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INVESTIGATION, PERCEPTION, BELIEFS AND ACCEPTABILITY OF RENEWABLE ENERGY PROJECTS IN THE NIGER DELTA COMMUNITIES

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ABSTRACT

This study investigated the perception, beliefs and acceptability of renewable energy projects in Niger Delta communities, a region which is historically associated with crude oil and environmental degradation. Despite the abundance of renewable energy resources, adoption remains low due to factors such as high costs, lack of awareness, inadequate infrastructure, and skepticism about reliability. Using a mixed-method approach, the study collected data from three communities—Ugborodo, Bonny Island, and Yenagoa—using well-structured questionnaires. The results revealed that 50% of respondents rely on generators, while only 20% use solar energy, highlighting the region's dependence on non-renewable sources. Although 90% of respondents were aware of renewable energy, only 50% viewed it as a viable solution, with concerns about cost (40%) and reliability (36%) being major barriers. Despite the challenges by the respondents, 76% expressed willingness to adopt renewable energy if barriers were addressed. The study recommended public awareness campaigns, community involvement in project, government and private sector collaboration in providing funding, subsidies and infrastructure improvements. The findings emphasized the need for inclusive, community-centered approaches to promote renewable energy adoption, ensuring sustainable energy transitions in the Niger Delta. This research provides valuable insights for policymakers and stakeholders aiming to address energy poverty and environmental challenges in the region.

Keywords: Acceptability, Energy, Renewable Energy, Perception, Niger Delta

1.0 INTRODUCTION

The growing global demand for energy, coupled with the environmental consequences of fossil fuel dependence, has intensified interest in renewable energy as a sustainable alternative (Oyedepo, 2012). Solar, wind, biomass, and hydroelectric power are increasingly recognized as viable solutions to energy security, climate change mitigation, and economic development (Ramchandra & Boucar, 2011; Sovacool & Dworkin, 2015). However, the successful adoption of renewable energy projects hinges on societal perceptions, beliefs, and willingness to transition from conventional energy systems (Carrington & Stephenson, 2018). This study examines the perceptions, beliefs, and acceptability of renewable energy initiatives in Niger Delta communities—a region historically defined by crude oil extraction and severe environmental degradation (UNEP, 2011).

Despite its vast oil reserves, the Niger Delta has endured decades of ecological harm from fossil fuel exploration, including gas flaring, oil spills, and biodiversity loss (UNEP, 2011). While

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the region possesses abundant renewable energy potential, adoption remains sluggish due to systemic barriers such as limited awareness, high upfront costs, inadequate infrastructure, and skepticism about reliability (Akinbami et al., 2001; Okafor & Joe-Uzuegbu, 2010). Research indicates that community acceptance of renewable energy is often shaped by perceptions of affordability, reliability, and anticipated economic benefits (Sovacool & Dworkin, 2015; Ugwoke et al., 2018).

Public attitudes toward renewable energy in the Niger Delta are further influenced by past experiences with energy policies, infrastructural deficits, and economic constraints (Famuyide et al., 2011; Oyebamiji & Kigbara, 2011). While some community's express reluctance due to fears of high maintenance costs or technological failures, others view renewables as a pathway to combat energy poverty and environmental pollution (Ugwoke et al., 2018). The role of government policies and private-sector investment is critical, with subsidies, public awareness campaigns, and infrastructure development serving as key enablers for project viability (IEA, 2020; Ngala et al., 2007).

This study assesses the current awareness, perceptions, and acceptability of renewable energy projects in the Niger Delta. By identifying barriers and opportunities, it offers actionable insights to accelerate sustainable energy transitions in the region.

1.1 Community Acceptance Model (CAM)

The Community Acceptance Model (CAM) for renewable energy adoption in the Niger Delta emphasizes inclusivity, trust-building, and tangible benefits. Effective implementation requires active community engagement through transparent communication, participatory decision-making, and cultural sensitivity (Economic and Social Research Council [ESRC], 2015). Demonstrating immediate advantages—such as electrifying schools and health facilities—can enhance local support, while job creation and skill-development programs foster economic empowerment (Emeka, 2010).

Policy support from public, private, and non-governmental stakeholders is essential to address historical grievances and build trust. This includes regulatory frameworks, subsidies, and partnerships (IEA, 2020). Concurrently, targeted education campaigns can dispel misconceptions and highlight the socio-environmental benefits of renewable energy (Sovacool & Dworkin, 2015).

2.0 MATERIALS AND METHODS

2.1 Study area

This study will focus on three selected communities in the Niger Delta: Ugborodo in Delta State, Bonny Island in Rivers State, and Yenagoa in Bayelsa State. These communities were chosen due to their distinct energy challenges and environmental concerns. Ugborodo, a coastal community in Delta State, has suffered from years of gas flaring and oil spills, leading to poor air quality and an unreliable electricity supply, making it a prime location for investigating the acceptability of renewable energy (UNEP, 2011). Bonny Island, despite hosting the Nigeria Liquefied Natural Gas (NLNG) plant, has relatively better electricity access compared to many Niger Delta communities, offering a unique contrast in energy perception. However, parts of

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Bonny still rely on expensive alternative energy sources such as diesel generators (Ugwoke et al., 2018). Lastly, Yenagoa, the capital of Bayelsa State, experiences frequent power outages, with many households and businesses depending on generators and firewood for energy. As a state rich in oil resources but with poor energy infrastructure, Bayelsa presents an interesting case for examining the feasibility of renewable energy adoption. These communities collectively represent the diverse energy access challenges in the Niger Delta, providing valuable insights into public perception, beliefs, and willingness to transition to renewable energy solutions.

2.2 Questionnaire Design

The questionnaire is designed to investigate the perception, beliefs, and acceptability of renewable energy projects in Niger Delta communities. It is divided into five sections, each focusing on specific aspects of energy access, usage, perceptions and barriers to renewable energy adoption. The sections include Demographic Information, Energy Access and Usage, Perception and Beliefs About Renewable Energy, Acceptability and Willingness to Adopt Renewable Energy, and Barriers and Opportunities for Renewable Energy Adoption. The design ensures a comprehensive understanding of community attitudes, energy usage patterns, and the potential for renewable energy adoption in the region.

2.3 Demographic Information

The demographic section collects essential background information about respondents to contextualize their responses. It includes questions on gender, age bracket, educational level, occupation, and length of residence in the community. For example, respondents are asked to specify their gender (Male/Female/Other), age group (Below 18/18-39/40-60/Above 60), educational attainment (No formal/Primary/Secondary/Tertiary/Postgraduate), and occupation (Farming/Fishing/Trading/Wage earner/Artisan/Unemployed/Other).

2.4 Ethical Consideration

Participation in the survey was voluntary and informed consent was obtained from all participants. Confidentiality of the respondents was ensured by anonymizing the data. The study was conducted in accordance with ethical guidelines for research involving human participants as laid down by ESRC (2015).

3.0 RESEARCH DESIGN

The research adopts a dual approach of quantitative and qualitative analysis using primary data collected through structured questionnaires. The study focuses on Niger Delta communities, targeting residents to gather insights into their energy access, usage, and perceptions of renewable energy. A purposive sampling technique is used to ensure representation of key demographic groups, such as farmers, traders, wage earners, and artisans. The questionnaire is designed to be simple and accessible, considering the educational levels of respondents, while also allowing for detailed responses where necessary. Data analysis involves descriptive statistics (e.g., percentages, charts) for quantitative data and narrative analysis for qualitative insights, ensuring a comprehensive understanding of energy use and perceptions in the Niger Delta.

3.1 Statistical analysis

The results obtained from the survey were analyzed using Microsoft excel 2016 (16.0). The results were represented in graphs, tables and Charts.

4.0 RESULTS

The demographic data reveals a diverse sample population, with 60% male and 36% female respondents, and a small percentage (4%) identifying as other. The majority of respondents (60%) fall within the 18-39 age bracket, indicating a relatively young population. Educational levels vary, with 40% having secondary education and 16% having no formal education, highlighting potential gaps in awareness and access to information. Occupation data shows that 30% are engaged in farming or fishing, reflecting the agrarian nature of the community. Most respondents (76%) have lived in the area for over 10 years, suggesting a stable, long-term population with deep community ties. These demographics provide context for understanding energy access and adoption patterns.

Table 1: Demographic information of respondents at the survey

Demographic Category	Options	Number of Respondents (n)	Percentage (%) (n/50)
Gender	Male	30	60
	Female	18	36
	Other	2	4
Age Bracket	Below 18	5	10
	18-39	30	60
	40-60	12	24
	Above 60	3	6
Educational Level	No formal education	8	16
	Primary	12	24
	Secondary	20	40
	Tertiary	8	16
	Postgraduate	2	4
Occupation	Farming/Fishing	15	30
	Trading	12	24
	Wage earner	10	20
	Artisan	8	16
	Unemployed	3	6
	Other	2	4
Length of Residence	Less than a year	2	4
	1-9 years	10	20
	10-20 years	20	40
	Over 20 years	18	36

4.1 Energy access and Usage

The primary source of energy for 50% of respondents is generators, indicating a reliance on non-renewable and costly energy solutions. Only 20% use solar energy, reflecting limited adoption of renewable energy. Electricity access is poor, with 40% experiencing less than 2 hours of power daily, and only 10% having almost 24-hour access. Monthly energy expenses are high for 42% of respondents, who spend above N10,000, underscoring the financial burden

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of energy access. This data highlights the urgent need for affordable and reliable energy solutions, particularly renewable energy, to reduce costs and improve access.

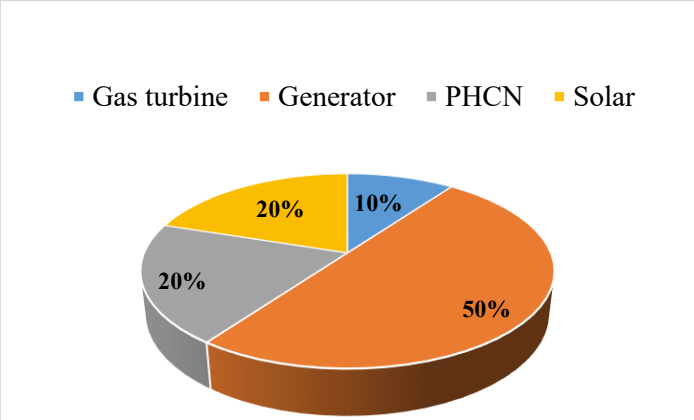

Fig. 1: Primary source of Energy

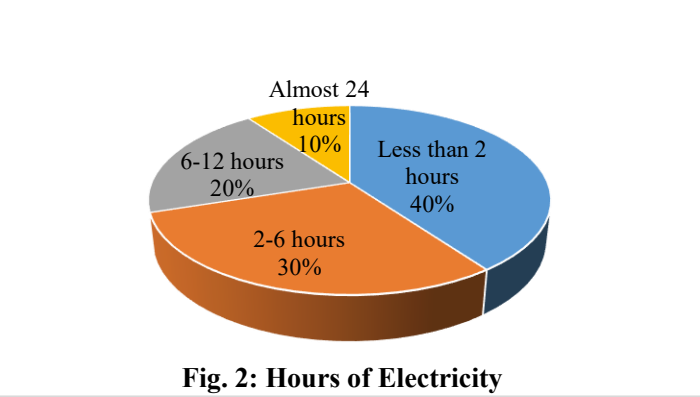

Fig. 2: Hours of Electricity

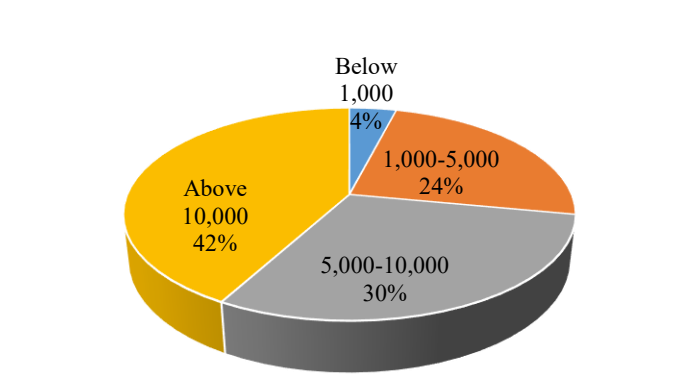

Fig. 3: Monthly Energy Related Expenses

4.2 Perception and beliefs about renewable energy

A significant majority (90%) have heard of renewable energy, with solar energy being the most familiar (50%). However, only 50% believe renewable energy is a viable solution, while 30% remain unsure, indicating a need for more education and awareness. Concerns about renewable energy projects focus on cost (40%) and reliability (36%), with fewer worries about

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environmental impact (4%). This suggests that while awareness is high, misconceptions and financial barriers hinder broader acceptance and adoption of renewable energy solutions.

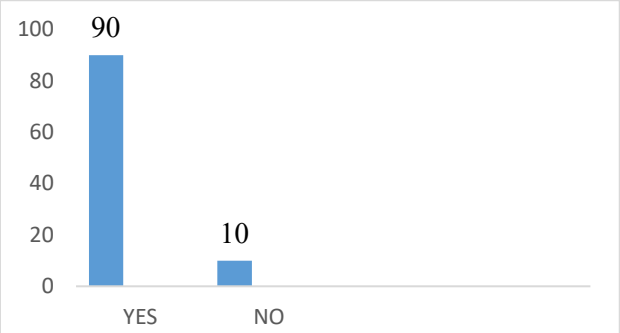

Fig.4: Heard of Renewable energy?

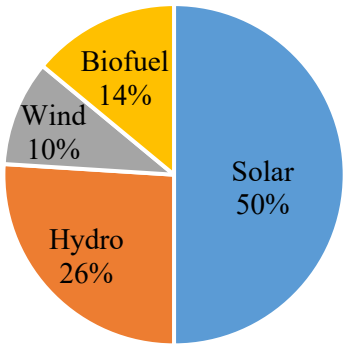

Fig. 5: Type of renewable energy familiar with

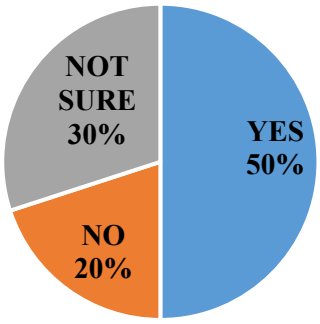

Fig. 6: Renewable energy as a viable solution

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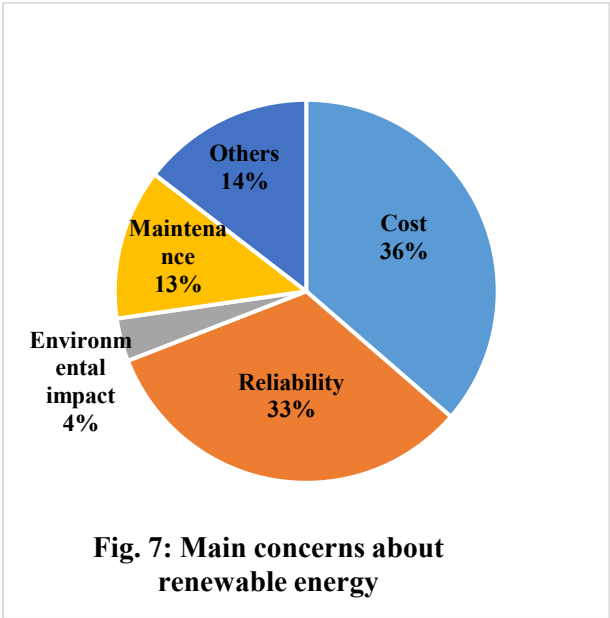

Fig. 7: Main concerns about renewable energy

4.3 Acceptability and willingness to adopt renewable energy

Only 20% of respondents reported renewable energy projects in their community, with solar-powered streetlights being the most common (50%). Satisfaction with these projects is mixed, with 50% expressing neutrality or dissatisfaction, indicating room for improvement in project implementation. However, 76% are willing to switch to renewable energy, demonstrating strong potential for adoption if barriers like cost and awareness are addressed.

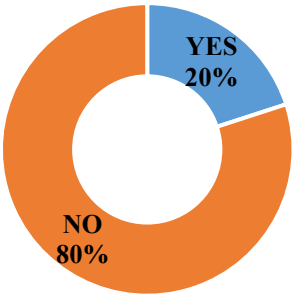

Fig. 8: Renewable projects in a community

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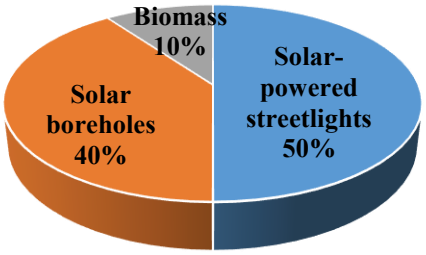

Fig. 9: Types of renewable projects available (if yes)

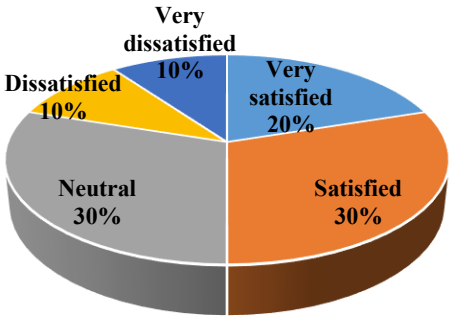

Fig. 10: Satisfaction with perfomance of projects

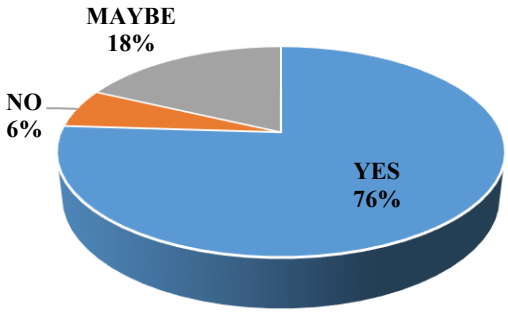

Fig. 11: Willingness to switch to renewable energy

4.4 Barriers and opportunities for renewable energy adoption

The primary challenge in accessing renewable energy is high cost (44%), followed by lack of awareness (26%). Government and private sector roles are crucial, with 40% emphasizing the need for funding and subsidies, and 30% calling for improved infrastructure. Incentives such as subsidies (40%) and improved infrastructure (36%) are seen as key drivers for adoption.

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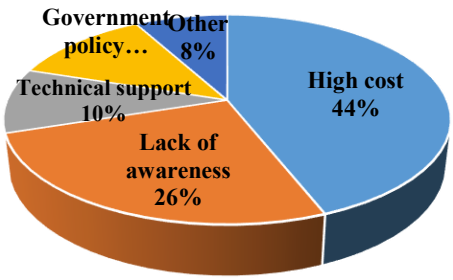

Fig. 12: Challenges in Accessing renewable energy

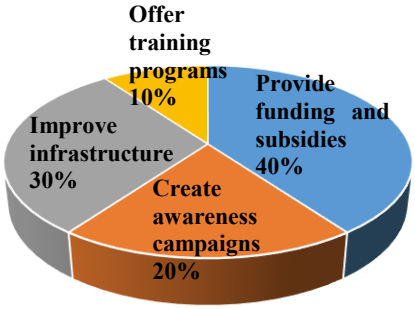

Fig. 13: Roles of Government and Private sector

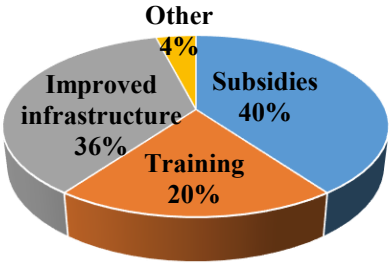

Fig. 14: Incentives to Adopt renewable Energy

5.0 DISCUSSION

The results of this study outlined the energy access, perceptions and barriers to renewable energy adoption in the Niger Delta. The demographic data revealed a predominantly young population (60% aged 18-39), with a significant portion engaged in farming or fishing (30%), reflecting the agrarian nature of the region. Educational levels vary, with 40% having secondary education and 16% having no formal education, indicating potential gaps in awareness and access to information about renewable energy. The majority of respondents

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(76%) have lived in their communities for over 10 years. This suggests a stable population with deep-rooted ties to the region. These demographic factors are crucial in understanding the socio-economic context that shapes energy usage patterns and perceptions of renewable energy. For instance, the reliance on traditional occupations like farming and fishing may influence energy needs and preferences, particularly for affordable and reliable energy sources (Ugwoke et al. 2018).

Energy access and usage patterns further underscore the challenges faced by Niger Delta communities. Generators are the primary energy source for 50% of respondents, highlighting a heavy reliance on non-renewable and costly energy solutions. Only 20% use solar energy, indicating limited adoption of renewable energy technologies. Electricity access is poor, with 40% experiencing less than 2 hours of power daily, and 42% spending above N10,000 monthly on energy-related expenses. This financial burden, coupled with unreliable energy access, underscores the urgent need for affordable and sustainable energy solutions. The high cost of energy and limited access to electricity are significant barriers to economic development and quality of life in the region (Oyedepo, 2012). Renewable energy, particularly solar power, could offer a viable alternative, but its adoption is hindered by high initial costs and infrastructural limitations (Akinbami et al., 2001).

Perceptions and beliefs about renewable energy reveal a mixed picture. While 90% of respondents have heard of renewable energy, only 50% believe it is a viable solution, and 30% remain unsure. Solar energy is the most familiar (50%), followed by hydro (26%) and wind (10%). Concerns about renewable energy projects focus on cost (40%) and reliability (36%), with fewer worries about environmental impact (4%). This suggests that while awareness of renewable energy is relatively high, misconceptions and financial barriers hinder broader acceptance. The lack of confidence in the reliability of renewable energy technologies may stem from past experiences with failed or poorly implemented projects. Addressing these concerns through public awareness campaigns, demonstration projects, and community engagement could help build trust and encourage adoption (Sovacool & Dworkin, 2015).

Despite these challenges, there is strong potential for renewable energy adoption in the Niger Delta. While only 20% of respondents reported renewable energy projects in their communities, 76% expressed willingness to switch to renewable energy if barriers like cost and awareness are addressed. Satisfaction with existing projects is mixed, with 50% expressing neutrality or dissatisfaction, indicating room for improvement in project implementation. Government and private sector roles are crucial, with 40% of respondents emphasizing the need for funding and subsidies, and 30% calling for improved infrastructure. Incentives such as subsidies (40%) and improved infrastructure (36%) are seen as key drivers for adoption. These findings align with global trends, where government policies and private sector investments play a pivotal role in promoting renewable energy adoption (IEA, 2020).

5.1 Challenges Faced During the Survey

1. Questionnaire Length and Complexity: Many respondents found the questionnaire too long and complex, which affected their concentration and the quality of their responses, particularly towards the end of the survey. This issue was highlighted in both

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documents, with respondents expressing fatigue due to the lengthy and detailed nature of the questions.

2. Government Bureaucracy: Accessing government ministries, departments, and agencies (MDAs) proved challenging due to bureaucratic protocols and limited availability of officials. This delayed the survey process and made it difficult to obtain timely and comprehensive responses from key stakeholders.
3. Misinterpretation of Terms: Some respondents misunderstood certain terms, such as "fuel," which they interpreted narrowly as "petrol" rather than in the broader context of energy sources. This limited the scope of their responses and affected the accuracy of the data collected.
4. Time Constraints: The survey process was time-consuming, particularly in communities where interviews were conducted. This led to fatigue among respondents, impacting the quality of their responses, especially for open-ended questions.

6.0 CONCLUSION

The survey revealed that the Niger Delta region has major obstacles in implementing renewable energy and gaining access to energy. The region has a wealth of renewable energy resources, but adoption is still low because of high costs, a lack of knowledge, and poor infrastructure. Most responders use expensive and environmentally harmful non-renewable energy sources like generators. Although there is a fair amount of information regarding renewable energy, misunderstandings regarding its affordability and dependability prevent further adoption. The results also highlight how important it is for the public and commercial sectors to work together to encourage the use of renewable energy. Public awareness campaigns, better infrastructure, and subsidies are seen to be important factors in removing adoption hurdles.

6.1 Recommendations

1. Public awareness campaigns should be conducted to educate communities about the benefits of renewable energy, its affordability, and its reliability. This could include town hall meetings, visual aids like billboards, and community workshops.
2. The government and private sector should work together to provide funding, subsidies, and infrastructure improvements to support renewable energy projects. Policies should be implemented to incentivize the adoption of renewable energy technologies.
3. Renewable energy projects should be designed with community involvement to ensure ownership and sustainability. Training programs should be provided to local communities to maintain and manage these projects effectively.
4. Financial incentives, such as subsidies and low-interest loans, should be introduced to reduce the high initial costs of renewable energy technologies. This would make them more accessible to low-income households and businesses.
5. Government ministries and agencies should develop clear policies and frameworks for renewable energy adoption. Capacity-building programs should be implemented to equip officials with the knowledge and skills needed to promote renewable energy initiatives.
6. Communities should be actively involved in the planning and implementation of renewable energy projects to ensure their needs and concerns are addressed. This would foster a sense of ownership and increase the likelihood of project success.

7. Successful renewable energy projects, such as solar-powered streetlights and boreholes, should be scaled up and replicated in other communities. Lessons learned from these projects should be used to improve future implementations.

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ANNEX

INVESTIGATION OF PERCEPTION, BELIEFS AND ACCEPTABILITY OF RENEWABLE ENERGY PROJECTS IN NIGER DELTA COMMUNITIES.

SECTION 1: DEMOGRAPHIC INFORMATION.

1.1 What is your gender? Male ☐ Female ☐ Other ☐

1.2 What is your age bracket? Below 18 ☐ 18-39 ☐ 40-60 ☐ bove 60 ☐

1.3 What is your educational level? ☐ No formal ☐ Primary ☐ Secondary ☐ Tertiary ☐ Postgraduate

1.4 What is your occupation? ☐ Farming/fishing ☐ Trading ☐ Wage earner ☐ Artisan ☐ Unemployed ☐ Other

1.5 How long have you lived in this community? ☐ Less than a year ☐ 1-9 years ☐ 10-20 years ☐ Over 20 years

SECTION 2: ENERGY ACCESS AND USAGE

2.1 What is your primary source of energy? ☐ Gas turbine ☐ Generator ☐ PHCN ☐ Solar ☐ Firewood ☐ Other

2.2 How many hours of electricity do you receive daily? ☐ ess than 2 hours ☐ 2-6 hours ☐ 6-12 hours ☐ Almost 24 hours

2.3 What alternative energy sources do you use?

Solar panels ☐ Biomass ☐ Wind ☐ Other ☐

2.4 How much do you spend on energy-related expenses monthly? Below N1,000 ☐ N1,000-5,000 ☐ N5,000-10,000 ☐ Above N10,000 ☐

SECTION 3: PERCEPTION AND BELIEFS ABOUT RENEWABLE ENERGY

3.1 Have you heard of renewable energy? ☐ Yes ☐ No

3.2 What type of renewable energy are you familiar with?

Solar ☐ Hydro ☐ Wind ☐ Bio-fuel ☐ Other ☐

3.3 How would you rate your knowledge of renewable energy?

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Excellent ☐ Good ☐ Fair ☐ Poor ☐

3.4 Do you believe renewable energy is a viable solution to energy challenges in your community? ☐ Yes ☐ No ☐ Not sure

3.5 What are your main concerns about renewable energy projects?

Cost ☐ Reliability ☐ Environmental ☐ impact ☐

Maintenance ☐ Other ☐

SECTION 4: ACCEPTABILITY AND WILLINGNESS TO ADOPT RENEWABLE ENERGY

4.1 Are there any renewable projects in your community? Yes ☐ No ☐

4.2 If yes, what type of projects?

Solar-powered streetlights ☐ Solar boreholes ☐ Biomass energy
Other ☐

4.3 How satisfied are you with the performance of these projects?

Very satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Very dissatisfied ☐

	YES	NO	MAYBE
4.4 Would you be willing to switch to renewable energy if it becomes affordable and reliable?			
4.5 Would you support community-based renewable energy initiatives?			

SECTION 5: BARRIERS AND OPPORTUNITIES FOR RENEWABLE ENERGY ADOPTION

5.1 What challenges do you face in accessing renewable energy?

High cost ☐ Lack of awareness ☐ Technical support ☐ Government policy
Other ☐

5.2 What opportunities do you see for renewable energy development in your community?

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Job creation ☐ Environmental sustainability ☐ Reduced energy costs ☐ Improved health ☐ Other

5.3 What role do you think the government and private sector should play in promoting renewable energy?

_____

_____

_____

5.4 What incentives would encourage you to adopt renewable energy solutions? Subsidies ☐ Training programs ☐ Improved infrastructure ☐ Other ☐

