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Bridging Abundance and Access: Nigeria's Role in the Global Energy Transformation

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Abstract. Energy security is examined as a key component of national stability shaped by the interplay of geographic, political, and economic factors. Particular attention is given to its manifestations in the countries of the Global South, where structural vulnerabilities intersect with the growing demands of the global energy transition. Using Nigeria — one of Africa's largest hydrocarbon producers — as a case study, the analysis highlights a paradoxical situation: despite possessing substantial oil, natural gas, hydroelectric and solar energy reserves, the country continues to experience insufficient domestic energy supply and widespread energy poverty. This contradiction is indicative of deep-rooted institutional and infrastructural imbalances that prevent resource-exporting states from deriving sustainable developmental benefits from their natural wealth. Existing research on energy security tends to focus on discrete dimensions, such as supply stability, affordability, or technological modernization. However, such approaches often overlook the complex interaction of political, legal, infrastructural, and socio-economic factors that shape domestic energy access in resource-exporting economies. As a result, a significant research gap has emerged: insufficient attention has been paid to how countries such as Nigeria can enhance domestic energy availability while maintaining their strategic role in the global transformation of energy markets. The study places particular emphasis on inconsistencies in energy infrastructure, chronic shortages of long-term investment, and regulatory constraints hindering sustainable sectoral development. An integrated analytical framework is proposed, combining an assessment of the geopolitical dimensions of energy exports with an evaluation of domestic infrastructural capacity and a comparative analysis of other emerging resource-oriented economies. Methodologically, the research employs a mixed approach integrating quantitative and qualitative methods, including the analysis of primary and secondary data. This enables a more profound exploration of the causal linkages among resource abundance, institutional characteristics, and levels of public energy access. The findings provide a foundation for identifying Nigeria's strategic opportunities in fostering a just, sustainable, and inclusive energy transition — an objective of critical importance for the broader development trajectory of the African continent.

Key words: energy security, energy resources, energy insecurity, energy prospect, socio-economy development, energy diplomacy

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Disclaimer. The opinions expressed in this article are those of the authors. They do not purport to reflect the opinions or views of the editorial team.

Authors' contributions. K. Genesis: conceptualization, development of research methodology, data curation, manuscript draft preparation, study execution, editing of the manuscript and data visualization. I.F. Shiriiazdanova: conceptualization, development of research methodology, data curation, manuscript draft preparation, research supervision and review. Both authors have read and approved the final version of the article.

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Сочетание изобилия и доступности: роль Нигерии в глобальном энергическом переходе

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Аннотация. Рассмотрена энергетическая безопасность как ключевой элемент национальной стабильности, формируемой сочетанием географических, политических и экономических факторов. Наибольший интерес представляют системы энергетической безопасности стран Глобального Юга, где структурные уязвимости сочетаются с растущими требованиями глобального энергетического перехода. На примере Нигерии — одного из крупнейших производителей углеводородов в Африке — проанализирована парадоксальная ситуация: обладая значительными запасами нефти, природного газа, гидро- и солнечной энергии, страна продолжает сталкиваться с дефицитом внутреннего энергоснабжения и широко распространенной нехваткой энергии. Это противоречие указывает на глубинные институциональные и инфраструктурные дисбалансы, не позволяющие странам — экспортерам природных ресурсов извлекать устойчивые выгоды для собственного развития. Существующие исследования в области энергетической безопасности преимущественно акцентируют внимание на отдельных ее аспектах, таких как стабильность поставок, экономическая доступность или технологическая модернизация. Однако такие подходы зачастую игнорируют комплексное взаимодействие политических, правовых, инфраструктурных и социально-экономических факторов, определяющих внутренний доступ к энергии в государствах, ориентированных на экспорт ресурсов. В связи с этим выявляется существенный исследовательский пробел: недостаточно изучено, каким образом страны, подобные Нигерии, могут расширить внутреннюю энергетическую доступность, при этом сохранив свою стратегическую роль в глобальной трансформации энергетических рынков. Особое внимание уделено несоответствиям в энергетической инфраструктуре, хронической нехватке долгосрочных инвестиций и нормативно-правовым ограничениям, препятствующим устойчивому развитию сектора. Предлагается интегрированный аналитический подход, включающий оценку геополитических аспектов экспорта энергоресурсов, анализ внутреннего инфраструктурного потенциала и сопоставление опыта других государств с формирующейся рыночной экономикой и ресурсной ориентацией. Методологическая база исследования сочетает количественные и качественные методы, включая анализ первичных и вторичных данных, что позволяет глубже раскрыть причинно-следственные связи между изобилием ресурсов, институциональными особенностями и уровнем доступа населения к энергии. Полученные результаты формируют основу для определения стратегических возможностей Нигерии в обеспечении справедливого, устойчивого и инклюзивного энергетического перехода, имеющего критическое значение для дальнейшего развития Африканского континента.

Ключевые слова: энергетическая безопасность, энергетические ресурсы, энергетическая нестабильность, энергетическая перспектива, социально-экономическое развитие, энергетическая дипломатия, энергетическая бедность

Заявление о конфликте интересов. Авторы заявляют об отсутствии конфликта интересов.

Вклад авторов. Дженесис К.: концептуализация, разработка методологии исследования, обработка данных, подготовка черновика рукописи, выполнение исследования, редактирование рукописи и визуализация данных. Ширияздановa И.Ф.: концептуализация, разработка методологии исследования, обработка данных, подготовка черновика рукописи, научное руководство и рецензирование. Оба автора ознакомлены с окончательной версией статьи и одобрили ее.

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Introduction

The concept of a resource is inherently anthropocentric, as for any phenomenon or object to be considered a resource, it must be perceived as having value to humans. In this context, energy resources occupy a central position, serving as a fundamental basis for the functioning of all spheres of human activity.

Nigeria, located on the western coast of Africa and characterized by a diverse range of natural and climatic conditions, from arid to humid equatorial zones, possesses a significant endowment of natural wealth. The most prominent of these are its substantial reserves of oil and natural gas. Despite the availability of a broad spectrum of both renewable and non-renewable energy resources, a considerable proportion remains underexploited. One of the most underutilized renewable energy sources is solar energy, the potential of which is likely to remain largely untapped for the foreseeable future. The effective mobilization of these resources is critical for the national economy, as the most economically valuable minerals include crude oil, natural gas, coal, tin, and columbite. First discovered in 1957, oil has become a key source of government revenue and foreign exchange earnings (Ajao et al., 2021).

Despite its significant energy potential, Nigeria faces substantial challenges in strengthening its position within the global system, particularly in terms of socio-economic and infrastructural development, as well as military capacity. More than 70 % of the population still lacks access to electricity.[1] Globally, over one billion people — approximately 13 % of the world's population — are without electricity, with the majority residing in Africa and South Asia.[2] In sub-Saharan Africa, around 600 million people, constituting 57 % of the population, live without electricity, whereas in developing regions of Asia, the figure is 350 million, representing 9 % of the population.[3] Such domestic energy deficits significantly constrain economic development, exacerbate social inequalities, hinder infrastructure modernization, and limit the state's capacity to ensure energy sustainability in line with global standards.

[1] Cozzi L., Diarra N., Roge A., Idini B., Jongejans A. Access to Electricity Stagnates, Leaving Globally 730 Million in the Dark // IEA. October 9, 2025. URL: https://www.iea.org/commentaries/access-to-electricity-stagnates-leaving-globally-730-million-in-the-dark (accessed: 15.10.2025).

[2] SDG7: Data and Projections // IEA. November 15, 2024. URL: https://www.iea.org/reports/sdg7-data-and-projections (accessed: 01.12.2024).

[3] Decoding Africa's Energy Journey: Three Key Numbers // UN Sustainable Development Group. January 27, 2025. URL: https://unsdg.un.org/latest/stories/decoding-africa%E2%80%99s-energy-journey-three-key-numbers (accessed: 20.04.2025).

Nonetheless, the combination of energy potential and geographic positioning provides Nigeria with certain advantages amid the ongoing global energy transition. As the global economy shifts towards a low-carbon model, resource-rich countries are increasingly evaluated not only by their export capacity but also by their ability to ensure sustainable and inclusive domestic growth. Achieving these objectives would enable Nigeria to strengthen its national resilience and enhance its international appeal, thereby creating favourable conditions for energy cooperation and participation in technology transfer initiatives.

The escalation of the Russia — Ukraine conflict has further highlighted the need to reassess global energy policy, particularly in European countries seeking to reduce their dependence on Russian natural gas. In this context, Nigeria's energy potential assumes strategic significance as a possible alternative gas supplier: current data indicate that its natural gas reserves exceed 200 trillion cubic feet as of 2024, concentrated in strategically important gas corridors in West Africa (Oluku & Olori, 2025).

The European Union has demonstrated a clear intention to expand its cooperation with Nigeria, including the revival of projects such as the Trans-Saharan Gas Pipeline and the augmentation of liquefied natural gas imports from Nigerian terminals. However, the country's capacity in this sector is constrained by infrastructural limitations, security threats, and persistent political instability in the Niger Delta.

Meanwhile, Nigeria is developing energy partnerships with China and Russia: China is investing in gas transportation infrastructure, while Russia engages in negotiations with strategic energy companies, including Gazprom. Should Nigeria successfully navigate this complex diplomatic landscape and effectively address domestic challenges, it has the potential to provide Europe with a viable alternative, increase demand for its own energy resources, strengthen its bargaining position, and attract new investments. Ultimately, the country could transcend its role as a mere energy supplier and emerge as a significant geopolitical actor, influencing the formation of strategic alliances in Eurasia and Africa through the tools of energy diplomacy.

Methodology and Literature Review

This study employs a qualitative comparative policy analysis methodology aimed at critically assessing the state of Nigeria's energy security within a global context. The research draws upon a combination of primary and secondary sources, organized into three main categories: legal and institutional frameworks, scholarly research, and international statistical data. Key national energy documents were systematically reviewed, providing a foundation for understanding the country's regulatory obligations and institutional preparedness for the energy transition.

The study also synthesizes peer-reviewed literature produced by both Nigerian (Owebor et al., 2025; Ekechukwu & Eziefula, 2025; Owoeye et al., 2025) and international energy scholars. The literature emphasises the diversification of the energy mix and sustainable development (Oyedepo, 2012; Ajia, 2025; Dosunmu & Olanrewaju, 2024), the scalability of solar energy (Okeke, Izueke & Nzekwe, 2014), critiques of enforcement practices in energy-related legal violations (Akabuiro & Umeobika, 2020), as well as analyses of institutional deficiencies in energy sector governance, the evolving international gas market and its regulatory frameworks (Oyewunmi & Ehanmo, 2021).

Statistical data and comparative indicators were sourced from widely recognized international organizations, including the International Energy Agency (IEA), the Organization of the Petroleum

Exporting Countries (OPEC), the World Bank, and the United States Energy Information Administration (EIA). These datasets enable an assessment of Nigeria's performance in the broader context of global and regional energy transition trends, particularly among Global South nations, emerging economies, and countries dependent on fossil fuels.

The Concept of Energy Security and Insecurity

The lack of a universally accepted definition of energy security generates ambiguity and complicates the formulation of effective policy in this domain. This uncertainty stems from the multidimensional nature of the term, the meaning of which varies depending on the context.

Scholarly literature has sought to systematize existing definitions and to propose integrative frameworks that account for the various dimensions of energy security. However, the application of energy security indicators to assess policy impacts remains problematic, as regulatory measures often exert ambiguous effects on different metrics. The lack of a rigorous microeconomic basis in these indicators poses a significant challenge for policymakers seeking to evaluate and enhance energy security.

Parallel to this, research has developed on energy supply security, addressing issues such as accessibility and price stability. Some scholars advocate a more comprehensive approach that considers the impact of energy-related risks on economic and social well-being. Energy security may be influenced by geopolitical tensions, armed conflicts, natural disasters, and infrastructure disruptions, all of which can compromise energy supply chains.

The accessibility of energy resources constitutes another critical component of energy security, as high prices may restrict access and contribute to energy poverty, particularly among low-income households and communities. Equally important is the aspect of physical access, referring to the ability to connect to energy infrastructure, which is especially relevant for remote or underserved regions. According to the International Energy Agency (IEA), energy security is defined as "the uninterrupted availability of energy at an affordable price."[4] This implies the capacity of an energy system to meet individual, social, and economic needs without compromising national interests. Energy security encompasses the stability and diversification of energy supply sources, the prevention of service interruptions, and the management of issues related to energy production, distribution, and consumption. Stability in the energy system is a fundamental prerequisite for economic development and societal well-being. Conversely, energy insecurity refers to the lack of reliable, affordable, and sustainable access to essential energy resources, which remains a critical challenge for many countries and communities.

Overall, the various definitions of energy security converge on the objective of mitigating the risks that could disrupt the balance between energy supply and demand. Nevertheless, scholars propose different criteria for evaluating the severity and scope of energy threats. Such criteria include the speed, magnitude, duration, coverage, uniqueness, and predictability of their consequences. The scale of the impact may range from ensuring the continuity

[4] Energy Supply Security 2014: International Energy Agency // OECD. URL: https://www.oecd.org/content/dam/oecd/en/publications/reports/2014/08/energy-supply-security-2014_g1g4668f/9789264218420-en.pdf (accessed: 10.03.2024).

of services to maintaining economic stability and averting broader environmental and social repercussions. Although these criteria have primarily been applied to the continuity of goods supply, they can be adapted to assess any form of energy-related impact (Winzer, 2011, pp. 2–3).

According to the Managing Director of the Nigerian National Petroleum Corporation, the country's oil reserves exceed 32 billion barrels, making it the largest hydrocarbon producer on the African continent. In addition to 32.7 billion barrels of crude oil, Nigeria possesses over 165 trillion cubic feet of natural gas, including 75.4 trillion cubic feet of non-associated gas. Despite approximately 70 % of West Africa's energy resources originating from Nigeria, the country faces challenges in reliably supplying energy to the global market due to domestic infrastructure deficiencies and security concerns (Edomah, 2018).

Oil production in Nigeria commenced in 1956 at approximately 5,100 barrels per day, accompanied by the gradual expansion of energy infrastructure. Following its accession to OPEC in 1971, production steadily increased, reaching 2.32 million barrels of crude oil and condensate per day by 2019, at an average price of USD 60 per barrel. Since May 2020, production volumes have fluctuated significantly between 1.1 and 1.4 million barrels per day, resulting in a substantial reduction in monthly federal revenue.[5]

Nigeria's Energy Resources

Natural gas is the predominant source of electricity generation in Nigeria. As of 2023, approximately 79.5 % of the country's electricity was generated from this source (Table 1). Hydropower ranks second, accounting for around 20.4 % of Nigeria's electricity production.[6] Nigeria also possesses the largest natural gas reserves in Africa and is one of the countries with the largest proven reserves worldwide (Towler, 2013).

Table 1. **Share of Electricity Generation in Nigeria by Source in 2023, %**

Energy generation source	Distribution of electricity generation
Gas	79.46
Hydroenergy	20.37
Coal	0
Solar energy	0.12
Bioenergy	0.05
Other fossils	0

Source: compiled by K. Genesis and I.F. Shiriiazdanova based on: Share of Electricity Generation in Nigeria in 2023, by Source // Statista. URL: https://www.statista.com/statistics/1237541/nigeria-distribution-of-electricity-production-by-source/ (accessed: 31.10.2024).

[5] Nigeria: Overview // U.S. Energy Information Administration. 2023. URL: https://www.eia.gov/international/analysis/country/NGA (accessed: 11.06.2024).

[6] Share of Electricity Generation in Nigeria in 2023, by Source // Statista. URL: https://www.statista.com/statistics/1237541/nigeria-distribution-of-electricity-production-by-source/ (accessed: 31.10.2024).

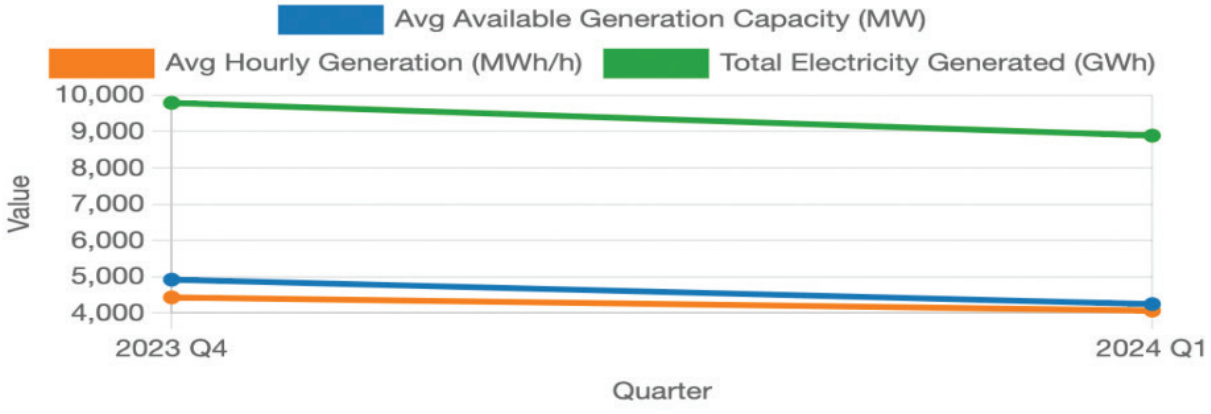

Figure 1. Electricity Generation Indicators in Nigeria, Q4 2023 — Q1 2024

Source: compiled by K. Genesis and I.F. Shiriiazdanova based on: Nigeria Electricity Production, 2005–2024 // CEIC Data. URL: https://www.ceicdata.com/en/indicator/nigeria/electricity-production (accessed: 10.11.2024).

Figure 1 illustrates a decline in electricity generation indicators from the fourth quarter of 2023 to the first quarter of 2024: the average available generating capacity decreased from 4,922.26 MW to 4,249.10 MW, representing a reduction of 13.68 %. The average hourly generation fell from 4,433.82 MW/h to 4,069.57 MW/h, a decline of 8.22 %. The total electricity output decreased from 9,789.87 GWh to 8,887.93 GWh, corresponding to a reduction of 9.21 %.[7]

Global Energy Trends

Global energy markets are undergoing a significant transformation as countries prioritize energy diversification, decarburization, and sustainable development. According to the International Energy Agency (IEA), global energy demand is expected to increase by 25 % between 2021 and 2040, primarily driven by developing countries, particularly in Africa.[8] The global energy transition and the expansion of renewable energy sources present both opportunities and challenges for Nigeria, one of the world's largest oil-producing nations. Despite having substantial oil reserves and ranking 16th globally in oil production,[9] Nigeria faces a paradox of abundant resources amid persistent energy shortages. The country's potential to enhance energy security in West Africa and globally is constrained by infrastructural deficiencies and inefficiencies in energy utilization.

As a major player in the global energy sector, Nigeria must leverage its significant renewable energy potential, including solar, wind, and hydropower, while aligning itself with international sustainability initiatives such as the objectives of the Paris Agreement. Projections for global renewable energy generation by 2030 highlight key milestones in the sector's development, indicating that renewable electricity production is expected to surpass coal, nuclear, and hydropower generation (Figure 2). In particular, wind and solar power generation are anticipated to experience substantial growth, with renewable electricity output forecasted to exceed 17,000 TWh by 2030, representing a significant increase compared to 2023 levels.

[7] Energy Sector in Nigeria — Statistics & Facts // Statista. August 19, 2024. URL: https://www.statista.com/topics/11022/energy-sector-in-nigeria/ (accessed: 01.10.2024).

[8] Global Energy Review 2025 // IEA. URL: https://www.iea.org/reports/global-energy-review-2025 (accessed: 12.10.2025).

[9] Ajayi F. Meet Africa's Top 10 Oil Producers // Shore.Africa. November 27, 2024. URL: https://shore.africa/2024/11/27/top-ten-oil-producers-in-africa-2024/ (accessed: 12.10.2025).

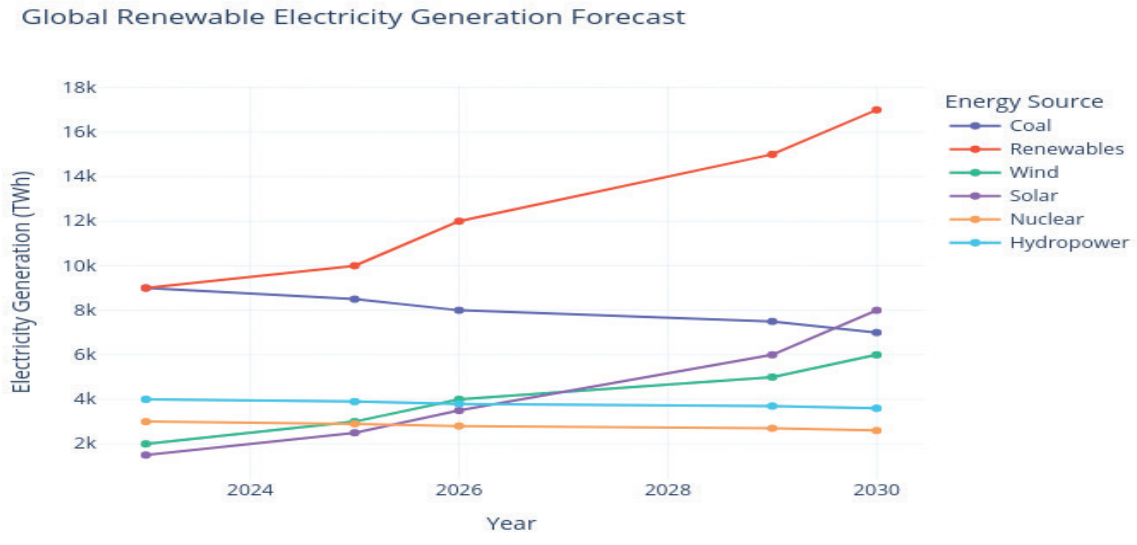

Figure 2. Global Renewable Energy Production Forecast to 2030

Source: compiled by K. Genesis and I.F. Shiriiazdanova on the basis of data: Share of Renewable Electricity Generation by Technology, 2000–2030 // IEA. December 18, 2023. URL: https://www.iea.org/data-and-statistics/charts/share-of-renewable-electricity-generation-by-technology-2000-2030 (accessed: 10.11.2024).

Currently, regional disparities in the utilisation of renewable energy sources (RES) are shaped by economic conditions, infrastructural challenges, and political frameworks. The Global South, in particular, faces substantial obstacles in scaling up renewable energy solutions due to underdeveloped infrastructure and limited investment in the sector. Countries in this region (excluding China) receive only 15 % of the USD 2 trillion allocated for clean energy investments. In contrast, countries such as China are positioning themselves as leaders in renewable energy deployment, accounting for 60 % of the global growth in 2023.[10]

Meanwhile, regions such as Europe and North America also encounter significant challenges, including high costs and unresolved issues within supply chains.

As illustrated in Figure 3, Asia leads in the deployment of renewable energy sources (RES), producing approximately 8,000 TWh. This reflects substantial investments and technological advancements in renewable energy, particularly in countries such as China and India. Europe follows, with a production level of around 4,000 TWh, underpinned by a robust political framework and the strong commitment of European governments to the principles of sustainable development. In North America, RES generation stands at 3,000 TWh, with ongoing efforts to transition to cleaner energy sources. In contrast, South America and Africa exhibit lower rates of RES deployment, with approximately 2,000 TWh and 1,500 TWh, respectively. These figures suggest that challenges such as inadequate infrastructure and limited investment are present. It is noteworthy, however, that Africa possesses 40 % of the world's reserves of cobalt, manganese, and platinum, which are critical for the energy transition. Nevertheless, the continent faces significant obstacles — including financing shortages, insufficient infrastructure, and political instability — that constrain the pace of renewable energy adoption compared with other regions.[11]

[10] World Energy Investment 2024 // IEA. URL: https://iea.blob.core.windows.net/assets/60fcd1dd-d112-469b-87de-20d39227df3d/WorldEnergyInvestment2024.pdf (accessed: 04.05.2025).

[11] Khoza S. Africa's Steady Race Towards Renewable Energy Sources // Global Energy Alliance. March 12, 2024. URL: https://energyalliance.org/africas-steady-race-towards-renewable-energy-sources/ (accessed: 11.10.2024).

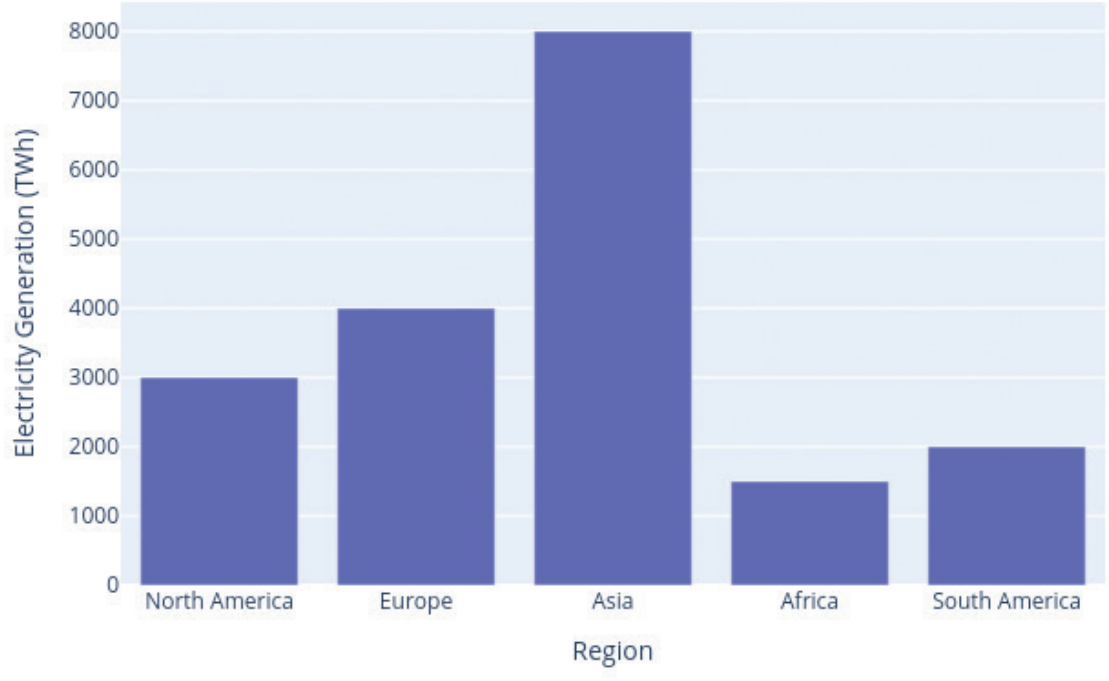

Figure 3. Regional Renewable Energy Generation in 2025

Source: compiled by K. Genesis and I.F. Shiriiazdanova based on: (Chen, 2025, p. 244).

Table 2. **Deployment of Renewable Energy Sources in Selected African Countries, 2024–2025**

Country	Year	Share of Renewables, %	Share of hydropower generation,%	Solar energy, MW	Wind energy, MW
Kenya	2024	89	17	350	310
	2025	89	18	350	310
Egypt	2024	22	11	2500	1600
	2025	28	11	2700	1800
South Africa	2024	12	1	2700	4600
	2025	14	1.2	2900	4800
Angola	2024	6	2.5	500	0
	2025	6.8	4	600	0

Source: compiled by K. Genesis and I.F. Shiriiazdanova based on: (Alex-Oke et al., 2025, p. 59).

Based on the data presented in Table 2, it can be asserted that Kenya and Angola both possess renewable energy systems, albeit with differing compositions: while Kenya employs a combination of geothermal and hydroelectric power,[12] Angola relies exclusively on hydroelectric energy.[13] Egypt and the Republic of South Africa (RSA) are actively expanding their solar and wind energy projects; however, the overall penetration of renewable energy in these countries remains limited due to their substantial dependence on fossil fuels. According to current projections, by the end of 2025, the RSA is expected to lead in installed capacity,[14] Kenya will top the list of African countries in terms of the share of renewables in total energy production, Egypt is anticipated to demonstrate balanced growth,[15] and Angola is likely to remain predominantly reliant on hydroelectric power (Alex-Oke et al., 2025, pp. 2–15).

Global Policy Alignment and the Energy Transition

Energy policy across nations, particularly in sub-Saharan Africa, is becoming increasingly aligned with the global Sustainable Development Goals (SDGs), notably SDG 7, which aims to ensure universal access to affordable, reliable, and modern energy services by 2030.

The geopolitical significance of energy resources is paramount. Countries endowed with substantial energy reserves, such as Nigeria, have the potential to influence global energy supply chains. For example, the energy transition in Africa is critical for mitigating threats to global energy security, as regions such as Europe and Asia seek to diversify their energy imports. Nigeria's strategic position in the Gulf of Guinea, coupled with its participation in the African Continental Free Trade Area (AfCFTA), provides opportunities for energy trade and collaboration with other continental states, potentially enhancing regional energy stability and security.

Nonetheless, domestic political realities — including persistent security challenges, underdeveloped infrastructure, endemic corruption, and ongoing intercommunal violence — alongside geopolitical factors such as security threats in the Niger Delta, regulatory risks, and economic vulnerability to fluctuations in global oil prices, must be addressed to strengthen Nigeria's energy security at both regional and international levels. At present, these factors impede the country's capacity to fully realize its energy transition potential, significantly limiting its ability to maintain high levels of oil production and allocate sufficient resources to infrastructure development and institutional reform.[16]

[12] Kenya Energy & Petroleum Statistics Report. Financial Year 2023/2024 // Energy & Petroleum Regulatory Authority. URL: https://www.epra.go.ke/sites/default/files/2025-03/Bi-Annual%20Energy%20%26%20Petroleum%20Statistics%20Report%202024_2025.pdf (accessed: 15.11.2025).

[13] National Strategy for Renewable Energies // Ministry of Energy and Water (MINEA-Angola). January 7, 2019. URL: https://www.minea.gov.ao/index.php/component/content/article/19-destaque/137-national-strategy-for-renewable-energies (accessed: 15.11.2025).

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[15] Al-taqrir al-sinwaa lil-sharikat al-qabidat li kahraba' misr 2023/2024 [Egyptian Electricity Holding Company Annual Reports 2023/2024] // Wizarat al-kahraba' wa at-taqat al-mutajaddida. Jumhuriyyat misr al-arabiyya [Ministry of Electricity and Renewable Energy of the Arab Republic of Egypt]. (In Arabic). URL: http://www.moee.gov.eg/test_new/PDFReports/24-05-2025-154065Arr.pdf (accessed: 15.11.2025).

[16] National Energy Policy. Revised Edition. April 27, 2022 // Energy Commission of Nigeria. URL: https://energy.gov.ng/Energy_Policies_Plan/APPROVED_REVISED_NEP_2022.pdf (accessed: 12.04.2024).

Nigeria's national energy policy focuses on diversifying energy sources, improving access, and reducing carbon emissions. The government's energy transition plan emphasizes gas development, increasing the share of renewables, and enhancing energy efficiency. International climate agreements, such as the Paris Agreement, exert pressure on nations to transition to low-carbon economies. While Nigeria has made progress in diversifying its energy sources, further efforts are required to align the energy sector with climate objectives. In 2021, Nigeria committed to reducing emissions by 20 % below the business-as-usual level by 2030 unconditionally, or by up to 47 % with international support.[17] Achieving these targets necessitates substantial investment in clean energy infrastructure and the strengthening of regional cooperation to ensure universal access to sustainable energy.

The activities of illegal armed groups (despite an amnesty programme offering education and employment in exchange for disarmament), illicit hydrocarbon trading, and ethnic conflicts pose threats to Nigeria's energy security by potentially disrupting the continuous supply from the Niger Delta, the country's primary source of hydrocarbons since 1956. Nepotism and bureaucratic inefficiency hinder necessary structural reforms. A 2014 audit revealed that corruption and theft had resulted in approximately USD 20 billion in lost oil revenues, with estimates suggesting that since 1960, around USD 400 billion has been siphoned off through networks of militias, commanders, businesspeople, corrupt politicians, and military personnel (Rexer, 2022, p. 7).

In recent years, as part of energy import diversification, Nigeria has actively procured petrol and diesel internationally, despite efforts to expand domestic refining capacity to meet energy needs. Key suppliers include Belgium, India, the Netherlands, Malta, the Russian Federation, Saudi Arabia, South Korea, Norway, the United Kingdom, and others.[18] At the same time, as an OPEC member heavily reliant on regular crude oil deliveries, Nigeria possesses only four ageing refineries, which produce less than the required output.[19]

The development and implementation of a comprehensive long-term energy transition plan requires a strong commitment to its principles, effective coordination, and resilient institutional structures. This is particularly critical in several key areas. First, electrification using renewable energy sources requires the coordinated and strategic deployment of technologies to ensure reliability and efficiency. Power plants must be equipped with appropriate technologies, and organizational measures must be in place to facilitate the timely implementation of new energy solutions. Second, a well-structured financial framework is essential to support the energy transition, including the redistribution of incentives and the promotion of investment in low-carbon technologies (Alagoz & Alghawi, 2023). Third, programmes and measures are required to enhance access to finance, stimulate innovation, and promote economic growth.

[17] Nigeria: Paris Agreement Targets // Climate Action Tracker. October 22, 2021. URL: https://climateactiontracker.org/countries/nigeria/2021-10-22/targets/ (accessed: 10.10.2024).

[18] Nigeria Petroleum Oils etc. (excl. Crude); Preparation Imports by Country in 2023 // World Integrated Trade Solution. URL: https://wits.worldbank.org/trade/comtrade/en/country/NGA/year/2023/tradeflow/Imports/partner/ALL/product/271000 (accessed: 10.10.2024).

[19] Dzirutwe M. Nigeria Commissions Dangote Refinery, Seeks to End Fuel Imports // Reuters. May 22, 2023. URL: https://www.reuters.com/world/africa/nigeria-commission-dangote-refinery-crude-supply-concern-2023-05-22/ (accessed: 12.04.2024).

Additionally, raising awareness among consumers and citizens is crucial to securing public support for transition-related initiatives and improving policy implementation effectiveness (Bamisile et al., 2021). Collectively, technological, financial, political, and social measures form a coherent strategy for advancing the energy transition, ensuring the stability of the energy system and supporting sustainable development.

The analysis of Nigeria's total energy consumption from 2018 to 2040, based on various scenarios (Figure 4), indicates a sustained upward trend, reflecting the country's economic development prospects. Projections from *2040 Africa Case* corroborate the anticipated increase in energy demand under the prevailing political and economic conditions. This is of critical importance for assessing Nigeria's future energy requirements and for formulating policies capable of addressing both domestic and regional energy challenges.

A series of strategic measures is recommended to enhance Nigeria's energy security and support sustainable development:

1. Diversification of energy consumption: Nigeria should promote investment in renewable energy sources, including solar, wind, hydro, and biomass, in order to reduce its dependence on fossil fuels and strengthen system resilience,

2. Investment in electricity infrastructure: This includes generation, transmission, and distribution, which is essential to improving the reliability, efficiency, and accessibility of electricity nationwide,

3. Establishment of clear and consistent regulatory frameworks: Such frameworks can stimulate investment, foster innovation, and support the sustainable development of the energy sector,

4. International cooperation: Engagement with partners, organisations, and agencies provides Nigeria with access to technical expertise, financing, and best practices, while participation in global initiatives enhances the country's credibility and supports the objectives of the energy transition.

The comprehensive implementation of these measures, encompassing technological, financial, regulatory, and diplomatic dimensions, constitutes a strategic approach to managing the growing energy demand, ensuring energy security, and facilitating an inclusive and sustainable energy transition in Nigeria.

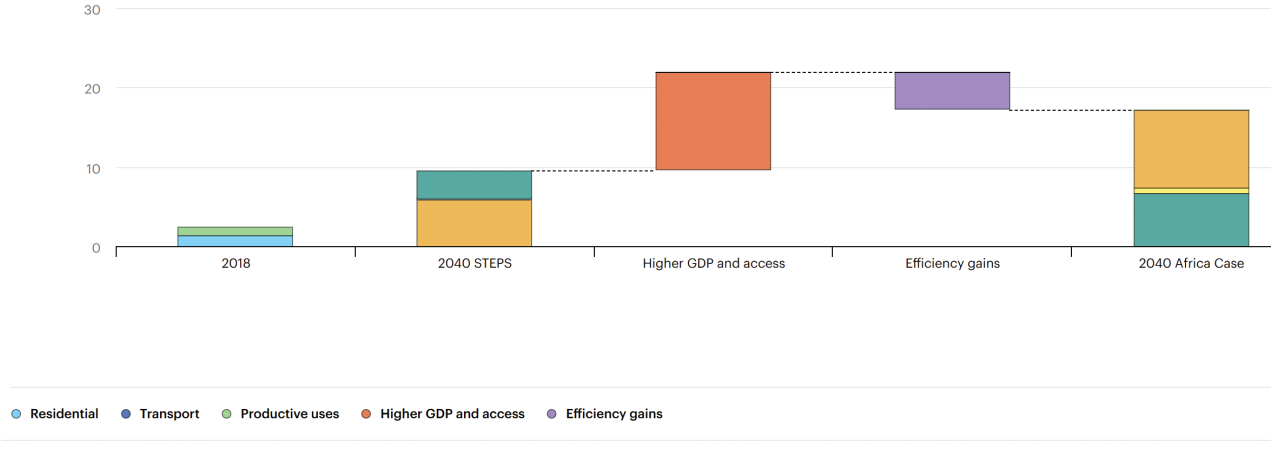

Figure 4. The Projected Energy Consumption in Nigeria, 2018–2040

Source: Electricity Final Energy Consumption in Nigeria by Scenario, 2018–2040 // IEA. URL: https://www.iea.org/data-and-statistics/charts/electricity-final-energy-consumption-in-nigeria-by-scenario-2018-2040 (accessed: 12.10.2024).

Challenges and Prospects of the Global Energy Transition in the Context of World Politics

The global energy transition is reshaping the geopolitical landscape by shifting influence from traditional fossil-fuel giants to emerging actors controlling renewable resources and technologies. While this transition promises environmental sustainability and energy security, it also presents multifaceted challenges. A primary driver of this global energy shift is the 2015 Paris Agreement, an international treaty that recognizes climate change as an urgent global emergency. It obliges signatory states to take immediate climate action, particularly by transforming their energy systems to reduce carbon dioxide emissions. The Agreement has triggered a wave of political reforms and the adoption of innovative strategies across nations, reinforcing the centrality of the energy transition in achieving long-term climate objectives.

Countries in Africa and the Middle East, as well as the Russian Federation, which are heavily dependent on fossil fuels, face economic vulnerability as global demand increasingly shifts towards renewable energy sources, compelling them to pursue economic diversification. Additionally, states endowed with significant renewable energy potential or critical minerals, such as lithium and cobalt, particularly in Africa, Latin America, and Asia, may gain geopolitical influence. However, the realisation of this potential is constrained by governance challenges and infrastructural deficiencies. Furthermore, "green protectionism," exemplified by the European Union's Green Deal, may provoke trade disputes, while cyber threats to decentralized energy infrastructure raise new security concerns.

Despite these obstacles, the transitional period presents opportunities to establish multilateral alliances, such as the International Solar Alliance, and to reconsider global cooperation paradigms based on equitable and sustainable energy systems.

Table 3 presents the results of a comparative analysis of energy transition strategies adopted by key global and regional energy sector actors — the United States, the European Union, China, and Nigeria.

Table 3. **Comparative Analysis of Energy Transition Strategies: USA, EU, China, and Nigeria**

Country	Energy Policies	Production Capacities	Technological Advancements	Potential for collaboration
United States	Significant investments in clean energy (USD 369 billion)	Focus on electric vehicles and renewable components	Leading in green technology production	Geopolitical competition may hinder collaboration
European Union	*Fit for 55* initiatives aiming for climate neutrality by 2050	Investments in hydrogen, offshore wind, grid modernization	Investments in clean energy technologies	Potential for international cooperation on climate goals
China	Largest producer of solar panels, leveraging supply chains	Dominates solar panel and battery production	Strengthening global leadership in clean energy tech	Risk of supply chain disruptions due to geopolitical tensions
Nigeria	Diversifying energy sources, attracting investments in renewables	Rich in fossil fuels, aiming for 30 % renewable capacity by 2030	Exploring partnerships for clean energy technology	Opportunities for collaboration in energy transition

Source: compiled by K. Genesis and I.F. Shiriiazdanova based on: World Energy Investment 2024 // IEA. URL: https://iea.blob.core.windows.net/assets/60fcd1dd-d112-469b-87de-20d39227df3d/WorldEnergyInvestment2024.pdf (accessed: 04.05.2025).

Conclusion

Addressing Nigeria's energy challenges requires strategic frameworks that delineate priority development areas, alongside comprehensive measures for sectoral reform, infrastructure investment, and the expansion of renewable energy sources. The effective management of the energy transition necessitates the integration of national goals and commitments into all long-term planning, including technology regulation, the phased reduction of fossil fuel subsidies, and a thorough assessment of the social and economic impacts. Energy planning must consider diverse transition pathways, encompassing electrification, the deployment of new technologies, and the development of critical infrastructure, such as clean gas, biomass, and solar energy.

Nigeria is at a critical juncture in its energy development: possessing substantial fossil fuel reserves and significant renewable energy potential, the country is well-positioned to play a decisive role in Africa's energy landscape and to make a meaningful contribution to the continent's global low-carbon transition. Addressing energy insecurity requires balancing domestic electricity needs with energy exports, while simultaneously investing in cleaner and more sustainable energy sources. International cooperation can enhance supply chain stability, and collaborative initiatives can ensure domestic energy access while supporting the achievement of global energy transition objectives.

Amid the gradual global shift towards renewable energy, Nigeria has a unique opportunity to establish itself as a regional energy leader and a key participant in international efforts to achieve the Sustainable Development Goals. The role of government and political institutions is critically important: the effective implementation of renewable energy transitions will enable the diversification of the energy mix, strengthen energy security, and support sustainable economic growth.

Significant obstacles, including infrastructural limitations, the social and economic ramifications of subsidy reductions, and the need to integrate renewable energy, require carefully structured strategic governance. By adopting appropriate measures at both policy and civil society levels, Nigeria can leverage its energy resources to stimulate national development, generate investment opportunities, and reinforce infrastructure.

Finally, there is a global consensus that the challenges of rising energy demand, climate change, and energy price volatility can be addressed through the development of renewable energy. Failure to follow these recommendations risks perpetuating the "resource curse," characterised by dependence on fossil fuel exports alongside insufficient domestic electrification, which may exacerbate social inequality and political instability. Therefore, resolving issues of energy security, environmental protection, and sustainable economic development is therefore pivotal to advancing renewable energy in Nigeria.

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