

# Effect of Erratic Electric Power Supply on The Environment

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**Abstract:** This study investigated the effect of erratic electric power supply on natural and man-built environments in Nigeria. The study was anchored on three hypotheses formulated in line with the objectives of the study. The study adopted descriptive survey design. Sample size consisted of 464 respondents reached across the six geopolitical zones of Nigeria via the Google Form. A 5-point Likert scale format questionnaire was used as instrument for data collection. The instrument was pilot tested for reliability using the Cronbach Alpha reliability test method, and a reliability index of 0.83 was obtained. Descriptive statistics and analysis of covariance (ANCOVA) were employed for data analysis. It was discovered that erratic electric power supply in Nigeria has significant negative effects on natural and man-built environments; socio-economic development and growth; and human health and wellbeing. It was, therefore, recommended that Nigerian government should prioritize and be more proactive in the supply of a stable and regular electric power; other environmental friendly sources of generating electric power such as solar energy should also be explored to enhance stable and regular electric power supply in the country.

**Keywords:** Erratic Electric Power, Natural, Man-Built Environment

## I. INTRODUCTION

The functions of electricity in the socio-economic system is like that of blood in human body. As blood transports oxygen and nutrients to the lungs and tissues; and regulates body temperature among other functions, the similitude is also with electricity. Electricity energizes appliances and equipment installed in dwelling houses; components of machines in industries, and facilitates functions within intra and inter social cultural sectors such as financial, agricultural, medical, educational and other sectors in the society. As a matter of fact, electric power cannot be separated from sustainable development of every component of the society, be it social, cultural, economic, political, etc.

Indeed, electricity as a form of energy enjoys considerable patronage from both individual and cooperate citizens. It is a crucial source of energy for domestic and non-domestic purposes including commercial and industrial activities throughout the world (Olukoju, 2004). Also, it is a vital input to economic growth and development of every nation. This makes its demand to continue to increase because of its necessity to the maintenance of modern life; and the rate of input and output of goods and services is directly linked to availability of electricity (Akinbami, 2012).

Electricity has essential functions in industrial and technological as well as environmental development of the world (Aremu, 2019). Almost all equipment and appliances used at home, industries and hospitals require electricity (Orji & Orji, 2012). Therefore, the backbone of infrastructural development, wealth creation, and job opportunities lie mostly on availability of electricity (Ademole & Afeiwana, 2004). Likewise, Ikhisemojie (2016) stresses that "electric power is an abundant resource whose availability improves the quality of daily life". As such, any country that is desirous of sustainable development in this age of technology must, as a matter of necessity, device means of regular generation and distribution of electricity to all nooks and crannies of its society. Without it, meaningful socio-economic as well as industrial development of any kind cannot be achieved. Apart from this, efficient electricity supply impacts positively on other facets of human existence in the modern world, most especially in vital areas like commerce, education, communication and the general standard of living (Urrutia cited in Aremu, 2019).

Unfortunately, in spite of these numerous benefits, electric power supply in Nigeria is erratic. Being erratic means that the residents, industries, and companies demanding electricity cannot be sure or predict its availability for consumption (Ohajianya, Abumere, Owate & Osarelube, 2014). Erratic power supply can also be equated to negative power in a situation where epileptic nature of the supply causes damage to the equipment being powered. In addition, erratic power supply impedes socio-economic activities which provide basic human needs, it limits economic growth and development since a nation without constant electric power supply cannot measure up in manufacturing, distribution, and consumption of needed goods and service. Invariably, erratic electric power supply can affect the quality of life as citizens are deprived of goods and services that would make necessities of life affordable. It can as well affect the natural and man-built environments since it can cause residents to look for alternative energy such as felling of trees for fuel wood and production of charcoal for cooking, and powering of their small and medium scale industries (Ekpo, 2021; Ekpo & Is'haq, 2021). Pollution of the atmosphere with carbon dioxide cannot be disassociated with erratic power supply when residents and industries opt for using alternative sources of power such as electric power generators. These can also effect human health and well-being (Ikhisemojie, 2016).

As a source for generating adequate electric power for Nigerians, the National Electric Power Authority (NEPA) was

established in 1972 with the responsibility of generating, transmitting and distributing electric power in Nigeria. NEPA metamorphosed into Power Holding Company of Nigeria (PHCN) in 2005 as a transitional corporation that comprises of 18 successor companies namely six generation companies, eleven distribution companies and one transmission company (Nigerian Electricity Regulatory Commission, 2022).

Despite this effort, inefficiency and erratic power supply have characterized its operation. It was reported that Nigeria has the highest people without electricity in the world and this has led to about four percent loss of gross domestic product (GDP) (Onyenwe, 2022). This phenomenon has also forced many individuals, entrepreneurs, and industrial establishments in the country to undertake extra investment in small, medium, and large size electric power generation in order to avoid production losses as well as damage to machines, appliances, and equipment. These extra investment have raised production costs and made it difficult for local made products to compete favourably in price with their imported counterparts. This has also prompted numerous industrialists and company owners to leave Nigeria to neighboring countries for a profitable business environment (Ohajianya, Abumere, Owate & Osarelube, 2014; Akiri, Ijuo & Apochi, 2015; Onwumere, Amaghionyeodiwe & Ndukwe, 2019; Owa, Adesina, Kolawole, Adigun & Kareem, 2020). In a nutshell, erratic electric power supply in Nigeria apart from being a national embarrassment, is a hydra-problem that has stifled economic development and growth, affected natural and man-built environments, and human health and wellbeing.

#### *Purpose of the Study*

This study investigated the effect of erratic electric power supply on natural and man-built environments in Nigeria. Specifically, the study investigated the following:

- i. The effect of erratic electric power supply on natural and man-built environments in Nigeria.
- ii. The effect of erratic electric power supply on socio-economic development and growth in Nigeria.
- iii. The effect of erratic electric power supply on human health and wellbeing in Nigeria.

#### *Research Questions*

The underlisted research questions were raised to guide the study:

- i. What is the effect of erratic electric power supply on natural and man-built environments in Nigeria?
- ii. What is the effect of erratic electric power supply on socio-economic development and growth in Nigeria?
- iii. What is the effect of erratic electric power supply on human health and wellbeing in Nigeria?

#### *Hypotheses*

The following null hypotheses were generated for the study:

- H<sub>01</sub>: There is no significant effect of erratic electric power supply on natural and man-built environments in Nigeria.
- H<sub>02</sub>: There is no significant effect of erratic electric power supply on socio-economic development and growth in Nigeria.
- H<sub>03</sub>: There is no significant effect of erratic electric power supply on human health and wellbeing in Nigeria.

## II. EMPIRICAL STUDIES

Simon-Oke (2012) evaluated the impact of electricity crisis on the manufacturing productivity growth in Nigeria (1980 - 2008). The ex-post facto research design was employed. The study employed the ordinary least square multiple regression to analyze the time series data between 1980 and 2008. The result of the study shows that electricity generation and supply in Nigeria under the reviewed period impacted negatively on the manufacturing productivity growth, due to unnecessary government's spending on non-economic and unproductive sectors. It recommended a reverse of the ugly trend of poor electricity supply through the initiative of independent power project, as proposed by some states in Nigeria.

Ologundudu (2014) investigated the impact of epileptic electricity power supply on industrial and economic development in Nigeria from 1972 – 2010. The ex-post facto design was utilized in the study, and the endogenous growth model was adopted. Data for the study were sourced from Central Bank of Nigeria statistical bulletins. The Granger Causality test and the ARDL bounds test were employed for analysis. Results revealed relationship between GDP per capita and electricity supply. It was concluded that erratic electric power supply posed negative effects on industrial and economic development in Nigeria.

Doe and Asamoah (2014) analyzed the effect of electric power fluctuations on the profitability and competitiveness of SMEs in Accra business district of Ghana. The cross-sectional survey was adopted in the study. A sample of 70 Ghanaian SMEs was selected using a systematic sampling approach. Data were collected through interview and questionnaire. Inferential statistics was used for data analyses. The study found that without reliable energy supply, SMEs are unable to produce in increased quantities and quality leading to poor sales hence low levels of profitability. It is established that low profitability negatively affects return on assets and return on investment of SMEs. Government was advised to intensify efforts to ensure stable power supply.

Akiri, Ijuo and Apochi (2015) examined the impact of electricity supply on the productivity of manufacturing industries in Nigeria between 1980 and 2012. The ex-post facto research design was utilized in the study. Data of the study were extracted from 2012 edition of Central Bank of Nigeria Statistical Bulletin (over the period of 32 years). The study employed the ordinary least square multiple regression to analyze the time series data between 1980 and 2012. The result of the study showed that inadequate and irregular supply of

electricity hampered manufacturing productivity growth. It was recommended that government should be more concerned of adequate and regular electric power supply to manufacturing industries across the nation.

Ahmed and Mallo (2015) examined the impact of deficient electric power supply on the operations of small scale businesses operating in north-east of Nigeria. Descriptive survey design was employed. The population of the study comprised of 468 small scale businesses in the zone. A sample size of 245 was selected through the use of stratified random sampling. Questionnaire was used for data collection, and the data were analyzed using descriptive statistics and analysis of variance. Results revealed the severity of electricity supply outages and the costs imposed by power supply outages on the operation of this class of businesses in the region. It was recommended that there is urgent need for policy attention towards revitalizing the electricity

Ibrahim, Aryeetey, Asampong, Dwomoh and Nonvignon (2016) examined the health effects of erratic electric power supply among university students in Ghana. The study majorly focused on anxiety disorder. The survey research design was adopted in the study. Participants of the study were 650 students randomly selected from the 13 different halls of residence of the University of Ghana. The Generalized Anxiety Disorder 7-item scale (GAD-7) was used for data collection. The data were analyzed using the likelihood ratio (LR) test and Fisher's exact tests. Results disclosed that students interviewed felt nervous, anxious or on edge almost every day due to the erratic power supply. It was concluded that erratic electric power supply has health and well-being implications.

Nyanzu and Adarkwah (2016) compared the effect of power supply on the performance of small and medium size enterprises in Tema and the Northern part of Ghana. The study uses the World Bank 2013 enterprise survey on Ghana which consist of 710 firms. The study employs both chi-square and t-test to do pattern analysis. In addition, ordinary regression analysis (OLS) was employed to regress firm performance variable on electricity supply variable and other covariates. The results show that power outages experienced and hours of power outages negatively affected firms performance (profitability). In addition, it was further realized that power outages (power interruptions) severely affects SMEs located in the Northern part of Ghana than SMEs located elsewhere. The study therefore recommended that government should implement policies and programs such as power mix approach and renewable energy and bring in private sector participation to install competition and efficiency. SMEs should consider alternative sources of power such as solar power, inverter, biogas, generators, which would help curb the cost power outage brings to their production and to boost output.

Onwumere, Amaghionyeodiwe and Ndukwe (2019) examined the effects of epileptic power supply on the investment and performance of bakeries in Abia State. Survey research design was adopted in the study. Respondents of the study were 69 bakers sampled using purposive sampling technique. Data of the study were gathered using well-structured questionnaire.

Data were analyzed using both descriptive statistics such as mean, frequency tables and percentages; and inferential statistics such as multiple regression and probit regression analyses.

Findings revealed increase in the trend of expenses on electricity generation among bakeries due to epileptic power supply. It was recommends that National electric supply should be made to be constant to trigger the preference of the bakeries operators to national electric power generation rather than to depend on auto generation of electricity for their business as the smoke from the auto generators pollutes and degrades the environment faster and increases their cost of operations thereby leading to consumers spending more for these product.

Abubakar and Olusegun (2019) examined the relationship between electricity supply and performance of small and medium enterprises in Nigeria. The study focused North-western states of Nigeria. The descriptive survey design was employed in the study. From a targeted population of 1986 SMEs owners operating in the city of Kano, Katsina and Jigawa states, 197 participated in the study. The data of the study were collected using questionnaire. Descriptive statistics and multiple linear regression model were used for data analysis. The study found significant relationship between SMEs growth and electricity supply as well as firm characteristics - firm age, size and leverage. It was recommended that there is an urgent need to improve electricity power supply in order to accelerate the growth of enterprises and by extension the economy in Nigeria.

Fakih, Ghazalian and Ghazzawi (2020) examined the effects of power outages on the performance of manufacturing firms in the Middle East and North Africa (MENA) region. The ex-post facto research design was adopted. Data of the study were gathered from a firm-level dataset derived from the World Bank's Enterprise Surveys (WBES) database. Regression statistics was used for data analysis. Results of the study showed adverse effects of power outages on performance of manufacturing firms in the MENA region especially, and that the effects of power outages exhibit variations with firm size.

Mukhtar, Obiora, Yimen, Quixin, Bamisile, Jidele and Irvboje (2021) investigated the impact of the electricity crisis on the economic growth of Nigeria. Ex-post facto design was employed. Data were collected through publications of World Bank, International Monetary Fund, and Office of the European Union. Data analysis was done using the time series linear regression model. It was discovered that erratic electric power supply affected gross national income (GNI) in Nigeria.

### III. METHODOLOGY

The descriptive survey design was adopted for this study. Population of the study comprised of adult residents of Nigeria (18 years and above). Sample size consisted of 464 subjects who responded to the instrument from the six geopolitical zones of Nigeria via the Google Form. Data of the study were gathered using questionnaire constructed in a 5-point Likert scale format of Strongly Agree (SA) – 5 points; Agree (A) – 4

points; Undecided (U) – 3 points; Disagree (D) – 2 points; and Strongly Disagree (SD) – 1 point.

The instrument was face validated by physics and environmental education lecturers in Department of Science and Environmental Education (SEE) in the Faculty of Education, University of Abuja. It was pilot tested using 85 respondents in Federal Capital Territory, Abuja, who were not part of the study. A reliability index of 0.83 was obtained through the Cronbach alpha reliability test. Data collected for the study with respect to research questions raised and demographic information were analyzed using descriptive statistics of frequency counts, simple percentage, mean (x), and standard deviation while one-way analysis of covariance (ANCOVA) was used to test the generated null hypotheses at 0.05 level of significance. The analysis were carried out on MS Excel and SPSS.

*Presentation and Analysis of Data*

Table 1: Demographic Data of the Respondents

Variable	Classification	Frequency	Percentage
Geo-Political Zone	North Central	86	18.5
	North East	67	14.4
	North West	84	18.1
	South East	77	16.6
	South South	62	13.4
	South West	88	19.0
	<b>Total</b>	<b>464</b>	<b>100</b>
Gender	Male	253	54.5
	Female	211	45.5
	<b>Total</b>	<b>464</b>	<b>100</b>
	18 – 25	64	13.8

	26 – 35	188	40.5
Age	36 – 45	142	30.6
	Above 45	70	15.1
	<b>Total</b>	<b>464</b>	<b>100</b>
Academic Qualifications	Sec. Sch. Certificate	13	2.8
	NCE/OND	61	13.1
	1 <sup>st</sup> Degree	185	39.9
	2 <sup>nd</sup> Degree	107	23.1
	PhD	98	21.1
	<b>Total</b>	<b>464</b>	<b>100</b>

Source: Field Survey, 2022

Table 1 showed the demographic data of the respondents. 86 (18.5%) respondents were in North Central geo-political zone, 67 (14.4%) were from the North East zone, 84 (18.1%) were from North West zone, 77 (16.6%) were from South East zone, 62 (13.4%) from South South zone while 88 (19%) were from the South West. In addition, the respondents comprised of 253 (54.5%) males and 211 (45.5%) females.

For the Age of the respondents, 64 (13.8%) respondents were between the ages of 18 and 25 years, 188 (40.5%) respondents were between the ages of 26 and 35 years, 142 (30.6%) of the respondents were between the ages of 36 and 45 years, while 70 (15.1%) were more than 45 years.

Regarding academic qualifications of the respondents, 13 (2.8%) of the respondents had secondary school certificates, 61 (13.1%) of the respondents were NCE/OND holders, 185 (39.9%) were first degree or HND certificate holders, 107 (23.1%) had additional certificates to their first degree, while 98 (21.1%) of the respondents had PhD certificates.

Table 2: Effect of erratic electric power supply on natural and man-built environments

S/N	Item	SA	A	U	D	SD	X	σ
1	Erratic electric power supply causes malfunctioning of equipment and appliances	260	137	40	27	0	<b>4.36</b>	<b>0.87</b>
2	Malfunctioning of equipment and appliances as a result of erratic electric power supply causes fire outbreaks in building and other infrastructures	144	127	73	107	13	<b>3.61</b>	<b>1.22</b>
3	Malfunctioning of equipment and appliances leads to spending of huge amounts of money to replace and restore the damaged equipment and appliances in buildings and other infrastructures	257	157	36	14	0	<b>4.42</b>	<b>0.76</b>
4	Infrastructures/buildings set ablaze due to erratic electric power supply release toxic fumes which pollute the environment	226	187	20	15	16	<b>4.28</b>	<b>0.95</b>
5	Water bodies could be contaminated by runoff resulting from fire outbreaks caused by erratic electric power supply	237	162	15	37	13	<b>4.23</b>	<b>1.03</b>
6	Loss of biodiversity could be caused by destruction of forests from fire outbreak resulting from erratic electric power supply	221	180	29	34	0	<b>4.27</b>	<b>0.87</b>
7	Use of alternative power supply such as electric power generators contribute to pollution of atmosphere	179	158	63	48	16	<b>3.94</b>	<b>1.12</b>
8	Use of alternative sources of energy for domestic purposes such as fuel wood and charcoal cause deforestation	152	80	130	48	54	<b>3.49</b>	<b>1.35</b>
9	Erratic electric power supply causes loss of life and properties of most citizens due to storing of premium motor spirit (PMS) at home	95	117	112	65	75	<b>3.19</b>	<b>1.35</b>
10	Erratic electric power supply leads to unsustainable exploitation of natural resources such as fossil fuel and gas for domestic and industrial use	302	67	59	36	0	<b>4.37</b>	<b>0.98</b>

Source: Field Survey, 2022

The entire questionnaire items raised in relation to research question one were agreed upon. The least and maximum means to the items were 3.19 and 4.42 respectively. Also, the least and maximum standard deviations for the responses were 0.76 and

1.35. It, therefore, implied that respondents agreed that erratic electric power supply has effect on natural and man-built environments in Nigeria.

Table 3: Effect of erratic electric power supply on socioeconomic development and growth

S/N	Item	SA	A	U	D	SD	x	$\sigma$
1	Erratic electric power supply causes high cost of production of goods and services	197	121	98	33	15	<b>3.97</b>	<b>1.10</b>
2	Erratic electric power supply frustrates efforts of small and medium scale entrepreneurs	163	185	61	48	7	<b>3.97</b>	<b>1.01</b>
3	Erratic electric power supply stifles socio-economic development and growth which in turn causes entrepreneurs relocation to other countries	192	162	47	48	15	<b>4.01</b>	<b>1.11</b>
4	Erratic electric power supply reduces the rate of foreign direct investment	250	152	15	47	0	<b>4.30</b>	<b>0.94</b>
5	Erratic electric power supply encourages importation of finished goods which completes unfavourably with local productions	203	187	45	29	0	<b>4.22</b>	<b>0.86</b>
6	Erratic electric power supply prevents value to be added to raw materials exported to other countries	171	171	69	41	12	<b>3.97</b>	<b>1.05</b>
7	Erratic electric power supply prevents transfer of much needed technology and skills to Nigerian entrepreneurs and workers by foreign partners	139	121	125	36	43	<b>3.60</b>	<b>1.25</b>
8	Erratic electric power supply causes hike in prices of local manufactured goods and reduces profit margins of the manufacturers	180	143	111	23	7	<b>4.00</b>	<b>0.98</b>
9	High cost of goods and services due to erratic electric power supply results in low patronage by consumers and causes most companies to produce below capacity	163	189	51	51	10	<b>3.96</b>	<b>1.05</b>
10	Erratic electric power supply robs Nigerians and Nigeria of human capital development and domestic revenue generation and mobilization	178	178	60	37	11	<b>4.02</b>	<b>1.02</b>

Source: Field Survey, 2022

Data related to research question two were presented on Table 3 which showed the minimum and maximum means to questionnaire items to be 3.60 and 4.30 respectively while the standard deviations for the items were 0.86 and 1.25 in the same

order. It implied that erratic electric power supply has a negative effect on socioeconomic development and growth in Nigeria.

Table 4: Effect of erratic electric power supply on human health and wellbeing

S/N	Item	SA	A	U	D	SD	x	$\sigma$
1	Toxic fumes from electric power generating machines threaten human health, and wellbeing including lung, and eyes	216	156	50	42	0	<b>4.18</b>	<b>0.95</b>
2	Noise pollution emanating from electric power generating machines can be unpleasant and harmful to humans and can affect their hearing capacities	240	153	47	24	0	<b>4.31</b>	<b>0.85</b>
3	Erratic electric power supply can affect mental stability, sensitivity, and wellbeing of Nigerians	141	132	74	106	11	<b>3.62</b>	<b>1.20</b>
4	Inhalation of smoke from electric power generating machines may cause frequent cycle of ill-health and respiratory problems such as asthma	244	165	43	12	0	<b>4.38</b>	<b>0.76</b>
5	Disruption of electric power supply can cause death of hospital patients whose life support appliances depend on constant electric power supply	206	186	48	12	12	<b>4.21</b>	<b>0.92</b>
6	Interruption of electric power supply that regulates room temperatures affect leisure and resting time of individuals	191	192	41	31	9	<b>4.13</b>	<b>0.96</b>
7	Erratic electric power supply increases level of poverty among citizens	203	156	89	16	0	<b>4.17</b>	<b>0.86</b>
8	Erratic electric power supply increases crime rates and social vices as hoodlums and thieves operate mostly under the cover of darkness	145	125	76	107	11	<b>3.62</b>	<b>1.21</b>
9	Erratic electric power supply affect quality of life due to noise and air pollution from domestic power generators used among citizenry	137	214	110	3	0	<b>4.05</b>	<b>0.75</b>
10	Erratic electric power supply causes loss of man-hours in both private and public sectors of the economy	178	213	61	12	0	<b>4.20</b>	<b>0.76</b>

Source: Field Survey, 2022

Table 4 captured data gathered in relation to research question three. From the table, the least mean and standard deviation for the questionnaire items were 3.62 and 0.75 respectively while

the maximum mean and standard deviation were 4.38 and 1.21 respectively. Hence, erratic electric power supply has effect on human health and wellbeing in Nigeria.

*Test of Hypotheses*

**Hypothesis One:** There is no significant effect of erratic electric power supply on natural and man-built environments in Nigeria.

Table 5: Analysis of Covariance for Hypothesis One

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6376.315 <sup>a</sup>	7	910.902	41.040	.000	.387
Intercept	57240.899	1	57240.899	2578.928	.000	.850
Age	2.308	1	2.308	.104	.747	.000
Academic Qual.	33.154	1	33.154	1.494	.222	.003
Geo-political Zone	6293.316	5	1258.663	56.708	.000	.383
Error	10121.200	456	22.196			
Total	764749.000	464				
Corrected Total	16497.515	463				

a. R Squared = .387 (Adjusted R Squared = .377)

Table 5 showed the result of the one-way analysis of covariance conducted to compare respondents' views regarding the effect of erratic electric power supply on natural and man-built environments in Nigeria based on age, academic qualification and geo-political zones. It revealed insignificant difference  $F(1,456) = 0.10$ ,  $p = 0.75$ , partial eta squared = 0.00 (age) and,  $F(1,456) = 1.49$ ,  $p = 0.00$ , partial eta squared = 0.00 (academic qualification). However, significant difference was recorded in the geopolitical zones,  $F(5,456) = 56.71$ ,  $p = 0.00$ , partial eta squared = 0.38. Hence, there is significant effect of erratic electric power supply on natural and man-built environments in Nigeria.

**Hypothesis Two:** There is no significant effect of erratic electric power supply on socio-economic development and growth in Nigeria.

Table 6: Analysis of Covariance for Hypothesis Two

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5905.595 <sup>a</sup>	7	843.656	21.363	.000	.247
Intercept	67920.631	1	67920.631	1719.866	.000	.790
Age	700.206	1	700.206	17.730	.000	.037
Academic Qual.	90.439	1	90.439	2.290	.131	.005
Geo-political Zone	4996.325	5	999.265	25.303	.000	.217
Error	18008.267	456	39.492			
Total	766954.000	464				
Corrected Total	23913.862	463				

a. R Squared = .247 (Adjusted R Squared = .235)

Table 6 showed the result of the one-way analysis of covariance conducted to compare respondents' views regarding the effect

of erratic electric power supply on socio-economic development and growth in Nigeria based on age, academic qualification and geo-political zones. It revealed insignificant difference  $F(1,456) = 17.73$ ,  $p = 0.00$ , partial eta squared = 0.04 (age) and,  $F(5,456) = 25.30$ ,  $p = 0.00$ , partial eta squared = 0.22 (geopolitical zones). However, significant difference was recorded in the academic qualification,  $F(1,456) = 2.29$ ,  $p = 0.13$ , partial eta squared = 0.01. Hence, there is significant effect of erratic electric power supply on socio-economic development and growth in Nigeria.

**Hypothesis Three:** There is no significant effect of erratic electric power supply on human health and wellbeing in Nigeria.

Table 7: Analysis of Variance for Hypothesis Three

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2850.891 <sup>a</sup>	7	407.270	25.930	.000	.285
Intercept	57762.946	1	57762.946	3677.684	.000	.890
Age	117.057	1	117.057	7.453	.007	.016
Academic Qual.	271.012	1	271.012	17.255	.000	.036
Geo-political Zone	2729.309	5	545.862	34.754	.000	.276
Error	7162.089	456	15.706			
Total	785003.000	464				
Corrected Total	10012.981	463				

a. R Squared = .285 (Adjusted R Squared = .274)

Table 7 showed the result of the one-way analysis of covariance conducted to compare respondents' views regarding the effect of erratic electric power supply on human health and wellbeing in Nigeria based on age, academic qualification and geo-political zones. It revealed insignificant difference  $F(1,456) = 7.45$ ,  $p = 0.01$ , partial eta squared = 0.02 (age),  $F(1,456) = 17.26$ ,  $p = 0.00$ , partial eta squared = 0.04 (academic qualification) and,  $F(5,456) = 34.75$ ,  $p = 0.00$ , partial eta squared = 0.28 (geopolitical zones). Hence, there is significant effect of erratic electric power supply on human health and wellbeing in Nigeria.

IV. DISCUSSION OF FINDINGS

Based on the outcome from analyses of data of the study, findings were discussed as follows:

It was discovered that erratic power supply causes malfunctioning of domestic and industrial equipment and appliances in Nigeria, sometimes huge amount of money is spent to replace and restore the damaged equipment and appliances. Also, numerous fire outbreaks in Nigeria are associated with erratic electric power supply, and this has led to loss of life and valuable properties. In addition, erratic power electric supply in Nigeria poses threat to the natural environment due to pollution from electric power generating machines used as alternative in industries and homes. In the same vein, erratic electric power supply has multiplier effect on

natural environment as poor citizens embark on wanton destruction of forests through felling trees for fuel wood and charcoal as alternative sources of energy for domestic and small business purposes. Obviously, these activities pose significant effects on natural and man-built environments in Nigeria.

On socio-economic development and growth, this study revealed that erratic electric power supply is a threat. It was discovered that high cost of production of goods and services in Nigeria has relationship with the menace of erratic electric power supply in the country. It further frustrates the efforts of small and medium scale entrepreneurs causing them to relocate to other countries. It was also discovered that most companies produce below capacity, and causes hike in prices of manufactured goods, reduces profit margins of the manufacturers, and encourages importation of finished goods from other countries which invariably completes unfavourably with local productions. Furthermore, erratic electric power supply reduces the rate of foreign direct investment, and prevents value to be added to raw materials exported to other countries, prevents transfer of much needed technology and skills to Nigerian entrepreneurs and workers by foreign partners, and robs Nigerians and Nigeria of human capital development and domestic revenue generation and mobilization.

This finding is consistent with the findings of Simon-Oke (2012) and, Akiri, Ijuo and Apochi (2015) who disclosed negative impact of electricity crisis on the manufacturing productivity growth in Nigeria. Also, Ologundudu (2014) disclosed that epileptic electricity power supply negatively affected industrial and economic development in Nigeria between 1972 and 2010. Likewise, Doe and Asamoah (2014) and, Nyanzu and Adarkwah (2016) found that electric power fluctuations effected profitability and competitiveness of SMEs in Ghana. In the same vein, Ahmed and Mallo (2015), Onwumere, Amaghionyeodiwe and Ndukwe (2019) and, Abubakar and Olusegun (2019) respectively submitted that poor electric power supply affected operations of small scale businesses operating in Nigeria. More so, Fakih, Ghazalian and Ghazzawi (2020) asserted that power outages affected performance of manufacturing firms in the Middle East and North Africa (MENA) region. This position was corroborated by Mukhtar, Obiora, Yimen, Quixin, Bamisile, Jidele and Irivboje (2021) who disclosed that erratic electric power supply affected gross national income (GNI) in Nigeria.

This study has equally discovered that erratic electric power supply has contributed to problems related to human health and well-being of Nigerians include disruption of life support appliances, increase in crime rates and social vices, interruption of leisure and resting time of individuals, among others. This finding is in line with the findings of Ibrahim, Aryeetey, Asampong, Dwomoh and Nonvignon (2016) who averred that erratic electric power supply has effect on health and wellbeing of university students in Ghana. Also, Ikhisemogie (2016) affirmed that “regular electric power supply is an abundant resource whose availability improves the quality of daily life”,

but reverse is the case when one is grappling with erratic electric power supply.

## V. CONCLUSION AND RECOMMENDATIONS

Majorly, this study investigated the effect of erratic electric power supply on the Nigerian environment. It concluded that electric power supply in Nigeria is erratic, hence, it significantly affects natural and man-built environments, socio-economic development and growth as well as human health and wellbeing. Based on these, the following recommendations were submitted:

- i. Nigerian government should prioritize and be more proactive in the supply of a stable and regular electric power for the enhancement of both natural and man-built environments.
- ii. Other environmental friendly sources of generating electric power such as solar energy should be explored towards ensuring stable and regular electric power supply for socioeconomic development and growth, and for the overall human health and well-being of Nigerians.

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