Electricity Tariff Reform and Stakeholder Perceptions: A Survey of the South-South Nigeria Power Sector

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Abstract—This study examined the influence of electricity tariff on the socioeconomic and industrial development of South-South Nigeria, with emphasis on its implications for consumers, investors, regulators, and other stakeholders. The major problem addressed is the persistent imbalance between rising electricity tariffs and the continued unreliability of electricity supply, which creates hardship for households, discourages small business growth, and reduces productivity in key economic sectors. The study adopted a descriptive survey research design using structured questionnaires and interviews to obtain primary data from electricity consumers and sector professionals. Using Cochran's formula, a sample size of 384 respondents was determined, while 349 questionnaires were returned, giving a response rate of 90.6%. Out of these, 302 valid responses (78.4%) were used for analysis. Descriptive statistics, mean score analysis, and standard deviation were applied using SPSS, alongside regression and correlation methods for bivariate sectoral assessment. Results revealed that 62.2% of respondents agreed that PHEDC/BEDC are performing well (Mean = 2.698, SD = 0.896), while 92.3% affirmed that the electricity market is profitable (Mean = 3.358, SD = 0.640). Also, 61.3% believed tariff increases will improve electricity supply (Mean = 2.752, SD = 0.937). Furthermore, 97.0% agreed that inadequate funding is a major setback in the electricity sector (Mean = 3.470, SD = 0.557). Billing results showed 35.8% use prepaid meters, 37.7% postpaid meters, and 25.8% face estimated billing. The study recommends policy reforms to strengthen tariff transparency, enforce fair billing, expand metering coverage, and improve funding mechanisms to ensure supply reliability.

Keywords — Electricity Tariff, Energy Policy, Economic Growth, Stakeholder Analysis, Nigeria.

I. INTRODUCTION

Contemporary societies have become progressively reliant on diverse energy sources, with electric power assuming a preeminent role [1]. Energy consumption has intricately been associated with socioeconomic development, influencing production, income advancement, education, and health (United Nations, 1996). The economic progress of Nigeria fundamentally relies on the sustained availability and cost-effectiveness of electricity. The recent rise in energy pricing in Nigeria is intended to ensure the viability of the power sector by generating sufficient funds to ensure operational efficiency. However, tariff assessments are crucial to shield consumers from excessive charges and to sustain the industry's investment viability. The correlation between energy consumption and economic growth is intricate, shaped by variables like family income, power tariffs, and the accessibility of energy supplies. A balance among reasonable rates, sustainable income production, and effective energy use is essential for promoting economic growth and development [1].

It is generally acknowledged that the demand for electrical energy is influenced by two primary factors: family income and electricity pricing [2]. The household income is the primary predictor of electricity use, since an increase in money significantly influences living standards, hence boosting power usage. As a household's income rises, individuals typically seek greater entertainment, comfort, and convenience, leading to an increased acquisition of televisions, refrigerators, air conditioners, heaters, and other household appliances, which in turn elevates the energy consumption for cooking, heating, and lighting.

Per capita energy consumption serves as an indicator of both per capita wealth and national success [3]. Numerous studies demonstrate that family income and power usage should be significantly and consistently positively correlated. Similar to family income, electricity pricing (tariff) is a significant determinant of power consumption. High power tariffs may induce families to reduce energy use. It is anticipated that a negative link exists between electricity tariffs and household power consumption; when energy costs are too high, individuals, particularly those in the low-income bracket, may decrease their usage. Moreover, when costs are too low, there is sometimes a misuse of electrical energy.

[4] asserted that tariff evaluations are performed to guarantee that consumers are not overcharged and that the business stays sustainable and appealing for investors. The tariff evaluations are influenced by economic factors such as inflation rate, currency rate, gas prices, and available generating capacity.

II.   LITERATURE REVIEW

2.1 Energy Tariff

An energy tariff is a schedule or set of charges for the provision of electrical energy to different customer groups [5]. An energy tariff is a levy imposed on an energy product. It is the price framework a retailer imposes on a consumer for energy use. Electricity tariffs refer to the charges imposed for the usage of electricity. The price at which energy is supplied to customers includes numerous expenses related to production, distribution, and infrastructure maintenance. These tariffs are essential for maintaining the financial sustainability of power suppliers and promoting efficient energy use. The fundamental elements of electricity tariffs are generating expenses, transmission and distribution expenses, operations and maintenance expenses, administrative expenses, taxes and regulatory charges, and a profit margin [6].

Boniface [7] asserts that electricity pricing, often known as electricity tariff, exhibits significant variation among countries for several reasons. The cost of power production is primarily influenced by the kind and market price of the fuel used, government subsidies, industry regulations, and local meteorological conditions [11]. Electricity costs differ across nations and may even fluctuate within a specific area or distribution network of the same country. In traditional regulated monopoly markets, electricity tariffs often differ across residential, commercial, and industrial consumers. Prices for any specific category of energy consumers may fluctuate based on the time of day or the capacity and characteristics of the supply circuit for industrial clients, whether single-phase or three-phase, among others. A particular market enables real-time dynamic pricing, with a recent option available in certain markets. Typically, with the implementation of electronic metering (pre-paid), prices may fluctuate between periods of low and high power network demand. The real power rate that a client incurs is often influenced by customer charges,

especially for small consumers such as residential users [10].

 The tariff consists of two components: a set price for energy delivery to your property and a variable charge based on your energy use. Every electric energy user anticipates that utility providers will fulfill their peak demand at any hour of the day. A customer may choose to secure his residence or workshop for about three months; nevertheless, upon his return, he anticipates the ability to activate his lighting, motor, and other electrical devices without prior notification to the power supply provider. As alternating current cannot be stored like water or gas, it must be generated on demand, necessitating the constant availability of power generation equipment to satisfy customer needs at any time of dayV[9]. To realize this, a specific segment of the producing facility and its corresponding distribution network must be effectively designated for each consumer's exclusive usage. Consequently, a comparable tariff is allocated to the customer. For example, tariffs may be levied on the sale or purchase of oil, electricity, coal, and gas. Consequently, electricity tariffs may manifest in many formats, such as flat rate, tiered or block rate, time-of-use (TOU), demand tariff, and seasonal tariff [8].

III.   METHODS

3.1 Research Design

This research investigated the influence of electricity tariff in South-South, Nigeria. The study employed the survey method, specifically a descriptive survey which involves the use of questionnaires for data collection. The survey was distributed randomly among electricity consumers, employees of power companies, retired electricity workers, and personnel from relevant economic sectors which included households, SMEs, Manufacturing Firms, Commercial Sector and Health Sector. For the purpose of this study, Cochran formula for determining sample size for unknown population was considered suitable (Cochran, 1977). The formula is stated as follow:

$$n_0 = \frac{t^2 \times p \times (1-p)}{d^2} \qquad (3.\,1)$$

Where:

n_0 constitutes the bare minimum for the projected sample size.

t is t-value; for the chosen α, 0.5, t = 1.96

p is the fraction of the population that is estimated (50% was used).

d is the margin of error; commonly suggested as 0.05 (Cochran, 1977, Ndu, 2018).

The sample size was calculated using (3.1) as follows:

$$n_0 = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2}$$
$$= \frac{3.8416 \times 0.5 \times 0.5}{0.0025}$$
$$= \frac{0.9604}{0.0025}$$
$$= 384.16$$

Consequently, the sample size consisted of three hundred and eighty-four respondents. The questionnaire was distributed to a selection of electric energy consumers and professionals within the electricity sector in South-South, Nigeria. This research adopted stakeholders' theory tool to aggregate the perspectives of electric energy consumers. Stakeholder theory serves as a theoretical foundation which enabled the researcher to identify individuals or groups who may influence or be influenced by a proposed action. This process involves categorizing these stakeholders based on their potential impact on the action and the effects that the action may have on them. The participants in this context included both individuals and organizations. Stakeholders were classified into various groups, including consumers, investors, regulators, and additional entities.

3.2 Sample and Sampling Technique

The stakeholders are categorized into four groups: customers, investors, regulators, and others. Consumers consist of the ultimate consumers of produced power, including both families and companies (industries). Individuals with an interest in the production, transmission, or distribution of electricity, whether as company owners or financiers, are classified as investors. The investors include the distribution companies (DISCOs), primarily personnel from the Port Harcourt Electricity Distribution Company (PHEDC) and the Benin Electricity Distribution Company (BEDC). Regulators are the officers of the Nigerian Electricity Regulatory Commission (NERC). Individuals who do not belong to any of the three groups (consumers, investors, and regulators) are designated as others. The stakeholders, including both people and organizations, have been randomly chosen over the internet to complete the surveys. Respondents were contacted by mail, with telephone interviews potentially undertaken as a follow-up and supplement to the mailing technique. Owing to time constraints and geographical limits, the majority of respondents to whom the questionnaire was personally distributed were residents and employees in Rivers and Edo States, Nigeria. Stakeholders were identified, and study questionnaires were sent individually to these persons.

3.3 Research Instrument

The questionnaire was used as a data collection instrument that was utilized. A total of twenty-three (23) questions were included in the questionnaire, and these questions were divided into four (4) distinct parts. This proposal includes an appendix page that has a draft of the questionnaire that may be seen there. The questionnaire is divided into five sections, and Section A is comprised of five questions. These questions are designed to gather fundamental information about the respondent, with the goal of ensuring that the respondent is in a position to provide the necessary replies. The section has been constructed in such a manner that it may evaluate which category the respondents belong within the identified stakeholders' group. The status of the respondent with regard to the power rate in Nigeria was investigated in Section B. Within this part, the respondent's thoughts on the proper energy pricing for Nigeria were examined. The structure of the electricity pricing mechanism in Nigeria was investigated in Section C, while the purpose of Section D examined the effect of the energy rate on proprietors of small-scale businesses.

Following the completion of the collecting process, the questionnaire was revised to guarantee that sufficient replies have been rendered and that the responses are consistent with one another. As a result of this, the major data for this study was collected via the use of questionnaires that were given by the researcher in both hard copies and soft copies through the administration of Google forms. In addition, the questionnaire included open-ended questions, which gave respondents the opportunity to contribute explanations on the topic matter. These questions, together with the interview sessions, were used to collect qualitative data for the research. The study also utilized an ex-post-facto design, which involved the collection of secondary data through visits to the Benin electricity distribution company (BEDC) and the Port Harcourt Electricity Distribution Company (PHDC) during energy audit sessions. The data was gathered from the records and observations of energy usage of the hotels that were visited. Customers of power in a variety of industries were given the

questionnaire and the opportunity to participate in an interview session. Because of this, the analysis was reported in two distinct sessions. These sessions included the quantitative analysis, which comprised questionnaire reports as well as the qualitative analysis, which included open-ended questions and an interview report.

3.4   Model Specification

The regression model is grounded in the endogenous growth theory as discussed in theoretical frameworks. The variables were judiciously chosen for their relevance. The examined literature also revealed several factors influencing economic growth. The overarching endogenous production function is as follows:

$$Y = Af(K, L) \qquad (3.2)$$

where: Y = Output (industrial output or gross domestic product)

A = Total factor productivity or efficiency parameter

K = Capital stock

L = Labour

3.5   Data Analysis Technique

In order to conduct an analysis of the data acquired from the survey, a descriptive statistical tool was used. In order to do this, the study employed the use of tables, charts, and percentages. For the purpose of analyzing the replies, the categorization of the stakeholders was used, and then an analysis of each question was carried out with the aid of tables. Additionally, percentages, mean score values and standard deviation were used in the process of analyzing the responses.

3.5.1 Quantitative Analysis

This study's quantitative analysis includes data obtained from the research instrument (questionnaire) and power billing records collected during visits to electricity distribution firms. Descriptive analysis offers enhanced insight into the qualities and appropriateness of the obtained data, whereas inferential analysis allows the researcher to draw conclusions based on the established objectives and research questions of the study. The findings are shown in Tables 4.1 through 4.5 and Figures 4.1 through 4.4. The presentation of data is essential to clarify the source of data collection, the technique used, and the characteristics of the respondents.

3.5.2 Analysis of Questionnaire Items: This section provided a descriptive analysis of the research, concentrating on the univariate analysis of each questionnaire item. It analyzes the diverse replies provided to the questionnaire questions. The primary objective was to determine respondents' levels of agreement or disagreement with each item in the study questionnaire to assess the effectiveness of electricity tariff from different sectors of the Nigerian economy. The study focused on the distribution of each variable, considering their respective dimensions, measures, and item indicators. Univariate analysis enables the researcher to depict the distinct response patterns for each variable being examined. The examination of central tendency (mean) and standard deviations offers significant insights into the fundamental characteristics and qualities of the data collected for the inquiry. Kothari (2010) performed a study that conformed to the framework established by Asawo (2009), concentrating on elucidating the average amount of exposure analyzed in the research. The findings of this analysis are shown in Tables 4.6 to 4.11, categorized according to the questionnaire questions.

3.5.3 Assessing the Effect of Increase in Electricity Tariff in Nigeria: This section evaluated the effects of rising power tariffs on five key components of the Nigerian economy: families, small and medium-sized enterprises (SMEs), large-scale commercial firms, the manufacturing sector, and the health sector. This bivariate analysis was conducted using regression and correlation analysis, facilitated by SPSS, as previously mentioned in prior portions of this research. This research was conducted to evaluate the effects of rising power costs on the specified sectors of the Nigerian economy. The findings of these studies were detailed in Sections 4.1.4 to 4.1.8.

3.6 Qualitative Analysis

To further confirm the findings of the quantitative study, the researcher conducted a qualitative analysis using theme analysis techniques. For the qualitative analysis, the researcher collected qualitative data via interview sessions with fifteen (15) respondents during field visits. The respondents were intentionally selected for their relevant expertise and experience about energy tariffs in Nigeria. This is essential to allow respondents to articulate their views on the topic while addressing areas of concern and potential solutions. The researcher obtained consent from respondents to transcribe the discussion, which was then analyzed alongside prior investigations. The qualitative analysis findings were

presented in accordance with the study's topic. This was addressed in two primary sections: data reporting and results.

3.6.1 Data Reporting

As earlier stated, the qualitative data for the study was gathered during interview sessions with the respondents. The data collected from the interviews were analysed using thematic analysis to identify recurring themes and patterns. Furthermore, this report provides an overview of the saturation analysis process within a typical qualitative research study on the impact of electricity tariff on Nigerian economy.

IV. RESULTS AND DISCUSSIONS

4.1.1 Demographic Results

A total of three hundred eighty-four (384) questionnaires were sent, of which three hundred forty-nine (349) were returned, resulting in a response rate of 90.6%. Of this total, three hundred and two (302) were deemed suitable for the analysis. This yielded a legitimate response rate of 78.4%, which was then used for analysis.

To facilitate a comprehensive understanding of the gathered data and the participants, their demographic information is delineated in Table 1.

Table 1 illustrates the gender breakdown among the responses. The findings indicated that male respondents comprised 78% of the sample size, totaling 236, and female respondents represented 21.9%, with a count of 66. The findings indicated that the majority of respondents in this survey are male. This is also shown in Figure 1.

Table 1: Gender of respondents

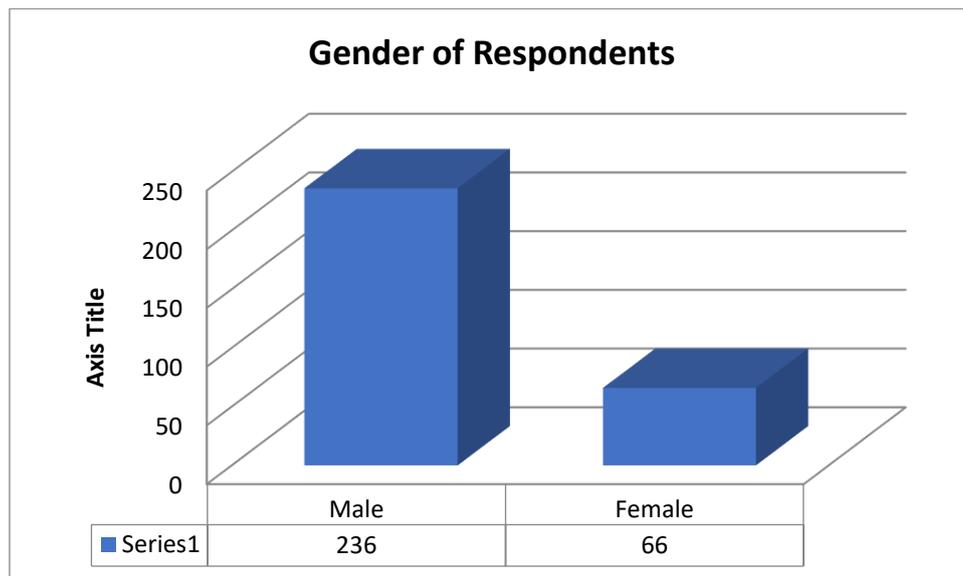|		Frequency	Percentage	Cumulative Percentage
Valid	Male	236	78.1	78.1
	Female	66	21.9	100.0
	Total	302	100.0	

(*Source: Field Survey, 2024*)

Figure 1: Gender of respondents

(Source: Field Survey, 2024)

Table 2 presents the duration of experience possessed by the respondents within the energy sector. The findings indicated that 49 respondents, representing approximately 16%, possess between 0 to five years of experience; 115 respondents, constituting 38% of the sample, have between 6-10 years of experience; 77 respondents (25.5%) hold around 11-15 years of experience in the energy sector; 36 respondents, accounting for about 11.9%, have 16-20 years of experience, while merely about 8% of the sample

boasts industry experience of 20 years or more. The findings indicate that a significant proportion of the respondents possess over five years of experience within the energy sector. This is illustrated in Figure 2.

Table 2: Respondents' years of experience

How many years of experience have you got in the industry

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5 Years	49	16.2	16.2	16.2
	6-10 Years	115	38.1	38.1	54.3
	11-15 Years	77	25.5	25.5	79.8
	16-20 Years	36	11.9	11.9	91.7
	20 years and above	25	8.3	8.3	100.0
	Total	302	100.0	100.0	

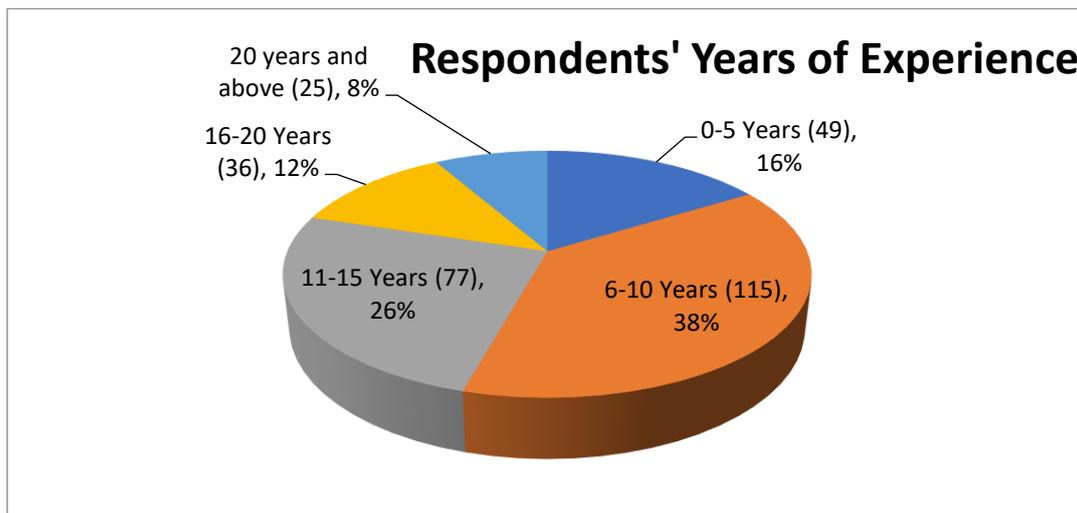(*Source: Field Survey, 2024*)

Figure 2: Respondents' years of experience

(*Source: Field Survey, 2024*)

Table 3 shows the educational qualifications of respondents. The result revealed that 54 respondents, which accounted for about 18% have diploma/ordinary national diploma (OND) certifications; 36 respondents, which comprised about 12% of study size have Higher National Diploma (HND) certification; 117 respondents (38.7%) have bachelor degree while 95 respondents, which comprised 31.5% of the study size have masters/doctoral degrees. The results clearly indicated that most of the respondents to this study have bachelor degree and above. This is further depicted in Figure 3.

Table 3 Educational qualifications of respondents

Educational Background

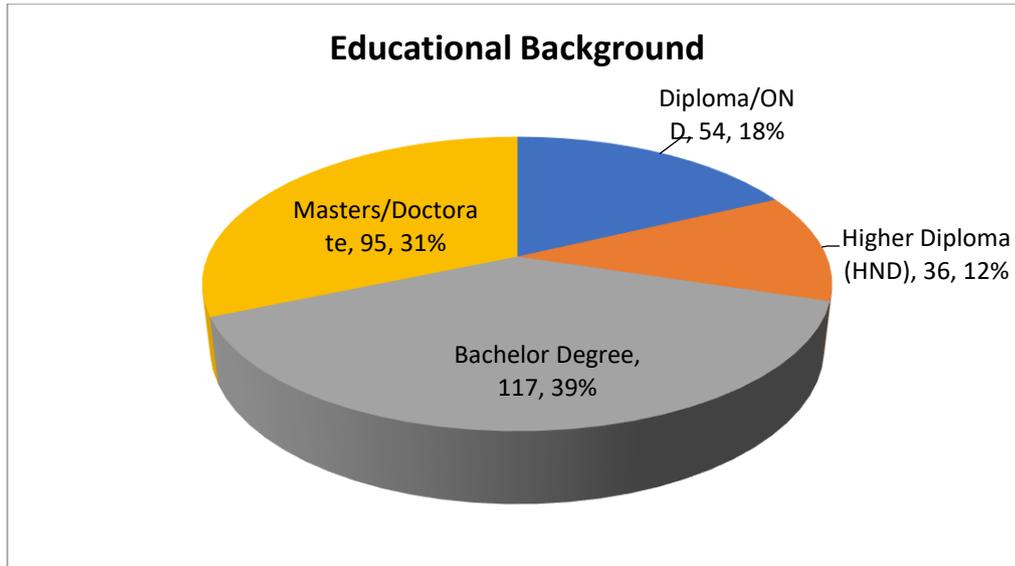|	Qualifications	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma/OND	54	17.9	17.9	17.9
	Higher Diploma (HND)	36	11.9	11.9	29.8
	Bachelor Degree	117	38.7	38.7	68.5
	Masters/Doctorate	95	31.5	31.5	100.0
	Total	302	100.0	100.0	

(*Source: Field Survey, 2024*)

Figure 3: Educational background of respondents
(*Source: Field Survey, 2024*)

Table 4 shows the categories of respondents as stakeholders in the Nigerian energy sector. The result revealed that 229 respondents, which accounted for about 75.8% of the study size are consumers; 36 respondents, which represented about 11.9% of the study size are investors; 22 (7.3%) are regulators while 15 respondents are within other categories not specified in the study.

This result therefore shows that majority of the respondents of this study are consumers in the Nigerian energy sector. This is further depicted in Figure 4.4.

Table 4 Stakeholder categories of respondents
Which category do you fall into as a stakeholder in electric energy?

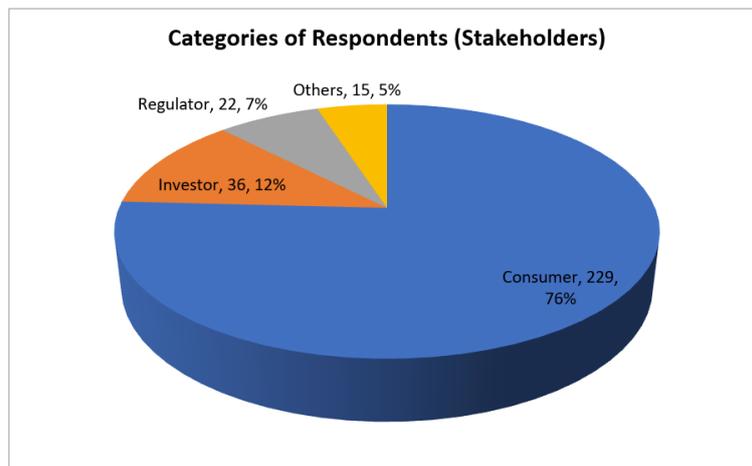|	Stakeholder category	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Consumer	229	75.8	75.8	75.8
	Investor	36	11.9	11.9	87.7
	Regulator	22	7.3	7.3	95.0
	Others	15	5.0	5.0	100.0
	Total	302	100.0	100.0	

(*Source: Field Survey, 2024*)

Figure 4: Stakeholder categories of respondents

(Source: Field Survey, 2024)

4.1.2 Descriptive Results
The results of this survey are presented in seven tables based on the categories of the questionnaire items. Table 5 is titled the performance of Electricity Distribution Companies (DISCOS), which entailed questions asked on how well the electricity distribution companies are providing their services to the public. Other results include analysis on tariffs and billing method in Nigeria, electricity tariff increment as well as impacts of electricity tariffs increment on various sector of the Nigerian economy such as SMEs, households, manufacturing industry, commercial/business units and the health sector.

Table 5 Descriptive result on DISCO performance, electricity tariff and Billing Methods in Nigeria

Questionnaire Items	Responses	Freq.	(%)	Mean	S.D
The BEDC/PHEDC is currently performing well	Strongly Agree	56	18.5		
	Agree	132	43.7		
	Disagree	81	26.8		
	Strongly Disagree	33	10.9		
	Total	302	100.00	2.698	0.896
Electricity market in Nigeria profitable	Strongly Agree	133	44.0		
	Agree	146	48.3		
	Disagree	21	7.0		
	Strongly Disagree	2	0.7		
	Total	302	100.00	3.358	0.640
Tariff increase will lead to improvement of electric supply in Nigeria	Strongly Agree	73	24.2		
	Agree	112	37.1		
	Disagree	86	28.5		
	Strongly Disagree	31	10.3		
	Total	302	100.00	2.752	0.937
Inadequate funding is a major factor causing the setback in the Nigerian electricity supply industry over the last decade	Strongly Agree	151	50.0		
	Agree	142	47.0		
	Disagree	9	3.0		
	Total	302	100.00	3.470	0.557
In support of the above, poor electricity tariff is the cause of unreliable and inadequate electricity supply in Nigeria	Strongly Agree	64	21.2		
	Agree	111	36.8		
	Disagree	127	42.0		
	Total	302	100.00	2.791	0.769
How familiar are you with Multi-Year Tariff Order methodology?	Very Familiar	134	44.4		
	Familiar	147	48.7		
	Not Familiar	21	6.9		
	Total	302	100.00	3.374	0.612
How are you billed?					

Prepaid Metre	108	35.8		
Post-Paid Metre	114	37.7		
Estimated Billing	78	25.8		
Others	2	0.7		
Total	302	100.00	3.086	0.798

(*Source: Field Survey, 2024*)

V. CONCLUSION

This study concludes that electricity tariff remains a critical determinant of energy consumption and economic performance in South-South Nigeria. The findings revealed that although a large proportion of respondents (92.3%) perceive the Nigerian electricity market as profitable, electricity supply is still widely viewed as inadequate, mainly due to poor funding and weak infrastructure development. The study further established that tariff increment is believed to have the potential to improve electricity supply, as 61.3% of respondents agreed that increased tariffs can enhance service delivery when properly managed. However, challenges such as estimated billing (25.8%) and limited prepaid metering reduce consumer confidence and contribute to dissatisfaction. The demographic evidence also showed that the majority of stakeholders are consumers (75.8%), indicating that tariff decisions directly affect household welfare and business productivity. Therefore, the study concludes that tariff policies must be transparent, fair, and supported by effective regulation, metering expansion, and investment-driven improvements in electricity generation and distribution.

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