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Nigeria's Energy Transition Plan and Sustainable Development Goal 7: Assessing Policy Alignment and Implementation Gaps

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Abstract **Original Research Article**

Nigeria is grappling with two energy challenges, access to affordable and reliable energy and minimizing environmental and economic vulnerabilities arising from reliance on fossil fuels. The Federal Government responded with the Nigeria Energy Transition Plan (ETP) which is a long-term plan to tackle energy poverty, encourage renewable energy and lower emissions to achieve net-zero emissions by 2060. This study evaluates the degree of alignment of the ETP with Sustainable Development Goal 7 (SDG 7) and specifically focuses on the interlinkage between ETP and universal energy access, renewable energy integration and energy efficiency and implementation capacity. The study used a mixed methodology that included a structured survey of 150 stakeholders that included policy makers, energy professionals and developers, semi-structured interviews of 12 key informants and secondary data from international and national energy sources. Descriptive statistics, analysis of variance (ANOVA), correlation analysis and thematic analysis were used. The internal consistency of the survey instrument was relatively high with Cronbach's α ranging from 0.87 to 0.89. Results show that the alignment of ETP with SDG 7 (universal access to energy) and SDG7b (increase in the share of renewable energy) is relatively high with mean scores of 4.00 and 4.05 respectively. But, the alignment is relatively low in energy efficiency with a mean score of 3.30. Renewable energy is seen as being key to the transition, and solar energy had the highest mean score of 4.20. The most significant implementation issues were the funding shortages (mean = 4.50), poor grid infrastructure (mean = 4.30), regulatory incoherence (mean = 4.20), political and institutional constraints (mean = 4.17), and poor local technical capacity. Private Sector Involvement, international climate finance, regulatory reform and technical capacity building were deemed as significant opportunities, however. The study finds the conceptualization of Nigeria's ETP is well aligned with SDG 7, but there is a significant implementation gap between the policy ambition and delivery. It suggests a holistic architecture for implementation focusing on sustainable financing, decentralization of renewable energy generation, grid modernization, regulatory coherence, and energy-efficiency goals, along with technological capacity at local level and inclusive governance.

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Introduction

Energy is a key factor in economic growth and development, technology and innovation and environmental sustainability (Sadiq et al., 2025). Energy is essential for industry, education, health care, transportation, agricultural production and provision of critical public services, and is reliable and affordable. Access to sustainable modern energy is thus an important prerequisite for broader development goals and a development priority in itself (Al-Amin et al., 2025). Affordable, reliable, sustainable and modern energy for all is the Sustainable Development Goal (SDG 7) set in the United Nations (UN) 2030 Agenda for Sustainable Development. It has universal access to electricity and clean cooking,

increased use of renewable energy and improvements in energy efficiency as its main priorities (United Nations, 2015). However, ambition for achieving these goals has been uneven, especially in Sub-Saharan Africa, where a reliance on traditional energy services, including energy poverty, constrained investment potential, population growth, and insufficient infrastructure continue to limit access to modern energy services (International Energy Agency et al., 2025).

Nigeria is a relevant example that can be used to explore the linkage between energy transition policies and sustainable development. Nigeria offers a valuable example that can be utilized to analyze the connection between energy transition policies and sustainable development (Malabu et al., 2025). The nation has major problems with access to electricity, access to clean cooking technologies, and the reliability of electricity supplies, despite its vast oil and natural gas reserves and its potential for solar, hydro, wind, and biomass energy. All of these problems are experienced by households, businesses, public institutions and productive sectors in the economy. Many households also face the health and environmental risks of dependence on traditional fuels and sources of energy, and the pressure on forest resources (Odenu et al., 2025; Olusola et al., 2025). This situation points to the paradox of Nigeria being a fully-fledged hydrocarbon-producing nation while many parts of the populace continue to grapple with energy access challenges (Ismail et al., 2026). Policies that create more opportunities for access to modern energy services while ensuring affordability, reliability, environmental protection, and inclusive economic growth, are needed to address this contradiction (International Energy Agency et al., 2025; Federal Government of Nigeria, n.d.).

Nigeria finds itself in a complex situation in the global landscape of energy, with opportunities and challenges to the way it deals with these concerns. These developments, which include advances in renewable-energy technologies, decreasing PV system costs, battery storage and mini-grid solutions, have opened up new opportunities to boost electricity access and cut reliance on high-emission energy sources. International climate agreements and new market mechanisms for climate finance have also provided impetus to the investment in more environmentally friendly energy systems. Switching to more sustainable forms of energy, however, will require significant investment, good institutions, the right technologies, policies and long-term planning. The economic transition should also be considered in terms of jobs, government revenue, energy security, industrial competitiveness, and energy cost for households for oil and gas-producing economies which rely heavily on oil and gas revenues. The Intergovernmental Panel on Climate Change (2022) highlights the need for coordinated changes in energy systems, infrastructure, technology and investments to achieve significant emissions reductions. So, Nigeria's energy transition should also consider environmental goals and energy poverty reduction while taking into account the nation's development needs.

To meet these challenges, the Federal Government of Nigeria has adopted Nigeria Energy Transition Plan (ETP), a country-based strategy that leverages evidence and addresses energy poverty with long-term emissions reductions and economic development goals. The plan takes a step towards carbon neutrality by 2060 and emphasizes five main sectors: power, cooking, transport, oil and gas, and industry. It aims to increase access to modern energy services, lower poverty, foster economic growth, protect jobs and ensure a just and equitable transition (Federal Government of Nigeria, n.d.). The ETP is relevant to SDG 7 in particular, due to the fact that its priorities align with the key targets of SDG 7: universal access to modern energy services (7.1), increase in the use of renewable energy (7.2), improved energy efficiency (7.3), and investment in clean energy technologies and infrastructure (7.a and b) (United Nations, 2015). However, the potential impact of this alignment will be realized if the energy access and sustainability commitments in the plan can be translated into actual programmes.

Even though the policy relevance of the fact that an ambitious strategy for energy transition exists, this is not sufficient to ensure successful implementation of the strategy. Realizing Nigeria's ETP goals will need significant financial, technological, regulatory, policy, and co-ordinative capacities, including good relationships among government agencies, private investors, development partners and local communities, and a strong electricity infrastructure. The magnitude of the problem is reflected in the global evidence: The Energy Progress Report 2025 identified over 666 million people without access to electricity and the rate of progress on clean cooking has been less than necessary to reach universal access by 2030. The report also emphasizes the need for decentralized renewable energy solutions, such as mini-grids and off-grid solar power, in addressing remote and underserved areas (International Energy Agency et al., 2025). The findings of this research underscore the importance of not just considering the ambition of the ETP, but also the readiness of the financing mechanisms, infrastructure development, institutional coordination and implementation mechanisms of the ETP in Nigeria.

In this context, the current study investigates the Energy Transition Plan implementation in Nigeria and its relationship with Sustainable Development Goal 7, focusing on the policy alignment, challenges and ways forward for sustainable energy access. In particular, the study aims to establish the level of congruence between the ETP and SDG 7, the key challenges to the implementation of ETP, the role of renewable energy in the implementation of SDG 7, and policy options to enhance the effectiveness and inclusiveness of Nigeria's energy transition. The study seeks to address these challenges and to help improve the understanding of how national energy policy can be more effectively implemented to increase access to affordable, reliable and modern energy

services, while ensuring environmental sustainability and socioeconomic development.

Literature Review

Conceptual Review

Concept of Energy Transition Plan

The Energy Transition Plan (ETP) is a strategic policy framework that defines the objectives, processes, resources and actions that will be used to shift an energy system from current energy structure to a more sustainable, reliable, affordable and environmental-friendly energy structure (Magaji et al., 2026). It offers a framework for how energy production, distribution and consumption can be managed as the world transitions to more renewable energy, becomes more energy-efficient, and lowers greenhouse gas emissions. An effective energy transition plan must take into account the financial, institutional, economic and social requirements for the desired energy transition as well as technological change. According to the International Energy Agency (IEA, 2024), long-term energy planning should be carried out in a systematic process of evaluating future energy demand, the energy technologies available, policy options and potential energy development paths. In this context, an ETP can be used to coordinate and define measurable targets, prioritise investments, assign responsibilities, and track progress towards sustainable energy development. The Energy Transition Plan is a national strategy in Nigeria that takes a holistic approach to the multi-faceted problem of energy poverty and climate change and aims to promote economic development, industrialization and access to modern energy services. The plan pledges the path towards carbon neutrality by 2060 and outlines five key sectors for action – power, cooking, transport, industry, and oil and gas. The plan aims to mitigate emissions linked to energy consumption without compromising the development needs of the country and access to modern energy, according to the Federal Government of Nigeria (n.d.). This is because the energy transition that Nigeria is pursuing must be undertaken alongside the desire to provide electricity, better cooking methods, productive economic activities, and employment. The Nigeria ETP aims to balance sustainable development with the challenges of development in a country where energy access, infrastructure, and affordability are still significant issues.

Reliable access to electricity and the development of cleaner energy technologies is a key pillar of an Energy Transition Plan. These include upgrading of existing electrical infrastructure, expansion of renewable generation, upgrading of transmission and distribution networks, and decentralised energy systems (solar home systems and mini-grids). The interventions are especially significant in rural and under-served areas, where adding to the national electricity grid can be expensive or challenging. The ETP states that renewables, grid expansion, battery storage and off-grid electricity solutions are critical components of Nigeria's long-term pathway for the power sector (Federal Government of Nigeria, n.d.). Furthermore, the plan acknowledges the importance of household cooking behaviour and the need for a transition from traditional fuels (such as firewood and charcoal) to cleaner cooking technologies. These measures show that an ETP is not just about emissions reduction but it's about better energy access, reliability, and quality of life. The financial aspects of an Energy Transition Plan, along with institutional coordination are also key elements of a successful Energy Transition Plan. There is a considerable amount of investment required in renewable energy projects, electricity infrastructure, clean cooking technologies, research, technical skills and supporting institutions for the implementation of energy transition programmes. These can be drawn on by government spending, the private sector, international climate finance, concessional loans, grants, and public–private partnerships. Nigeria's ETP financing framework recognises the importance of combining different sources of capital to support the transition and address the financial requirements of energy development (Federal Government of Nigeria, n.d.). Access to finance alone is not enough without proper regulation, effective institutional coordination, transparency for selecting projects, and monitoring. The effectiveness of the plan thus hinges on the ability of the government to establish an enabling investment climate, to build support institutions and to allocate funds to projects that are sustainable and deliver energy access and sustainability.

The Energy Transition Plan is closely linked with Sustainable Development Goal 7 which aims at ensuring 'Access to Affordable, Reliable, Sustainable and Clean Energy' for all. It focuses on access to electricity, renewal energy, energy efficiency and modern energy infrastructure, which aligns with the key SDG 7 targets (United Nations, 2015). However, success in these aims will rely on the ability to adequately consider the economic and social factors affecting energy access in the plan. Lack of affordability of modern energy technologies, low initial investment costs, insufficient infrastructure, the lack of technical know-how, and policy inconsistencies may limit implementation. The transition should also take into account the situation of low-income households and communities with a reliance on traditional energy sources due to lack of or high cost of access to cleaner alternatives. Therefore, an inclusive ETP should integrate environmental goals with actions that champion vulnerable groups, involve local actors, promote jobs, and ensure that modern energy is available for various socio-economic groups. This is especially important in Nigeria, where energy transition policies need to serve the twin objectives of both addressing energy poverty and long-term environmental needs.

Concept of Sustainable Development Goal 7 (SDG 7)

The Sustainable Development Goal 7 (SDG 7) is one of the 17 global development goals set by the United Nations in the 2030 Agenda for Sustainable Development in 2015. It seeks

to ensure universal access to affordable, reliable, sustainable and modern energy services. The objective recognises the importance of energy as a key enabler to economic development, poverty reduction, technology development, environmental protection and enhancement of human welfare. Therefore, energy is seen as the cornerstone of development goals that must be met within households, businesses, industries and public institutions, which requires sufficient, sustainable energy supply (United Nations, 2015). The aim tackles a number of enduring energy issues such as low electricity availability, reliance on polluting cooking fuels, inefficient use of energy and low access to clean energy technologies. It stimulates use of renewables, energy efficiency, and investment in the installation of infrastructure to ensure access to modern energy services for their population. Ensuring a reliable supply of electricity, access to affordable alternative energy sources and the widespread use of traditional biomass can all impact the welfare of households, economic activities and environmental sustainability, especially in developing countries (United Nations, n.d.).

To achieve SDG 7, ongoing action is needed to boost access to modern energy services, expand the share of renewable energy in the energy mix, and enhance energy production and consumption efficiency. The objective also highlights the need for international cooperation, investment in research and technological innovation for clean energy, and development of infrastructure for energy, particularly in developing economies. The priorities indicate that sustainable energy development is not just about expanding electricity production, but also ensuring that energy services are available, affordable, reliable and environmentally friendly. Therefore, the effective implementation of SDG 7 is reliant on collaboration between governments, private-sector organisations, international development partners and local communities (United Nations, n.d.). SDG 7 at the household level is about providing access to sustainable energy services to people and families to perform their activities without breaking the bank or exposing them to unnecessary health and environmental risks. Household energy needs are satisfied through the use of clean cooking fuels and technologies that reduce exposure to harmful smoke and indoor air pollution, electricity for lighting and refrigeration, electricity for communication, and electricity to operate domestic appliances. These services are accessible, priced and reliable, and this impacts household living standards, spending patterns and choices in energy use. Hence, SDG 7 offers a valuable conceptual framework for probing the determinants of household energy preferences and how these preferences drive adoption of cleaner and more modern energy sources.

The relevance of SDG 7 is reflected in the existing disparities in access to electricity and clean cooking technologies in Nigeria, and the significant differences in access to these technologies across regions and socio-economic groups. According to the United Nations Statistics Division (n.d.) the percentage of Nigerian population with access to electricity increased from 43.2% in 2000 to 61.2% in 2023. Likewise, clean fuels and technologies for cooking gained share of the population, rising from 0.7 per cent to 26.2 per cent. While these figures show a marked improvement, they also highlight ongoing challenges in providing access to electricity and promoting the use of more sustainable cooking options. The results also indicate a need to break the electricity access and clean cooking indicators into separate yet interconnected domains for the analysis of Nigeria's performance towards SDG 7. As a tool, SDG 7 can be used to analyse the availability, affordability, accessibility and utilisation of household energy sources in both rural and urban communities in Niger State. Firewood and charcoal use can be significant among rural households, due to a lack of electricity, poor distribution systems and/or the price of commercial fuels. In addition to having more access to electricity and commercial energy markets, un-reliability of electricity supply and increasing prices on energy fuels can also impact urban households' choice of energy. The differences reveal some interrelated factors such as geographical location, income, infrastructure and availability of alternative energy sources, which affect household energy use. It is therefore essential to look at these factors to explain the differences in energy choices and use by rural and urban households.

In this study, SDG 7 means a global programme for providing affordable, reliable, modern, and environmentally sustainable household energy services by utilizing renewable energy, clean cooking technologies, energy efficiency and infrastructure. This knowledge offers a conceptual basis for the analysis of household energy choices and consumption pattern in rural and urban Niger State, Nigeria. It also helps to evaluate the relevance of the study's findings to the overall goal of sustainable energy development and pinpoint socio-economic and geographical issues which could hinder the implementation of cleaner and more sustainable energy options.

Concept of Energy Policy

Energy policy is a set of principles, objectives, legislation, regulation, planning and programmes set by governments to manage and co-ordinate energy resources for production, supply, distribution and use. It will be a reference document for managing energy resources, the development of energy supply systems and meeting the energy demand at the level of households, commerce, industry and public institutions. In addition, energy policy pinpoints main priorities on energy security, energy affordability, energy reliability, environmental sustainability and economic development. To implement long-term energy planning effectively, it is essential to conduct a thorough analysis of energy supply and demand, existing energy technologies, investment potential, environmental impacts, and the socioeconomic implications of energy-related decisions, according to the International Energy Agency (IEA, 2024). Thus, energy policy is not only

about the generation of electricity, but also about fuel production, fuel transport and distribution, household energy use and use of cleaner and more sustainable fuels.

Energy policy is important because of the impact of energy availability and the cost of energy on the performance of the economy, industrial development, welfare of households and national development. A policy framework that is well designed allows for governments to strike a balance between reliable energy supply and affordability and environmental protection. These can include changes to electricity generation, tax policy, subsidies, renewable energy incentives, energy-efficiency rules, investments, and rules for the electricity producers and distributors. The International Energy Agency (IEA, 2026) noted that factors such as energy security, energy affordability, efficient energy use, clean energy development and resilient energy supply chains are key in today's energy policy making. The priorities suggest that energy policies need to tackle immediate issues such as the shortage of reliable electricity supply and rising energy costs, as well as long-term concerns that involve climate change and natural resource conservation and technological development. In this sense, the effectiveness of an energy policy relies on the availability of proper policy funding, institutions and adequate regulation, as well as the possibility to implement and test the energy policy goals.

Theoretical Framework

Sustainable Development Theory

The theoretical underpinning of the study, Nigeria's Energy Transition Plan and Sustainable Development Goal 7: Assessing Policy Alignment and Implementation Gaps is Policy Implementation Theory. The theory outlines how government policies become programmes and outcomes in practice, and that the development of suitable policies does not necessarily result in successful implementation. Pressman and Wildavsky (1984) contend that there are several interconnected implementation processes that can be influenced by lack of resources, conflicting goals, insufficient institutional capacity, poor coordination, and limited agency commitment. The theory puts forward that setting goals to develop renewable energy, access electricity and clean cooking fuels, and improve energy efficiency are not enough until the required financial resources, institutional frameworks, infrastructures, and implementation approaches are provided under the umbrella of Nigeria's Energy Transition Plan (ETP). It thus serves as a platform for analysing the drivers shaping the implementation of Nigeria's energy transition commitments into tangible results that contribute to Sustainable Development Goal 7 (SDG 7).

The theory bears significance in the present study because it can provide an explanation for the possible gaps between Nigeria's energy policy promises and the efforts made towards sustainable energy development. It is important that all government ministries and regulators, private investors, energy providers, development partners, and local communities collaborate effectively in its implementation. But poor funding, legal gaps, lack of infrastructure, poor accountability, and low stakeholder engagement could impede policy goals. The institutions, governance and policy coordination in the advancement of energy development in Nigeria have been discussed in the research (Edomah, 2021; Nwozor et al., 2021). This will enable Policy Implementation Theory to inform the evaluation of the extent to which Nigeria's ETP is consistent with SDG 7 and what challenges could hinder the attainment of ETP's objectives. It also serves as a foundation for the recommendations for improved financing, institutional coordination, infrastructure development, monitoring and accountability for enhancing the implementation of sustainable energy policies.

Conceptual Framework

The study uses a conceptual framework that posits that the effect of Nigeria's ETP on the realization of SDG 7 is influenced by the extent to which its policy objectives align with the SDG 7 targets, and the extent to which it is feasible to achieve them in the energy sector. The framework thus separates policy alignment from capacity to implement, and acknowledges that while a policy may show a high degree of conceptual consistency with SDG 7, it would have weak results where financial, institutional, infrastructural and technological build-up is not concluded.

The first aspect of the framework is the alignment of energy access. The degree of coverage of the goal 7.1 of universal access to affordable, reliable and modern energy services in the ETP. In the Nigerian context, this dimension includes access to electricity, rural electrification, decentralised energy systems and access to modern household energy services. Its effectiveness will rely on the ability of the ETP to mitigate longstanding inequalities between urban and rural populations and to increase energy services for unserved areas.

The second dimension is one of renewable energy integration. This reflects the level of efforts being taken by the ETP to encourage the higher penetration and integration of renewables into the Nigerian energy matrix. Renewable-energy development is especially crucial to SDG 7 since it offers a chance to bring energy to those who are lacking, while at the same time decreasing reliance on carbon energy sources. Renewable-energy integration, in particular the development of solar and other decentralised renewable systems, is therefore a key pathway the ETP can take to contribute to sustainable energy development.

The third dimension is energy-efficiency policy. Energy efficiency is an important, but relatively less developed aspect of ETP–SDG 7 relationship. It is about how much the energy transition framework helps to reduce the intensity of energy use, efficient use of energy and sectoral performance of energy consumption. This dimension matters since, with expansion of energy supply alone, sustainable energy development is not guaranteed. Greater efficiencies can lead

to reduced energy demand, lower cost and help to achieve emissions reduction.

Implementation capacity is the fourth dimension. It means the conditions of institutions and materials that can make the ETP's policy promises into concrete results in the energy sector. The study theorises that the capacity to implement is determined by financial resources, energy infrastructure, regulatory coherence, institutional coordination, technical and technological capacity, stakeholder participation and political stability. The factors are identified as critical enabling conditions as the absence of one factor or another may affect the effectiveness of otherwise well-designed policy interventions.

The framework then takes for granted that the link between the ETP and SDG 7 is through the quality of implementation. It is expected that strong alignment of policies regarding energy access and renewable energy development will provide a conducive environment for SDG7. But translating the objectives into outcomes will rely on the availability of sufficient funding, infrastructure, governance mechanisms, technical expertise and stakeholders' cooperation. If these are not met, there could be a disconnect between the goals in the ETP and the progress made towards SDG 7.

Based on this, SDG 7 is seen as the outcome variable, which can be achieved through the gains in universal electricity access, access to clean cooking, proportion of renewables, energy efficiency, and availability of affordable, reliable and sustainable energy services. The framework is not based on the premise that these outcomes are necessarily the result of the ETP. Instead it states that policy effectiveness depends on the relationships between policy goals and implementation environment.

The conceptual relationship can analytically be represented by the following functional relationship:

$$SDG7 = f(EAA, REI, EEP, IC) \text{ ----------(1)}$$

where:

SDG7 = achievement of Sustainable Development Goal 7;

EAA = energy-access alignment;

REI = renewable-energy integration;

EEP = energy-efficiency policy; and

IC = implementation capacity.

An estimable empirical specification for the survey analysis is:

$$SDG7_i = \beta_0 + \beta_1 EA_i + \beta_2 RE_i + \beta_3 EE_i + \beta_4 FIN_i + \beta_5 INF_i + \beta_6 GOV_i + \beta_7 TECH_i + \beta_8 POL_i + \varepsilon_i \text{ --------(2)}$$

The model posits that greater alignment with the energy-access, renewable-energy and efficiency goals should enhance SDG 7 performance, and implementation constraints should decrease the likelihood of achieving measurable outcomes from policy objectives.

Since the empirical framework of the dissertation was essentially dependent on the perceptions of stakeholders, and a full multivariate regression was not the primary method of analysis but rather ANOVA and correlation and qualitative analysis, the equation is presented here as the analytical model for the article rather than as one that the dissertation estimated these coefficients.

Methodology

Research Design

The study was of a mixed methods design. This method was a mixture of quantitative survey data and qualitative interviews and secondary data. The combination of the two was deemed suitable, as measurable perceptions of the stakeholders and understanding of institutional and implementation issues are needed in examining a national energy policy.

The quantitative phase included a structured questionnaire that was completed by 150 participants, such as policy makers, energy professionals, and renewable energy developers. The qualitative part comprised of semi-structured interviews with 12 key informants. Secondary data sources such as International Energy Agency (IEA), International Renewable Energy Agency (IRENA), World Bank and relevant Nigerian energy institutions were used.

Population and Sampling

A study was conducted on the stakeholders who have knowledge and practical participation in the transition of Nigeria's energy system. Energy professionals, energy developers and policy makers were the respondents. The addition of these groups allowed the research to address the views of both policy makers and technical implementers and investors.

One hundred and fifty completed survey responses were analysed quantitatively, and 12 key informants were interviewed semi-structuredly.

Instrument and Measurement

The questionnaire was derived using the 5 point likert scale:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree.

The dimensions that were measured were:

- alignment of the ETP with SDG 7; and
- renewable-energy integration;
- energy efficiency;
- implementation barriers; and
- Opportunities to improve the ETP.

Cronbach's alpha coefficients ranged between satisfactory-to-high (0.87 to 0.89) with satisfactory internal consistency for the instrument.

Data Analysis

Response distributions were calculated and mean scores were obtained using descriptive statistics. ANOVA was used to determine if there were differences among stakeholder groups in their perceptions and correlation analysis was used to explore relationships among relevant variables. Thematic analysis was conducted on qualitative interviews data according to general guidelines of Braun and Clarke (2006).

Triangulation was used to verify the results of the survey with the information obtained from interviews and secondary sources.

Results and Analysis

The ETP aligns with SDG 7.The ETP is aligned to SDG 7.

The first research question sought to find out whether Nigeria's ETP is in line with SDG 7.

Table 1. The project involves conducting a stakeholder assessment of the alignment of ETP with SDG 7

Statement	SA	A	N	D	SD	Mean
ETP effectively aligns with universal energy access by 2030	22	48	18	8	4	4.00
ETP promotes renewable-energy integration	30	50	10	5	5	4.05
ETP addresses energy efficiency as a key strategy	12	35	28	15	10	3.30
ETP provides clear and actionable carbon-reduction strategies	—	—	—	—	—	Moderate

Source: Author's computation from a survey data, (2025).

The findings suggest that the ETP is seen as being aligned to SDG 7 by trade and industry stakeholders. Renewable-energy integration had the highest alignment with a mean of 4.05. The mean score of 4.00 was also achieved for universal energy access.

The comparatively lower mean value of 3.30 for energy efficiency suggests a lack in the relationship between policy and implementation. This is essential, because SDG 7 does not just mean what countries need to do to generate electricity, or what they have to do to expand renewables. Energy efficiency is a standalone measure of the goal and must be delivered in order to achieve reductions in energy intensity and minimise the volume of additional generation capacity needed.

The dissertation also finds that the ETP is more aligned with SDG 7.1 and SDG 7.2 than with SDG 7.3.

Renewable-Energy Integration

Renewable energy is one of the greatest levers available for Nigeria to both enable access to energy and to achieve decarbonisation.

Table 2. Stakeholder assessment of renewable-energy integration.

Statement	SA	A	N	D	SD	Mean
ETP will significantly increase renewable-energy capacity by 2030	27	55	10	5	3	4.00
Renewable-energy projects have been successfully implemented under ETP	15	50	20	10	5	3.60
Solar energy is the most viable renewable source under ETP	40	45	10	3	2	4.20

Source: Author's computation from a survey data, (2025).

These results are very positive for deployment of renewable energy. 82% strongly agreed or agreed that the ETP would substantially scale up renewable energy. The highest result was for solar energy, with an agreement score of 85% with a mean score of 4.20.

But this is still significantly lower with the mean score of 3.60 for successful implementation of renewable-energy projects. This gap is analytically significant as it represents a difference between the potential of the ETP and its actual performance in terms of implementation.

This separation is one of the most important implementation gaps identified by this study.

Renewable backed electrification and increased solar power are a key focus in ETPs pathway towards Nigeria's transition to zero emissions.

Barriers to Implementation

Table 3. There are significant obstacles to implementing ETPs.There are many barriers to ETP implementation.

Barrier	SA	A	N	D	SD	Mean
High cost/financial constraints	60	30	5	3	2	4.40
Inadequate grid infrastructure	50	35	10	3	2	4.30
Inadequate policy incentives	15	30	35	15	5	3.10
Insufficient local technical expertise	25	40	20	10	5	3.80

Source: *Author's computation from a survey data, (2025).*

The perceived most significant barrier is financial constraints. The cost-related item had a mean of 4.40, and the other item that was inadequate, "grid infrastructure," had a mean of 4.30. The findings show that the availability of technologies is not enough to ensure energy transition.

Complementary investments in transmission, distribution, storage, metering, digital systems and maintenance are needed for renewable technologies. These complementary systems are necessary for renewable generation to improve reliability or access if they are not present.

The uncertainty about the level of investment incentives is also reflected by the relatively low mean score of 3.10 for policy incentives. However, the local technical capacity (3.80) is a critical human-capital constraint that needs to be addressed.

A more general analysis of the dissertation reveals interrelated barriers of financial shortage, regulatory incoherence, political instability, grid obsolescence, awareness gaps and technical constraints.

Initiatives have been launched to enhance the ETP.There have been measures taken to improve the ETP.

Table 4. Opportunities for Improving ETP Implementation

Opportunity	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)	Mean
Increasing private-sector participation	37	43	16	2	2	4.20
Leveraging international climate finance	42	33	16	6	3	4.30
Investing in capacity building and technical training	32	48	11	6	3	4.10
Strengthening regulatory frameworks and governance	47	33	16	2	2	4.30

Source: Author's computation from a survey data, (2025).

The outcomes indicate high consensus within the stakeholder group on options available for addressing the question. There were no significant differences between regulatory strengthening and international climate finance in their mean scores (4.30). The capacity development and private-sector participation had scores of 4.10 and 4.20 respectively.

From these findings, it appears that the implementation issues of the ETP are not considered to be unmanageable according to the stakeholders. Instead, the key is to set up the financial, institutional and technological frameworks needed to make the plan a reality.

The Integrated National Financing Framework is relevant to this challenge as it acknowledges the need to have coordinated financing strategies, governance mechanisms and monitoring frameworks that support the SDGs in Nigeria.

Qualitative Evidence

The interviews corroborate the quantitative results. The ETP was considered ambitious, and generally set the right direction for SDG 7, but there were concerns about the sufficiency of the infrastructure, financing and implementation arrangements.

A policy expert highlighted the need to address deficiencies in infrastructure in rural areas and ensure adequate funding for achieving universal access. Grid integration and energy-storage limitations were identified by an energy developer. A government official noted that energy efficiency was not well developed relative to energy access and renewable energy goals.

Social and geographical aspects of implementation were also identified in the interviews. Respondents from the community and gender stressed the importance of renewable-energy investments reaching rural communities and women's involvement in decision-making.

The results of this research suggest a multi-faceted implementation gap. It not only covers the financial and infrastructural gap but also governance, inclusion, technical and institutional aspects.

Discussion

This study's main conclusion is that Nigeria's ETP is very similar at the policy-design level to SDG 7, but is not so effective at the implementation level.

Universal energy access and integration of renewable energy were among the highest mean scores, reflecting a high level of stakeholder awareness of the conceptual fit between ETP and SDG 7. This is not surprising as both frameworks focus on the access to energy, sustainability and renewable-energy deployment.

The challenge is when these objectives are translated into projects, infrastructure and services. This distinction is reflected in the fact that the lower assessment of the amount of renewable energy actually implemented in the economy is lower than the future contribution that is expected from renewable energy.

The result confirms the Policy Implementation Theory that the effectiveness of policy is dependent not only on the good policy formulation, but also on the institutional capacity, resources, coordination and implementation mechanism.

The positive rating on solar energy is a good indication of Nigeria's high solar resource potential and the scalability of decentralised solar supplies. Solar mini-grids and solar home systems may be able to overcome the economic and geographical constraints of providing electricity to remote communities.

The decentralised renewable-energy systems are also supported with international evidence as an important means for providing access to electricity to populations outside of conventional electricity grids. Decentralised renewable solutions are highlighted as potential enablers to drive rural access in the Tracking SDG 7 global assessment.

But, to deploy renewables we need storage, distribution infrastructure, suitable tariffs, maintenance systems and viable business models.

Therefore, renewable energy solutions must not be viewed as a generation technology only. It should be considered in the context of an overall energy-access ecosystem.

One of the biggest weaknesses noted in the study was the mean score of 3.30 for energy efficiency.

Measures to enhance energy efficiency can help to save energy, which can help to save money at home and in business, increase energy security and lessen emissions. However, efficiency is relatively underrepresented in contrast to renewable energy growth and electricity access in the stakeholder evaluation.

This is a weakness that is of great concern to Nigeria. As energy demand rises due to population growth and economic expansion, the nation may need to spend money continually on more generation capacity if there are not sufficient efficiencies. Therefore, energy efficiency is to be regarded as a source of energy.

The IEA's SDG 7 framework defines energy intensity and energy efficiency as an integral measure of progress.

In the study funding was the most important obstacle. The finding fits with the fact that energy transitions are capital intensive.

The country of Nigeria needs significant investments in renewable generation, transmission, distribution, storage, clean cooking, e-mobility, and institutional capacity and industrial efficiency.

This suggests that transition financing is not easily and sustainably financed with public budgets. Thus, a blended-finance structure with public funds, development finance, commercial investment, concessional loans, guarantees, green bonds and climate finance is needed.

The Nigeria Integrated National Financing Framework is a good institutional platform for incorporating financing into the sustainable-development-planning process.

The study also considers the regulatory incoherence and institutional fragmentation as significant barriers. This is in accordance with the policy implementation literature that indicates that complex policies with multiple institutions are susceptible to coordination failures.

It is a multi-sectoral ETP, so it needs a well-coordinated architecture. The Energy Transition Office and intergovernmental coordination mechanisms are part of the official implementation arrangement.

The following integration of the ETP implementation architecture into the overall climate-governance framework further highlights the need for institutional coordination. The UNDP also points to the governance needs of a just energy transition in Nigeria in its analysis.

The energy transition takes place only as long as renewable-energy capacity grows. Universal and affordable access is required by SDG 7.

The qualitative evidence suggests that women and rural households and marginalised communities might not share benefits equally in energy transition investments.

This has ramifications for the concept of a just transition. Community participation, gender-responsive planning, local employment, and technical training and protections for affordability should be part of Nigeria's transition.

A fair, inclusive and equitable transition is a key focus point of the official ETP itself.

There are several important policy implications of the findings.

To begin with, policy alignment needs to be translated into implementation milestones.

Nigeria should have a specific SDG 7-ETP performance framework with measurable indicators for:

- electricity access;
- clean cooking access;
- renewable-energy share;
- energy intensity;
- transmission and distribution performance;
- mini-grid deployment;
- energy affordability;
- rural access;
- gender inclusion; and
- emissions reduction.

Secondly, there needs to be more decentralisation in the deployment of renewable energy.

The deployment of solar mini-grids and solar home systems should be planned in a systematic way into rural-electrification strategies. This can also alleviate need for expensive extensions to the grid and enhance access to geographically isolated communities.

Third, the financing of an energy transition needs to be diversified.

Nigeria needs to improve access to:

- climate funds;
- green bonds;
- concessional finance;
- blended finance;
- guarantees;
- public-private partnerships; and
- development-finance institutions.

Fourth, modernisation of the grid should be done in parallel with deployment of renewables.

Renewables benefits will continue to be limited without increased T&D and storage capacity and better system-management.

Fifth, more policy focus should be placed on energy efficiency.

The ETP should set clear efficiency goals for energy in buildings, industry, transport and domestic energy use by sector.

Sixth, local technical capacity should be built up.

Nigeria needs to invest more in training in:

- solar installation;
- battery systems;
- energy auditing;
- grid management;
- smart-grid technologies;
- electric mobility;
- renewable-energy project finance; and
- energy-policy analysis.

The seventh is that implementation needs to be more inclusive.

The involvement of women, rural communities, youth, local governments and civil-society organisations must be defined in their roles in the planning and implementation.

Conclusion

The aim of this study was to evaluate the Energy Transition Plan in Nigeria with regard to alignment with Sustainable Development Goal (SDG) 7 and gaps in implementation. The evidence shows that Nigeria has developed a bold strategic agenda with goals aligned well with SDG 7's key pillars.

Stakeholders had relatively high levels of trust in the ETP's ability to foster universal energy access and integration of renewables. One of the most promising areas for increasing sustainable energy access identified was renewable energy, specifically solar energy.

The results show that there is, however, a significant disconnect between policy intent and capacity to put policy into action. Limited financial resources, poor grid infrastructure, regulatory loopholes, institutional incongruity, and low technical capacity and political instability slow down the realization of policy pledges.

Energy efficiency is the least well aligned dimension of policy alignment. This means that Nigeria's energy transition discussion remains predominantly on access and deployment of renewable energy, rather than on reducing energy intensity and efficiency of the current energy systems.

The study consequently finds that the primary reason for Nigeria's lack of energy transition policy ambition is not the lack of policy. Instead, the real difficulty will be implementation. Building the capacity of adequate fund-raising, enhancing infrastructure and strengthening governance, local technical capacity and monitoring mechanisms to track SDG 7 outcomes will determine the success of the ETP.

The shift, therefore, must be taken as one more than just moving from fossil fuel to renewable energy, but a shift in

Nigeria's energy-development system. This transformation should at the same time have to answer to access, affordability, reliability, sustainability, efficiency and equity.

Recommendations

Based on the findings, the study recommends that:

Nigeria should set up an integrated monitoring and evaluation mechanism, linking the goals of ETP to SDG 7 targets. The framework should contain measurable annual indicators on electricity access, use of clean cooking methods, renewable energy, energy efficiency and energy services' cost. Government ministries, regulatory bodies and energy sector institutions should have well-defined authority and mandates for data collection, analysis and reporting of reliable data on implementation progress. Assessment should be a regular feature to measure progress against targets, challenge implementation issues and question if targets and policies are having a positive impact on people's lives. The framework should also be transparent, publishing progress reports and inviting feedback from stakeholders in policy evaluations. This would allow the government, in identifying the weaknesses, to do so in a timely fashion, increase accountability and ensure that the implementation of the ETP supports the achievement of SDG7 effectively.

The Nigerian government should promote investments in renewable energy infrastructure, such as solar mini-grids and hybrid energy systems, to improve access in rural and underserved areas. Low and intermittent grid power are common problems in many communities, due to underdeveloped power grids, lack of infrastructure, and high costs of providing electricity to remote areas. Decentralised renewable energy systems would offer alternative supply to electricity to domestic and educational facilities, healthcare facilities, small businesses, and agricultural enterprises. Improving electricity availability with solar mini-grids and hybrid systems, integrating renewable energy with suitable storage or back-up options can help lower reliance on costly and polluting energy sources. Support measures from the government should include appropriate financing mechanisms, technical support, investment incentives and community involvement in project development and operation. The measures would enhance the sustainability of the rural electrification programmes, foster local economic activities and support ETP's contribution to SDG 7 by increasing access to reliable, affordable and cleaner energy service.

Nigeria's national energy-transition financing strategy should be strengthened to unlock adequate and sustainable financing for the goal of the ETP implementation. There is a need for significant investment, not just from public-sector budgets, to realise the universal energy access goal and to boost renewable energy, modernise electricity generation and distribution, and foster clean cooking technologies. A diversified financing approach is needed to combine domestic public financing, international climate finance, green bonds, concessional loans, financial guarantees, development assistance, and private investment, which should be introduced by the government. Climate finance and concessional lending might help lower the financing costs of eligible sustainable energy projects, and guarantees and blended financing of projects that have perceived financial risks could help attract private investment. The Government must also have a list of projects in the pipeline that are prepared and have been proven to be commercially viable, with feasibility studies, clear procurement processes and financial evaluations. Enhanced financial accountability and prioritizing resources on priority projects would enhance investor confidence, speed implementation and raise the chances of Nigeria's energy transition and SDG 7 targets.

The Nigerian government should focus on modernising electricity transmission and distribution lines as well as renewable-energy generation. Low transmission capacity, aging distribution equipment, technical losses, and under-investment in the distribution network can negatively affect electricity reliability and limit the capacity of renewables in the existing distribution network. Additional investments are needed in energy-storage facilities as appropriate, smart-grid technologies, transformers, distribution networks, and substations, as well as transmission lines, to improve the power system. The upgrades would help to increase the flow of electricity from power plants to customers, minimize unnecessary electricity losses and improve the integration of variable renewable energy, like solar and wind. In addition, the government should promote the collaboration between relevant electricity sector institutions, generation companies, distribution companies and renewable energy developers so as to ensure that the additional generation capacity is backed by the required network infrastructure. The concurrent modernisation of the grid and the introduction of renewables would lead to more reliable electricity supplies, less reliance on fossil fuels and a better base for SDG 7 of affordable, reliable, sustainable and modern energy.

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