

Electricity supply by Port Harcourt Electricity Distribution Company (PHED) and the socio-economic development of Cross River State Southern Senatorial District, Nigeria

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Abstract

Electricity plays essential role in the development of any nation. This has compelled government to get involved directly or indirectly in the supply of electricity to its people. and ultimately better the socio-economic development of Nigeria. However, the situation on ground negates the purpose for which the PHED was established. This study examined the extent to which availability of electricity supplied by PHED to consumers in the Southern Senatorial District of Cross River State affect socio-economic development of the people. The study used survey research design to draw cross sectional data from a target population of 1,923,700 people. Based on the Taro Yamane formula, adequate sample size of 400 with attrition rate of 20% was determined. The questionnaire was the instrument used for data collection. The data collected were analyzed using descriptive and inferential statistics. The study revealed among others that availability of electricity in the study areas is still skeletal to meet up the desired objectives of establishing PHED. The study recommend that aggressive efforts should be made by PHED to ensure availability of electricity by people in the Southern Senatorial District of Cross River State. Such access should be followed by reduction in the billing tariff to ensure affordability of electricity that will promote socio economic development.

Keyword: Availability, Electricity Supply, Southern Senatorial District, Port Harcourt Electricity Distribution Company, Socio-economic development.

Introduction

Across the world today, electricity is considered an essential catalyst for social and economic advancement. It is a global necessity that plays a critical role in the socio-economic development of every country in such a way that it keeps industries and businesses running, generates employment opportunities as well as other basic social amenities that enables modern living for man. Electricity stimulates productive activities in all sectors of a nation's economy including industry, agriculture, mining and commerce (Hachimenum, Ephraim & Fabian, 2016). Electricity plays a huge part in the daily life of man. In homes, places of work, schools, and even places of leisure. It is increasingly becoming indispensable in the activities of modern man (Paul, Fidelis, Abonor & Akpan, 2024).

In the explanation offered by Zohuri (2016), the background of electricity generation is long and convoluted; marked by myriad technological milestones, conceptual and technical, from hundreds of contributors. According to Patel, Larson and Harvey (2022), many scholars tend to agree, that electricity generation was started by an English man, Stephen Gray, which resulted in the invention of glass friction generators in 1740. A more significant improvement came in 1820, when Michael Faraday and Joseph Henry invented electric motor. Between 1890 and 1910, advances in Alternating Current (AC) had opened up new realms for electricity generation. And by 1910, electricity generated by coal was wide spread in many European Countries. Advances in technology in the 19th century brought new sources of electricity generation that effectively replaced coal. First was the hydropower (water chasing), then, the wind mill (blowing in the wind), followed by the birth of the wind turbine. Today, the sunshine (solar power) has been added and it is gaining popularity all over the world.

Electricity plays a huge part in the daily life of man. In homes, places of work, schools and even places of leisure. It is increasingly becoming indispensable in the activities of modern man. Its relevance and significance to modern way of living cuts across international borders. Elaborating further, Kinn and Abbot (2015), described electricity as the lifeblood of all modern societies. Like blood is to the human body, so is electricity vital for quality education and health

care delivery, small and medium scale businesses, functional communication, transportation, manufacturing and even agricultural production.

Functional public electricity supply improves the quality of life, sustains micro and macro enterprises, encourages investments, create employment opportunities, and enhances education and healthcare delivery, among others. It also makes life easier and enjoyable by aiding fun giving activities in homes and at places of leisure. The availability and functionality of electricity supply was cited as one of the major drivers of the Millennium Development Goals (United Nations Development Programme – UNDP, 2015). All over the world, nearly all socio-economic activities depend on electricity supply (Paul, Fidelis, Abonor & Akpan, 2024).

Nevertheless, it is expected that, with the present growth in human population and the need to increase industrialization, the demand for electricity will increase (Wade, Malik and Saul, 2021). But sadly, records show that, many people in Nigeria, including Southern Senatorial District of Cross River State are still experiencing electricity shortages, blackouts, increase in tariffs and constant interruptions in service (World Bank, 2021). This situation is prompting many to depend on private generating plants which are high in private and social cost (African Development Bank Group [ADB], 2021). According to Abang, Akwaji, Abonor and Akpan (2024) this suggests accessibility of electricity as a problem. Beside these, the PHED staff appears not to be effective, as broken-down poles could remain for weeks without repairs, and faulty transformers, for months, without due attention. In many instances, where the socio-economic activities of the consumers depended on the supply of electricity by the PHED.

The deficiency of reliable/constant electricity supply is a significant limitation for businesses and citizens. This explains the involvement of governments in the establishment and regulation of public electricity. It also gives credence to government's policy of privatization, which has created a quasi-partnership between government and the private sector in the management and supply of electricity in Nigeria. However, efforts of the government in the electricity regulation and supplies seems not to be paying off. It appears that there is a dearth in the availability, accessibility, as well as regularity and affordability of electricity supply in homes and businesses in Southern Senatorial District of Cross River State. The PHED tariffs have equally remained consistently high, especially when compared to the volume and quantity of supply of electricity (Abang, Akwaji, Abonor & Akpan, 2024)).

However, the situation even seems to be getting worse as recurrent power cuts and other electricity problems from the national grid have somewhat increased in the last five years, making it very difficult for small and medium scale businesses to survive (Anaba & Olubusoye, 2021). While scholars like Ohajianya, Abumere, Owate & Osarolube (2014), have pointed to inefficiency in power distribution and incompetent work force of the electricity companies, among other things, for being responsible for erratic power supply; Ayara and Ubi (2013) identified poor maintenance culture, inefficient distribution networks, as well as poor revenue collection performance as the paramount challenge. These challenges appear to have brought about insufficient power supply with adverse impact on social and economic activities in the Southern Senatorial District of Cross River State.

In fact, Inyang and Etuk (2018), in their study, found out that only 0.6 – 0.7 MW of electricity is supplied to the Southern Senatorial District of Cross River State by PHED. This amount of electricity supply seems inadequate as there are incessant cases of power cuts and poor accessibility to supply. Many consumers are complaining not only of erratic supply, but also of high cost of public electricity (Ayara, et al, 2013). It appears this situation has persisted

for so long that it is affecting the socio-economic lives of the people. Self-employed citizens who are in welding work, barbing saloon, hair-dressing saloon, hospitality and entertainment industries, rely on electricity supply. In the events of irregular and lack of power supply, it could affect earnable income from these sources, and hence, unemployment, poverty, low investment, poor education as well as poor healthcare delivery in the communities. It is also assumed that businesses are not making profit; small and medium scale industries seem to be winding up and investors are relocating to other parts of the country because of poor supply, and/lack of electricity.

According to the World Bank (2021), a huge percentage of people do not even have access to electricity. The World Bank study suggested that many people do not even know what national grid/public electricity mean. In Cross River State, including the Southern Senatorial District, it was discovered that 47% of the communities have access to electricity supply, but only 38% were connected to the national grid (Ayara, et al., 2013). Although the Ayara et al., (2013) study assessed the situation of electricity supply in Nigeria and Cross River State in particular, it did not include the impact of the supply on consumers; and hence, the extent to which supply of electricity and/or lack of it impacts on the consumers' socio-economic well-being, especially on the Southern Senatorial District of Cross River State. This study seeks to fill that gap.

Electricity supply is a phenomenon wherefore, power or electricity is distributed to its consumers or users. Availability of electricity therefore, refers to the amount of time or period that electricity or power is present and is at the disposal of its users or customers whenever it is needed. For Best and Burke (2018), electricity availability includes a plethora of aspects of electricity such as generation capacity, electricity consumption rate, consumption rate of the industrial sector, residential access rate, and quality of electricity supply. However, electricity availability is a major requirement for economic growth and national well-being. Lack of it can be a challenge to economic growth (Burke et al., 2018). Socio-economic development on the other hand, is a multidimensional concept that signifies the advancement of a people with regards to their economic well-being and general quality of life (social). Seidman (2010), cited in Hanapiyah et al. (2021) defined socio-economic development as a process of creating and using human, physical, and financial assets to generate a better and widely shared economic well-being, as well as quality of life for a society. These involves those socio-economic activities that take place when resources such as human and capital goods, labour, manufacturing techniques or intermediary resources are put together to produce specific goods, services, and a better life (European Union, 2020). The aim of socio-economic development is to better the social and material wellness of individuals and social institutions for the purpose of achieving higher human development (Fritz, 2004). Therefore, available electricity supply has become a fundamental concern, which cannot be overstated. Studies show that it helps in wealth creation and serves as a catalyst for socio-economic development in every nation. Since the industrial revolution, all forms of energy including electricity have remained pivotal to social and economic development. It plays both direct and indirect roles in most productive processes and services, including transportation and IT (Bergasse et al, 2013).

Electricity availability has gradually become an indispensable factor of production in numerous production processes (Stern, 2011, cited in Best & Burke, 2018). Today, it is almost impossible to substitute electricity for other inputs in the production process. It is believed that electrification, which is one of the indices of availability of electricity makes available a solid foundation for development of local communities. It is apparent that communities that have good electricity supply, can easily have access to safe potable water, food security, better health and education conditions, as well as lighting, information, and industries. Also, availability of

electricity lessens the need for harnessing other traditional energy resources, such as firewood and animal dung for cooking and heating (Goldemberg, Reddy, Smith & Williams, 2000, cited in Bezerra et al., 2017).

Nevertheless, several studies have shown that there is a link between availability of electricity and socio-economic development; because electricity has the potential to improve education, increase income, and reduce poverty (United Nations Economic and Social Commission for Asia and the Pacific [UNESCAP], 2019). Ukoima & Ekwe (2019) in their review of the impact of electricity supply in a number of selected underdeveloped countries, found out that regular availability electricity supply is a panacea to economic growth. Stating that, when there is an increase in electricity supply by 1% towards regularity, a country's economy is anticipated to grow by 3.94%. Although there is still an ongoing argument concerning the causality between electrification and socio-economic growth, it has been widely accepted that regular availability of electricity supply is important for a good number of socio-economic activities, thereby contributing to socio-economic development (Burke, Stern & Bruns, 2018).

In our world today, even means of communication, transportation, and manufacturing have been revolutionized by electricity. Also, modern means of amusement such as radio, television and cinema which are the most popular form of entertainment are provided by electricity (Lekshmi, 2010). Corroborating, Bergasse et al., (2013) stated that availability of electricity is required to meet the basic social needs of man. They pointed to the residential sector where electricity is needed to meet multiple needs like; efficient lighting, heating, cooking, air conditioning, IT, telecommunication services, refrigeration, and powering of other household electrical appliances. In fact, Bergasse et al., (2013) further submitted that availability of electricity is also playing a very prominent role in improving the economic needs of households like income and welfare. Besides the comfort it guarantees in homes, electricity vis-à-vis mobile telecommunication is perceived by the vulnerable population as the most important service with the largest poverty reducing potential that is critical to increasing their household income. The socio-economic benefits of electricity are further listed to include service activities like education, trade, offices, tourism, etc.

In Nigeria particularly, availability of electricity seems to be getting worse over the years; the country is unable to meet its demand because of several reasons which include; poor policies, regulations, and management of operations (Olowosejeje, 2020). The electricity demand in the country outstrips the supply and the supply is very epileptic (Sambo, Garba, Zarma & Gamji, 2010). Power is never available 24 hours daily for its growing population. In fact, presently, Nigeria which has the largest population and economy in sub-Saharan Africa, only has 12 GW installed generating capacity of electricity (IEA, 2020). This is far below what is needed to run the economy and provide power for the teeming population in their homes and streets. In Cross River State, which includes the Southern Senatorial District, there is a growing gap between the demand for electricity and electricity available from the national grid. The electricity availability situation is poorer because of near total reliance on electricity generated from other States in Nigeria (Ayara et al., 2013).

The percentage of Nigerians using grid or public electricity is dwindling by the day. At the moment, there is about 14 GW self-generated electricity through small scale petrol and diesel generators (IEA, 2020). Although this comes with it attendant problem of increased greenhouse gas emissions, it accounts for about half of all the electricity consumed in the country. Thereby increasing electricity availability (Olowosejeje, 2020). It is expected that government and other relevant agencies will intensify efforts to improve electricity availability in the country and Southern Senatorial District of Cross River State in particular; because of

the pivotal role electricity plays in the social and economic development of the area, especially given the fact that Cross River State is the tourism hub of Nigeria. It is expected that improved availability of electricity will boost the functionality of the hotels and leisure centers, tourism sites, and other enterprises as well as support security efforts to keep the senatorial district safe by powering street lights.

Methodology

Research design. The cross-sectional survey research design was adopted for this study. This design capacitates a researcher to investigate both large and small populations. The design allows for the selecting and studying of samples chosen from the population to determine the incidence, distribution, and interrelations among the variables of interest.

Area of study. This research covered the Southern Senatorial District of Cross River State. The Southern Senatorial District is a political territory in Cross River State, from which a senator is elected to the National Assembly. It falls within the South-South Geo-Political Zone of Nigeria, bordering the Republic of Cameroon to the East; the Calabar Sea to the South; Akwa Ibom State to the South-West; Ebonyi State to the North-West, and Yakurr Local Government Area of Cross River State to the North. Administratively, the district is made up of seven local government areas (LGAs), namely: Akamkpa, Akpabuyo, Bakassi, Biase, Calabar Municipality, Calabar South, and Odukpani. All the LGAs and their headquarters are electrified. The senatorial district also has three Federal Constituencies and two hundred council wards (Ogban-Iyam, 2014). According to the National Population Commission (2006), the Southern Senatorial District has a population of 1,190,354 people. The projection of the population as at 2016 showed that the population was growing at the rate of 3.2 percent. Using the exponential growth rate, the population is estimated at 1,923,700 as at midyear, 2021. Geographically, it has an area of 4,444 square kilometers, located on latitude 4, 32; and 5, 53 North and longitude 7; 25 and 8; 25 East.

The Southern Senatorial District is made up of several related ethnic groups which include, the Efiks, the Ejagams, the Efuts, the Quas and the Ekois. The people are of the Bantu stock who migrated from Central Africa. They speak different languages, but all the languages have a common language root which is the Niger-Congo languages (Cross River State Government [CRSG], 2019). People of the district have cultural affinities which is seen in their history, mode of dressing, music and dance-steps, foods, names, religion, and marriage and burial ceremonies (Edem, 2014). They equally have similarities in their line of businesses, particularly small and medium enterprises, which is a pointer to their common decent. The business enterprises and most of the people need public electricity supply to enhance productivity in their various occupations and for their leisure.

Population of the study. The population of the study consisted of all the inhabitants of the seven local government areas that make up the Southern Senatorial District of Cross River State. This includes all the current customers of Port Harcourt Electricity Distribution Company (PHED). However, a representative sample for the study was drawn from all the seven local government areas that make up the senatorial district. The spread of the sample was drawn from the headquarters of each of the seven LGAs except Bakassi. This is because since the handing over of Bakassi by the Federal Government of Nigeria to the Republic Cameroon in 2009, the new headquarter at the outskirts of Akpabuyo LGA is yet to have effective link with the national grid; and many of the Bakassi indigenes live in Akpabuyo. Therefore, the estimated population of the study as at midyear, 2022; using the exponential formula at a growth rate of 3.2% is 1,923,700 inhabitants.

Sample size determination. The study adopted the Taro Yamane (1967) formula to determine the adequate representative sample of 400. In order to cater and make up for questionnaires which were not returned at the retrieval stage or the ones that were wrongly completed, twenty percent (20%) of the calculated sample size (80) was added. This generated a total sample size of 480.

Sampling techniques. Given the projected population of Southern Senatorial District of Cross River State (1,923,700), the calculated sample size was distributed among the six Local Government Areas (LGAs) viz: Akpabuyo, Akamkpa, Biase, Calabar Municipality, Calabar South, and Odukpani, based on proportional sample distribution. With availability of the sample frame, systematic random sampling method was used to select respondents in each LGA. Based on the calculation, every 15th name on the list was selected until the needed 62 respondents are selected. The contact information of the customers in the PHED's list was used to locate samples so selected and administered the questionnaire. Respondents in other LGAs were selected and identified using the same procedure.

Instruments for data collection. The questionnaire was the instrument for data collection. It contained two sections, A and B. Section A contained questions that elicited information on the respondents' socio-demographic characteristics. Section B elicited information from respondents on the main variables of the study.

Method of data collection. This encapsulates the whole processes of data collection. The primary data was obtained through the use of the instruments (interviews and questionnaires). The researcher administered the questionnaires and interview schedules on selected respondents with the help of four trained Research Assistants. The questionnaires and interviews were administered in sets at different periods to cover the sample population, which was representative of the entire population of the Southern Senatorial District of Cross River State. The instruments were constructed in English Language and in situations whereby the respondents were not literate, the Researcher and his Assistants were available to explain and translate the items in the manner and language the respondents understood. Furthermore, the questionnaires were administered and retrieved on the same day to ensure 100% retrieval, while the interviews were recorded for further transcription. All collected data were forwarded for editing, coding, and entries into SPSS for cleaning and subsequent analysis.

Method of data analysis. Data analysis involves descriptive method using univariate, bivariate and multivariate techniques. All data was summarized and presented in tables to make it easy for information to be extracted. Thereafter, analysis of data was done hypothesis-by-hypothesis, testing each one at 0.05 level of significance.

Socio-demographic variables of respondents

The socio-demographic characteristics of respondents covered in the study included gender, age, marital status, educational qualification, occupation, years of business, and location. These data are hereby presented in table 1.

The data as presented in Table 1 showed that there were more male (262 or 56.2%) than female (204 or 43.8%) respondents in the study. This is instructive to the point that it reflected the demographic significance of men as heads and breadwinners of households, who mostly bear the financial burdens of families including electricity tariffs. The data for the age distribution of respondents showed that 31 (6.7%) respondents were below the age of 19; 135 (29.0%) were between 20 – 25 years; 115 (24.7%) were between 26 – 30 years; 74 (15.9%) were between 31 – 35 years; while 66 (14.2%) were between 36 – 40 years. Another 45 (9.7%) were 41 years and above. This indicated that most of the respondents were young people (20 –

30 or 53.7%). This demographically implies that the population of the study area is largely an economically active population.

Table 1: Distribution of respondents by socio-demographic variables, N = 466

Variables		Frequency	Percentage
Gender	Male	262	56.2
	Female	204	43.8
Age	19 and below	31	6.7
	20-25	135	29.0
	26-30	115	24.7
	31-35	74	15.9
	36-40	66	14.2
	41 and above	45	9.7
Marital Status	Married	208	44.6
	Single	223	47.9
	Separated	17	3.6
	Divorced	8	1.7
	Widowed	10	2.1
Educational Qualification	No formal education	22	4.7
	Primary	26	5.6
	Secondary	131	28.1
	Tertiary	287	61.6

Source: Field Survey, 2023

Similarly, the distribution of respondents according to marital status showed that respondents numbering 223 (47.9%) were single; another 208 (44.6%) respondents were married; 17 (3.6%) were separated; 8 (1.7%) were divorced, while 10 (2.1%) were widowed. This revealed that the singles constituted a majority of the respondents. It was inferred that there are fewer married people within the population because young people constitute the majority in the population of the study area. The data distribution of respondents' educational qualification from Table 2 showed that most of the respondents (387), which constituted 61.6% of the total number of respondents had tertiary level of education. 131 (28.1%) had secondary education; a small number of 26 (5.6%) had primary education, while just 22 (4.7%) had no formal education. This is instructive and it implies that majority of the people that make up the total urban and sub-urban population in the study area have embraced education. It also suggests that the respondents were knowledgeable about the subject matter.

Table 2: Distribution of respondents by sources of livelihood and duration of employment

Variable		Frequency	Percentage
Sources of livelihood	Business	158	33.9
	Farming	45	9.7
	Civil/Public Servant	147	31.5
	Artisan	45	9.7
	Trading	35	7.5
	Others	36	7.7
Duration of employment & Years of business	1-3 years	129	27.7
	4-6 years	161	34.5
	7-9 years	101	21.7
	9-12 years	42	9.0
	13 and above	33	7.1

Source: Field Survey, 2023

The distribution of respondents according to occupation showed that 158 (33.9%) were into business, 45 (9.7%) were into farming, 147 (31.5%) were Public Servants, 45 (9.7%) were

Artisans, while 35 (7.5%) were unemployed, and 36 (7.7%) were into other kinds of enterprises like internship, and fishing. These findings suggest that most of the population is economically engaged. Also, data from table 4.2 showing the years of respondents' operation of businesses revealed that 129 (27.7%) respondents had operated between one to three years, 161 (34. 5%) had operated between four to six years, 101 (21.7%) respondents had operated between seven to nine years, 42 (9.0%) respondents had operated between nine to 12 years, and 33 (7.1%) had operated between 13 years and above. This is indicative of the respondents' experiences in business and their suitability to comment or give answers to questions concerning the state and importance of electricity supply (subject matter) in their locations.

Indicators of socio-economic development in Southern Senatorial District of Cross River State

The components of socio-economic development in Southern Senatorial District of Cross River State were assessed. Respondents were asked to rate the components of socio-economic development using a 5-point Likert Scale, which ranged from 'strongly disagree' (1) to disagree (2), undecided (3), Agree (4) to strongly agree (5). The summary of the data from the field is presented in table 4.4 below:

Table 3: Respondents ratings of the indicators (components) of socio-economic development in Southern Senatorial District of Cross River State, Nigeria

Description	SA*	A*	UD*	D*	SD*	Mean	Std
Quality housing	230	170	28	26	12	4.24	.975
Ability to pay fees for education and others	188	219	24	25	10	4.18	.920
Access to credit facilities	273	154	20	13	6	4.45	.810
Gainful employment	158	259	22	19	8	4.16	.824
Relate well with others	291	143	15	11	6	4.51	.782
Live a happy life	122	309	13	16	6	4.13	.782
Ability to meet my basic needs	314	107	13	22	10	4.49	.921
Access to health care services	242	150	30	20	24	4.21	1.08
Earn reasonable income	185	135	57	49	40	3.80	1.29
Access to recreational facilities	150	139	120	34	23	3.77	1.12
Social inclusivity	150	139	120	34	23	3.77	1.12
Ability to meet my religious obligations	174	144	59	49	40	3.77	1.28
Grand mean						4.12	0.99

Source: Field Survey, 2023

*SA = Strongly agree; A = Agree; UN = Undecided; D = Disagree; SD= Strongly disagree

Table 3 presented respondents' rating of what socio-economic development means to respondents in the study area. Respondents rated relationship with others (Mean = 4.51, Std = 0.782) above all other indicators of socio-economic development. For capitalist economic indicators of wealth, this rating may be strange, but the finding suggested the belief in social capital among the residents of the study area, and the communal nature of the people. For them, maintaining good relationship with others in the society was considered a high socio-economic indicator, especially in an era where disagreement among people has resulted in wanton destruction of lives and properties.

Following "relationship with community member" was "ability to meet basic needs". In the instrument for data collection, "basic needs" was operationalized to include, food, housing, clothing, and getting good health. Under a scale of five, ability to meet basic needs received a mean score of 4.49 with a standard deviation of 0.921, which suggests high convergence of the opinion of the respondents around the mean score.

Another indicator of "socio-economic development" in the area that received high mean rating was "access to credit facilities" (Mean = 4.45), followed by "quality housing" (4.24).

Although the rating of opinion differs when the standard deviations were considered (0.824 vs. 0.975 respectively), the ratings suggested that the types of housing residents live and ability to access loanable money for small scale businesses were high indicators of socio-economic development. In this context, the desire to do business by residents of the study area is high, as well as the need to improve upon the type of houses that they live in. Another high mean rating was given to “access to healthcare services” (mean = 4.21) and “ability to pay for education” (Mean = 0.920). There was more convergence opinion in terms of “ability to pay for education” (Std = 0.920) than “access to healthcare services” (Std = 1.08). The findings here suggested the common belief among respondents in the study area about acquisition of education, not only for knowledge’s sake, but also for its multiplier effect on socio-economic development. It also suggested, that compared to education, there are high variations in opinion about “access to health care services” among the respondents.

In terms of mean rating, ability to earn income as measured by “gainful employment” was rated 4.16 (Std = 0.824), a little above “living a happy life” (Mean = 4.13, Std = 0.782). However, agreement among respondents on “living a happy life” was more cohesive than agreement on “gainful employment” as a measure of socio-economic development as indicated by the coefficients of standard deviations (0.782 vs. 0.824).

Other mean ratings that were above average, given a Likert Scale of five were “earning reasonable income” (Mean = 3.80, Std = 1.29), “access to recreation facilities” and “Social inclusivity” (Mean = 3.77, Std = 1.12 respectively). This was followed by “ability to meet religious obligation (Mean = 3.77, Std = 1.28). The grand mean and standard deviation of all the twelve variables that were used to measure “socio-economic development” was 4.12 (Std = 0.99). This suggested a very high rating for all the variables (above the mean score of 2.50). The findings suggested that for electricity supply to aid socio-economic development in the study area, it must meet these expectations as rated by the respondents.

Electricity supply by PHED in the Southern Senatorial District of Cross River State, Nigeria

The supply of electricity by PHED in Southern Senatorial District of Cross River State was assessed by respondents. The summary of the data from the field is presented in table 4 below:

Table 4: Respondent’s ratings of supply of electricity by PHED in Southern Senatorial District of Cross River State, Nigeria

Electricity supply by PHED is:	Rating of electricity supply					Mean	Std
	SA	A*	UN*	D*	SD*		
Usually, full current	24	122	41	157	122	2.50	1.269
Usually, Low current	92	67	33	211	63	2.82	1.377
Usually, Erratic	150	139	120	34	23	3.77	1.125
Usually, reliable	11	56	31	184	184	1.98	1.075
Usually comes once in a week	22	35	79	160	170	2.10	1.119
Usually comes twice in a week	36	51	74	150	155	2.28	1.245
Usually comes thrice in a week	28	38	88	130	182	2.14	1.196
Usually, once a day for 7 days a week	92	67	33	211	63	2.12	1.337

Source: Field Survey, 2023.

*SA = Strongly agree; A = Agree; UN = Undecided; D = Disagree; SD= Strongly disagree

The supply of electricity by PHED in Southern Senatorial District of Cross River State was assessed using a 5-point Likert scale, which ranged from ‘strongly disagree (1) to disagree (2), undecided (3), agree (4) to strongly agree (5). Eight questionnaire items as summarized in table 5 were used for the assessment. There were divergence opinions among the respondents as shown in the standard deviations, which ranged from 1.075 (usually reliable) to 1.337 (usually low current and usually once a day for seven days a week). This finding

supports the high rating of electricity supply in the study area as being mostly erratic (Mean = 3.377, Std = 1.125). About 58.9 per cent of the respondents reported experience of low current supply (Mean = 2.82, Std = 1.377), while 59.9 per cent of the respondents reported electricity supply as being average (Mean = 2.50, Std = 1.269).

Other than power supply being erratic and low-current, the reliability of power supply was rated low (Mean = 1.98, Std = 1.075). Specifically, 70.8 per cent of the respondents experienced power supply only once in a week (Mean = 2.10, Std = 1.119), 65.5 per cent reported experience of electricity power supply from PHED only twice in a week (Mean = 2.28, Std = 1.245), while 67.0 percent experienced power supply only thrice in a week (Mean = 2.14, Std = 1.196). There were also electricity consumers in the study area who experienced power supply once a day for seven days in a week (N = 274, 58.8%). In this context, the rating of electricity supply was rated below average (Mean = 2.12, Std = 1.337).

Table 5: Respondents ratings of the usefulness of electricity supply for socio- economic activities (as proxies of socio-economic development).

S/N	Socio economic activities	Very useful	Useful	Undecided	Not useful	Not very useful	Mean	Std
1	Saloon (Haircut & Hair dressing)	18	203	38	126	81	2.89	1.244
2	Viewing Centre	174	144	59	49	40	3.08	1.284
3	Restaurant	199	158	66	21	22	4.05	1.083
4	Hotel and relaxation	21	177	65	122	81	2.86	1.225
5	Welding	244	150	29	18	25	4.22	1.084
6	Carpentry	242	150	30	20	24	4.21	1.084
7	Farming	25	37	369	24	12	3.08	.664
8	Supermarket	117	181	24	57	87	3.39	1.453
9	Filling station	241	153	43	18	11	4.28	.950
10	Trading store	235	136	49	24	22	4.15	1.104
11	Hospitals, maternity & clinic	235	129	54	32	16	4.15	1.088
12	Other income yielding activities	196	143	61	47	19	3.97	1.150
13	Social activities and leisure	230	170	28	26	12	4.24	.975
14	Security	34	90	50	148	144	2.40	1.299
15	Other manufacturing businesses	193	156	83	15	19	4.05	1.043

Source: Field Survey, 2023

*VU = Very Useful; U = Useful; UN = Undecided; NU = Not Useful and NVU = Not Very Useful.

In order to assess respondents' knowledge of usefulness of electricity for purpose of socio-economic development, respondents were asked of such usefulness with respect to 15 socio-economic activities (used as proxies of economic development), which citizens engage in for regular income in Southern Senatorial District of Cross River State. Respondents were asked to rate the usefulness electricity using a 5-point Likert Scale, which ranged from "Very useful" (5), "Useful" (4), "Undecided" (3), "Not useful" (2), and "Not very useful" (1). The findings are presented in table 4.6. The usefulness of electricity for selected socio-economic activities were rated above average. Specifically, Saloons (Haircut & Hair dressing) were rated (Mean = 2.89, Std = 1.244). Viewing Centre and Restaurants were rated (Mean = 3.08, Std = 1.284) and (mean = 4.05, Std = 1.083) respectively. while Hotel and relaxation had a mean score of 2.86 (Std = 1.225). The suggestion of the finding is that electricity supply can positively impact on aforementioned socio-economic activities.

Nevertheless, other mean ratings of the usefulness of electricity for operation of socio economic activities that were above average, given a Likert Scale of five were "Welding" (mean = 4.22, Std = 1.084), "Carpentry" (Mean = 4.21, Std = 1.084), "Farming" (Mean = 3.08, Std = .664), "Supermarket" (Mean = 3.39, Std = 1.453), "Filling station" Mean = 4.28, Std = .950, "Trading store" (Mean = 4.15, Std = 1.104), "Hospitals, maternity & clinic" (Mean =

4.15, Std = 1.088), “Other income yielding activities” (Mean =3.97, Std = 1.150), “Social activities and leisure” (Mean =4.24, Std = .975), and “Other manufacturing businesses” (Mean =4.05, Std =1.043). However, the mean rating for Security was below average (Mean = 2.40, Std =1.299). Drawing from the common opinion among respondents in the study area, the findings imply that electricity is helpful to social and economic activities, and therefore, has multiplier effect on socio-economic development.

Availability of electricity supplied by PHED and socio-economic development

Arising from respondents’ knowledge of the usefulness of electricity for socio-economic development, the study inquired into “availability of electricity supplied by PHED for the purpose of enhancing operation of business in the study area. Availability was assessed in terms of frequency. Respondents were asked to rate the frequency of supply with respect to socio-economic activities that enhanced income and happiness of the people, and thus contributed to socio-economic development. Fifteen socio-economic activities that are popular in the area were selected for rating. Table 6 presented a summary of the findings.

Table 6: Ratings of availability of electricity supplied by PHED for operation of socio-economic activities

S/N	Type of Socio-economic activities	Rating of availability of Electricity by PHED					Mean	Std
		Very frequent	Frequent	Undecided	Not frequent	Not very frequent		
1	Saloon (Haircut & Hair dressing)	76	112	84	121	73	2.99	1.335
2	Viewing Centre	97	100	49	183	37	3.08	1.325
3	Restaurant	94	103	30	202	37	3.03	1.335
4	Hotel and relaxation	36	155	56	182	37	2.94	1.161
5	Welding	24	122	41	157	122	2.50	1.269
6	Carpentry	53	147	57	127	82	2.92	1.321
7	Farming	75	115	52	137	87	2.90	1.388
8	Supermarket	21	177	65	122	81	2.86	1.225
9	Filling station	41	165	47	121	92	2.88	1.320
10	Trading store	45	164	38	131	88	2.89	1.329
11	Hospitals, maternity & clinic	74	100	53	194	45	2.92	1.284
12	Other income yielding activities	46	135	34	139	112	2.71	1.365
13	Social activities and leisure	18	203	38	126	81	2.89	1.244
14	Security	24	158	48	139	97	2.73	1.267
15	Other manufacturing businesses	23	137	37	149	120	2.56	1.284

Source: Field Survey, 2023

As shown in table 6 the rating of frequency of availability of power supply for operators of business in the study area was in terms of frequency. It ranged from “Not very frequent” (1) to “Not frequent” (2), “Undecided” (3), “Frequent” (4) “Very frequent” (5). (1). Although opinions vary, respondents rated the frequency of availability of electricity by PHED to Saloons (Haircut & Hair dressing) with a high mean score (Mean = 2.99, Std = 1.335). This was however, lower than the mean rating given to Viewing Centre (Mean = 3.08, Std = 1.325), which operate mostly in the evening in the night hours. The mean ratings for availability of powers for Restaurants and Hotel operators were above average (Mean = 3.03, Std = 1.335 and 2.94, Std = 1.161 respectively). In this context, the availability of electricity supply by PHED to these categories of business operation can be said to have positive effect on social and economic activities.

However, the findings in table 4.8 also showed that the frequency of electricity power supply to other selected socio-economic activities, viz: “Welding”, “Carpentry”, “Farming”,

‘Supermarket’, ‘Filling station’, ‘Trading store’, ‘Hospitals, maternity & clinic’, ‘Other income yielding activities’, ‘Social activities and leisure’, ‘Security’, and ‘Other manufacturing businesses’ were not too highly rated even when they were above average score of 2.50. These findings suggest positive impactful on socio-economic activities, depending on their location as some areas in the study location cannot access electricity (Table 6).

Findings

Finding of the statistical analysis revealed that Socio economic development in Southern Senatorial District of Cross River State, Nigeria is significantly depended on electricity supplied by PHED. It showed that the independent variable in this study which is electricity supplied (availability) by PHED, exerted positive and negative significant contributions to the dependent variable which is socio-economic development in the study area. Specifically, while low electricity supplied significantly retarded economic development in the Southern Senatorial District of Cross River State, electricity supplied at least thrice a week exerted significant positive contribution to socio-economic development. It suggested that a unit increase in the supply of electricity by PHED, will increase socio-economic development in the study area.

These findings confirmed the discovery of Bassey and Ikpe (2021) who found in their study that there is erratic and insufficient supply of electricity in Nigeria and Cross River State in particular. Adding specifically that the deficient electricity supply has a significant negative effect on consumption and the performances of small and medium scale businesses in Calabar South and Calabar Municipality of Southern Senatorial District of Cross River State. Also, these findings agree with the work of Egwaile, Onohaebi and Ike (2013), cited in Abanihi, et al., (2018), who maintained that Nigeria’s electricity distribution network which PHED is a part of is faced with low and high voltage drop (current fluctuation), which brings losses and dissatisfaction to businesses and electricity consumers as found in Southern Senatorial District of Cross River State.

Furthermore, the findings of this study are in agreement with Olowosejeje (2020) who stated that the country’s low electricity supply, which has not been able to meet its electricity demand of the country is inhibiting economic growth. The findings are also in tandem with that of Ayara, et al., (2013) who, in their study of electric power development gaps in Cross River State, Nigeria, found that there are electric power supply irregularities and voltage challenges (current fluctuation), with some areas in the study area not getting PHED supply as found in this study. These deficiencies as rated by the respondents, has effects on socio-economic activities and living standards in Southern Senatorial District of Cross River State. This means that all the measured sub-variables which point to electricity supplied by PHED being erratic and inconsistent; with many customers having light once, twice, thrice or more days a week; had inhibiting and enhancing influence on the socio-economic development in Southern Senatorial District of Cross River State, Nigeria.

Conclusion

The study concluded that electricity supply by PHED is positively instrumental to the advancement of socio-economic development in Southern Senatorial District of Cross River State, Nigeria. This was attained even with the limited level of availability. However, with improvement in the availability, and sustainable regularity of electricity supply by PHED. Social and economic activities will be further enhanced, and this will have a multiplier effect on the level of socio-economic development in Southern Senatorial District of Cross River State, Nigeria. The indicators of such multiplier effects will be seen on employment and income rates, education, housing, investment, community safety, healthcare and so forth.

Recommendations

The following recommendations were contrived, predicated on the findings of the study:

- i. The management of PHED should ensure that power supply to Southern Senatorial District of Cross River State is enough to enhance socio-economic development of the people.
- ii. The PHED management should improve electricity supply and expand coverage in the Southern Senatorial District of Cross River State for the purpose of socio-economic development of the area.
- iii. Aggressive efforts should be made by PHED to ensure access to electricity by people in the Southern Senatorial District of Cross River State. Such access should be followed by reduction in the billing tariff to ensure affordability of electricity

References

- Abang, E. O., Akwaji, F. N., Abonor, L. B. & Bassy, A. E. (2024). Port Harcourt Electricity Distribution Company (PHED) Tariff Structure and the Socio-Economic Development of Southern Senatorial District of Cross River State, Nigeria. *African Scholars Multidisciplinary Journal (ASMJ)*, 7, 80-89.
- African Development Bank Group (2021). *Africa Infrastructure Knowledge Program*.
- Abanihi, V. K., Ikheloa, S. O. & Okodede, F., (2018). Overview of the Nigerian power sector. *American Journal of Engineering Research AJER*, 7(5), 253-263.
- Anaba, S. A., & Olubusoye, O. E. (2021). Determinant of use of solar energy as an alternative means of energy by small and medium enterprises in Lagos State, Nigeria. *Discover Sustainability*, 2(1), 1-17.
- Ayara, N., Essia, U., & Ubi, P. (2013). Overview of Electric Power Development Gaps in Cross River State, Nigeria. *International Journal of Management and Business Studies*, 3(7), 101-109.
- Bassey, C. E., & Ikpe, K. I. (2021). The effect of electricity supply on the performance of small and medium-scale enterprises in Nigeria: A case study of Calabar South and Calabar Municipality of Cross River State. *International Journal of Engineering and Management Research*, 11(4), 68 – 78.
- Bergasse, E., Paczynski, W., Dabrowski, M., & Dewulf, L (2013). *The relationship between energy and socio-economic development in the Southern and Eastern Mediterranean: Technical report* (No. 27). Retrieved from Mediterranean Prospects (MEDPRO) <https://www.medpro-foresight.eu>.
- Best, R., & Burke, P. J. (2018). Electricity availability: A precondition for faster economic growth? *Energy Economics, Elsevier*, 74(c), 321-329.
- Bezerra, P. B. D., Callegari, C. L., Ribas A., Andre, F. P. L., Portugal-Pireira, J., Koberle, A., Szklo, A., & Schaeffer, R. (2017). The power of light: Socio-economic and environmental implications of a rural electrification program in Brazil. *Environmental Research letters*, 12(9), 301-333.
- Burke, P. J., Stern, D. I., & Bruns, S. B. (2018). The impact of electricity on economic development: A macroeconomic perspective. *International Review of Environmental and Resource Economics*, 12(1), 85-127.
- European Union (2020). *Economic activity classification*.
- Fritz, J. M. (2004). Socioeconomic developmental social work. In *Encyclopedia of life support systems*. Retrieved from <http://www.eolss.net>.
- Gaunt, T. & Nordstrom, A. H., (2007). Economic, social and environmental dimensions of access to electricity.

- Hachimenum, N. A., Ephraim, N. C. O., & Fabian, I. I. (2016). Assessment of impact of outages in selected electricity intensive industries in Nigeria. *International Journal of Research in Engineering & Technology*, 4(10), 9-24.
- Hanapiyah, Z. M., Kamaruzzaman, R. & Isa, A., (2021). Economic recovery plan (penjana) towards corporate sustainability performance: A case study of hotels in Klan Valley. *International Journal of Business, Economics and Law*, 24(6), 39-47
- International Energy Agency (2020). *Nigeria electricity generation by technology in the Africa case, 2010-2040*.
- Inyang, L. O. & Etuk, G. R. (2018). Public electricity fluctuation and sustainability of micro enterprises in Southern Senatorial District of Cross River State, Nigeria. *Scholars Bulletin*, 4(2), 130-135.
- Kinn, M. & Abbott, C. (2015). The centrality of electricity supply for global Sustainable development. Retrieved from <https://www.sustainabledevelopment.un.org>.
- Lekshmi, S. (2010, March 8). Importance of electricity. *The Hindu newspaper, India*, p.8.
- Ohajianya, A. C., Abumere, O. E., Owate, I. O., & Osarolube, E. (2014). Erratic power supply in Nigeria: Causes and solutions. *International Journal of Engineering Science Invention*, 3(7), 51-55.
- Olowosejeje, S. A. (2020). *Quantifying the challenges associated with poor electricity supply in Nigeria and the role of a hybrid PV system in addressing them* (PhD thesis, University Collage Cork, Ireland). Retrieved from <https://cora.ucc.ie/handle/10468>.
- Patel, A. (2017, March 31). How does electricity get to my home? [Blog post]. Retrieved from <https://blog.directenergy.com/how-does-electricity-get-to-home/>.
- Patel, S., Larson, A., & Harvey, A. (2022, October 1). History of power: the evolution of the electric generation industry. *Power Magazine*, p. 3–7. Retrieved from <http://www.powermag.com>.
- Ukoima, K. N., & Ekwe, O. A. (2019). Review of the Impact of Electricity Supply on economic growth: A Nigeria case study. *IOSR Journal of Electricity and Electronic Engineering*, 14 (1), 28-34.
- Sambo, A. S., Garba, B., Zarma, I. H., & Gaji, M. M., (2003). Electricity generation and the present challenges in the Nigerian power sector. *Energy Resources Review*, 4, 7-10
- United Nations Development Programme (2015). *The millennium development goals report*.
- United Nations Economic and Social Commission for Asia and the Pacific (2019). *Electricity access for social change*.
- United States Agency for International Development (2021). *Nigeria power African fact sheet*.
- Wade, W., Malik, N. S., & Saul, J. (2021, October 7). Global energy crisis threatens to hit U.S. grids this winter. *Bloomberg*. Retrieved from <https://www.bloomberg.com/news/article/2021-10-07/energy-crisis-may-trigger-u-s-winter-blackouts-xcoal-ceo-says..>
- World Bank (2021, February 5). *Nigeria to Improve Electricity Access and Services to citizens*, [press release]. <https://www.worldbank.org/en/news/press-release/2021/02/05/nigeria-to-improve-electricity-access-and-services-to-citizens>.
- World Bank (2021, June 7). *Report: Universal access to sustainable energy will remain elusive without addressing inequalities*, [press release]. <https://www.worldbank.org>.
- Zohuri, B. (2016). Electricity, an essential necessity in our life. In B. Zohuri & P. McDaniel (Ed.s), *Application of compact heat exchangers for combined cycle driven efficiency in next generation nuclear power plants* (pp.17-35). New York City, United States: Springer International Publishing.