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**NEEDS ASSESSMENT OF THE PROSPECT OF RENEWABLE ENERGY IN
NIGERIAN ECONOMIC SPACE: THE PANACEA FOR SUSTAINABLE
INDUSTRIALIZATION AND ECONOMIC DEVELOPMENT OF NIGERIA**

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ABSTRACT

This study examined needs assessment of the prospect of renewable energy in Nigerian economic space as a panacea for sustainable industrialization and economic development of Nigeria. Needs assessment survey design was adopted for this study which was carried out in Nigeria. The targeted population for the study comprised all Environmental Scientist and Economist in Nigeria (precisely in Akwa Ibom Enugu States). A stratified random sampling technique was used to select 50 environmental scientists and 30 economists each from Akwa Ibom State and Enugu State and this gave a total of 160 respondents used for the study. The instrument used for data collection was a structured questionnaire titled “Renewable Energy and Sustainable Industrialization Questionnaire (RESIQ)”. Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument had the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.85, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive analysis to answer research questions. The result of the data analysis revealed that “Hydropower” among other types of renewable energy, was the most needed for sustainable industrialisation and economic development in Nigeria. It also showed that “job creation and economic opportunities,” among other effects of renewable energy, was the most prominent for the economic development of Nigeria. Finally, it also portrayed “inadequate infrastructure” as the greatest challenge of renewable energy adoption in Nigeria, among other challenges faced. The study concluded that by harnessing diverse renewable resources such as solar, wind, and biomass, Nigeria can address its energy deficits while promoting environmental sustainability and economic resilience. One of the recommendations provided was that government incentives and policy support should foster sustainable growth by encouraging innovation, investment, and equitable access to resources, ultimately driving economic resilience and social progress.

Keyword: Needs, Prospect, Renewable Energy, Economic Development, Economic Space, Sustainable Industrialization and Nigeria.

Introduction

Nigeria is a country located in West Africa, bordered by Cameroon, Niger, the Benin Republic, and the Atlantic Ocean. Nigeria is richly blessed with reasonably high qualities of various energy resources, such as crude oil, tar sands, natural gas, and coal. According to Amadi, Madu, Ojuka, and Igbogidi (2024), energy is a necessary weapon for politics, security, and diplomacy as well as an input that powers the creation of products and services in a country’s transportation, agriculture, industrial, health care, and educational sectors globally. Every nation’s socioeconomic development and growth are based on its energy supply.

As Nigeria grapples with the dual challenges of energy scarcity and economic development, the need for a comprehensive needs assessment of renewable energy prospects has become increasingly critical. With a population exceeding 200 million and a growing demand for energy, the traditional reliance on fossil fuels poses significant risks, including environmental degradation and economic instability. In this context, renewable energy emerges not only as a viable alternative but also as a potential catalyst for sustainable industrialisation and economic growth. Adewuyi (2020) mentioned that the persistent inconsistency in the availability and market price of electricity and petroleum products in the Nigerian energy industry reflects the inefficiency to meet demand and makes the challenge more conspicuous.

Renewable energy sources—such as solar, wind, hydro, and biomass—offer Nigeria the opportunity to diversify its energy mix and reduce dependence on non-renewable resources. The country is endowed with abundant renewable resources, particularly solar energy due to its geographic location and favourable climate conditions. Hence, there is an urgent need to optimally harness the renewable energy potentials available in Nigeria for the benefit of her citizens (Ajaelu & Okereke, 2020). A thorough needs assessment can identify existing gaps in infrastructure, technology, and policy frameworks necessary for the deployment of renewable energy solutions. This evaluation will enable stakeholders to understand the specific requirements for transitioning to a more sustainable energy system, including investment needs, capacity building, and regulatory reforms. By aligning these needs with national development goals, Nigeria can position itself as a leader in renewable energy within the African context.

The need for a comprehensive assessment of renewable energy prospects in Nigeria is essential for unlocking the country's potential for sustainable industrialisation and economic development. As the world increasingly shifts toward sustainable practices, Nigeria stands at a crossroads where strategic investments in renewable energy could yield substantial benefits for its economy and society at large.

Concept of Renewable Energy

Renewable energy can be defined as energy derived from natural sources that are replenished at a higher rate than they are consumed. Some examples sunlight, water, wind and also geothermal sources such as hot springs and fumaroles. The concept of renewable energy has been around for centuries, with ancient civilisations using wind and water power to perform tasks. In the 1970s, environmentalists began promoting the development of renewable energy as a replacement for fossil fuels, and since then, the technology has continued to evolve and become more competitive with fossil fuels.

Today, renewable energy accounts for 30% of global electricity generation, and the cost of renewable energy technologies continues to decline, making them more competitive with fossil fuels. Many countries have set targets to amplify their use of renewable energy in the coming years. Notwithstanding the benefits, renewable energy still encounters many challenges, including the intermittency of renewable energy sources, high upfront costs, and lack of infrastructure in some areas, which can make it hard to guarantee an established energy supply and transport and allocate renewable energy. This approach makes use of waste management, food production, water management, sustainable building techniques, renewable energy sources, communication, and connectivity in order to create an environmentally friendly and sustainable environment while also enhancing user health and well-being. Shinn (2022) stated that renewable energy, often referred to as clean energy, comes from natural sources or processes that are constantly replenished (Usanga, 2024). As asserted by Selin (2024), renewable energy is usable energy derived from replenishable sources such as the sun (solar

energy), wind (wind power), rivers (hydroelectric power), hot springs (geothermal energy), tides (tidal power), and biomass (biofuels).

Concept of Sustainable Industrialization

Sustainable industrialisation refers to the transformation process towards a desirable industrialised economy characterised by wealth generation, rapid social development, and environmentally sound manufacturing all at the same time (Salonga, 2021). It is a developmental loom that aims to reduce the ecological footprint of industrial actions by transforming industries to become more environmentally friendly, generally responsible, and efficiently doable while maintaining financial growth, social expansion, and the value of life. It includes changing production processes and business models that unleash dynamic and competitive economic forces while generating income and improving living standards for all people without compromising the ability of future generations to meet their own needs.

Sustainable industrialisation is guided by three core values: ecological sustainability, collective responsibility, and financial viability. It offers numerous profits, as well as employment, financial growth, and ecological security. It can create new employment opportunities in areas such as renewable energy, sustainable manufacturing, and eco-tourism, while also encouraging economic growth and enhancing production. Despite its benefits, sustainable industrialisation faces numerous challenges, including technological barriers, policy and dictatorial frameworks, and skills and capability gaps. Sustainable industries are constantly developing and innovating their infrastructure to meet the needs of society without destroying the environment for future generations. Sustainable development calls for more responsible consumption and production patterns.

Concept of Economic Development

The process of converting low-income, basic national economies into sophisticated Industrial economies is known as economic development (Akpan & Bernard, 2024). Economic development is the process by which a nation improves the economic, political, and social well-being of its people. This goes beyond the narrow focus of economic growth, which mainly involves the increase of a nation's output of goods and services (GDP). Additionally Akpan & Clark (2024) mentioned that Economic development, on the other hand, encompasses qualitative improvements in living standards, infrastructure, education, healthcare, and other critical areas of life. It is about creating a sustainable environment where people can thrive economically and socially, making it a more holistic approach to national progress (Acemoglu & Robinson, 2018). At the core of economic development is the idea of human capital development.

Another important element of economic development is infrastructure development. Infrastructure such as roads, electricity, and telecommunications plays a critical role in facilitating trade, boosting productivity, and attracting foreign investment. Poor infrastructure is often a barrier to economic development in many developing nations. Improved infrastructure not only reduces the cost of doing business but also enhances the quality of life for citizens by providing better access to services (Ekins & Zenghelis, 2021). A strong physical infrastructure is, therefore, the foundation upon which economies can grow and diversify.

Moreover, innovation and technological advancement are key drivers of long-term economic development. Technological progress leads to increased productivity, the creation of new industries, and the modernisation of traditional sectors like agriculture and manufacturing. Countries that prioritise research and development (R&D) often lead in global competitiveness. As Romer (2018) suggests, economies that invest in innovation create a positive feedback loop,

where technological advancements lead to higher economic output, which in turn finances more innovation. Environmental sustainability has become an integral part of modern economic development discourse.

Concept of Nigeria Economic Space

Nigeria's economic space refers to the unique environment in which the country's economic activities take place, shaped by its resources, infrastructure, institutions, and policies. As Africa's largest economy, Nigeria's economic space is characterised by a mix of formal and informal sectors, significant oil and gas revenues, and a rapidly growing population. However, it is also shaped by challenges such as poverty, unemployment, weak infrastructure, and institutional inefficiencies (Edo & Okodua, 2020). Over the years, efforts to diversify the economy into other sectors like agriculture, manufacturing, and services have seen varying levels of success (Adeniyi & Folawewo, 2018).

A key feature of Nigeria's economic space is the informal sector, which accounts for a large share of employment, especially in urban areas. Small-scale enterprises, street vendors, and unregistered businesses make up a significant portion of Nigeria's labour force. Poor infrastructure, particularly in the areas of power supply, transportation, and telecommunications, continues to hamper economic growth. Inadequate infrastructure not only raises the cost of doing business but also limits access to markets, both locally and internationally. Improving Nigeria's infrastructure is essential for stimulating growth in non-oil sectors and promoting inclusive development across the country.

The role of institutions in shaping Nigeria's economic space cannot be overstated. Strong institutions are necessary for creating an enabling environment for businesses and foreign investment. However, Nigeria has long struggled with institutional weaknesses, including corruption, bureaucratic inefficiencies, and political instability (Acemoglu & Robinson, 2018). These issues affect everything from ease of doing business to the effective management of public resources, hindering the country's ability to maximise its economic potential. Thus, Nigeria's engagement in global and regional economic spaces presents both opportunities and challenges for its growth.

Types of Renewable Energy

Renewable energy refers to energy generated from natural sources that are constantly replenished, such as sunlight, wind, water, geothermal heat, and biomass. These sources offer a sustainable alternative to fossil fuels, and their use helps reduce greenhouse gas emissions and other environmental impacts. Below is an extensive explanation of the different types of renewable energy.

Solar Energy

Solar energy harnesses energy from the sun using photovoltaic (PV) panels or solar thermal systems. PV panels convert sunlight directly into electricity, while solar thermal systems capture and concentrate sunlight to produce heat, which is then used to generate electricity. Solar power is highly versatile; it can be deployed on a large scale (such as solar farms) or small scale (such as residential rooftop panels). The efficiency of solar technology has significantly improved over the past decade, making it one of the fastest-growing renewable energy sources. It is particularly advantageous in regions with abundant sunlight, although innovations in battery

storage are helping to address its intermittent nature (International Renewable Energy Agency, 2019).

Wind Energy

Wind energy is captured using turbines that convert the kinetic energy of wind into electricity. Wind farms can be located onshore or offshore, where stronger and more consistent winds are found. Wind power is one of the most cost-effective sources of renewable energy, with modern turbines capable of generating electricity even at low wind speeds. In recent years, offshore wind farms have gained popularity due to their higher efficiency and reduced visual impact. However, wind energy is dependent on geographical location and weather patterns, which can influence its overall reliability.

Hydropower

Hydropower, also known as hydroelectric power, is generated by harnessing the energy of flowing water. Dams are often used to store large amounts of water, which, when released, drives turbines to produce electricity. There are different forms of hydropower, including run-of-river systems and pumped-storage systems, which help balance electricity supply during periods of high demand. Hydropower is highly efficient and provides a consistent and reliable source of energy. However, large-scale hydropower projects can have significant environmental and social impacts, including habitat disruption and displacement of communities (Johnstone & Newell, 2018).

Geothermal Energy

Geothermal energy exploits the heat from within the Earth's crust to generate electricity and provide direct heating. This energy source is accessed by drilling wells into geothermal reservoirs, where hot water and steam are brought to the surface and used to drive turbines connected to electricity generators. Geothermal energy is a stable and reliable source, as it does not depend on weather conditions. It can provide base-load electricity, which means it can generate power consistently throughout the day. Geothermal power plants have a low carbon footprint but are often limited to areas near tectonic plate boundaries where geothermal resources are concentrated (National Renewable Energy Laboratory, 2018). By eliminating dangerous chemicals from the air, indoor plants can filter the air and improve indoor air quality ().

Biomass Energy

Biomass energy is derived from organic materials such as wood, agricultural residues, and animal waste. These materials are burnt or processed to produce heat, electricity, or biofuels. Biomass is considered renewable because the plants and trees that provide the biomass can be replanted and regrown. Biomass energy can help reduce waste by utilising materials that would otherwise go to landfills.

Effects of Renewable Energy on Economic Development of Nigeria

Renewable energy can help Nigeria not only meet its energy needs but also power sustainable economic growth; understanding the impact is crucial. Below are the effects of renewable energy on the economic development of Nigeria:

Enhancing Energy Security and Access

Renewable energy has a significant impact on improving energy security and access in Nigeria, a country that has long struggled with unreliable power supply. The integration of renewable energy sources, such as solar, wind, and hydroelectric power, can diversify the energy mix and reduce dependency on fossil fuels. Enhancing energy security is essential for fostering economic development, as a stable power supply is crucial for industrial activities, healthcare services, and education. The deployment of decentralised renewable energy systems, particularly in rural areas, can provide much-needed electricity, driving economic activities and improving the quality of life.

Job Creation and Economic Opportunities

The renewable energy sector has significant potential for job creation, offering employment opportunities across various levels, from manufacturing to installation and maintenance. The renewable energy sector in Nigeria could create millions of jobs in the coming years as investments grow. This job creation is particularly vital for Nigeria, which faces high unemployment rates, especially among its youth. By fostering skills development and providing training programs, the renewable energy sector can enhance the employability of the workforce, contributing to broader economic growth.

Sustainable Economic Growth and Diversification

The adoption of renewable energy can significantly contribute to sustainable economic growth and diversification in Nigeria. By reducing reliance on oil and gas, the country can mitigate the adverse effects of price volatility in global markets. Renewable energy offers opportunities for industrial diversification, enabling the development of new sectors and businesses. Embracing renewable energy sources can foster innovation, enhance productivity, and create resilient economies less vulnerable to external shocks. This diversification is essential for achieving long-term economic stability.

Enhancing Agricultural Productivity

Renewable energy can play a pivotal role in enhancing agricultural productivity, a critical sector for Nigeria's economy. Access to reliable and sustainable energy sources can improve irrigation systems, processing facilities, and cold storage, thus reducing post-harvest losses. The integration of renewable energy in agriculture not only boosts productivity but also creates value-added opportunities for rural communities. By enabling farmers to utilise modern technologies powered by renewable energy, agricultural practices can become more efficient and sustainable, contributing to food security and rural economic development.

Environmental Benefits and Public Health

The transition to renewable energy sources significantly reduces greenhouse gas emissions and air pollution, leading to environmental and public health benefits. The reliance on fossil fuels in Nigeria has led to severe environmental degradation and health issues related to pollution. By shifting to cleaner energy sources, Nigeria can mitigate these adverse effects, improving air quality and public health outcomes. This shift not only benefits the environment but also reduces healthcare costs associated with pollution-related illnesses, creating a healthier workforce and contributing to economic productivity.

The Challenges of Renewable Energy Effective Adoption in Nigeria

While Nigeria has the potential to harness renewable energy to address its energy crisis, several challenges impede its adoption. These include inadequate infrastructure, high initial costs, policy inconsistency, lack of awareness, and environmental concerns. Challenges of Renewable Energy Adoption in Nigeria include:

Inadequate Infrastructure

Nigeria, blessed with abundant renewable energy resources such as solar, wind, hydro, and biomass, faces significant challenges in adopting these energy sources effectively. The country's energy sector is historically characterised by a heavy reliance on fossil fuels, particularly oil and natural gas, which has impeded the growth of renewable energy technologies. One of the primary challenges is the lack of adequate infrastructure to support renewable energy generation and distribution. Many rural areas remain off-grid, and the existing grid is often outdated and inefficient, limiting the integration of renewable sources.

High Initial Capital Costs

Another significant barrier to renewable energy adoption in Nigeria is the high initial capital cost associated with the installation of renewable technologies. Although the long-term benefits are substantial, the upfront investment required for solar panels, wind turbines, and other renewable energy systems can be prohibitively expensive for both consumers and investors. As it is inadequate infrastructure is caused financial limitation compounded by limited access to financing options, as local banks and financial institutions are often hesitant to fund renewable energy projects due to perceived risks (Iledare, 2018).

Lack of Awareness and Knowledge Gaps

Additionally, there is a significant knowledge gap and lack of awareness regarding renewable energy technologies among the Nigerian populace. Many citizens are unfamiliar with the benefits of renewable energy, leading to a reliance on traditional energy sources. This lack of awareness extends to policymakers, who may not fully understand the implications of transitioning to a renewable energy-based economy. Educational initiatives and awareness campaigns are crucial for promoting the benefits and feasibility of renewable energy solutions (Ezeabasili & Okechukwu, 2022).

Environmental Concerns

Another challenge is the environmental impact of renewable energy projects. While renewable energy is often touted as a cleaner alternative to fossil fuels, projects like large-scale hydroelectric dams can have detrimental effects on local ecosystems and communities. Concerns regarding land acquisition, displacement of local populations, and environmental degradation can lead to opposition from affected communities, complicating the implementation of renewable energy initiatives (Bangbose et al., 2019).

Technological Limitations

The current technological landscape for renewable energy in Nigeria is still developing. Limited access to advanced technologies and expertise restricts the efficient deployment of renewable

energy systems. This gap affects the quality and reliability of energy produced from renewable sources.

Strategies of mitigating the Challenges of Renewable Energy Adoption

Adopting renewable energy comes with challenges such as high initial costs, technological limitations, intermittency issues, and infrastructure needs. However, various strategies can help mitigate these challenges to ensure smoother adoption and integration of renewable energy sources. Below is a list of strategies to address these challenges:

Improving Energy Storage Technologies

One of the primary challenges of renewable energy sources like solar and wind is their intermittency. Energy storage solutions, particularly battery technologies, are essential to storing surplus energy generated during peak times and releasing it when demand exceeds supply. Recent advancements in battery technology, such as lithium-ion and solid-state batteries, have improved energy storage capacity and efficiency. According to O'Shaughnessy (2019), enhancing storage technologies not only helps balance supply and demand but also increases the reliability of renewable energy.

Government Incentives and Policy Support

To encourage renewable energy adoption, governments need to offer policy support and financial incentives. Subsidies, tax credits, and feed-in tariffs can help lower the financial burden associated with the high initial costs of renewable energy projects. Strong regulatory frameworks also promote investment and innovation in the sector. Muench (2020) mentioned that policy instruments such as renewable portfolio standards and carbon pricing mechanisms create market conditions that favour the development and deployment of renewable technologies.

Public awareness and education campaigns

Public perception and awareness play a significant role in renewable energy adoption. Many individuals are unaware of the environmental and economic benefits of renewable energy. Educational campaigns and awareness programs can bridge this knowledge gap. As noted by Sovacool and Griffiths (2021), increasing public understanding of the benefits of renewable energy, particularly its role in reducing carbon emissions, is essential for garnering public support and encouraging investment in sustainable energy practices.

Enhancing Technological Innovation

Continuous research and development in renewable energy technologies are critical for overcoming technical challenges such as low efficiency, high costs, and geographical limitations. Technological innovation can lead to the development of more efficient solar panels, more robust wind turbines, and lower-cost bioenergy solutions. Breakthroughs in material science, nanotechnology, and energy conversion processes are crucial to improving the overall performance and cost-effectiveness of renewable energy systems.

Fostering International Collaboration

INTERNATIONAL JOURNAL OF EDUCATIONAL AND SCIENTIFIC RESEARCH

FINDINGS, MAY, 2025, ISSN: 2749-7481 VOL. 7 NO.1, GERMANY

International cooperation is essential for sharing knowledge, technology, and resources needed to tackle global energy challenges. Collaborative efforts between countries can lead to the development of standardised technologies, the exchange of best practices, and the pooling of financial resources for large-scale renewable projects.

METHODOLOGY

Needs assessment survey design was adopted for this study which was carried out in Nigeria. The targeted population for the study comprised all Environmental Scientist and Economist in Nigeria (precisely in Akwa Ibom Enugu States). A stratified random sampling technique was used to select 50 environmental scientists and 30 economists each from Akwa Ibom State and Enugu State and this gave a total of 160 respondents used for the study. The instrument used for data collection was a structured questionnaire titled “Renewable Energy and Sustainable Industrialization Questionnaire (RESIQ)”. Face and content validation of the instrument was carried out by an expert in test, measurement, and evaluation in order to ensure that the instrument had the accuracy, appropriateness, and completeness for the study under consideration. The reliability coefficient obtained was 0.85, and this was high enough to justify the use of the instrument. The researcher subjected the data generated for this study to appropriate statistical technique such descriptive analysis to answer research questions.

RESULTS AND DISCUSSIONS

Research Question 1

The research question sought to find out the types of renewable energy needed for sustainable industrialization and economic development of Nigeria. To answer the research question a percentage analysis was performed on the data, (see table 1).

Table 1

Percentage analysis of the types of renewable energy needed for sustainable industrialization and economic development of Nigeria.

TYPES	FREQUENCY	PERCENTAGE
Hydropower	145	33.56* *
Solar Energy	121	28.01
Wind Energy	89	20.60
Biomass Energy	54	12.50
Geothermal Energy	23	5.32*
TOTAL	432	100%

** The highest percentage frequency

* The least percentage frequency

SOURCE: Field survey

The above table 1 presents the percentage analysis of the types of renewable energy needed for sustainable industrialization and economic development of Nigeria. From the result of the data analysis, it was observed that “Hydropower” 145(33.56) was rated the highest types of renewable energy needed for sustainable industrialization and economic development of Nigeria, while “Geothermal Energy” 23(5.32) was rated the least. The result therefore is in

**INTERNATIONAL JOURNAL OF EDUCATIONAL AND SCIENTIFIC RESEARCH
FINDINGS, MAY, 2025, ISSN: 2749-7481 VOL. 7 NO.1, GERMANY**

agreement with the research findings of Johnstone & Newell (2018), who noted that large-scale hydropower projects can have significant environmental and social impacts, including habitat disruption and displacement of communities.

Research Question 2

The research question sought to find out the effects of renewable energy on economic development of Nigeria. To answer the research percentage analysis was performed on the data, (see table 2).

Table 2
Percentage analysis of the effects of renewable energy on economic development of Nigeria.

EFFECTS	FREQUENCY	PERCENTAGE
Job Creation and Economic Opportunities	151	30.63**
Sustainable Economic Growth and Diversification	135	27.38
Environmental Benefits and Public Health	92	18.66
Enhancing agricultural productivity	46	16.84
Enhancing Energy Security and Access	32	6.49*
TOTAL	493	100%

** The highest percentage frequency

* The least percentage frequency

SOURCE: Field survey

The above table 2 presents the percentage analysis of the effects of renewable energy on economic development of Nigeria. From the result of the data analysis, it was observed that “Job Creation and Economic Opportunities” 151(30.63) was rated the highest effects of renewable energy on economic development of Nigeria, while “Enhancing Energy Security and Access” 32(6.49) was rated the least effects. The result therefore is in agreement with the research findings of an expert in the related and same field.

Research Question 3

The research question sought to find out the challenges of renewable energy adoption in Nigeria. To answer the research percentage analysis was performed on the data, (see table 3).

Table 3
Percentage analysis of the challenges of renewable energy adoption in Nigeria.

CHALLENGES	FREQUENCY	PERCENTAGE
Inadequate infrastructure	112	29.63**

**INTERNATIONAL JOURNAL OF EDUCATIONAL AND SCIENTIFIC RESEARCH
FINDINGS, MAY, 2025, ISSN: 2749-7481 VOL. 7 NO.1, GERMANY**

High Initial Capital Costs	98	25.93
Technological Limitations	73	19.31
Lack of Awareness and Knowledge Gaps	51	13.49
Environmental Concerns	44	11.64*
TOTAL	378	100%

** The highest percentage frequency

* The least percentage frequency

SOURCE: Field survey

The above table 3 presents the percentage analysis of the challenges of renewable energy adoption in Nigeria. From the result of the data analysis, it was observed that “Inadequate infrastructure” 112(29.63) was rated the greatest challenge of renewable energy adoption in Nigeria, while “Environmental Concerns” 44(11.64) was rated the least challenge. The result therefore is in agreement with the research findings of Iledare (2018), who noted that inadequate infrastructure as caused by financial limitation are compounded by limited access to financing options, as local banks and financial institutions are often hesitant to fund renewable energy projects due to perceived risks.

Conclusion

The needs assessment of renewable energy prospects in Nigeria underscores its pivotal role as a catalyst for sustainable industrialisation and economic development. The result of the data analysis concluded that “Hydropower” among other types of renewable energy, is the most needed for sustainable industrialisation and economic development in Nigeria. It also showed that “job creation and economic opportunities,” among other effects of renewable energy, were the highest on the economic development of Nigeria. Finally, it also portrayed “inadequate infrastructure” as the greatest challenge of renewable energy adoption in Nigeria, among other challenges faced. By harnessing diverse renewable resources such as solar, wind, and biomass, Nigeria can address its energy deficits while promoting environmental sustainability and economic resilience. The integration of renewable energy into the national grid not only supports industrial growth and job creation but also enhances energy security and reduces dependency on fossil fuels. For Nigeria to fully capitalise on these opportunities, strategic investments, policy reforms, and community engagement are essential, positioning renewable energy as a cornerstone for a sustainable and prosperous future.

Recommendations

- Government incentives and policy support should foster sustainable growth by encouraging innovation, investment, and equitable access to resources, ultimately driving economic resilience and social progress.
- To enhance the efficiency and adoption of renewable energy systems, it is crucial for government incentives and policy support to prioritize the advancement of energy storage technologies, fostering a reliable and sustainable energy infrastructure.
- The government should prioritise the development of a comprehensive policy framework that supports renewable energy investments, including incentives for private sector participation and public-private partnerships.

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**INTERNATIONAL JOURNAL OF EDUCATIONAL AND SCIENTIFIC RESEARCH
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