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Tracking Recent Renewable Energy Initiatives

OALP ESG NEWSLETTER

INTRODUCTION

"Nigeria can provide sustainable energy for all its citizens in a cost-effective manner. Nigeria has a unique opportunity to develop a sustainable energy system based on renewables that support socioeconomic recovery and development while addressing climate challenges and accomplishing energy security."[1]

It is no news that Nigeria is endowed not only with resources such as natural gas and crude oil but also with abundant renewable energy sources that have the potential to develop solar, hydro, wind, hydrogen, geothermal and ocean power. However, studies have shown that these renewable energy sources in Nigeria have not yet been optimally utilised.[2]

However, notwithstanding Nigeria's overdependence on conventional energy sources, there is currently an appreciable level of growth in the use of renewable energy sources and this Article seeks to track the recent renewable energy initiatives being undertaken in the country.

The advantages of renewable energy are evident with little or no negative impact on the environment. This article discusses the impact of renewable energy on the reduction of carbon emissions, increase in energy access, and its promotion of sustainable development. We also examine some of the challenges to the successful implementation of renewable energy initiatives and proffer recommendations on how these can be addressed.

PREVIOUS RENEWABLE ENERGY INITIATIVES - THE 14 SOLAR IPPS

Despite Nigeria's abundant solar energy capacity, there is currently no solar power plant in Nigeria that produces more than 10MW of electricity. Currently, the largest capacity solar plant in the country is the 10MW facility located at that Challawa Industrial Area in Kumbotso Local Government Area of Kano State.

In 2016, the Nigerian Bulk Energy Trading Company (**NBET**), entered into power purchase agreements (**PPAs**) with several developers to design, build, finance, and operate 14 solar Independent Power Producers (**IPPs**) totalling 1,200 MW in capacity (the **14 Solar IPPs**).[3]

However, when the project developers attempted to get guarantees from the Federal Government of Nigeria (FGN), they encountered several hurdles after signing their PPAs in July 2016. One of the assurances they sought from the FGN was the Put-Call Option Agreement (**PCOA**).

1. *IRENA, Renewable Energy Roadmap Nigeria, https://energy.gov.ng/reports/IRENA_REMap_Nigeria_2023.pdf*
2. *International Bar Association, renewable energy in Nigeria: law, regulations, trends and opportunities Renewable energy in Nigeria: law, regulation, trends and opportunities | International Bar Association (ibanet.org) last accessed 16 march 2024.*
3. *Proximo https://www.proximoinfra.com/articles/6766/nigerian-solar-the-path-to-bankability last accessed 16th may 2024*

This agreement would have permitted the developers of the Solar IPPs to "put" their solar plants up for sale. In the event that the project is failing for reasons that are within the FGN's control but not the IPP's, the FGN is obligated to purchase the plant at the agreed-upon price. If the Solar IPP violates its operating agreements, the PCOA also gives the FGN the authority to "call" for the asset to be sold to the FGN.

However, as a result the refusal of the FGN to provide sovereign guarantees to the 14 Solar IPPs or to execute the PCOAs, the initiative failed to progress as anticipated. Thus, none of the 14 Solar IPPs reached financial close, despite the FGN's attempts to encourage investment in green IPPs and apparent investor demand for the projects.

RECENT RENEWABLE ENERGY INITIATIVES

In recent years, there has been a notable push to explore renewable energy sources in Nigeria, driven by a heightened awareness of their sustainability advantages. This suggests a gradual transition away from fossil fuels as the dominant force in the energy sector, with increasing attention directed towards the potential of renewable energy sources in Nigeria. This section will delve into various renewable energy projects that have been initiated in Nigeria in recent times.

LEGISLATIVE AND POLICY INITIATIVES

Concerted efforts have been made by the Nigerian government in recent years to promote the development and deployment of renewable energy, through policies and initiatives. These include:

The National Renewable Energy and Energy Efficiency Policy (NREEEP):

This sets out a framework for action to address the challenges of Nigerians to

- inclusive access to modern and clean energy resources;
- improved energy security; and
- climate objectives;

NREEEP recognises that rural areas are remote, have low demand densities, and rely on off-grid energy solutions because the economics of on-grid deployment do not favor rural electrification. Therefore, it calls for improving the nation's energy supply and the need for making better use of renewable energy sources. This policy advances the idea that renewable energy and energy efficiency can be seen as complementary to each other and as a means of achieving cleaner, greener energy since it lowers inefficient usage and increases availability to electricity for users. Thus, NREEEP aims to serve as a blue print for sustainable development as well as coordinate and act as a comprehensive way to drive the harnessing of hydropower, biomass, solar and wind as energy sources.

The Renewable Energy Master Plan (REMP):

The REMP articulates Nigeria's vision and sets out a road map for increasing the role of renewable energy in achieving sustainable development. The policy primarily addresses Nigeria's need for increased electricity supply, improved grid reliability and security. The REMP seeks to increase the share of renewable electricity in Nigeria, from 13% of electricity generation – mainly sourced from large hydro sources – in 2015, to 23% in 2025 and 36% by 2030.

Nigeria Climate Change Act of November 2021:

The Climate Change Act was enacted to provide Nigeria with a legal framework for the country to achieve its climate goals, long-term social and economic sustainability, and resilience. This Follows the President of Nigeria's commitment made at the COP 26 in Glasgow to Nigeria becoming net zero by 2060.

Energy Transition Plan (ETP) (2022):

On August 24, 2022, the FGN launched its Energy Transition Plan designed to simultaneously tackle the challenges of energy poverty and the climate change crisis. The ETP outlines a set of crucial strategies and timelines for reducing emissions across five key sectors: oil and gas, power, transport, cooking, and industry.

The Electricity Act, 2023:

the core objective of the Electricity Act, 2023 (the **Act**) is to provide a holistic integrated policy plan that recognizes all sources for the generation, transmission, and distribution of electricity, including the integration of renewable energy into Nigeria's energy mix. The Act also brings about the establishment of the National Hydroelectric Power Producing Areas Development Commission.

Renewable Energy Roadmap:

In January 2023, the Nigerian government (via the Energy Commission of Nigeria) in conjunction with the International Renewable Energy Agency (**IRENA**) launched the Renewable Energy Roadmap (**REMAP**) in Abu Dhabi, United Arab Emirates at the Abu Dhabi Sustainability Week. REMAP is expected to guide Nigeria in her quest to meet her energy demands through the instrumentality of renewable energy with renewable energy sources expected to account for nearly sixty (60) percent of Nigeria's energy demand in 2050. The roadmap aims to help Nigeria solve its energy deficit crisis whilst also meeting its net emission targets.

This initiative demonstrates how the renewable energy resources of Nigeria can be integrated and scaled-up to achieve a sustainable energy mix both on- and off-grid - while meeting growing energy needs to support the country's development. It provides analysis of the energy types and quantities currently utilised in all sectors of the economy, namely residential, commercial, industry, agriculture and transport. It also predicts how energy types and quantities may evolve in terms of energy conservation and energy efficiency up to 2050.

RECENT RENEWABLE ENERGY PROJECTS AND INITIATIVES IN NIGERIA

1 *Wind*

The generation of power from wind has continued to grow gradually. Small scale wind turbines are being used all over the country for purposes such as water pumping, small scale electrification and battery charging. Currently, a largescale onshore wind turbine is located in the Rimi Local Government Area of Katsina state, with an estimated output capacity of 10 MW. Other small-scale wind turbines that also exist in the country include the 5KW wind energy system installed in Sokoto (Sayyan Gidan Gada) and the 1KW of wind power turbines installed in Bauchi (Kedada) and Katsina (Goronyo) for pumping water.[11]

2 *Solar*

Nigeria's power supply is famously epileptic, with a significant portion of the population lacking access to the national grid. Even those connected, primarily in urban regions, experience frequent brownouts and blackouts. Considering Nigeria's vast solar energy potential as the continent's largest economy, solar power has the capacity to consistently supply electricity to vast areas of the country, if not the entire nation. In Nigeria, both the public and private sectors have made substantial investments towards harnessing solar energy for electricity generation.

Notably, there has been a surge in the adoption of solar energy, particularly for rural electrification purposes. One of the major initiatives that evidences the growth in solar utilization is the Nigerian Sovereign Investment Authority (**NSIA**) solar project.[4] NSIA was appointed in 2018, to assume the role of Funds and Project Manager for the development and construction of a 10MW FGN/Kano Solar Project (the **Project**).[5]

NSIA was tasked with the responsibility of creating a special purpose vehicle (**SPV**) – Haske Solar Company Ltd – with the following ownership structure: Federal Government of Nigeria with 80%, Kano State Government with 15%, and Kumbotso Local Government with 5%.

4. *Chukwuma Chris Okonkwo, Francis Odikpo Edoziuno, Adeolu Adesoji Adediran, Renewable Energy in Nigeria: Potentials and Challenges, Journal Of Southwest Jiaotong University, Vol. 56 No. 3 June 2021 ISSN: 0258-2724 DOI : 10.35741/issn.0258-2724.56.3.44*
5. *NSIA, Kano Solar Project https://nsia.com.ng/portfolio/kano-solar-project/ last accessed 16 March 2024*
6. *NSIA, Kano Solar Project https://nsia.com.ng/portfolio/kano-solar-project/ last accessed 16 March 2024*

The main target of the Project was the installation and operation of a 10MW solar power plant in Challawa Industrial Area in Kumbotso Local Government Area of Kano State, the aim of which is to stimulate investment in the Nigeria power sector. [6]

In January 2023, the erstwhile President of Nigeria commissioned the 10-Megawatt Kano Solar Power Project in Kumbotso Local Government, Kano State, funded and managed by the NSIA. The NSIA envisages that the project will boost growth in the power sector. The Kumbotso solar project, quoted as costing $16 million is said to currently be "the largest grid-connected solar PV plant" and "has provided about 2,000 direct and indirect jobs to the immediate community." The Project, which is expected to power about 200, contributes to Nigeria's attempts toaddress its energy shortage crisis as well as the attainment of its commitment to combat climate change and attain net zero carbon emissions by 2060 as espoused by the ETP.

Another initiative launched by the Federal Government is the Nigeria Electrification Project (**NEP**), which has supported the establishment of 125 mini grids and the sale of over a million Solar Home Systems, through which more than 5.5 million Nigerians have gained access to electricity. NEP has also resulted in the creation of over 5,000 private-sector local green jobs in Nigeria.

In 2022, the Kebbi State Government allocated 200 hectares of land to a private investor to set up a 5,600 megawatts solar power plant in the state.[7] The project will be located at Fakon Sarki in Argungu and has been designed to improve and stabilise electricity supply to all communities in the state, as well as to create jobs. The project is currently at the announcement stage as construction is set to kickstart in 2025 while commencement of operations is slated for 2027.

On 1st December, 2020, the FGN, through its implementing Agency, Rural Electrification Agency (**REA**), which aims to support economic recovery in response to the COVID-19 pandemic, launched an initiative as part of the Economic Sustainability Plan (**ESP**) to achieve the roll out of 5 million new solar connections in off grid communities (**Solar Power Naija Initiative**).[8] Generally, the ESP's goals are to create jobs in manufacturing, services, and agriculture; invest in information technology, roads, bridges, and other infrastructure; and support the underprivileged through social investment programs.

Thus, the Solar Power Naija Initiative introduced as a result of the ESP was intended to expand energy access to 25 million individuals (5 million new connections) through the provision of Solar Home Systems (SHS) or connection to a mini grid, increase local content in the off grid solar value chain and facilitate the growth of the local manufacturing and assembly industry and incentivize the creation of 250,000 new jobs in the energy sector.

On December 14, 2023, the World Bank approved the Nigeria Distributed Access through Renewable Energy Scale-up (**DARES**) project, which is financed by an International Development Association (**IDA**) credit of $750 million and will leverage over $1 billion of private capital and significant parallel financing from development partners. The DARES program will enable the Federal Government of Nigeria to coordinate and finance all off-grid electrification efforts and will help states access technical assistance to develop institutional capacity and policy frameworks for rooftop solar.[9]

Also, in 2023 Sun Africa LCC pledged $2.2 billion to develop Nigeria's power sector. The project's initial phase will focus on delivering 961 MWp of solar PV infrastructure and 455 MWh of battery energy storage, valued at approximately $2.2 billion[10],

Other solar initiatives and projects in Nigeria currently under implementation or completed includes but not limited to the projects in Table 1

7. *NIPC, https://www.nipc.gov.ng/2022/06/27/kebbi-allocates-land-for-5600mw-solar-power-project/*
8. *Solar Power Naija (rea.gov.ng) accessed 7 April 2024*
9. *Nigeria to Expand Access to Clean Energy for 17.5 Million People (worldbank.org) accessed on 7 April 2024*
10. *Sun Africa pledges to commit $2.2bn into power project in Nigeria – Minister (premiumtimesng.com) accessed on 7 April 2024*

Gezhouba Lagos Solar PV Park

The 360MW Gezhouba Lagos Solar PV Park is located in Lagos, Nigeria. It is being developed by Falcore Power and Energy. The Solar PV project is currently in permitting stage. The commercial operation of the project is expected in 2026.

Lafia Solar PV Park

The Lafia Solar PV Park is a 350MW Solar PV power project. It is planned in Nasarawa, Nigeria. The project is currently in permitting stage. It will be developed by Sun Africa, Sterling and Wilson. Post completion of construction, the project is expected to get commissioned by 2026. Niger Delta Power is the owner of the project

Gombe Solar PV Park

The 270MW Solar PV project, Gombe Solar PV Park is expected to get commissioned by 2026. It is being developed by Sun Africa, Sterling and Wilson. The project is currently in permitting stage. Niger Delta Power is the owner of the project is currently in permitting stage. Niger Delta Power is the owner of the project

Argungu Solar PV Park

The Argungu Solar PV Park is a 5,600MW Solar PV power project located in Kebbi, Nigeria. The project is currently in announced stage. The project is expected to enter commercial operation in 2027.

Jigawa Solar PV Park.

Jigawa Solar PV Park is a 1,000MW Solar PV power project in Jigawa, Nigeria. The project is expected to come online by 2025. The project is currently in announced stage

Sun Africa Solar PV Park

The Project is a Solar PV Park set to deliver 961 MWp of solar PV infrastructure and 455 MWh of battery energy storage, valued at approximately $2.2bn.

Kano Solar PV Park

This Project entails the installation and operation of a 10MW solar power plant in Challawa Industrial Area in Kumbotso Local Government Area of Kano State. The project is currently completed.

Ongoing projects

Announced

Completed

3

Hydro

Currently, hydro energy poses to be the most utilized power resource for electrical power generation and supply in Nigeria. This is no surprise given the nation's abundant water supply which are being adequately leveraged. One of the notable efforts in Nigeria to utilize hydro energy is the Zungeru hydropower project.

In February 2023, the Federal Government of Nigeria announced the concession of the Zungeru Hydroelectric Power Plant, Nigeria's second-largest hydroelectricity power station. This is a 700MW hydroelectric facility being built in the upper and middle reaches of the Kaduna River in the Niger State of Nigeria.[12] The project is estimated to cost $1.3bn and the concession, which is for a term of 30 (thirty) years was awarded to Mainstream Energy Solutions Limited.

The concession was approved by the Federal Government at the meeting of the National Council on Privatisation in December 2023. The Zungeru project is estimated to generate 2.64 billion kWh of electricity a year, which will meet close to 10% of Nigeria's total domestic energy needs. With its four 175 MW hydroelectric turbines, Zungeru is the largest power plant financing project in sub-Saharan Africa.[13] More so, the Kano State government has announced the completion of a 10MW hydropower plant at Tiga Dam located in Bebeji LGA. The energy supplied by the plant is intended to serve streetlights in the state alongside the state's water treatment plant at Tamburawa.

IMPACT OF THE RENEWABLE ENERGY INITIATIVES IN THE NIGERIAN ENERGY SECTOR

Renewable energy sources present a potential solution to the energy challenges facing the country. By expanding the access and utilization of renewable energy , Nigeria could benefit in numerous ways. The following are some of the impact of renewable energy initiatives in Nigeria.

Energy Access:

Over the years, Nigeria has struggled to meet the electricity needs of its populace, leading to significant hardships. One persistent issue in the electricity sector is frequent power grid failures. According to reports, a staggering 92 million Nigerians lack access to electricity, with only about 44% of the population having intermittent access. Even among those with access, 24-hour availability is far from guaranteed, unlike in other parts of the continent. Across various regions of Nigeria, abundant sunshine and wind present opportunities for renewable energy utilization. The implementation of the renewable energy initiatives has notably improved electricity access, especially for rural communities currently off the grid.

Stable and Efficient Power Supply for Businesses:

The escalating energy costs have forced many businesses in Nigeria to either shut down or inflate their prices to compensate. A staggering 40% of Nigerian households resort to generators for electricity, exacerbated by the soaring prices of petrol and diesel, which have surged by over 100% in the past year alone. The unreliable power supply in the country, according to the World Bank, translates to an annual economic loss of $26.2 billion. Amidst these challenges, an increasing number of businesses are turning to renewable energy as a viable alternative. By embracing renewable energy solutions, businesses gain greater control over their energy supply, reducing reliance on costly fuel for generators. Additionally, transitioning to renewable energy enables businesses to eliminate excessive expenses associated with erratic power supply and exorbitant electricity bills.

11. *Ibid*
12. *Bureau of Public enterprise, Zungeru hydropower project, https://www.bpe.gov.ng/zungeru-hydropower-project/ last accessed 16 march 2024*
13. *Bureau of Public enterprise, Zungeru hydropower project, https://www.bpe.gov.ng/zungeru-hydropower-project/ last accessed 16 march 2024*

Sustainability:

The adoption of renewable energy in Nigeria corresponds with global efforts to address climate change. Like many other nations, Nigeria faces environmental challenges associated with the extraction and combustion of fossil fuels. Transitioning to renewable energy sources has proven effective in mitigating these environmental impacts, notably by reducing carbon emissions and fostering a cleaner, more sustainable future. With Nigeria aiming for net zero emissions by 2060, it is evident that the initiatives currently underway are integral to achieving this target. By prioritizing renewable energy, Nigeria can significantly decrease its carbon footprint, mitigate the impacts of climate change, and contribute to a more environmentally sustainable trajectory. This strategic shift not only aligns with international climate goals but also demonstrates Nigeria's commitment to environmental stewardship and sustainable development.

Job Creation and Economic Growth:

The renewable energy sector is a catalyst for job creation. As Nigeria invests in solar projects, it opens up opportunities for skilled and unskilled labour. Moreover, the growth of the renewable energy industry contributes to economic diversification, reducing the country's dependence on oil revenue and fostering a more resilient economy. Thus, the renewable energy initiative is helping to advance economic growth.

CHALLENGES TO THE SUCCESSFUL IMPLEMENTATION OF THE RENEWABLE ENERGY INITIATIVES IN NIGERIA

While Nigeria has a wealth of clean energy resources and opportunities, there are also several challenges that need to be addressed to facilitate the transition to a sustainable energy future:

Access to Funding:

Despite its immense potential, renewable energy still receives inadequate funding. In 2021, the federal government acknowledged that Nigeria would need over $400 billion to effectively transition to cleaner energy sources and reduce dependence on fossil fuels. However, between 2010 and 2020, Nigeria only attracted a total of USD 509 million in renewable energy investments. Securing sufficient financing for large-scale renewable energy projects necessitates a robust collaboration between the public and private sectors, along with government commitments and guarantees. The scarcity of funding presents challenges for renewable energy developers in realizing their projects.

Infrastructure and Investment:

Investing in wind and solar energy proves to be more beneficial when considering lifespan costs. However, a significant barrier to renewable energy development is the lack of infrastructure. The current infrastructure predominantly supports fossil fuel and nuclear plants, making it ill-equipped to handle large-scale integration of renewable energy sources. Moreover, some prime renewable energy sources lack necessary infrastructure altogether. The aging energy infrastructure poses a critical challenge. Most electric transmission and distribution lines were erected during the 1950s and 1960s, surpassing their expected 50-year lifespan. Consequently, these structures are inadequate to meet current demands and cope with the impacts of severe climatic changes. Urgent reform of the existing energy infrastructure is imperative to facilitate the transition to renewable energy and ensure reliable power supply amidst evolving environmental challenges.

High Installation Costs:

Solar and wind energy are among the cheapest sources of energy. However, there is a significant disparity in the upfront installation costs between solar power systems and gas-fired plants. Large-scale solar power systems have an installation cost of around $2,000 per kilowatt, while small-scale residential systems typically cost around $3,700 per kilowatt. In contrast, the installation cost for a new gas-fired plant is only $1,000 per kilowatt. This substantial difference in installation costs is huge. The high upfront investment required for solar power systems often leads investors and lenders to perceive renewables as high-risk investments. In comparison, the lower installation costs of fossil fuel plants make them more acceptable to investors and lenders. This perception of risk versus reward often influences investment decisions in the energy sector, posing a challenge for the widespread adoption of renewable energy despite its long-term cost-effectiveness.

Power Storage:

A critical drawback of renewable energy is the lack of affordable power storage solutions. Unlike fossil fuel plants, which can generate power on demand, renewable energy sources such as solar and wind generate electricity intermittently and may not align with peak demand hours. This intermittency poses a challenge as solar and wind energy production fluctuates based on weather conditions. The unpredictability of solar and wind energy contributes to volatility in both generation and load management. Without effective energy storage solutions, excess energy generated during peak production periods goes to waste, while insufficient energy may be available during times of high demand.

While Nigeria has a new plan for energy transition for a universal energy access by 2030 and a carbon-neutral system by 2060, it is necessary to ensure a detailed action plan with clear targets and timelines for effective monitoring and attainment of the objectives of the plan.[14]

RECOMMENDATIONS

Nigeria's transition to a clean energy economy is vital for its long-term economic growth and environmental sustainability. However, issues such as currency convertibility concerns, funding shortages, and a lack of technology and experience act as major obstacles to scaling up the renewable energy sector.[15] Addressing these challenges will require focused efforts and viable solutions. Nigeria's ongoing reforms have shown promising results, particularly in the solar power sector, presenting significant opportunities for renewable energy development. For instance, in August, the World Bank announced plans to support the construction of 1,000 mini solar power grids in collaboration with the government and private sector.

Investing in renewable energy can reduce Nigeria's reliance on fossil fuels, improve air quality, mitigate global warming, and bolster the overall economy. While achieving this transition will demand substantial time and resources, it is achievable. Solutions include addressing currency risks, mobilizing funding through public-private partnerships, investing in technological innovation and capacity building, and continuing policy reforms to create an enabling environment for renewable energy investments. By adopting these measures, Nigeria can accelerate its shift towards clean energy and reap the associated benefits for sustainable development.

Some of the recommendations for the successful implementation of the renewable energy initiatives in Nigeria include:

- ***Policy Stability and Support: :***

The Government should initiate consistent and supportive government policies that prioritize renewable energy development. Clear and stable regulatory frameworks provide confidence to investors and help drive long-term growth in the sector. For example, the Supplementary Order to the Multi-Year Tariff Order 2024 has now ensured the imposition of a Renewable Purchase Obligations on DisCos which mandates that a minimum of 16MW (50%) of embedded generation capacity be sourced from renewable energy sources.[16] It is intended that this would promote investment in the renewable energy sector.

- ***Investment Incentives:***

Government should provide financial incentives and grants to attract investment in renewable energy projects. This can help offset the high initial costs and encourage private sector participation. For instance; the FGN has exempted the sale of renewable energy equipment from the application of Value Added Tax in the VAT (Modification) Order 2021. More so, the Finance Act 2022, now allows companies engaged in renewable energy projects to be eligible for Pioneer Status.

- ***Capacity Building:***

Investment in education, training, and skills development programs to build a competent workforce specialized in renewable energy technologies. This includes training engineers, technicians, and policymakers to effectively plan, implement, and manage renewable energy projects.

14. *World Bank NEP, https://rea.gov.ng/world-bank-nep-intervention-rescuing-nigerias-communities-darkness/#:~:text=The%20World%20Bank%20recently%20announced,and%20technological%20limitations%20remain%20challenges. Last accessed 16th may 2024*
15. *International Energy Agency, https://iea.blob.core.windows.net/assets/5afce034-9bd7-451a-ac36-1b35c63aaf5e/FinancingCleanEnergyinAfrica.pdf last accessed 16th May 2024*
16. *Paragraph 11, supplementary order to MYTO 2024.*

- *.Research and Development (R&D):*

Allocate resources to research institutions and universities to conduct R&D activities aimed at improving renewable energy technologies, reducing costs, and increasing efficiency. Encouraging innovation can drive advancements in solar, wind, hydro, and other renewable energy sources.

- *Public-Private Partnerships (PPPs):*

Foster collaboration between the government, private sector, and international organizations through PPPs. Leveraging private sector expertise, resources, and technology can accelerate the deployment of renewable energy infrastructure.

- *Infrastructure Development:*

Substantial investment should be made in the development of renewable energy infrastructure, including grid expansion, energy storage systems, and transmission networks. Upgrading existing infrastructure and building new facilities can enhance the reliability and stability of renewable energy systems.

- *Community Engagement:*

Government should involve local communities in the planning and implementation of renewable energy projects to ensure their needs and concerns are addressed. Community engagement fosters acceptance and support for renewable energy initiatives, leading to smoother project implementation.

- *Awareness and Outreach:*

More public awareness campaigns should be conducted to educate citizens about the benefits of renewable energy and encourage sustainable energy consumption practices. Increasing awareness can drive demand for renewable energy solutions and foster a culture of environmental stewardship.

- *Monitoring and Evaluation:*

There should be well established mechanisms for monitoring, evaluating, and reporting on the progress and impact of renewable energy initiatives. Regular assessment ensures accountability, identifies areas for improvement, and informs future decision-making.

- *International Cooperation:*

Collaborate with international partners, organizations, and donors to access funding, expertise, and best practices in renewable energy development. International cooperation can facilitate technology transfer, capacity building, and knowledge sharing to accelerate progress towards renewable energy targets.

- *Energy Storage:*

One of the main challenges is overcoming the erratic nature of renewable energy sources, such wind and solar power. Creating energy-storage technologies, such as batteries, can aid in storing extra energy for use at a later time and guarantee a steady power supply. This can be done by creating Solar energy storage systems based around batteries – whether Lithium-ion, lead-acid, nickel-cadmium or nickel-metal hydride – which can store energy that has been captured by solar panels

CONCLUSION

The importance of renewable energy to the society cannot be overemphasized. In spite of its abundance, Nigeria has not been able to exploit fully these resources with less environmental and climate impact. In fact, on the contrary, the nation's energy source has primarily been dependent on fuel wood and fossil fuels.

These energy resources have been overutilized and exploited in no small measure and have thereby resulted in dire environmental consequences. The complete transition from the use and exploitation of conventional energy sources to renewable energy sources in Nigeria has been long-overdue. Thus, the FGN needs to do more to ensure that more access to these energy sources is provided as this would help advance the Sustainable Development Goals (**SDGs**) and protect our environment in the long-term.

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