

An Examination of Energy Consumption and Economic Growth in Nigeria from 1986-2016

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Abstract

The study examined the energy consumption and economic growth in Nigeria, using the time frame of thirty (30) years period from 1986-2016. It was established in the study that before the introduction of appropriate energy consumption, energy sector funds were grossly mismanaged, contracts were awarded based on 'connections' rather than on merit and high occurrence of corruption in Nigerian power sector.

Since power sector has been seen as an important instrument tool to be used by the government to improve the economy, the appropriate growth from power supply have strengthened all sectors in Nigeria economy and minimize the incidence of economic retardation. The result of the study reviewed that: Energy consumption has significant relationship with economic growth in Nigeria. The study suggested that energy conservation policies could be effectively implemented without having any negative effect on economic growth in Nigeria and energy growth policy should be adopted in such a way that, growth in the energy sector could stimulates economic growth and thus expands employment opportunities in the country.

Keywords: *Energy Consumption, Economic Growth, Employment Opportunities and Corruption.*

1.0 Introduction

Globalization has brought about changes in the entire world and this is known to everyone, however, it emerged with many challenges but energy received major attention from researchers. The demand for energy is increasing quickly in this globalizing world. Most countries in world including Nigeria are facing scarcity of energy and consequently it is brutally affecting the economic growth. Now, the search for alternative and renewable sources of energy has become the need of hour for countries (Chaudhry, Safdar and Farooq, 2012). Energy has remained one of the main inputs to production. Therefore energy is vital for both developed and developing countries. The oil crises during the 1970's and the abnormal increases in oil prices in 1990's and 2000's verified the importance of energy also making energy as a fundamental resource in the economy. Consequently, economic growth is directly related to energy consumption.

As Alam (2006) puts it, “energy is the indispensable force driving all economic activities”. Energy is one of the most imperative resources used in all production processes and this has increased the foreign income of countries that export energy products. Most countries especially the less developed countries have benefited from transfer of technology in the process of exploration, production and marketing. The energy industries have also provided jobs to a good number of people who were unemployed. There have been improvements in infrastructure and socioeconomic activities of communities in the process of energy resource exploitation. Base on the above arguments, consistence supply of energy, thus becomes central to economic and infrastructural transformation of the most nations’ economy (Sama and Tah, 2016). Thus, various studies have been conducted on the relationship between economic growth and energy consumption (Yilmaz and Hasan, 2014; Sama and Tah, 2016). According to Ojinnaka (2008) energy consumption runs hand in hand with the national product. His study revealed that energy consumption per capita is an important indicator of economic growth. Continuous increase in production in the world has increased the need of energy, but the insufficiency of oil and natural gas resources in the world poses an obstruction for the sustainable economic growth.

However, Electricity power is a secondary energy resource obtained from the conversion of the primary energy resources such as fossil fuels (natural gas, oil, coal) and wind energy. Coal has been the fuel mostly used in electricity generation, the share of nuclear power and natural gas in electricity consumption has increased in recent years, while the use of oil in electricity generation has declined since the late 1970s due to sharp increases in oil prices. World net electricity generation was 20.2 trillion kilowatt-hours in 2010 and was expected to rise 39.0 trillion kilowatt-hours by 2040 which represent an increase of 93%. The growth of electricity demand in the OECD countries is slower than in the non-OECD countries (U.S. Energy Information Administration, 2013; Yilmaz and Hasan, 2014). Evidences have shown that Nigeria is primarily an energy store house accommodating resources such as coal and lignite, natural gas, crude oil, solar, hydro, nuclear, wood fuel, geothermal, tide, biogas and biomass. In spite of the available vast resources, only four sources (coal, crude oil, natural gas and hydro) are currently utilized in processed forms while two others (wood fuel and solar) are used in their crude forms for heating, cooking and lighting (Ogundipe and Apata, 2013).

Similarly, economic growth has continues to be a key macroeconomic concept of interest among most researchers and policy makers around the world (Abaidoo, 2015). The sustain interest in this macroeconomic indicator stems from its pivotal role in impacting other integral segment of an economy and livelihoods. Today, Nigeria is seen as one of the greatest developing nations in Africa with highly endowed natural resources including potential energy resources. However, increasing access to energy in Nigeria has proved to be not only a continuous challenge but also a pressing issue with the international community (Ogundipe and Apata, 2013). Economic growth is a requirement for a nation to move from a third world country to a developed country. For a developing country like Nigeria, the greater the economic growth, the better its chances to become more developed; with adequate use of energy potentials to meet the demand, the nation would experience high levels of economic growth (Ogundipe and Apata, 2013).

1.1 Aim and Objectives of the Study

The main Aim of the study is to examine the effect of energy consumption and economic growth in Nigeria. Hence the following are specific objectives

1. To study the trend analysis of energy consumption in Nigeria

2. To examine the relationship between energy (Electricity) consumption and the Nigerian economic growth.
3. To make policy recommendations based on the analysis from the study.

1.2 Research Questions

The study seeks to answer the following research questions;

1. What is the trend analysis of energy consumption in Nigeria?
2. What is the relationship between energy (Electricity) consumption and the Nigerian economic growth?

1.3 Research Hypotheses

In the course of the study, the following hypotheses would be tested:

Hypothesis One

H₀: There is no significant relationship between Electricity Consumption and economic growth in Nigeria

H₁: There is a significant relationship between Electricity Consumption and economic growth in Nigeria

2.0 Literature Review

The section will use various approach as reviewed in extant literatures in the study, which includes, conceptual, empirical and theoretical approach. Hence methodological review of various studies will also be added.

2.1 Conceptual Framework & Review

The conceptual framework of the study will extensively review concept identified in the study, energy consumption, electricity, coal, crude oil and economic growth will be review broadly in this section.

2.1.1 Energy Consumption in Nigeria

Energy is ability of matter to perform work as the outcome of its motion or its position in relation to forces acting on it (Onakoya, Onakoya, Jimi – Salami and Odedairo, 2013). We use energy for the whole thing we do, from creating a jump to sending astronauts into space. The same concept according to Tejada-Bailly (1981) can be expressed as the amount of heat that must be transferred, exchanged or used up to effect a process or deliver a good to a particular point in the economic system. Energy exists in various forms, including atomic, electrical, chemical, mechanical, nuclear, radiant and thermal. Although energy can be transferred from one form to another but it cannot be created or destroyed. Energy can be extracted from a variety of resources that can be categorized as primary and secondary; commercial and non-commercial; conventional and nonconventional; renewable and non-renewable and traditional and non-traditional (Aminu and Aminu, 2015).

Energy is widely regarded as a driving force behind any economic activity and indeed industrial production. Therefore, high grade energy resources will increase the influence of technology and create tremendous economic growth (Onakoya *et al.*, 2013). The significance of energy lies in other aspect of development - increase in foreign earnings when energy products are exported, transfer of technology in the process of exploration, production and marketing; increase in employment in energy industries; improvement of workers welfare through increase in worker's salary and wages, improvement in infrastructure and socio-economic activities in the process of energy resource exploitation (Onakoya *et al.*, 2013).

Nigeria had been a lucky nation to have huge energy resources, which possibly give the country an ample opportunity to transform her economy and the lives of her citizens. Nigeria sits astride of over 35 billion barrels of oil, 187 trillion cubic feet of gas, 4 billion metric tons of coal and lignite, as well as enormous reserves of tar sands, hydropower and solar radiation, amongst others (Adenikinju, 2008; Odularu and Okonkwo, 2009). Today, Nigeria is seen as one of the highest developing nations in Africa with highly endowed natural resources with potential energy resources. However, increasing access to energy in Nigeria has proved to be not only a nonstop challenge but also a persistent issue with the international community. The significance that the country has placed on crude oil is relatively very high. The over reliance of crude oil in Nigeria is a major encounter because it has failed to spread its energy consumption and ensure a fitting energy mix. The consumption of oil is highly essential because there is no alternative to it presently (Odularu and Okonkwo, 2009). Fossil fuels like coal are insignificantly extracted in the country. The coal located in eastern Nigeria is sub-bituminous which means that it burns slowly and gives out a lot of heat. Subsequently, it is also low in Sulphur and ash content. Coal has been the oldest commercial fuel used in Nigeria in since it was discovered in 1916.

Since the discovering of oil in Nigeria, coal has been relegated to less importance and became highly dormant. With a reserve of over 2 billion metric tonnes, Nigeria produces about 200000 to 600000 tonnes yearly. Per capita power consumption in Nigeria is estimated at 82KW which gross inadequate where as other African counterparts like South Africa has a per capita consumption of 3793KW. Nevertheless, with vast abilities, energy can be adequately supplied in the country if well tapped. If consumption is positively related to economic growth, the benefits of increased consumption includes generating more income, increasing economic activities which will boost economic growth and increased growth especially poverty reduction (Odularu and Okonkwo, 2009).

2.2 Empirical Review

2.2.1 Global Perspective

Energy consumption and its relationship with economic growth have been considered by various scholars. The first study by Kraft and Kraft (1978) revealed that the causality of GNP growth to energy consumption was unidirectional in case of the US for period 1947-1974. The research showed that there was low dependency of U.S economy on energy, due to which U.S pursued energy conservation policies, without having adverse effects on income. Jumble (2004) analysed the causality between electricity consumption, agriculture income, and non-agriculture income by using error correction model and Granger causality analysis for the period 1970 to 1999 on, Malawi. The results indicated that agriculture and non-agriculture income had causal effect on electricity consumption, and on the other hand electricity caused the total income. Erol and Yu (1987) carried out a study on England, France, Italy, Germany, Canada and Japan and found diverse empirical evidence on the relation between economic growth and energy consumption for the period 1952- 1982. The results showed that there was bi-directional causality for Japan case, for Canada there was unidirectional causality from energy consumption to GDP, for Germany and Italy there was unidirectional causality from GDP to energy consumption, and for France and England there was no causality.

Pachauri (1977) and Tyner (1978) established a correlation between economic development and energy consumption in India, and there was evidence of bidirectional causality. The relationship between gross national product (GNP) of five countries was examined by Yu and Choi (1985), reasoning that there was unidirectional causality from energy consumption to GNP for Philippines, for South Korea the causality was opposite, and there was no evidence of

causality in the case of U.S, UK, and Poland. Cheng (1995 and 1997), by engaging a multivariate approach, reasoned that there was no evidence of causality energy consumption and Capital towards economic growth for U.S, Mexico, and Venezuela. Cheng (1995 and 1997) & Asafu-Adjaye (2000) studied the causal relationship between energy consumption, prices, and economic growth for Asian developing countries such as India, Indonesia, Philippines, and Thailand over the period of 1971 to 1995. They also found evidence of unidirectional causality from energy consumption and prices towards income in the case of India, and Indonesia, on the other hand for Thailand and Philippines there was mutual causality between energy consumption, income and prices.

Yoo (2005) also found that in Korea, economic growth is affected by electricity consumption and that economic growth seems to also affect the consumption of electricity. The casual relationship between GDP and the energy consumption, which took into consideration the energy sources natural gas, coal and electricity; was carried out by Yang (2000). He found bidirectional causality between total energy consumption and GDP in case of India, and in case of Pakistan and Indonesia, it was GDP that caused energy consumption. Yoo (2006) carried out a study of ASEAN member economies including Thailand, Malaysia, Indonesia, and Singapore. He considered the relationship between electricity consumption and economic growth. Data considered was from 1971 up to 2002. A one way causal relation from economic growth to energy consumption (electricity consumption) existed in Indonesia and Thailand. In Malaysia and Singapore, a bivariate causal link was established between electricity consumption and economic growth.

A cointegration approach was employed by Chen et al. (2007) to study the data from 10 Asian countries. Bivariate causality was seen to exist in the panel. However the causality went from GDP per capita to electricity consumption per capita under the heterogeneous causality approach. Narayan and Singh (2007) reported uni-variate causality from electricity consumption to economic growth in the case of Fiji, and Narayan and Smyth (2009), for Middle Eastern countries, reported that if the electricity consumption rises by one percent, then this would result in a 0.04 percent rise in the GDP. Narayan and Prasad (2008) documented a study for 30 OECD countries that investigated the relationship between electricity consumption and economic growth. A rise in the use of electricity caused a rise in the real gross domestic product per capita in Australia, Iceland, Italy, the Slovak Republic, the Czech Republic, Korea, Portugal, and the UK. For South America, Yoo and Kwak (2010) report that a univariate causal link from electricity consumption to economic growth (real GDP used as a proxy) for Argentina, Brazil, Chile, Columbia, and Ecuador but two-way causality for Venezuela, and no causal relationship between electricity consumption and economic growth could be established for Peru.

2.2.2 Africa and Nigeria

In Adegbemi, Adegbemi, Jimi – Salami, and Odedairo, (2013) study, Akinlo (2008) examined the relationship between energy consumption and economic growth for eleven countries in sub-Saharan Africa used the autoregressive distributed lag (ARDL) bounds test. The study finds that energy consumption is co-integrated with economic growth in Cameroon, Cote d'Ivoire, Gambia, Ghana, Senegal, Sudan and Zimbabwe. Moreover, this test suggests that energy consumption has a significant positive long run impact on economic growth in Ghana, Kenya, Senegal and Sudan. Granger causality test based on vector error correction model (VECM) shows bi-directional relationship between energy consumption and economic growth for Gambia, Ghana and Senegal. However, Granger causality test shows that economic growth

Granger causes energy consumption in Sudan and Zimbabwe. The neutrality hypothesis is confirmed in respect of Cameroon and Cote d'Ivoire, Nigeria, Kenya and Togo.

Esso (2010) investigates the long-run and the causality relationship between energy consumption and economic growth for seven Sub-Saharan African countries during the period 1970–2007. Using the Gregory and Hansen testing approach to threshold co-integration, the study indicate that energy consumption is co-integrated with economic growth in Cameroon, Cote d'Ivoire, Ghana, Nigeria and South Africa. The test suggests that economic growth has a significant positive long-run impact on energy consumption in these countries before 1988; and this effect becomes negative after 1988 in Ghana and South Africa. Furthermore, causality tests suggest bi-directional causality between energy consumption and real GDP in Cote d'Ivoire and unidirectional causality running from real GDP to energy usage in the case of Congo and Ghana. The investigation of the relationship between the consumption of crude oil, electricity and coal in the Nigerian economy (1970 to 2005) was conducted by Odularu and Okonkwo (2009). Their result obtained after applying the co-integration technique, showed that there exists a positive relationship between period energy consumption and economic growth. However, with the exception of coal, the lagged values of these energy components were negatively related to economic growth. Using a vector error correction based Granger causality test, the examination of the relationship between energy consumption and economic growth in Nigeria (1970 - 2005),

2.3 Summary and Gap in Literature

The review of literature review of related studies on energy consumption and its relationship with economic growth has showed a variety of analysis by various scholars with findings that showed energy consumption has a significant positive long run impact on economic growth in Ghana, Kenya, Senegal and Sudan. Also economic growth has a significant positive long-run impact on energy consumption in these countries before 1988; and this effect becomes negative after 1988 in Ghana and South Africa. Also studies showed that the petroleum consumption and electricity consumption are statistically significant on economic growth but coal consumption is statistically insignificant. Furthermore, a positive and significant relationship between petroleum consumption, electricity consumption, Gross domestic investment (GDI) and population growth rate and economic growth. Hence most studied have failed to examine the energy consumption based on electricity, Coal and Crude oil on economic growth. Hence this is the gap the study intends to fill within the estimation period.

3.0 Materials and Methods

3.1 Area of Study

The study focused on the energy consumption and economic growth in Nigeria and the Head Quarters of Federal Ministry of Power, Works and Housing, Abuja were used as the case study in this study.

3.2 Population of the Study

The staff in various departments of the Power, Federal Ministry of Power, Works and Housing Abuja formed the population of the study.

3.3 Sampling Procedure and Sample Size

A stratified random sampling technique was used for the study. A population of one hundred (100) staff of the various departments were studied:

3.4 Research Design

The research design used for this study was the descriptive research design. Since data characteristics were described using frequencies and percentages, and no manipulations of data or variables were necessary, the researcher chose this research design. The researcher discarded other alternatives such as the causal and explanatory research designs, because accurate findings and data analysis may not be achieved.

3.5 Sources of Data Collection

This involves the selection of the sample unit and sample procedures as analysed by the researcher. It also includes the source of data available in the process of this study can be grouped into two such as primary and secondary data.

3.5.1 Primary Sources of Data

The primary data was collected by communication which involved the questioning of respondents to serve the desire information and personal observation.

3.6 Method of Data Analysis

The statistical methods adopted were used of percentage, correlation and chi-square techniques. All computations requiring the use of data analysis technique were accessed by a statistical software package called SPSS (Statistical Package for Social Sciences).

4.0 Analysis and Presentation of Results

In the course of the research, one hundred (100) questionnaires each containing nineteen (19) items was administered to various respondents, who were staff in Federal Ministry of Power, Works and Housing, Abuja and all the questionnaires were duly completed, thus giving a perfect collection rate of 100%.

The results are hereby presented as follows:

Table 1: Gender Distribution of Respondents

Gender	Frequency	Percentage
Male	48	48%
Female	52	52%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

The table above shows the gender distribution of respondents. 48% of the respondents were male and the remaining 52% were female. Thus, female respondents were slightly higher than their male counterparts.

Table 2: Age Distribution of Respondents

Age	Frequency	Percentage
20-30 years	24	24%
31-40 years	47	47%
Above 40 years	29	29%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

The table above shows the age distribution of respondents. 24% of the respondents are between the age bracket of 20-30 years; 47% which constituted the majority are between the age bracket of 31-40 years and 29% are above 40 years.

Table 3: Marital Status of Respondents

Marital Status	Frequency	Percentage
Single	13	13%
Married	87	87%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

The table revealed the marital status distribution of respondents. Majority of the respondents, which constituted 87% are married while the remaining 13% respondents are unmarried.

Table 4: Educational Qualification of Respondents

Qualification	Frequency	Percentage
SSCE	11	11%
HND/B.Sc	80	80%
M.Sc/PhD	9	9%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

The table revealed the educational qualification of respondents. 11% of the respondents are SSCE holders, 80% of them, which formed the majority, are HND/B.Sc holders and 9% are M.Sc/PhD holders.

Table 5: Position of Respondents

Position	Frequency	Percentage
Manager	12	12%
Accountant	31	31%
Auditor	26	26%
Cashier	24	24%
Others	7	7%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 5 unveiled the distribution of position of respondents. 12% are managers, 31% are accountants, 26% are auditors, 24% are cashiers and 7% are mostly administrative staff.

Table 6: Transparency Has Put A Check On The Circumvention Of Appropriate Government Expenditure In Energy For Economic Growth In Nigeria

Response	Frequency	Percentage
Strongly Agree	23	23%
Agree	48	48%
Disagree	9	9%
Strongly Disagree	7	7%
Neutral	13	13%
Total	100	100.0%

Source: Author's Computation from Field Survey

Table 6 indicated that 23% of the respondents strongly agreed that transparency has put a check on the circumvention of appropriate government expenditure in in energy for economic growth in Nigeria, 48% agreed; 9% disagreed; 7% strongly disagreed and 13% were neutral.

Table 7: The Inhabitants of Energy Companies Have Benefited From the Proceeds of the Appropriate Power Investment in Improvement Of Energy In Nigeria

Response	Frequency	Percentage
Strongly Agree	39	39%
Agree	45	45%
Disagree	5	5%
Strongly Disagree	6	6%
Neutral	5	5%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 7 revealed that 39% of the respondents strongly agreed that the inhabitants of energy companies have benefited from the proceeds of the appropriate power investment in improvement of energy in Nigeria; 45% agreed; 5% disagreed; 6% strongly disagreed and 5% were neutral.

Table 8: Energy Consumption in Nigeria Is Favourable To both the People and the Nation

Response	Frequency	Percentage
Strongly Agree	24	24%
Agree	55	55%
Disagree	12	12%
Strongly Disagree	8	8%
Neutral	1	1%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 8 disclosed that 24% of the respondents strongly agreed that energy consumption has been favourable to both the people and the nation in Nigeria; 55%, which constituted the majority agreed; 12% disagreed; 8% strongly disagreed and 1% was neutral.

Table 9: The Trend of Energy Consumption in Nigeria Is Encouraging

Response	Frequency	Percentage
Strongly Agree	24	24%
Agree	55	55%
Disagree	12	12%
Strongly Disagree	8	8%
Neutral	1	1%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 9 disclosed that 24% of the respondents strongly agreed that trend of energy consumption has been encouraging; 55%, which constituted the majority agreed; 12% disagreed; 8% strongly disagreed and 1% was neutral.

Table 10: It Has Been Observed To Have Increased To 7000MW as at 2018

Response	Frequency	Percentage
Strongly Agree	24	24%
Agree	55	55%
Disagree	12	12%
Strongly Disagree	8	8%
Neutral	1	1%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 10 disclosed that 24% of the respondents strongly agreed that energy consumption has been favourable to both the people and the nation in Nigeria; 55%, which constituted the majority agreed; 12% disagreed; 8% strongly disagreed and 1% was neutral.

Table 11: The Energy Consumption Rate Has Affected the Official and Non- Official Economic Life and Financial Behavioural Attitudes of Federal Ministry Staffs, Abuja, Nigeria

Response	Frequency	Percentage
Strongly Agree	24	24%
Agree	55	55%
Disagree	12	12%
Strongly Disagree	8	8%
Neutral	1	1%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 11 disclosed that 24% of the respondents strongly agreed that energy consumption rate has affected the official and non-official economic life and financial behavioural attitudes of federal ministry staffs at Ikeja; 55%, which constituted the majority agreed; 12% disagreed; 8% strongly disagreed and 1% was neutral.

Table 12: Appropriate Expenditure On The Nigeria Energy Sector In The Economy Has Led To The Development Of The Country Which Has Effect The Desired Performance In Federal Ministry Of Power, Works and Housing, Abuja

Response	Frequency	Percentage
Strongly Agree	35	35%
Agree	49	49%
Disagree	0	0
Strongly Disagree	0	0
Neutral	16	16%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 9 unveiled that 35% of the respondents strongly agreed that appropriate government expenditure on the Nigeria energy sector in the economy has led to the development of the country which has effect the desired performance in federal ministry of power at Ikeja; 49%, which constituted the majority agreed; 16% were neutral. None of the respondents disagreed nor strongly disagreed.

Table 13: The Government Adheres To Its Yearly Budget on Energy

Response	Frequency	Percentage
Strongly Agree	21	21%
Agree	29	29%
Disagree	34	34%
Strongly Disagree	16	16%
Neutral	3	3%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 13 showed that 21% of the respondents agreed that the government adheres to its yearly budget on energy; 29% agreed; 34% disagreed; 16% strongly disagreed and 3% were neutral.

Table 14: Sometimes the Energy Consumption is Always Annoying in the Country

Response	Frequency	Percentage
Strongly Agree	0	0
Agree	4	4%
Disagree	34	34%
Strongly Disagree	45	45%
Neutral	17	17%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

From table 14, it can deduced that majority of the respondents, which constituted 45% , strongly agreed that the energy consumption is always annoying sometimes in the country; 34% disagreed; 17% were neutral and 4% agreed.

Table 15: Energy Consumption Has Impact on Nigeria Economic Growth

Response	Frequency	Percentage
Strongly Agree	20	20%
Agree	28	28%
Disagree	35	35%
Strongly Disagree	7	7%
Neutral	10	10%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

From table 15, it can be deduced that 20% of the respondents strongly agreed that energy consumption has impact on Nigeria economic growth; 28% agreed; 35% disagreed; 7% strongly disagreed and 7% were neutral.

Table 16: In Your Own Opinion is it Necessary to Improve on the Energy Yearly Expenses and Budgets in Nigeria

Response	Frequency	Percentage
Strongly Agree	34	34%
Agree	61	61%
Disagree	0	0
Strongly Disagree	0	0
Neutral	5	5%
Total	100	100.0%

Source: Author's Computation from Field Survey

From table 16, 34% of the respondents strongly agreed that it is necessary to improve on the energy yearly expenses and budgets in Nigeria; 61%, which constituted the majority agreed; 5% were neutral and none disagreed nor strongly disagreed.

Table 17: The Performance in the Energy Sector of Nigeria Has Been Effective

Response	Frequency	Percentage
Strongly Agree	25	25%
Agree	38	38%
Disagree	21	21%
Strongly Disagree	7	7%
Neutral	9	9%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

From table 17, it can be seen that 25% of the respondents strongly agreed that the performance in the energy sector of Nigeria has been effective; 38% agreed; 21% disagreed; 7% strongly disagreed and 9% were neutral.

Table 18: Stable Energy in Nigeria Will Create More Jobs

Response	Frequency	Percentage
Strongly Agree	33	33%
Agree	55	55%
Disagree	6	6%
Strongly Disagree	3	3%
Neutral	3	3%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

From table 18 above, 33% of the respondents strongly agreed that stable energy will create more jobs in Nigeria; 55% agreed; 6% disagreed; 3% disagreed and 3% were neutral.

Table 19: There Have Been Frauds of Serious Nature in the Energy Sector within the Government Which Has Affected the Ministries

Response	Frequency	Percentage
Strongly Agree	13	13%
Agree	34	34%
Disagree	42	42%
Strongly Disagree	7	7%
Neutral	4	4%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

Table 19 indicated that 13% of the respondents strongly agreed that there has been frauds of serious nature in the energy sector within the government which has affected the federal ministry of power in Nigeria negatively; 34% agreed; 42% disagreed; 7% strongly disagreed and 4% were neutral.

Table 20: Energy Consumption Will Increase Nigeria GDP If Well Managed

Response	Frequency	Percentage
Strongly Agree	15	15%
Agree	24	24%
Disagree	27	27%
Strongly Disagree	16	16%
Neutral	18	18%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

From table 20, 15% of the respondents strongly agreed that energy consumption will increase Nigeria GDP if well managed. 24% agreed; 27% disagreed; 16% strongly disagreed and 18% were neutral.

Table 21: Energy Has Enhanced the Continuity of Oil and Gas Companies Functioning In Nigeria

Response	Frequency	Percentage
Strongly Agree	21	21%
Agree	41	41%
Disagree	19	19%
Strongly Disagree	7	7%
Neutral	12	12%
Total	100	100.0%

Source: Author's Computation from Field Survey

Table 21 showed that 21% of the respondents strongly agreed that energy has enhanced the continuity of oil and gas companies functioning in Nigeria; 41% agreed; 19% disagreed; 7% strongly disagreed and 12% were neutral.

Table 22: Without Energy the Country Might Be Shut Down, Because All Business Will Fail

Response	Frequency	Percentage
Strongly Agree	39	39%
Agree	60	60%
Disagree	0	0
Strongly Disagree	0	0
Neutral	1	1%
Total	100	100.0%

Source: Author's Computation from Field Survey 2018

From table 22, 39% of the respondents strongly agreed that without energy the country will be shut down because it will automatically affect all businesses; 60%, which constituted the majority agreed and 1% were neutral.

4.1 Testing of Hypotheses

Two hypotheses were developed in the study. The chi-squared technique was used to test the stated hypotheses at 5% significance level. The decision rule of the chi-squared technique postulates that if the calculated value of χ^2 is greater than the critical value of χ^2 at a specified degrees of freedom and level of significance, the null hypothesis should be rejected (H_0) or accept the alternative hypothesis (H_1). Otherwise, do not reject the null hypothesis.

Hypothesis One

H₀: There is no significant relationship between Electricity Consumption and economic growth of Nigeria

H₁: There is a significant relationship between Electricity Consumption and economic growth of Nigeria

To test the first hypothesis, the result on table (6) will be used.

Table 20: Chi-Squared Table for Hypothesis One

O	E	O-E	(O-E) ²	(O-E) ² /E
23	20	3	9	0.45
48	20	28	784	39.2
9	20	-11	121	6.05
7	20	-13	169	8.45
13	20	7	49	2.45
				56.6

Degrees of Freedom: $(N-1) = (5-1) = 4$

Level of Significance= 0.05

Critical value of χ^2 : $(4; 0.05) = 9.49$

Since the calculated value of χ^2 is greater than the critical value of χ^2 ($56.6 > 9.49$), the alternative hypothesis is accepted that energy consumption has significantly relationship with economic growth in Nigeria.

Table 22: Decisions of Hypotheses Tested

Hypothesis	Degrees of Freedom	Level of Significance	χ^2 calculated	χ^2 tabulated	Decision
One	4	0.05	56.6	9.49	Accept H_1

5.0 Discussion of Findings

The results found that energy consumption has significant relationship with economic growth in Nigeria. This implies that energy consumption has stopped the evasion of due process in most activities of the economy. This result is consistent with the findings of (Maku, 2014; Olugbenga and Owoye, 2007). Energy consumption has birthed the more revenue which means the redistributed of the fiscal capacity has a positive impact on the energy. Generally speaking, energy consumption has influence the infrastructural spending which affects aggregate resources combined with fiscal and monetary policies.

5.1 Conclusion

It is concluded that the relationship between energy consumption and economic growth is important for all developing economies like Nigeria, most of which have experienced increasing level of government spending and have achieved low level of economic development overtime. Since independence, the revenues accruing to the Nigeria Government has been on the increase annually in power sector. The study further concluded that; Issues pertaining to energy consumption and economic development should be given adequate attention especially in the budget schemes and because of this, substantial amount should be allocated to the power sector in order to resolve its challenges and keep the sector in good shape for it to make meaningful impact in economic growth.

This study concluded that Energy consumption has significant relationship with economic growth in Nigeria based on our study

5.2 Recommendations

Based on the findings enumerated above, this study therefore, recommends that energy conservation policies should be effectively implemented without having any negative effect on economic growth in Nigeria and energy growth policy should be adopted in such a way that, growth in the energy sector stimulates economic growth and thus expands employment opportunities in the country.

References

- Abaidoo, R. (2015). Economic growth and energy consumption in an emerging economy: augmented granger causality approach. *Research in Business and Economic Journal*, 1 (1), 1 – 2.
- Alam, M. S (2006). Economic growth with energy. Retrieved on the 20th November 2006.
- Adegbemi, B. O., Adgbemi, O.O., Jimi–Salami, A.O., and Odedairo, B.O. (2013). Energy Consumption and Nigerian Economic Growth: An Empirical Analysis. *European Scientific Journal*, 9 (4), 1 – 3.
- Adenikinju A (2008) Energy demand in Nigeria, a co-integration analysis, *international Journal of Energy Economics, USA*, vol. 45, pg. 12-21, America Press limited.
- Adenikinju A. (2003) Energy Consumption and growth in Nigeria: Evidence from Nigeria *international Journal of Energy Economics United states of America*, Vol. 18, pg 32-41, America Press limited.
- Akinlo AE (2009). Electricity consumption and economic growth in Nigeria: Evidence from cointegration and co-feature analysis. *J. Policy Model*, 31: P 681-693
- Akinlo, A.E. (2008). Energy Consumption and Economic Growth: Evidence from 11 Sub-Saharan African Countries. *Energy Economics*, 30(5) 2391-2400. doi.org/10.1016/j.eneco.2008.01.008
- Akomolafe, A.K. J., and Danladi, J. (2014). Electricity Consumption and Economic Growth in Nigeria: A Multivariate Investigation. *International Journal of Economics, Finance and Management*, 3 (4) 1 – 2.

- Aminu, M. M., and Aminu, M. F. (2015). Energy Consumption and Economic Growth in Nigeria: A Causality Analysis. *Journal of Economics and Sustainable Development*, Vol.6, No.13, 42 2015
- Augutis, J., R. Krikštolaitis, S. Pečiulytė and I. Konstantinavičiūtė, 2011. Sustainable development and energy security level after shutdown. *Technological and Economic Development of Economy*, 17 (1):5–21.
- Ayodele, A.S., (2004). Improving and sustaining power (Electricity) supply for socio economic development in Nigeria.
- Choji, L. D. (2014). Energy Demand and Economic Growth in Nigeria. A thesis Submitted to the Institute of Graduate Studies and Research in Partial Fulfillment of the Requirements for the Degree of Master of Science in Economics.
- Chaudhry, I. S., Safdar, N.M., and Farooq, F. (2012). Energy Consumption and Economic Growth: Empirical Evidence from Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, 32 (2), 371-382
- Daha, M. A. K. (2011). Determinants of Economic indicators for Electricity Consumption in Pakistan. Master programme in Economic Growth, Innovation and Spatial Dynamics. Slow Growth Model by Fiona Maclachlan, the Wolfram Demonstrations Project.
- Dantama, Y.U., Y., Umar, Y.Z., Abdullahi, I. Nasiru (2012). Energy Consumption – Economic Growth Nexus in Nigeria: An Empirical Assessment Based on ARDL Bound Test Approach. *European Scientific Journal*, 8 (12), 141-157. doi.org/10.1016/j.eneco.2010.08.003
- Electric Power sector reform Implementation Committee (EPIC) (2004).
- Energy information Administration (2004). International energy Outlook, Highlights. Retrieved on 12th November 2007 from www.eia.doe.gov
- Energy information Administration (2007). Country analysis briefs: Nigeria. Retrieved on 12th November 2007 from www.eia.doe.gov.
- Energy Information Administration (2010). International Petroleum Monthly. February Retrieved from <http://www.eia.doe.gov/emeu/ipsr/appc.html>
- Erol, U. and E.S.H. Yu, (1987). On the relationship between energy and income for industrialized Countries. *Journal of Energy and Employment*, 13(1): 113-122.
- Esso, Loesse, J. (2010). Threshold cointegration and Causality Relationship between Energy Use and growth in seven African countries. *Energy Economics*, Elsevier, vol.32 (6), pages 1383-391,
- Gbadebo, O.O., and Okonkwo, C. (2009). Does Energy Consumption Contribute to Economic Performance? Empirical Evidence from Nigeria. *Journal of Economics and Business*, 12 (1), 2–3.
- Gbadebo, O. Olusegun and O. Chinedu (2009). Does energy consumption contributes to economic performance: Empirical evidence from Nigeria. *Journal of Economics and International Finance*, 1(2): 044-058.
- Gbadebo, O.O., and Okonkwo, C. (2009). Does Energy Consumption Contribute to Economic Performance? Empirical Evidence from Nigeria. *Journal of Economics and Business*, 12 (1), 2–3.
- IEA (2006). World Energy Outlook 2006. International Energy Agency, Paris, France
- International Energy Agency (2007). Renewables in Global Energy supply: An IEA Facts sheet. www.iea.org
- International Energy Agency (2011). www.iea.org
- International Energy Agency, (2010). Key world energy statistics. Available from <http://www.iea.org/publications/freepublications/publication/key-world-energy-statistics>. 2015. Html
- Iyke, B. N. (2014). Electricity Consumption, Inflation, and Economic Growth in Nigeria: A

- Dynamic Causality Test. Munich Personal RePEc Archive
- Jaruwan, C. (2010). Modelling Causality between Electricity Consumption and Economic Growth in Asian Developing Countries, P-318, 319
- Jaruwan, C. (2010). Modelling Causality between Electricity Consumption and Economic Growth in Asian Developing Countries, P-31
- Jhingan, M. L. (2007) *Economies of Development and Planning*, Viranda Publication, 36th Ed. India. 65-80
- Jochem, E (2004). *World Energy assessment: Energy and the challenges of sustainability. Energy end - use efficiency*, pgs. 174-217.
- Kraft, J and Kraft A. (1978). On the Relationship between Energy and GDP. *Journal of Energy and Development* 3, 401-403
- Kraft, J., & Kraft, A., 1978. On the relationship between energy and GNP. *Journal of Energy Development* 3, P 401-403
- Krizanic, F (2007). *The European market of Electricity and Natural Gas*. EIB forum, Ljubljana.
- Lee C Adkins, R. Carter Hill, *Using Stata for Principles of Econometrics*, Third Edition
- Life in the City: Pakistan in Focus', released by the United Nations Population Fund
- Lee, C., and Chang, C., (2008). Energy consumption and gdp in developing countries: A co-integrated panel analysis. *Energy Economics*, 27(3): 415-427.
- National Bureau of Statistics (2010). Retrieved from <http://www.nigerianstat.gov.ng/index.php//sector> Statistics
- National Bureau of Statistics (2010). Retrieved from <http://www.nigerianstat.gov.ng/index.php//sector> Statistics 4 July 2013
- National electric power policy. Retrieved on 21st July 2007.
- Ogundipe, A. A., and Apata, A. (2013). Electricity Consumption and Economic Growth in Nigeria. *Journal of Business Management and Applied Economics*, 1(2), 4 – 5.
- Ojinnaka, I. J. (2008). Energy crisis in Nigeria, the role of natural gas. *Bullion*. The Publication of Central Bank of Nigeria, 22 (4), 78-97.
- Odularu, G.O. and C. Okonkwo (2009). Does energy consumption contribute to economic performance? Empirical evidence from Nigeria. *Journal of Economics and International Finance* 1, 2044-058.
- Ogundipe, A. A., Akinyemi, O., Ogundipe, O.M. (2016). Electricity Consumption and Economic Development in Nigeria. *International Journal of Energy Economics and Policy*, 2016, 6(1), 134-143.
- Ogundipe, A. A., Apata, A. (2013). Electricity Consumption and Economic Growth in Nigeria. *Journal of Business Management and Applied Economics*, 8 (4) 1 – 2.
- Olusanya, S. O. (2012). Long run Relationship between Energy Consumption and Economic Growth: Evidence from Nigeria. *Journal of Humanities and Social Science (JHSS)*, 3 (3), 40–50.
- Onakoya, A. B., Onakoya, A. O., Jimi – Salami, O.A., and Odedairo, B.O. (2013). Energy Consumption and Nigerian Economic Growth: An Empirical Analysis. *European Scientific Journal*, 9 (4) 1 – 3.
- Ongono, P., 2009. Energy consumption and economic performance in Cameroon. MPRA Paper No. 23525.
- Orhewere, B. and H. Machame (2011). Energy Consumption and Economic Growth in Nigeria *JORIND* (9) 1, 153-165. Retrieved from www.ajol.info/journals/jorind
- Pernille, K., and Joutz, J. (2003), Oil Consumption and Economic Growth in China: A Multivariate Cointegration Analysis. *The 2008 International Conference on Risk Management & Engineering Management*, 178-183.
- Sama, M. C., Tah, N. R. (2016). The Effect of Energy Consumption on Economic Growth in Cameroon. *Asian Economic and Financial Review*, 6(9): 510-52.

- Shahbaz, M, (2011). Bounds Test Approach to Co-integration and Impact of Financial Development on Energy Consumption for Pakistan, P 1-3
- Solow Growth Model by Fiona Maclachlan, the Wolfram Demonstrations Project Solow, Robert M. (1957), "Technical Change and the Aggregate Production Function": Review of Economics and Statistics. (3): 312–320
- Tejada-Bailly, Y. (1981). Energy demand and economic growth: the African experience. J. Policy Model, 27, 891–903.
- Yılmaz B., and Hasan, A.O. (2014). Electricity Consumption and Economic Growth in Emerging Economies. *Journal of Knowledge Management, Economics and Information Technology*, 1(4),1–2.
- Yang, H.Y (2000). A note on the causal relationship between energy and GDP in Taiwan. *Energy Economics* 22(3), 309-317.
- Yoo, S. (2005). Electricity Consumption and Economic growth: Evidence from Korea. *Energy policy* 33(12), 1627-1632.
- Yu, E. and J. Choi (1985). The causal relationship between energy and GNP, an international comparison. *Journal of Energy and Development*.
- Zard, M., and Bodger, P. (2013), Energy Consumption, Carbon Emissions and Economic Growth in China. *Ecological Economics*, 68(10), 2706-2712.