
ASSESSMENT OF ABUJA ELECTRICITY DISTRIBUTION COMPANY'S EFFICIENT AND SUSTAINABLE ENERGY DISTRIBUTION

Dickson Ifiok Inyang

Sustainable Development Centre,
University of Abuja
dicksoninyang68@gmail.com

Sule Magaji

Department of Economics
University of Abuja
sule.magaji@uniabuja.edu.ng
ORCID ID: 0000-0001-9583-3993

Yahaya Ismail

Department of Economics
University of Abuja
ismail.yahaya@uniabuja.edu.ng
ORCID ID: 0009-0006-7876-9524

Abstract

This study assesses the efficiency and sustainability of electricity distribution by the Abuja Electricity Distribution Company (AEDC) to evaluate service delivery, billing practices, customer satisfaction, and the company's commitment to renewable energy. A mixed-method approach was adopted, using a structured questionnaire administered to 276 respondents across Abuja. The findings reveal significant inefficiencies in AEDC's operations, including irregular power supply, voltage fluctuations, poor fault response, and widespread dissatisfaction with billing accuracy and customer service. Notably, only a minority of respondents believe that electricity is distributed or that AEDC is committed to sustainability. However, most consumers expressed a strong willingness to adopt alternative energy sources, such as solar power, and support for greater investment in renewable energy sources. The study was anchored on Systems Theory, Institutional Theory, and the Resource-Based View (RBV), which collectively explained the operational failures as systemic dysfunctions, misalignment with societal expectations, and underutilization of internal strategic resources. The research concludes that AEDC's current structure and approach hinder efficient and sustainable energy distribution. Key recommendations include infrastructure upgrades, enhanced customer service, broader deployment of prepaid meters, and proactive investment in renewable energy sources. This study

contributes to energy policy discourse by offering empirical insights into urban electricity distribution and highlighting consumer readiness for a renewable energy transition in Nigeria.

Keywords: Electricity Distribution, Sustainability, Abuja Electricity Distribution Company (AEDC), Customer Service and Renewable Energy

1.0 Introduction

The provision of efficient and sustainable electricity remains a crucial factor in driving socioeconomic development, particularly in rapidly urbanising regions such as Nigeria's Federal Capital Territory (FCT). A reliable power supply is a fundamental driver of industrial growth, education, healthcare, and overall economic activity (Adenikinju, 2020). However, the persistent challenges of inadequate distribution infrastructure, energy losses, and system inefficiencies have hampered electricity supply across the country. Within this context, the Abuja Electricity Distribution Company (AEDC), which serves the FCT and neighbouring states, plays a central role in determining the extent to which households, businesses, and industries access sustainable energy services (Okafor & Eze, 2021).

Over the years, the Nigerian electricity sector has undergone several reforms aimed at improving energy generation, transmission, and distribution efficiency. Despite these reforms, distribution companies, including AEDC, continue to face operational and structural constraints, such as poor metering systems, electricity theft, and financial non-viability (Ogunleye, 2017). These challenges have not only hindered the achievement of a stable power supply but have also raised concerns about the sustainability of the current electricity distribution framework. Given Abuja's position as the political and administrative capital of Nigeria, evaluating AEDC's efficiency and sustainability practices becomes particularly significant for policy formulation and sustainable energy transition (Olayemi & Bello, 2022).

Furthermore, the global emphasis on sustainable development and climate action underscores the need for electricity distribution companies to adopt environmentally friendly, socially inclusive, and economically viable practices (United Nations, 2015). Sustainable energy distribution involves minimising both technical and non-technical losses, enhancing customer satisfaction, and ensuring equitable access to electricity. As Nigeria is committed to achieving Sustainable Development Goal (SDG) 7, which aims for universal access to affordable, reliable, and sustainable energy, the performance of AEDC serves as a microcosm of the broader energy sector's strengths and weaknesses (Akinyemi, 2019).

Several studies have highlighted the role of distribution efficiency in bridging the gap between electricity demand and supply. For instance, Adeoye and Omolade (2020) observed that while electricity generation capacity has improved in Nigeria, distribution bottlenecks remain a significant impediment to reliable access to electricity. AEDC's operational performance, therefore, becomes critical in ensuring that improvements in generation and transmission translate into tangible benefits for end-users. This raises pertinent questions about how well AEDC is meeting its mandate in delivering efficient and sustainable energy distribution.

This study aims to evaluate AEDC's efficiency and sustainability in electricity distribution within its service areas. By focusing on the operational challenges, customer experiences, and strategic measures adopted by the company, the research aims to provide insights into how distribution efficiency can be enhanced in line with global sustainability standards. The findings are expected to contribute to the discourse on improving Nigeria's power sector and ensuring that electricity distribution companies, particularly AEDC, play a transformative role in achieving sustainable energy development.

2.0 Literature Review and Theoretical Framework

2.1 Conceptual Review

2.1.1 Energy Distribution Efficiency

Energy distribution efficiency refers to the ability of electricity distribution companies to deliver generated power to end-users with minimal losses, optimal resource utilisation, and reliable service delivery. It encompasses both technical efficiency, which reduces transmission and distribution losses through modern infrastructure, and operational efficiency, including effective metering, billing, and customer service systems (Adenikinju, 2020). In developing countries like Nigeria, inefficiencies often stem from obsolete infrastructure, electricity theft, and inadequate investment in grid modernisation, resulting in high system losses and unreliable supply (Adeoye & Omolade, 2020). Improving distribution efficiency is crucial for enhancing energy access, reducing costs, and supporting sustainable development, as it ensures that generated electricity is consumed by households and industries (Okafor & Eze, 2021).

2.1.2 Sustainable Energy Distribution

Sustainable energy distribution refers to the process of delivering electricity in a manner that is environmentally friendly, socially equitable, and economically viable over the long term. It goes beyond merely supplying electricity by integrating renewable energy sources, reducing carbon emissions, and promoting energy efficiency in transmission and distribution networks (Akinyemi, 2019). A sustainable distribution system ensures reliable access to affordable electricity while minimising both technical and non-technical losses, addresses energy poverty, and meets the needs of present and future generations (United Nations, 2015). In the Nigerian context, sustainable energy distribution is critical for achieving Sustainable Development Goal (SDG) 7, which advocates for universal access to affordable, reliable, and modern energy (Olayemi & Bello, 2022). This approach not only enhances energy security but also supports economic growth and environmental sustainability.

2.2 Theoretical Review

2.3.1 Systems Theory

Systems Theory is a multidisciplinary framework that views an organisation or process as a set of interconnected and interdependent components working together to achieve a common goal. Initially developed by Ludwig von Bertalanffy in the mid-20th century, the theory emphasises that no part of a system can be understood in isolation; instead, the behaviour of the whole

system emerges from the dynamic interactions of its constituent parts (Bertalanffy, 1968). In the context of electricity distribution, systems theory helps explain how generation, transmission, and distribution are linked, and how inefficiencies in one segment can disrupt the overall performance of the power sector (Ogunleye, 2017). Applying systems theory to energy distribution underscores the importance of coordination among infrastructure, technology, policies, and stakeholders in ensuring efficient and sustainable delivery of electricity (Okafor & Eze, 2021). Thus, the theory provides a comprehensive framework for analysing and enhancing the operations of distribution companies, such as the Abuja Electricity Distribution Company.

2.2 Empirical Review

Adebayo et al. (2020) investigated the impact of grid modernisation on electricity distribution efficiency in Nigeria. Their findings showed that adopting advanced grid technologies can substantially lower transmission and distribution losses, boost reliability, and increase customer satisfaction. Specifically, the study evaluated advanced metering infrastructure (AMI), distribution automation systems, and demand response programs. According to the results, AMI provides accurate, real-time data that helps detect and minimise technical and commercial losses. At the same time, distribution automation enhances grid reliability by enabling remote monitoring and control of substations and feeders. Additionally, demand response programs help balance electricity supply and demand, thereby reducing reliance on costly peak-load plants. The researchers concluded that Nigerian Distribution Companies (DisCos) should invest in grid modernisation to strengthen performance and support sectoral growth, aligning with the broader objective of achieving efficiency and sustainability through technological innovation.

Similarly, Okoye and Ezenwa (2021) explored the integration of renewable energy into Nigeria's electricity grid. Their analysis indicated that combining solar and wind energy could reduce fossil fuel dependency, strengthen energy security, and mitigate climate change. The study assessed both technical and economic feasibility and highlighted Nigeria's abundant solar and wind resources as viable for clean energy generation. However, it noted challenges such as intermittency and the need for grid upgrades to support the integration of distributed generation. The authors recommended that the Nigerian government implement supportive policies and incentives, such as feed-in tariffs, renewable energy certificates, and tax breaks, to encourage the adoption of renewable energy. These recommendations reinforce the importance of policy support in driving Nigeria's transition toward a sustainable energy mix.

Smith (2019) focused on the financial sustainability of DisCos in developing countries, particularly the effect of revenue collection challenges. The study revealed that inefficient metering, billing inaccuracies, and electricity theft contribute significantly to revenue losses and economic instability. After examining revenue collection systems across multiple developing countries, the study identified a lack of smart metering technologies and ineffective billing practices as significant issues. These factors reduce DisCos' financial viability and limit their ability to modernise infrastructure. Smith recommended investments in advanced metering technologies, such as smart meters and automated meter reading (AMR), alongside improved collection practices, including prepaid metering and mobile payments. This underscores the importance of tackling revenue collection inefficiencies to ensure long-term financial stability for DisCos.

Johnson (2022) investigated customer satisfaction in urban electricity distribution and found that frequent outages, poor customer service, and limited transparency were major drivers of dissatisfaction. Through surveys and interviews, the research revealed that customers were particularly frustrated by power disruptions that interfered with both business and personal activities, as well as by inefficient customer service characterised by delays, unresolved complaints, and poor communication. The study recommended that DisCos enhance communication strategies, improve complaint resolution, and adopt transparent operational practices to improve service quality. These findings emphasise the need for a customer-oriented approach to strengthen trust and satisfaction in electricity distribution.

Chen (2023) conducted a comparative analysis of distribution systems in developed and developing countries. The study highlighted that developed countries had advanced in grid modernisation and renewable energy integration, while developing countries struggled with outdated infrastructure, limited investment, and weak regulatory frameworks. By analysing systems across various contexts, Chen found that developed countries had successfully integrated innovative grid technologies and renewables, whereas developing countries faced persistent constraints. The study recommended that developing nations learn from global best practices by prioritising modernisation, renewable integration, and capacity building. This demonstrates the importance of adopting international lessons to accelerate improvements in electricity distribution.

Finally, Garcia (2021) examined the influence of regulatory frameworks on sustainable energy distribution. The study found that well-designed regulations could incentivise DisCos to adopt renewable energy, modernise grids, and enhance customer services. By evaluating regulatory systems across several countries, Garcia identified practical tools, including feed-in tariffs, renewable energy certificates, and performance-based regulations. The study concluded that consistent and transparent frameworks encourage investment, promote the adoption of renewable energy, and ensure consumer protection. Consequently, governments are encouraged to establish robust regulatory frameworks that promote sustainability and efficiency in electricity distribution.

3.0 Methodology

3.1 Research Design

This study will adopt a mixed-methods research design, combining quantitative and qualitative approaches. The quantitative component will involve surveys and statistical analysis of AEDC's performance. The qualitative component will involve in-depth interviews, focus group discussions, and document analysis to gather insights into the perspectives of various stakeholders.

The mixed-methods approach will provide a comprehensive understanding of AEDC's efficiency and sustainability in energy distribution. The quantitative data will provide statistical evidence of the company's performance, while the qualitative data will offer contextual insights into the factors influencing its operations.

3.2 Study Area

The study was conducted within the operational area of the Abuja Electricity Distribution Company (AEDC), which includes the Federal Capital Territory (FCT). This represents diverse urban and rural settings, providing a comprehensive view of AEDC's operations. The study will focus on selected locations within these states to ensure the representation of different customer segments and operational characteristics.

3.3 Population of the Study

The population of the study will include:

- I. AEDC Customers: Residential, commercial, and industrial customers across the operational area.
- II. AEDC Employees: Staff at various levels, including management, technical, and customer service personnel.
- iii. Government Officials: Representatives from regulatory bodies, ministries, and agencies involved in the electricity sector.
- IV. Industry Experts: Consultants, researchers, and professionals with expertise in energy distribution and sustainable energy practices.

3.4 Sample Size and Sampling Technique

The sample size will be determined using statistical formulas to ensure adequate representation of the population. The sampling techniques will include:

- i. Stratified Random Sampling: To select a representative sample of customers from different customer segments (residential, commercial, industrial) and locations (urban, rural).
- ii. Purposive Sampling: To select government officials, industry experts, and AEDC employees with relevant knowledge and experience for interviews and focus group discussions.
- iii. Convenience Sampling: To gather data from readily available AEDC customers for surveys and quick feedback.

3.5 Sampling Procedure

The sampling procedure will involve the following steps:

1. Identification of Sampling Frame: Develop a list of AEDC customers, employees, government officials, and industry experts.
2. Stratification: Divide the customer population into strata based on customer segments and locations.
3. Random Selection: Use random number generators to select customers from each stratum.
4. Purposive Selection: Identify and select government officials, industry experts, and AEDC employees based on their expertise and availability.

5. Convenience Sampling: Administer surveys to available AEDC customers at service centres and public locations.

3.6 Sources of Data

The study will utilise both primary and secondary data.

- i. Primary Data:
 - a. Surveys of AEDC customers.
 - b. In-depth interviews with government officials, industry experts, and AEDC employees.
 - c. Focus group discussions with AEDC customers and employees.
 - d. Observations of AEDC's operations and service delivery.
- ii. Secondary Data:
 - a. AEDC's operational and financial reports.
 - b. Regulatory documents and policy papers.
 - c. Academic journals, books, and research reports.
 - d. Industry publications and reports.
 - e. Government statistics and databases.

3.7 Instrument of Data Collection

The instruments for data collection will include:

- i. Questionnaires: Structured questionnaires for AEDC customers, covering aspects such as service quality, customer satisfaction, and perceptions of AEDC's performance.
- ii. Interview Guides: Semi-structured interview guides for government officials, industry experts, and AEDC employees, covering regulatory frameworks, operational challenges, and improvement strategies.
- iii. Focus Group Discussion Guides: These are discussion guides for facilitating focus group discussions with AEDC customers and employees, covering themes like service delivery, customer experience, and community engagement.
- iv. Observation Checklists: These checklists document observations of AEDC's operations and service delivery, including customer service centres, substations, and distribution networks.

3.8 Validity and Reliability of Instruments

The validity and reliability of the instruments will be ensured through:

- i. Content Validity: Expert review of questionnaires, interview guides, and observation checklists to ensure they cover the relevant topics and indicators.

- ii. Pilot Testing: Pilot tests will be conducted with a small sample of respondents to identify and address any ambiguities or inconsistencies in the instruments.
- iii. Internal Consistency: Cronbach's alpha is used to assess the internal consistency of the questionnaire items.
- iv. Triangulation: Using multiple data sources and methods to cross-validate findings and enhance the reliability of the study.

3.9 Technique of Data Analysis

The data analysis techniques will include:

- i. Quantitative Data Analysis:
 - a. Descriptive statistics (frequency distribution) will summarise the survey data.
 - c. Statistical software (SPSS, R) for data analysis and visualisation.

Based on your research questions and objectives, we need to define the dependent and

3.10 Ethical Considerations

The study will adhere to the principles of ethics throughout the research process. These include:

- i. Informed Consent: Obtaining informed consent from all participants before data collection.
- ii. Confidentiality and Anonymity: Ensuring the confidentiality and anonymity of participants' responses.
- iii. Voluntary Participation: Ensuring that participation in the study is voluntary and participants can withdraw at any time.
- iv. Data Security: Protecting the security and privacy of data collected during the study.
- v. Transparency and Integrity: Maintaining transparency and integrity in research and reporting findings.

4.0 Data Analysis, Presentation, and Discussions of Findings

4.1 This chapter will present and analyse data collated from the fieldwork.

Table 4.1 Demographic Characteristics of the Respondents

Serial Number	Characteristics	Frequency	Percentage
1	Gender		
	Male	156	56.52
	Female	112	40.58
	Prefer not to say	8	2.90
	Total	276	100
2	Age		
	18-20	12	4.35
	21-30	74	26.81
	31-40	93	33.70
	41-50	61	22.10
	Above 50	36	13.04
	Total	276	100
3	Occupation		
	Civil Servant	81	29.35
	Private Sector	58	21.01
	Self-employed	65	23.55
	Students	42	15.22
	Unemployed	30	10.87
	Total	276	100

Source: Fieldwork, 2025

Table 4.1 disclosed the gender distribution of the respondents. The table reveals that the majority of respondents (56.52%) are male, followed by 40.58% female. Only a small fraction (2.90%) preferred not to disclose their gender. The table disclosed the age distribution of the respondents. Those within the 31–40 age group form the largest share (33.70%) of respondents, indicating that middle-aged adults are the most represented in electricity use and assessment.

The findings from the table show that individuals in the civil service and those self-employed are the most dominant consumers of electricity services, reflecting the working-class dominance in Abuja, which constitutes more than 50% of the total respondents.

Table 4.2: Consumer Type

Serial Number	Type	Frequency	Percentage
1	Residential	178	64.49
2	Commercial	46	16.67
3	Industrial	18	6.52
4	Governmental	34	12.32
	Total	276	100

Source: Fieldwork, 2025

Table 4.2 reveals that residential users of electricity constitute more than half of the total population, with 64.49%, indicating a dominance in electricity usage in Abuja. This also highlights the importance of a stable household supply in Abuja.

Table 4.3: Electricity Supply

Serial Number	Responds	Frequency	Percentage
1	Electricity Supply Regularity		
	Very regular	24	8.70
	Irregular	108	39.13
	Very poor	46	16.67
	Total	276	100
2	Hours of Supply		
	Less than 4 hours	38	13.52
	4–8 hours	87	31.52
	9–15 hours	103	37.32
	Above 15 hours	48	17.39
	Total	276	100
3	Satisfaction with Supply Quality		
	Very satisfied	18	6.52
	Satisfied	71	25.72
	Dissatisfied	122	44.20
	Very dissatisfied	65	23.55

Source: Fieldwork, 2025

The 4.3 reveals that most respondents (39.13%) find the electricity supply irregular, while only 8.70% enjoy very regular power, and 16.67% experience an inferior electricity supply in their areas, indicating inefficiency in distribution. The table also disclosed the hours of electricity supply in the study area. The table shows that only 37.32% receive electricity between 9 and 15 hours daily, while only 17.39% enjoy more than 15 hours of supply, indicating that supply challenges persist. Again, the table shows that a significant portion (67.75%) is dissatisfied or very dissatisfied, suggesting that quality improvement is urgently needed in the study area.

Table 4.4 Response to Faults

Serial Number	Responses	Frequency	Percentage
1	Faults		
	Very prompt	22	7.97
	Prompt	88	31.88
	Delayed	104	37.68
	Very poor	62	22.46
	Total	276	100
2	Experience with a power surge		
	Yes	207	75.00
	No	69	25
	Total	276	100
3	Perceived Fairness Distribution		
	Yes	78	28.26
	No	124	44.93
	Not sure	74	26.81
	Total		

Source: Fieldwork, 2025

Table 4.4 reveals that 60.14% of customers experience delayed or poor responses to fault reports, reflecting customer dissatisfaction with AEDC's maintenance services. The table also shows that a worrying 75% have experienced power surges, highlighting major concerns with voltage stability. The table also revealed that nearly 45% believe the distribution is unfair, signalling potential biases in service coverage or favouritism.

Table 4.5 Billing

Serial Number	Responds	Frequency	Percentage
1	Types of Billing		
	Prepaid meter	121	43.84
	Postpaid billing	79	28.62
	Estimated billing	76	27.54
	Total	276	100
2	Satisfaction with Billing Accuracy		
	Yes	67	24.28
	No	123	44.57
	Sometimes	86	31.16
	Total	276	100

Source: Fieldwork, 2025

Table 4.5 reveals that prepaid meters are most common among respondents (43.84%), suggesting a trend towards user-controlled consumption. However, a significant portion still relies on postpaid and estimated billing, which may contribute to billing disputes. The table also shows

that nearly half (44.57%) are not satisfied with their billing accuracy, while only 24.28% expressed satisfaction. This reflects distrust in the billing system, especially among postpaid and estimated billing users.

Table 4.6: Customer Service Rating

Serial Number	Rating	Frequency	Percentage
1	Excellent	22	7.97
2	Good	88	31.88
3	Poor	96	34.78
4	Very poor	70	25.36
	Total	276	100

Source: Fieldwork, 2025

Table 4.6 indicates that customer service is a significant weakness, with 60.14% of respondents rating it as poor or very poor. Less than 8% find the service excellent, highlighting a substantial area for improvement.

Table 4.7: Complaint Resolution Experience

Serial Number	Complaint resolution	Frequency	Percentage
1	Yes resolved	82	29.71
2	Yes, but unresolved	91	32.97
3	No	103	37.32
	Total	276	100

Source: Fieldwork, 2025

Table 4.7 shows that only 29.71% of complaints were resolved satisfactorily. The majority either received no resolution or did not report at all, showing low confidence in complaint mechanisms.

Table 4.8 Perception of AEDC's Sustainability Commitment

Serial Number	Perceptions	Frequency	Percentage
	Strongly agree	17	6.16
	Agree	86	31.13
	Disagree	108	39.13
	Strongly disagree	65	23.55
	Total	276	100

Source: Fieldwork, 2025

Table 4.8 reveals that only 37.32% believe AEDC is committed to sustainable energy, while 62.68% either disagree or strongly disagree, showing scepticism about long-term planning and environmental responsibility.

Table 4.9: Awareness of AEDC Renewable Initiatives

Serial Number	Responds	Frequency	Percentage
1	Yes	98	35.51
2	No	178	64.49
	Total	276	100

Source: Fieldwork, 2025

Table 4.9 indicates that the level of awareness of AEDC's renewable energy initiatives is low, with nearly two-thirds of respondents being unaware of these efforts. This suggests a lack of effective communication and public engagement.

Table 4.10 Support for Renewable Energy Investment

Serial Number	Responds	Frequency	Percentage
1	Yes	203	73.55
2	No	42	15.22
3	Insufficient	31	11.23
	Total	276	100

Source: Fieldwork, 2025

Table 4.10 shows that a large majority (73.55%) supports more investment in renewable energy, indicating substantial public support for sustainable alternatives.

Table 4.11: Willingness to Adopt Alternative Energy (e.g., Solar)

Serial Number	Responds	Frequency	Percentage
	Very willing	114	41.30
	Willing	95	34.42
	Not willing	67	24.28
	Total	276	100

Source: Fieldwork, 2025

Table 4.11 reveals that over 75% of respondents are willing or very willing to adopt alternative energy, showing a readiness for transition provided support and infrastructure are available.

4.2 Discussion of Findings

The demographic analysis reveals that the majority of respondents were male (56.52%) and within the 31–40 years' age bracket (33.70%). This age group is economically active and likely to be highly concerned with power reliability for work and household activities. Civil servants (29.35%) and self-employed individuals (23.55%) comprised a significant portion of the respondent pool, highlighting a mix of formal and informal economic actors. The residential consumer category (64.49%) dominated, suggesting that most responses reflect household-level electricity usage, with fewer from commercial, industrial, or government consumers.

Again, the findings indicate widespread dissatisfaction with the electricity supply as follows:

Only 8.70% rated the supply as very regular, while 39.13% found it irregular and *16.67% considered it very poor. A large segment (37.32%) reported receiving electricity for 9–15 hours daily, but 13.77% receive less than 4 hours, a significant gap in service provision. Dissatisfaction with power quality is alarming, with 67.75% reporting dissatisfaction or strong dissatisfaction due to instability or interruptions. Fault response by AEDC is also perceived as weak, with 60.14% of respondents reporting delayed or poor responses to outages. Additionally, 75% of respondents experienced power surges, indicating voltage instability and poor infrastructure maintenance. Furthermore, only 28.26% believe electricity is fairly distributed across neighbourhoods, while 44.93% feel otherwise. AEDC's electricity distribution is perceived as

unreliable and uneven, characterised by frequent power surges and a slow response to customer complaints.

Again, the research revealed that the most common billing method is prepaid meters (43.84%), while 28.62% still use postpaid billing and 27.54% are billed on estimates, both of which can lead to inaccuracies. Billing dissatisfaction is prevalent, with 44.57% expressing disapproval of the accuracy of their bills, and only 24.28% being delighted. Customer service performance is poor: 60.14% rated AEDC service as poor or very poor, and just 7.97% said it was excellent. When asked about complaint resolution, 37.32% said they had never had their complaint resolved, and 32.97% had unresolved issues, despite reporting that only 29.71% of their complaints had been satisfactorily addressed. The billing system is considered inaccurate by many, and AEDC's customer service is mainly ineffective, undermining customer trust and satisfaction.

Consequently, it is evident from the results that only 37.32% of respondents agree or strongly agree that AEDC is committed to sustainability, while 62.68% disagree. Awareness of renewable initiatives supported by AEDC is low, with 64.49% of respondents being unaware of such programs. However, there is strong support for change: 73.55% of respondents believe AEDC should invest more in renewable energy sources, such as solar and wind. Additionally, 75.72% (combined) are willing or very willing to adopt alternative energy sources if supported. While public awareness of AEDC's sustainability efforts is limited, there is overwhelming support for investing in renewable energy and a strong willingness to adopt alternatives if they are appropriately facilitated.

In summary, the findings disclosed:

Service Reliability: The study reveals critical inefficiencies in power supply, marked by inconsistent electricity access, power surges, and low voltage issues.

Customer Experience: AEDC's customer service and billing practices are under intense scrutiny, with widespread dissatisfaction and a lack of faith in the complaint resolution process.

Equity and Fairness: Many respondents believe electricity is not distributed fairly, suggesting regional or political favouritism, which erodes public trust.

Sustainability Gap: Though respondents are eager to shift to renewables, AEDC's limited engagement in promoting or supporting such efforts reflects a missed opportunity.

Policy Recommendations: Enhance infrastructure to reduce outages and voltage fluctuations; Expand and upgrade prepaid metering systems; Improve customer service training and introduce feedback mechanisms; Launch awareness campaigns on sustainability initiatives; Partner with government or private firms to subsidise solar installations.

5.0 Conclusions and Recommendations

The study concludes that electricity distribution by the Abuja Electricity Distribution Company (AEDC) remains inefficient, unsustainable, and constrained by several institutional and operational challenges. Major issues identified include unreliable power supply, voltage fluctuations, and ineffective billing practices, particularly with estimated and postpaid billing methods. In addition, weak customer service delivery, poor complaint resolution mechanisms,

and limited public visibility in sustainable energy initiatives undermine consumer trust. Despite these shortcomings, findings reveal a significant level of public willingness to embrace alternative energy sources and an increasing demand for a more transparent, accountable, and proactive electricity service provider.

In light of these challenges, the study recommends targeted reforms to strengthen AEDC's performance and sustainability. Key actions include investing in modern technical infrastructure to reduce outages, adopting prepaid metering across all consumer categories to minimise billing disputes, and enhancing customer service and feedback systems through regular audits. Furthermore, AEDC is encouraged to pursue renewable energy partnerships with government and private stakeholders to expand solar adoption, while also engaging the public through awareness campaigns and collaborative solution design. Collectively, these measures would not only improve efficiency and customer satisfaction but also align AEDC with broader sustainable energy goals.

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