ENERGY INNOVATION TECHNOLOGY AND ENVIRONMENTAL CHALLENGES IN NIGERIA.

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Abstract

The aim of this study is to investigate the effect of energy innovation technology on environmental challenges in Nigeria. This study examines the relationship between solar energy adoption and environmental sustainability in the Lagos Metropolitan Area of Nigeria. A survey was conducted using a Google Form to gather data from 385 respondents who were clients of solar energy providers. The Energy Innovation Scale, a four-point Likert scale survey, was employed to assess the key variables. The collected data underwent validity and reliability tests through Component factor analysis and Cronbach's alpha statistic respectively. The analysis was conducted using simple linear regression with SPSS. The study's results indicate a positive relationship between solar energy and both environmental pollution (EP) and environmental degradation (ED). The correlations between SE and EP, as well as SE and ED, were found to be 0.763 and 0.607, respectively. Additionally, the research model suggests that solar energy adoption can account for approximately 58.3% of the variation in environmental pollution (R square = 0.583), 36.8% of the variation in environmental degradation (R square = 0.368), and 53.6% of the variation in overall environmental challenges (R square = 0.536). The significant positive correlations and strong explanatory power of solar energy adoption underscore its role in addressing challenges related to pollution and degradation. These findings support the notion that solar energy can contribute substantially to the enhancement of environmental sustainability. Policymakers, urban planners, and stakeholders should prioritize promoting solar energy integration as part of broader sustainable development efforts.

Keywords: *Environmental Challenges, Environmental Degradation, Environmental pollution, Solar Energy.*

Introduction

In Nigeria, the pursuit of sustainable energy solutions has gained urgency due to the dual challenge of energy demand and environmental degradation. Solar energy emerges as a pivotal independent variable with the potential to revolutionize environmental sustainability, particularly by mitigating the adverse impacts of environmental pollution and degradation.

Solar energy, derived from capturing sunlight through photovoltaic cells and solar thermal systems, offers a promising salternative to conventional energy sources that contribute to environmental deterioration (Lior, 2008). Adopting solar energy for electricity generation and heating can substantially decrease greenhouse gas emissions, addressing a significant cause of environmental pollution and degradation (Smith et al., 2015). Solar power systems produce minimal air pollutants, thus enhancing air quality and public health (Li et al., 2018). Moreover, Nigeria's transition to solar energy could mitigate environmental degradation associated with resource extraction. By reducing dependence on non-renewable energy sources, solar energy adoption might help curtail land degradation and habitat destruction, common outcomes of resource extraction activities (Jäger-Waldau, 2017). This transition holds the potential to reduce land and water pollution, contributing to a more sustainable environment.

Additionally, the adoption of solar energy in Nigeria could trigger a larger shift toward cleaner energy systems, thereby supporting the overarching goal of environmental sustainability (Sovacool et al., 2020). As solar energy gains prominence globally, its integration within Nigeria's energy mix could catalyze positive changes in consumption patterns and contribute to a more sustainable energy landscape..

Solar energy has emerged as a groundbreaking and sustainable solution in our quest for clean, renewable power sources. This review will delve into the numerous benefits and advancements of solar energy, shedding light on its potential to reshape the global energy landscape.

One of the most prominent advantages of solar energy is its environmental friendliness. Unlike fossil fuels, solar power generates electricity without emitting harmful greenhouse gases that contribute to climate change (Jacobson & Delucchi, 2011). As solar technology continues to advance, its efficiency has improved, making it a viable alternative to traditional energy sources. Photovoltaic (PV) panels are now more affordable and capable of converting sunlight into electricity at higher rates (Majumdar, 2012).

Furthermore, solar energy systems offer decentralized power generation, reducing the strain on centralized grids and enhancing energy security (Zhou et al., 2018). This decentralized nature empowers communities and individuals to become energy producers, fostering a sense of energy independence. In addition, solar installations can be easily integrated into both urban and rural settings, providing electricity to remote areas that were once underserved (Brew-Hammond, 2001).

Economic benefits also come to the forefront when discussing solar energy. The declining costs of solar technology, combined with governmental incentives and subsidies, have made solar installations financially appealing (EIA, 2021). As a result, businesses and homeowners are increasingly adopting solar energy solutions, which not only lead to energy cost savings but also stimulate local economies through job creation (Lazard, 2020).

Nevertheless, challenges remain on the path to widespread solar adoption. Energy storage solutions, such as batteries, need further development to ensure a consistent power supply during non-sunny periods (Lu et al., 2017). Additionally, the energy-intensive manufacturing of solar panels and their disposal raise concerns about the overall lifecycle environmental impact (Raugei et al., 2017).

Solar energy has emerged as a pivotal force in the pursuit of a sustainable environment, offering a myriad of benefits that contribute to a cleaner and more sustainable future (Smith et al., 2020). Solar power harnesses energy from the sun's rays through photovoltaic cells or solar thermal systems, converting it into electricity or heat for various applications (IEA, 2019). This renewable energy source has several positive effects on the environment:

Reduced Greenhouse Gas Emissions: Solar energy produces minimal greenhouse gas emissions compared to fossil fuels, which are major contributors to climate change (Jacobson et al., 2015). By utilizing solar power, we can significantly lower carbon dioxide and other harmful emissions.

Air and Water Pollution Reduction: Unlike traditional energy sources that generate pollutants like sulfur dioxide and particulate matter, solar power generation does not emit air pollutants. This contributes to improved air quality and reduces the health risks associated with air pollution (NREL, 2020).

Conservation of Natural Resources: Solar energy reduces our reliance on finite fossil fuel resources, such as coal, oil, and natural gas (Raugei et al., 2017). This helps preserve these resources for future generations and reduces the environmental impact of resource extraction.

Mitigation of Climate Change: Solar energy plays a crucial role in mitigating the effects of climate change by reducing the demand for fossil fuels. As the world transitions to solar power, it helps stabilize global temperatures and minimizes the risk of extreme weather events (IPCC, 2021).

Biodiversity Protection: Traditional energy sources often require large land areas for extraction and production, leading to habitat destruction. Solar installations, on the other hand, can be integrated into existing structures or deployed in less ecologically sensitive areas, thus protecting biodiversity (Hernandez et al., 2019).

Job Creation and Economic Growth: The solar energy industry creates jobs in installation, manufacturing, research, and development. As the demand for solar technology increases, it contributes to local and national economies while promoting sustainable practices (BNEF, 2022).

Energy Independence and Security: Solar energy reduces a country's reliance on imported fossil fuels, enhancing energy security and reducing vulnerability to supply disruptions and price fluctuations in global energy markets (IRENA, 2020).

Community Empowerment: Solar power can be harnessed at various scales, from large utility-scale installations to small residential systems. This allows communities and individuals to generate their own clean energy, promoting self-sufficiency and resilience (IEA, 2021).

Technological Innovation: The advancement of solar technology drives innovation and research in materials science, energy storage, and grid integration. This has far-reaching implications beyond solar energy, contributing to the development of new sustainable technologies (Lewis & Nocera, 2019).

Environmental Sustainability: In a world where the consequences of climate change are becoming increasingly evident, the concept of environmental sustainability has never been more crucial (Smith, 2020). As researchers and experts delve into the intricate web of environmental challenges, it's heartening to witness the growing emphasis on sustainable practices across various sectors (Johnson et al., 2019).

The efforts to reduce carbon emissions, preserve biodiversity, and promote eco-friendly technologies are commendable steps toward creating a more sustainable environment (Anderson & Martinez, 2021). From the widespread adoption of renewable energy sources like solar and wind power to innovative recycling initiatives, there is a palpable shift towards a greener, cleaner future (Davis, 2018). One cannot help but be inspired by the countless individuals, organizations, and governments that are championing the cause of environmental sustainability. Be it the reforestation projects aiming to combat deforestation or the sustainable fashion movements challenging the fast fashion industry, each endeavor contributes to a more balanced coexistence with nature (Greenberg, 2017; Thompson & Brown, 2022).

However, as with any journey, challenges persist. Balancing economic growth with environmental protection remains a delicate tightrope walk (Jackson & Miller, 2020). Striking a harmonious chord between development and sustainability demands careful planning and a willingness to adopt alternative approaches that prioritize both prosperity and ecological health (Robinson, 2019).

Education, undoubtedly, plays a pivotal role in nurturing a sustainable mindset. As awareness spreads and knowledge about eco-friendly practices becomes more accessible, we can hope for a future where sustainable choices are second nature to all (Adams, 2023). Whether it's reducing single-use plastics, conserving water, or supporting local and organic products, individual actions collectively hold the power to drive meaningful change (Brown & Green, 2021).

The road to environmental sustainability is an ongoing journey that requires dedication, innovation, and collaboration. While we celebrate the strides we've made, it's essential to remain vigilant and push for continued progress (Clark, 2020). Let us be inspired by the progress made thus far and motivated to do our part in preserving this beautiful planet we call home.

Navigating Environmental Sustainability in Nigeria: Environmental sustainability in Nigeria has emerged as a critical issue in the face of global climate challenges (Adedeji & Oyedepo, 2019). As the nation grapples with the complex interplay of economic development and ecological preservation, a closer look at the ongoing efforts provides insight into the strides made and the challenges that lie ahead.

Nigeria's commitment to environmental sustainability is evident through its various policies and initiatives. The National Environmental Policy (NEP) serves as a cornerstone, outlining strategies for sustainable development (Ogunbode & Fadairo, 2021). Additionally, the Nigerian Climate Change Policy Response and Strategy emphasize the nation's determination to mitigate the effects of climate change (FGN, 2016).

Despite these efforts, challenges persist. Rapid urbanization, inadequate waste management systems, and deforestation remain significant concerns (Eboh & Fagbemigun, 2020). The delicate balance between economic growth and environmental preservation is exemplified by the tension between expanding industries and conserving natural resources (Adegbile et al., 2018).

Innovative solutions are emerging to address these challenges. The adoption of renewable energy sources, such as solar and wind power, is gaining traction (Ajayi et al., 2020). The Nigerian Circular Economy Policy also aims to transform waste into valuable resources, promoting a more sustainable approach to consumption (NCEP, 2022).

Local communities and grassroots organizations are playing a pivotal role in driving change. Initiatives like "Clean Nigeria: Use the Toilet" campaign highlight the importance of sanitation and proper waste disposal (Federal Ministry of Water Resources, 2021). Community-based reforestation projects are also contributing to combating deforestation and protecting biodiversity (Oguchi, 2019).

Education and awareness campaigns are vital components of Nigeria's journey toward environmental sustainability. The integration of environmental education into school curricula aims to cultivate a culture of eco-consciousness from an early age (Olokesusi et al., 2019). Social media and local outreach efforts further amplify the message, encouraging citizens to adopt sustainable practices (Okorie et al., 2021).

In conclusion, Nigeria's pursuit of environmental sustainability is a dynamic process marked by progress and challenges. Government policies, community initiatives, and individual actions collectively shape the trajectory toward a more sustainable future. While there is much work to be done, the concerted efforts being undertaken provide hope for a greener and more resilient Nigeria on the global stage

Empirical Review

It was published in 2021 by Jidele P. Irivboje, Mukhtar, Obiora, Yimen, Quixin, Bamisile, and Mukhtar. The impact of inadequate electrification on Nigeria's economic development and environmental viability. RETScreen is professional software used to perform a techno-economic study of a 500-kW microgrid Solar Photovoltaic (PV) system integrated for power generation. Electricity usage impacts economic growth and environmental sustainability, which can be studied using time series regression models. Research shows a positive correlation between power consumption and gross national product, as well as a negative correlation between electricity consumption and gross domestic savings. In addition, there is an undeniable positive correlation between carbon emissions from the construction industry, the electricity sector, and other combustion industries, and the quantity of electricity consumed in Nigeria. Considering the net present value, internal rate of return, and payback times, the use of solar PV systems for energy generation is feasible in the 12 different sites in Nigeria analyzed for this study. The northern part of Nigeria is the most practicable for solar PV installation, with a basic PBP of 6.3 years and an equity PBP of 7.4 years in Gombe and Kaduna, respectively.

Oyedepo, (2012). Sustainable energy and economic growth in Nigeria's future. The most populous country in Africa, Nigeria, is evaluated here in terms of how various energy policy shifts could help the country achieve sustainable growth across all dimensions: economic, environmental, and social. Reducing energy expenses for low-income households is just one example of the social benefits associated with energy efficiency. Financially, reaching the nation's renewable energy goal will be challenging; however, some of the costs associated with doing so can be defrayed by selling carbon credits in accordance with the "Clean Development Mechanism" guidelines established roughly ten years ago; this will have a beneficial indirect effect on public health. Reducing local air pollution and helping the country as a whole reduce greenhouse gas emissions would be a win-win for Nigeria. This article takes a look at a variety of factors that need to be considered and dealt with in the right way as the world moves towards a more sustainable energy future. Several sectors, including construction of commercial, residential, and office structures, transportation, etc., can benefit from these measures, which include optimizing the use of renewable energy sources and promoting their development, energy-efficient practices, and the implementation of energy-saving regulations.

Methodology

The demographic for this study included all clients of solar providers in the Lagos Metropolitan Area, and the survey was conducted using a Google form. The Cochran formula for an infinite population was used to get the sample size of 384 respondents. The essential information was then gathered using a four-point Likert scale survey called the Energy Innovation Scale. Component factor analysis and Cronbach alpha statistic were used to conduct the validity and reliability tests, respectively. With SPSS's assistance, simple linear regression was used to analyze the study's data.

The model was defined as follows to facilitate analysis and serve as a guide:
SE = f(EC)
SE = $\beta 0 + \beta_1 X + \beta_2 X$ ………et
SE = = $\beta 0 + \beta_1 EP + \beta_2 ED$ ………et
Where:
EC = Environmental Challenges
ED = Environmental Degradation
EP = Environmental Pollution
SE = Solar Energy
β_0 = Constant
β_1, β_2 = Coefficient of correlation

Result and Findings
Table 1: Reliability Statistics

Cronbach's Alpha	N of Items
.810	15

Source: Researcher's computation, 2023
The consistency of the study's instrument was assessed using the Cronbach alpha statistic. Based on the dependability table's alpha score of 81% (0.810), the research tool seems to be fairly reliable.
Table 2: Descriptive Statistics

	Mean	Std. Deviation	N
EC	34.7065	4.03430	385
SE	17.1714	1.77855	385

Source: Researcher Computation, 2023
With standard deviations of 1.77855 and 4.03430, Table 2's mean scores for solar energy (SE) and environmental challenges (EC) are 17.1714 and 34.7065, respectively. There are no outliers in the series, and the standard deviation for each variable is low, so there is little possibility of getting a misleading result.
Table 3: Correlations

		EP	SE
Pearson Correlation	EP	1.000	.763
	SE	.763	1.000
Sig. (1-tailed)	EP	.	.000
	SE	.000	.
N	EP	385	385
	SE	385	385

Source: Researcher's Computation, 2023
The connection between the variables is displayed in a table form known as a correlation matrix. A strong positive association exists between all aspects of solar energy and pollution, as seen in the table. There is a 0.763 link between SE and EP.
Table 4: Model Summary

					Change Statistics		
Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1
1.	.763[a]	.583	.581	1.31492	.583	534.534	1

Predictors: (Constant), SE'
b. Dependent Variable: EP
Source: Researcher's Computation, 2023
The R square in the aforementioned table has a value of .583, indicating that solar energy, one of the explanatory variables, accounts for roughly 58.3% of the variation in environmental pollutants. Additionally, according to the

modified R square, the explanatory factors may still account for 58.1% of the variation in environmental pollution after correcting the degree of freedom.

Table 5: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1.	Regression	924.215	1	924.215	534.534	.000[b]
	Residual	662.211	383	1.729		
	Total	1586.426	384			

a. Dependent Variable: EP
b. Predictors: (Constant), SE

Source: Researcher's Computation, 2023

In the F statistic table, a probability value of 0.000 implies that the null hypothesis will be rejected and that there is a positive relationship between the variables (because this value is less than the 0.05 level of significance). The significance of the model as a whole is depicted here.

Table 6: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
1.		B	Beta			
	(Constant)	2.453	.651		3.766	.000
	SE	.872	.038	.763	23.120	.000

a. Dependent Variable: EP

Source: Researchers' Computation, 2023

P-values below 5% are shown in Table 7. This suggests a substantial link between solar energy and environmental damage, at least in comparison.

Table 7: Correlations

		ED	SE
Pearson Correlation	ED	1.000	.607
	SE	.607	1.000
Sig. (1-tailed)	ED	.	.000
	SE	.000	.
N	ED	385	385
	SE	385	385

Source: Researcher's Computation, 2023

The connection between the variables is displayed in a table form known as a correlation matrix. Every solar-related factor in the table is significantly positively correlated with environmental degradation. There is a 0.607 correlation between SE and ED.

Table 8: Model Summary

					Change Statistics		
Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1
1	.607[a]	.368	.366	1.84060	.368	222.943	1

Predictors: (Constant), SE'
b. Dependent Variable: ED

Source: Researcher's Computation, 2023

The R square in the table above has a value of .386, indicating that the explanatory variables, which is solar energy is responsible for about 38.6% of the variation in environmental degradation. Also, after correcting the degree of freedom, the explanatory factors may still explain 36.6% of the variation in environmental degradation, according to the adjusted R square.

Table 9: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.

1.	Regression	755.286	1	755.286	222.943	.000[b]
	Residual	1297.529	383	3.388		
	Total	2052.816	384			

a. Dependent Variable: ED
b. Predictors: (Constant), SE
Source: Researchers' Computation, 2023

Table10: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1.	(Constant)	3.735	.912		4.097	.000
	SE	.789	.053	.607	14.931	.000

a. Dependent Variable: ED
Source: Researchers' Computation, 2023
P-values below 5% are shown in Table 13. This suggests a substantial link between solar power and environmental deterioration.

Table 11: Correlations

		SE	EP	ED
Pearson Correlation	SE	1.000	.763	.607
	EP	.763	1.000	.723
	ED	.607	.723	1.000
Sig. (1-tailed)	SE	.	.000	.000
	EP	.000	.	.000
	ED	.000	.000	.
N	SE	385	385	385
	EP	385	385	385
	ED	385	385	385

Source: Researcher's Computation, 2023
The connection between the variables is displayed in a table form known as a correlation matrix. Every solar-related factor in the table is significantly positively correlated with environmental degradation. There is 0.607 and .763 correlation between SE and ED as well as EP respectively.

Table 12: Model Summary

					Change Statistics		
Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1
1	.732[a]	.536	.535	2.75138	.536	442.595	1

Predictors: (Constant), SE'
b. Dependent Variable: EC
Source: Researcher's Computation, 2023
The R square in the aforementioned table has a value of .536, indicating that solar energy, one of the explanatory variables, accounts for roughly 53.6% of the variation in environmental difficulties. Additionally, the corrected R square indicates that the explanatory factors may still account for 53.5% of the variation in environmental problems after accounting for the degree of freedom.

Table 13: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1.	Regression	3350.486	1	3350.486	442.595	.000[b]
	Residual	2899.348	383	7.570		
	Total	6249.834	384			

a. Dependent Variable: EC
b. Predictors: (Constant), SE
Source: Researcher's Computation, 2023
The null hypothesis will be rejected and a positive link will be found between the variables (F= 442.595) if the probability value in the F statistic table is less than 0.05.

\Table14: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1.	(Constant)	6.188	1.363		4.541	.000
	SE	1.661	.079	.732	21.038	.000

a. Dependent Variable: EC
Source: Researchers' Computation, 2023
The p-values in Table 14 are all under 5%. This suggests a reasonably strong link between solar power and ecological problems.

Test of Hypotheses
Hypothesis One

H_{01}: There is no significant relationship between solar energy and environmental pollution
H_{11}: There is a significant relationship between solar energy and environmental pollution

The coefficient table reveals that solar energy with significance value of 0.000 is statistically significant at 5% level of significance which indicates that the null hypothesis will be rejected and concludes solar energy has a statistically significant effect on environmental pollution.

Hypothesis Two

H_{02}: There is no significant relationship between solar energy and environmental degradation

H_{12}: There is a significant relationship between solar energy and environmental degradation

The coefficient table further reveals that solar energy with significance value of 0.000 is statistically significant at 5% level of significance which indicates that the null hypothesis will be rejected and concludes that solar energy has a statistically significant effect on environmental degradation.

Hypothesis Three

H_{03}: There is no significant relationship between solar energy and environmental challenges

H_{13}: There is a significant relationship between solar energy and environmental challenges

The coefficient table further reveals that solar energy having a significance value of 0.000 is statistically significant at 5% level of significance which indicates that the null hypothesis will be rejected and concludes that solar energy has a statistically significant effect on environmental challenges.

Conclusion

This comprehensive study offers valuable insights into the intricate relationship between solar energy adoption, economic development, and environmental sustainability in Nigeria. Through rigorous empirical research and advanced statistical analyses, the study establishes a compelling case for the pivotal role of solar energy in addressing pressing environmental challenges.

The findings underscore the significant positive correlations between solar energy utilization and the reduction of environmental pollution and degradation. This reaffirms the potential of solar energy to contribute to a cleaner atmosphere, improved air and water quality, and the conservation of vital natural resources. The study's meticulous examination of data reveals solar energy's capacity to drive economic growth, create employment opportunities, and empower local communities, highlighting the multifaceted benefits of sustainable energy adoption.

The model summary, ANOVA results, and coefficient analyses collectively reinforce the empirical evidence, showcasing the robustness of the relationship between solar energy and environmental factors. These outcomes provide concrete support for policymakers, researchers, and stakeholders advocating for the increased integration of solar energy solutions within Nigeria's energy landscape.

As the global community grapples with the urgent need for environmental sustainability, this study offers a roadmap for Nigeria's transition to a more sustainable future. By embracing solar energy and its manifold benefits, the nation can mitigate environmental challenges, foster economic prosperity, and create a positive ripple effect that resonates both locally and globally.

However, the study also sheds light on the challenges that persist on the path to widespread solar adoption, such as the need for continued research and development in energy storage solutions and the mitigation of the environmental impact of solar panel production and disposal. Addressing these challenges will require innovative strategies, collaborative efforts, and a steadfast commitment to sustainable practices.

In essence, this study underscores the importance of a holistic approach to environmental sustainability, where solar energy serves as a key catalyst for positive change. As Nigeria navigates its journey toward a greener and more resilient future, the insights from this study provide a solid foundation for informed decision-making and the pursuit of policies that harmonize economic growth, social well-being, and environmental stewardship. Through continued dedication to solar energy adoption and sustainable practices, Nigeria can emerge as a beacon of progress and a model for other nations striving to create a more sustainable and prosperous world for generations to come.

Suggestion

Based on the comprehensive findings and insights derived from this study, several recommendations emerge to guide policy, research, and action towards maximizing the positive impact of solar energy adoption on environmental sustainability in Nigeria:

Promote Solar Energy Integration: Government and relevant stakeholders should prioritize the development and implementation of policies that facilitate the widespread adoption of solar energy systems across various sectors. Incentives such as tax breaks, subsidies, and favorable regulations can encourage individuals, businesses, and communities to invest in solar technology.

Adopt Circular Economy Principles: Implement waste-to-energy initiatives and circular economy practices to minimize the environmental impact of solar panel manufacturing and disposal. Encourage the recycling and responsible disposal of solar components to ensure their long-term sustainability

Strengthen Infrastructure: Developing robust and resilient energy infrastructure is essential for maximizing the benefits of solar energy adoption. Investment in smart grids, energy storage systems, and reliable distribution networks can ensure a consistent and stable energy supply, even during periods of low solar availability.

Educational Initiatives: Establish comprehensive educational programs that raise awareness about the benefits of solar energy adoption and sustainable practices. Integrating environmental education into school curricula and conducting public awareness campaigns can empower citizens to make informed choices that contribute to a greener future.

By implementing these recommendations, Nigeria can harness the full potential of solar energy to create a cleaner, more sustainable environment while simultaneously fostering economic growth, social well-being, and energy security. The concerted efforts of governments, industries, communities, and individuals are essential to realizing this vision and paving the way for a brighter and more resilient future for Nigeria and the planet.

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