates (as cited in Obafemi & Ifere, 2014) [25], if nothing is done by 2030, about 900 million people will not have access to electricity, 3 billion people will still cook with traditional fuels, and 30 million people would have died due to smoke-related diseases. Additionally, hundreds of millions would have been confined to poverty due to lack of energy access.

Countries wishing to develop and become industrialized, must address their energy challenges and ensure that adequate energy goods and services are provided at affordable cost. (Agba, 2010) [2].

#	Country	Oil Reserves (barrels) in 2016	World Share
1	Venezuela	299,953,000,000	18.17%
2	Saudi Arabia	266,578,000,000	16.15%
3	Canada	170,863,000,000	10.35%
4	Iran	157,530,000,000	9.54%
5	Iraq	143,069,000,000	8.67%
6	Kuwait	101,500,000,000	6.15%
7	United Arab Emirates	97,800,000,000	5.93%
8	Russia	80,000,000,000	4.85%
9	Libya	48,363,000,000	2.93%
10	Nigeria	37,070,000,000	2.25%
11	United States	35,230,000,000	2.13%
12	Kazakhstan	30,000,000,000	1.82%
13	Qatar	25,244,000,000	1.53%
14	China	25,132,122,000	1.52%
15	Brazil	16,184,100,000	0.98%

Source: https://www.worldometers.info/oil/oil-reserves-by-country/

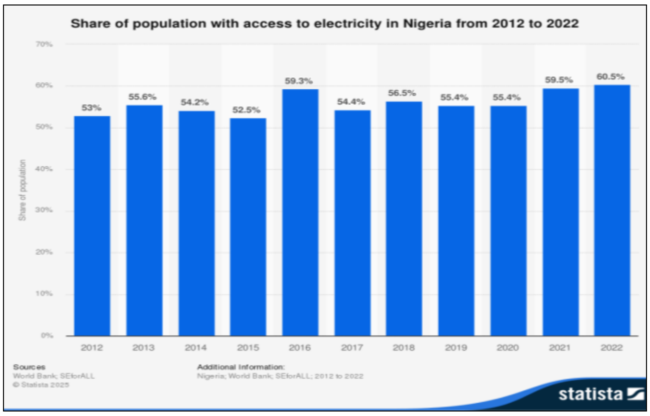
Fig 1: Oil Reserves by Country

Structural Drivers of Energy Poverty

1. Inadequate Infrastructure and Technical Inefficiencies

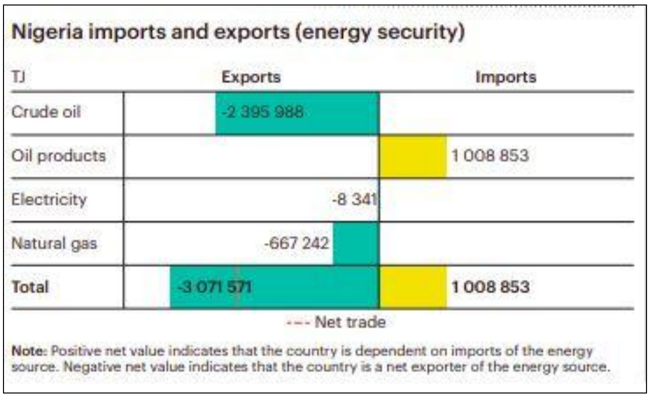
Nigeria's power sector is plagued by aging infrastructure and systemic inefficiencies. The national grid, with an installed capacity of 13,000 MW, delivers only 4,000–5,000 MW to end-users due to technical losses and vandalism (NERC, 2023) [20]. Transmission and distribution losses exceed 40%, one of the highest rates globally (IEA, 2022) [15]. This infrastructural decay is compounded by a lack of investment in grid maintenance and expansion, leaving rural areas disproportionately underserved.

The situation is even more dire in rural areas, where only about 35% of the population has access to electricity compared to around 70% in urban areas. For those without grid connections, kerosene lamps, candles, and diesel generators remain common alternatives, contributing to environmental degradation and posing health risks. The existing national grid infrastructure is outdated and incapable of meeting the growing demand for electricity. Transmission losses are high, and distribution networks often fail to reach rural communities. Investments in modernizing and expanding this infrastructure have lagged behind population growth and industrial needs. (EMRC Report, 2025) [10].



Source: https://www.statista.com/statistics/1307416/total-population-access-to-electricity-in-nigeria/

Fig 2: Share of Population with access to Electricity 2012-2022



Source: https://iea.blob.core.windows.net/assets/c0cba412-d48c-4712-9144-48f93bd9e277/CountryProfileNigeria.pdf

Fig 3: Nigeria's Energy Imports and Exports 2022

2. Governance Failures and Corruption

The Nigerian power sector has been a victim of chronic mismanagement and corruption. Despite the privatization of the Power Holding Company of Nigeria (PHCN) in 2013, the sector remains mired in inefficiency. A 2023 report by the Nigeria Extractive Industries Transparency Initiative (NEITI) revealed that over $16 billion allocated to power sector reforms between 1999 and 2023 had little tangible impact due to embezzlement and bureaucratic bottlenecks. The state-owned Nigerian National Petroleum Corporation (NNPC) exacerbates the problem by monopolizing energy resources and stifling competition.

From fraudulent contracts to bureaucratic red tape, the barriers to access must be dismantled and perpetrators held accountable (Ofoegbu, 2024) [26]. The Federal Audit report of 2001 revealed that, the Power and Steel sector lost in just a year more than 4 billion naira through misappropriation (Enuka, 2008) [9]. A national survey conducted in 2003 ranked the Power Holding Company of Nigeria (one of the key players in the Nigeria Energy Sector) as second most corrupt public institutions in the country after the Nigeria Police which ranked as the first (Adekeye, 2003) [1]. Sometimes corrupt staff of Power Holding Company of Nigeria cancel bills of customers after payment of between 40 to 50% of such bills as bribe (Okafor, 2008) [27]. This will continue to prevail because some of the key leaders in politics and administration are directly or indirectly involved in the misappropriation of funds of the sector. Contracts in the sector are awarded to politicians as compensation for political patronage. (Agba, 2010) [2].

Despite attempts to sanitize this sector, integrity is still absent more than 10 years after. The Independent Corrupt Practices and other Related Offences Commission (ICPC), arraigned the suspended Executive Director of Rural Electrification Agency (REA), Netufo Olaniyi Alaba and one Hassan Arivi Saddiq, for N15 million contract fraud. There are other fraud cases pending against four other staff members of REA, to the tune of N1.066,000,000. In March 2024, President Tinubu approved the suspension of the former CEO of REA, Ahmad Salihijo Ahamad and three directors, following corrupt allegation. (Alabi, 2025).

3. Over-Reliance on Fossil Fuels

Nigeria's energy mix remains heavily dependent on fossil fuels, particularly gas, which accounts for 80% of electricity generation (EIA, 2023) [8]. Paradoxically, gas flaring—the burning of excess natural gas during oil extraction, wastes approximately 300 million cubic feet of gas daily, enough to power 3 million homes (NDDC, 2021) [24]. This reliance on fossil fuels not only undermines energy security but also exacerbates environmental degradation, further marginalizing vulnerable communities.

According to the 2025 Energy Market and Rates Consultant reports, fossil fuel (oil and gas) accounts for both domestic consumption and export revenue. While these resources provide short-term economic benefits, they perpetuate an unsustainable energy model that neglects renewable alternatives.

Socioeconomic Consequences of Energy Poverty

1. Industrial and Economic Stagnation:

Energy poverty is a significant drag on Nigeria's industrial sector. Manufacturers spend up to 40% of operational costs on diesel generators, inflating production costs by 30% and rendering Nigerian goods uncompetitive (Lagos Chamber of Commerce and Industry, 2023) [18]. The resultant decline in industrial output has contributed to a 18% drop in foreign direct investment (FDI) in manufacturing between 2015 and 2023 (NBS, 2023).

2. Education and Healthcare Disruptions:

The lack of reliable electricity has dire consequences for human capital development. In rural areas, 60% of healthcare facilities lack consistent power, compromising vaccine storage and emergency medical services (WHO, 2022). Similarly, students in off-grid regions perform 25% worse on national examinations due to limited study time after dark (UNICEF, 2021) [31].

Akandel, Akindele and Owolabi found that Tertiary, Secondary and Primary Schools across the 19 wards in Ikorodu, Lagos State, Nigeria in both public and private institutions, with a total visit of 114 schools, 72% were present in energy-non poor communities, while the energy poor communities only host 28% of such institutions. This indicates that the owners of schools are attracted to locating schools and other training centers in areas that have more access to energy also the residents of non-poor communities have better economic status to pay for schools compared to energy poor residents generally, this indicates a high literacy level among residents from non-poor energy wards. The results show a higher impact of energy on education centers, which also conform to literature (Ashagidibi, as quoted in Akande, Akindele, & Owolabi, 2024) [3] submission.

Table 1: Relationship between energy poverty and standard schools in Ikorodu communities, Lagos State, Nigeria

Community	MEPI Energy Score	Estimated Energy score average for the last five years	Energy Availability	Number of standard schools present
Odogunyan	0.31	0.30	Energy non-Poor	9
Baiyeku/Oreta	0.28	0.27	Energy non-Poor	7
Erikorodu	0.29	0.28	Energy non-Poor	6
Ijede I	0.21	0.20	Energy non-Poor	8
Ijede II	0.19	0.18	Energy non-Poor	9
Ipakodo	0.24	0.23	Energy non-Poor	9
Isiu	0.27	0.26	Energy non-Poor	5
Agbala	0.26	0.25	Energy non-Poor	6
Ibeshe	0.25	0.24	Energy non-Poor	8
Agura	0.25	0.24	Energy non-Poor	7
Isele I	0.23	0.22	Energy non-Poor	9
Isele II	0.39	0.38	Energy Poor	6
Igbogbo I	0.44	0.43	Energy Poor	4
Igbogbo II	0.42	0.41	Energy Poor	4
Imota I	0.48	0.47	Energy Poor	2
Imota II	0.43	0.42	Energy Poor	2
Isele III	0.38	0.37	Energy Poor	2
Olorunda	0.37	0.36	Energy Poor	5
Aga/Ijimu	0.34	0.33	Energy Poor	6

Source: Akande, A.A., Akindele, A.A., & Owolabi, A.J.(2024) [3]. Socio-Economic Impacts of Energy Poverty on Households in Ikorodu Communities, Lagos State, Nigeria. Journal of Sustainability and Environmental Management, 3(2),66-77.

3. Gender and Social Inequality:

Energy poverty disproportionately affects women and girls, who spend an average of 10 hours per week collecting firewood for cooking—time that could otherwise be spent on education or income-generating activities (UNDP, 2020) [30]. The reliance on biomass fuels also exposes women to respiratory diseases, further exacerbating health disparities.

70% of female-owned small businesses report losses due to unreliable electricity and rising costs. Many women are scaling down operations or closing their businesses altogether (Mbelede, 2023) [19]. In rural areas, the impact is even worse, with some businesses shutting down completely due to frequent power outages (Nigerian Electricity Regulatory Commission, 2021) [21].

Pathways to Mitigation

1. Renewable Energy Integration

Nigeria must prioritize renewable energy sources, particularly solar, to diversify its energy mix. The country's solar potential is estimated at 485,000 MW, yet only 1% of this capacity is harnessed (IRENA, 2023) [17]. Initiatives like the Solar Naija Program, which aims to electrify 5 million households by 2030, represent a step in the right direction.

2. Decentralization and Mini-Grids

Decentralized energy systems, including mini-grids and microgrids, offer a viable solution for rural electrification. The success of off-grid solar projects in Kano demonstrates the potential of community-led energy solutions.

EM-ONE successfully commissioned a 1 MW solar power plant within the service area of Kano Electricity Distribution Company (KEDCO), an impressive pilot project with a 100 MWp development agreement between Bagaja Renewables and KEDCO. In fact, this is part of a larger effort to demonstrate the feasibility and benefits of interconnected mini-grids (IMGs) on a large scale in Nigeria. The project was a collaborative effort with Bagaja Renewables, backed by an investor consortium including the World Bank (through the Nigerian Electrification Project with the Rural Electrification Agency) and the Global Energy Alliance for People and Planet. Building over 200 MW through 100 interconnected mini-grids, bringing sustainable energy to potentially 25 million Nigerians.

3. Governance Reforms

Strengthening regulatory frameworks and combating corruption are critical to unlocking Nigeria's energy potential. Independent audits of the NNPC and stricter enforcement of energy sector contracts are essential to restoring public trust.

Conclusion

Energy poverty in Nigeria is not solely a technical issue but a manifestation of deeper governance failures and resource mismanagement. Addressing this crisis requires a multifaceted approach that combines renewable energy adoption, infrastructural investment, and institutional reforms. Without urgent action, Nigeria risks entrenching a cycle of underdevelopment that will hinder its economic ambitions for decades to come.

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