INTERNATIONAL JOURNAL OF LATEST TECHNOLOGY IN ENGINEERING, MANAGEMENT & APPLIED SCIENCE (IJLTEMAS)

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

Electricity Supply Dynamics and Economic Growth in Nigeria: Evidence from an Error Correction Model (1980-2021).

Nweze Paul Nweze[1,3] , Greg Ekpung Edame[2] , Okoi, Willie Wilfred[3] , Otemdam Jombo Okey[4] , Inaku, Jacob Sunday[5] , Ogbaji, Felicia Omonya[6] , Muhammad Kabir Lawal[7] , Patrick Awok Mbum[8]

[1,2]Department of Economics, Faculty of Social Sciences & Humanities, Ebonyi State University, Abakiliki, Nigeria.

[3]Department of Economics, Faculty of Social Sciences, University of Calabar, Calabar-Nigeria.

[4]Department of Economics, Faculty of Social Sciences, University of Calabar Calabar – Nigeria

[5]Department of Economics, Faculty of Social Sciences, University of Calabar Calabar, Nigeria.

[6]Department of Economics, Faculty of Social Sciences, University of Calabar Calabar – Nigeria

[7]Department of Economics, Faculty of Social Sciences, University of Calabar Calabar – Nigeria

[8]Department of Finance, Faculty of Management, ABU, Zaria-Nigeria

DOI: https://doi.org/10.51583/IJLTEMAS.2026.150600260

Received: 10 July 2026; Accepted: 15 July 2026; Published: 04 August 2026

ABSTRACT

This research study investigates the impact of electricity supply dynamics and economic growth in Nigeria: evidence from an Error Correction Model (1980 – 2021). The study examined the effects of electricity demand-supply gaps, electricity pricing per capita, lending interest rates, and disposable income on GDP. Result of ADF unit root test confirm that all variables were integrated of order one (I(1)); and this necessitated the test for long-run relationship. Thus, the cointegration result shows that there is one cointegrating equation ie trace statistics (83.73255) is greater than their respective critical value (69.81889) at 5% level of significance, hence there is a long-run equilibrium relationship among the variables. The ECM results reveal that power outages significantly reduce economic growth as a million MWh of deficit in electricity demand reduces GDP by 7600.8billion Naira, while disposable income positively and significantly drives growth. Interestingly, lending interest rates show a positive relationship with GDP, contrary to conventional expectations, possibly reflecting credit expansion during periods of economic optimism. Electricity pricing exhibited a negative but statistically insignificant effect. The findings highlight the importance of reliable power infrastructure, income-enhancing fiscal policies, and balanced energy pricing strategies for fostering inclusive economic growth in Nigeria. Therefore, the study recommends for governments' increasing investments in Energy/Electricity infrastructure in order to enhance energy supply and hence reduce power outages, benefiting all sectors of the economy. Also, there is need to advocate for full privatization of the Nigeria's energy sectors including electricity generation and the downstream.

Keywords: Electricity supply, Economic growth, Power outages, Energy pricing, Error Correction Model, Nigeria. JEL Classification: B41, C22, C32, O47, F43, P22, Q43, Q47.

Contribution / Originality: The study uniquely employs Error Correction Model (1980-2021), to examine electricity supply dynamics and economic growth evidence from Nigeria. The ECM results shows that power outages significantly reduce economic growth, while disposable income positively and significantly drives growth in the Nigerian economy.

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

INTRODUCTION

Energy is a cornerstone of modern civilization, playing a vital role in powering industries, sustaining households, facilitating transportation, and enabling virtually all technological and economic activities. It is widely recognized as one of the fundamental inputs for sustainable development and economic progress. A well-functioning energy system not only drives industrial output and infrastructure development but also enhances education, healthcare, and overall quality of life. The global experience affirms that a stable and efficient energy supply is intricately linked to higher productivity, improved welfare, and long-term macroeconomic stability (Erbaykal, 2008; Nathaniel & Bekun, 2020).

While aspects of most of the research either narrowly focused or limited in temporal scope. Importantly, there remains a significant gap in empirical studies that comprehensively examine the multifaceted relationship between electricity supply variables, such as per capita pricing, frequency of outages, financial intermediation (via bank lending rates), and consumer capacity (via disposable income) and Nigeria's macroeconomic performance over a long-term horizon.

Moreover, many existing studies have not sufficiently accounted for how these variables interact within Nigeria's unique political economy, nor have they proposed integrated policy responses grounded in the realities of implementation.

This study seeks to fill the critical gap by offering robust and nuanced electricity supply dynamics and economic growth in Nigeria, evidence from error correction model (1980 - 2021). In this context, despite its vast endowment of both conventional and renewable energy resources - including petroleum, natural gas, coal, hydro, solar, wind, and biomass; Nigeria suffers from a chronically underperforming energy sector. Nigeria ranks among the lowest globally in electricity access, quality of supply, and energy affordability. The energy crisis has become a problem of socio-economic development, stifling industrial, discouraging foreign direct investment, and exacerbating poverty and inequality (Awodumi & Adewuyi, 2020).

The mismatch between electricity supply and demand in Nigeria is severe. Recent estimates, shows that the nation generates less than 7,500 megawatts (MW) of electricity - despite a peak demand of over 170,000 MW for its population of more than 200 million. For instance, South Africa, with just over 60 million people, produces more than 50,000 MW, illustrating the gravity of Nigeria's energy deficit. The implications are profound: frequent power outages disrupt manufacturing, hinder service delivery, and impose substantial costs on businesses and households. The industrial sector, in particular, has suffered significant productivity losses, with many firms resorting to costly fossil fuel generators to maintain operations (Joseph, 2019 & Inuwa et al., 2022).

These inefficiencies are not confined to the economic realm alone—they ripple across society. Unreliable power supply undermines healthcare delivery, compromising critical services such as diagnostics, surgical procedures, and vaccine storage. Educational institutions struggle to operate effectively without consistent electricity, while communities face safety hazards and limited access to clean water due to the power-dependent nature of water systems (see Imadojemu & Tonuchi, 2021; Galadima & Aminu, 2020).

The structural issues underlying Nigeria's energy sector are manifold. They include underinvestment in power infrastructure, inadequate maintenance of existing facilities, limited diversification of energy sources, and weak regulatory and institutional frameworks. The electric power supply chain; spanning generation, transmission, and distribution is marked by inefficiencies, poor metering, high transmission losses, and low revenue collection. Additionally, politicization in energy policy further complicated reform efforts (Akuru & Okoro, 2011; Yang & Khan, 2022). The findings from this study aim to inform both national policy and regional development strategies by highlighting actionable interventions; including renewable energy adoption, pricing reform, infrastructure investment, and institutional strengthening - that can help Nigeria transition from energy poverty to energy security.

LITERATURE

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

Romer Endogenous Growth Theory

Energy and economic growth have long been examined through various theoretical lenses, notably the Solow-Swan Growth Theory. However, to better capture the dynamic role of technological innovation, infrastructure, investment on modern economies, Paul Romer's Endogenous Growth Theory (1990) provides a more robust framework for understanding how electricity and energy infrastructure contribute to sustained economic growth. Romer's posits long-term economic growth arises from internal factors, particularly investments in knowledge, innovation, and human capital. According to Romer (1990), public and private investments in infrastructure; including energy can yield increasing returns by enhancing productivity across all sectors of the economy. Electricity plays dual function: it is both a productive input and a catalyst for innovation and technology diffusion. Electricity enhances allowing for higher output per unit of input across industries. It also facilitates technological innovation, digitalization, and knowledge dissemination, especially when deployed in education, healthcare, ICT, and manufacturing. As such, a stable and efficient electricity supply is a non-trivial driver of knowledge-based capital accumulation, reinforcing the positive feedback loops central to endogenous growth dynamics (Romer, 1990; Aghion & Howitt, 1998).

In developing economies like Nigeria, however, electricity deficits act as a binding constraint on endogenous growth channels. Studies by Akinlo (2009) affirm electricity availability significantly influence output levels. Electricity supply failures reduce firm-level productivity, discourage innovation, and disincentivize capital accumulation—mechanisms that are central to Romer's growth formulation.

Moreover, the externalities associated with electrification—such as better health outcomes, improved educational attainment, and enhanced communication—contribute indirectly to economic growth by fostering human capital development, a key driver in endogenous growth models (Barro, 1991; Lucas, 1988). These indirect channels are particularly important in rural and peri-urban regions where electricity access correlates strongly with social mobility and access to public services.

According to Calderón and Servén (2010), infrastructure quality including electricity have strong and statistically significant effect on long-term growth and inequality reduction. Their work reinforces the endogenous argument that public infrastructure investment in electricity not only boosts current output but also creates cumulative productivity effects through time. In the Nigerian context, where the power sector suffers from underinvestment and inefficiency, these theoretical insights underscore the urgency of electricity reform as a pathway to unlock endogenous growth potentials. Additionally, UNIDO (2016) emphasizes the importance of electricity for industrial development and structural transformation in Africa. They note that without reliable power, economies remain stuck in low-productivity equilibria, unable to transition from primary commodities to value-added sectors—again reflecting Romer's model where technological diffusion and capital deepening are prerequisites for growth. Therefore, Romer's compelling foundation centrality on electricity to progress, particularly in economies aiming for structural transformation. Energy infrastructure, far from being a passive input, is a dynamic enabler of innovation, human development, and capital efficiency. As such, addressing electricity challenges in Nigeria merely service delivery, unlocking sustained, self-reinforcing economic growth.

Empirical Literature

Literature abounds on the significant relation between energy dynamic – energy supply, energy consumption, electricity pricing, technology all over the globe. The increased drastically especially from the early 21st century when technology was seen as a major driver of any economy. A number of works has a kind of conflicting results or findings. While some researchers found positive relationship between energy consumption, others found negative relationship with energy consumption especially from power outage. Some findings however revealed causality on energy dynamics in Nigeria some found no causality between the both concepts.

Dai, Jia and Wang (2022), looked at relationship between energy consumption and economic growth and the Kuznets energy curve of the United States and Germany. The results show that China's energy economic rate is higher than that of Germany and the United States at the turning point of energy consumption. The research makes an empirical analysis of the relationship between energy consumption and economic growth in OECD

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

countries and finds out the turning point of energy consumption to provide a theoretical basis for coordinating China's energy consumption and economic growth.

Ali, et al. (2020) explores the relationship between electricity consumption, and economic growth in Nigeria. Using various statistical tests and estimation methods such as the Maki cointegration test, Ng-Perron test, Zivot-Andrew's test, Kwiatkowski unit root test, FMOLS, DOLS, and CCR regression, the study analyzes annual data from 1971 to 2014. The findings suggest a positive relationship between electricity consumption and economic growth, indicating that electricity consumption plays a significant role in driving growth in Nigeria. Given Nigeria's heavy reliance on energy (electricity) consumption, this finding is desirable. The researchers employed the bounds test and the Bayer and Hanck cointegration tests to confirm the existence of a cointegrating relationship among the work consolidated the empirical insights in this research axis by using variables. The findings indicate that electricity consumption has a positive impact on economic growth. The robustness of the findings was confirmed through the application of the fully modified OLS, dynamic OLS, and canonical cointegrating regression techniques. Furthermore, the vector error correction model and Granger causality test supports the neutrality hypothesis in the short run and the feedback hypothesis in the long run, suggesting interdependencies among the variables over time. Based on these findings, the study suggests implementing policies that ensure efficient electricity supply, manage rapid urbanization, and promote sustainable economic growth in Nigeria.

Galadima and Aminu (2020) explored natural gas consumption and economic growth in Nigeria using econometric techniques. The main objectives of the study were to compare linear and nonlinear methods in determining the unit root property of the series, assess the impact of natural gas consumption on economic growth, and analyze the causal effects of positive and negative changes in natural gas consumption on economic growth. The findings of the study indicate that both natural gas consumption and economic growth in Nigeria exhibit nonlinear trends. This suggests that linear techniques may not fully capture the complexities of their relationship. The analysis reveals a nonlinear relationship between natural gas consumption and economic growth, where an increase in natural gas consumption leads to higher economic growth. The study also identifies bidirectional causality, indicating that positive changes in natural gas consumption have a causal effect on economic growth, and vice versa. Furthermore, the study uncovers evidence of unidirectional causality from economic growth to the negative impact of natural gas consumption. This implies that economic growth can influence the consumption of natural gas in a way that negatively affects the economy. The study concludes by suggesting further research on the trend process of energy consumption, particularly in the context of the Organization of Petroleum Exporting Countries (OPEC) or other regional energy organizations, using panel data techniques. This would provide a broader understanding of the relationship between energy consumption and economic growth beyond the scope of Nigeria.

Inuwa et al. (2022) focused their own study on examining the disaggregated effect of natural resource rents on economic growth in Nigeria from 1981 to 2017. The study utilizes traditional and modern unit root tests, as well as cointegration techniques such as the Bayer and Hanck combined cointegration test, canonical cointegration regression (CCR), and fully modified OLS (FMOLS). The findings of the study indicate the presence of a long-run equilibrium relationship among the variables. In terms of the impact on economic growth, the analysis reveals that oil and forest rents have a negative effect, supporting the resource curse hypothesis. On the other hand, natural gas, coal, and mineral rents have a positive effect on economic growth. Additionally, the study highlights that financial development stimulates economic growth in Nigeria. The policy implications of the findings suggest that different types of resource rents have varying impacts on economic growth. Therefore, the study recommends that the government utilize these rents judiciously to stimulate growth. This can be achieved by reinvesting in other sectors of the economy, such as the financial sector. The study also emphasizes the importance of designing and implementing policies to ensure the sustainable and beneficial use of rents obtained from resources like coal, mineral, and natural gas, so that they contribute positively to the Nigerian economy and avoid becoming a curse.

Awodumi and Adewuyi (2020) investigated the role of non-renewable energy consumption in economic growth and carbon emissions in the top oil-producing economies in Africa from 1980 to 2015. The study addresses the dilemma of balancing economic growth and pollution reduction, given that non-renewable energy consumption facilitates output production but also contributes to carbon emissions. Using the non-linear autoregressive distributed lag (NARDL) technique and accounting for nonlinearity and structural breaks, the study finds evidence of asymmetric effects of per capita consumption of petroleum and natural gas on economic growth and carbon emissions in all the selected countries, except Algeria. In Nigeria, a positive change in non-renewable energy consumption hampers growth but reduces emissions. In Gabon, increased consumption of these energy sources promotes growth and improves environmental quality. Egypt experiences negligible impact on environmental pollution as non-renewable energy consumption enhances economic growth. In Angola, positive changes in non-renewable energy consumption contribute to economic growth, but the effects on carbon emissions vary across time and energy types. Negative changes in petroleum and natural gas consumption have similar effects to positive changes in Egypt and Nigeria. Wang et al. (2020) examined the relationship between economic growth and life expectancy in Pakistan, taking into account the potential role of financial development and energy consumption. The researchers employed both traditional and advanced unit root tests to assess the stationary properties of the variables. They also utilize the ARDL bounds testing technique to explore the cointegration levels among life expectancy and its determinants, considering the presence of structural breaks in the data. The empirical findings confirm the presence of cointegration among the variables, indicating a long-term relationship. The results suggest a positive association between economic growth and life expectancy, indicating that as the economy grows, life expectancy tends to increase. However, financial development has a negative effect on life expectancy in the context of Pakistan, suggesting that factors related to financial development may hinder improvements in life expectancy. Additionally, the study reveals that energy consumption has a detrimental effect on life expectancy through environmental degradation. The findings of this empirical analysis provide valuable insights for policymakers, highlighting the potential of financial development and energy consumption as economic tools to improve life expectancy. The study suggests that policymakers should consider directing energy and finance policies towards promoting sustainable development and environmental protection in order to enhance life expectancy in Pakistan.

Lawal, Ozturk, Olanipekun and Asaleye (2020) investigated the relationship between electricity consumption and economic growth in sub-Saharan African economies from 1971 to 2017. The researchers utilize the System Generalized Methods-of-Moments (System GMM) techniques to account for endogeneity in the data generation process. Additionally, they examined whether the impact of electricity consumption differs based on the level of energy intensity. They employed an advanced dynamic panel threshold regression model to determine the threshold level of energy intensity and explore the potential asymmetric effect of energy consumption on economic growth. The findings reveal a significant positive relationship between electricity consumption and economic growth. Furthermore, they identified a threshold level of energy intensity at 0.48%, indicating that energy consumption beyond this level hampers growth, while consumption below this level stimulates growth. Numerous studies have examined the intricate link between energy consumption dynamics and economic growth across diverse global contexts. Notably, researchers such as Dai, Jia and Wang (2022), Ali, et al. (2020), and Nathaniel and Bekun (2020), has consistently shown a positive correlation between electricity consumption and economic growth by employing multiple regression techniques and cointegration tests to establish the positive relationship. Additionally, investigations into the connection between natural resource rents and economic growth showcased mixed effects. (see Inuwa, et al. (2022), Galadima and Aminu (2020), Yang and Khan (2022), and Nathaniel (2020). These studies collectively emphasize the importance of robust methodologies in unraveling these complex dynamics in offering insights to guide sustainable economic development strategies and energy consumption.

RESEARCH METHODOLOGY

Model Specification

In conventional research like this and any other related fields of econometric research, the first steps are to specify the functional model that will guide the research based on the theoretical and empirical evidence. This involves selecting an appropriate functional form for the model and choosing which variables to include in the model, of which it is paramount as wrong specification of the model can produce spurious and misleading result. This research will be anchored on the Romer endogenous growth theory as reviewed in Section two. Based on

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

the general model specified by the endogenous growth model, the general form of Romer endogenous production model is: Y = A f(K, L) (1)

Where: Y = Output (gross domestic product)

A = Total factor productivity or efficiency parameter, K = Capital stock and L = Labour.

For this study, it is assumed that the impact of energy dynamic on Nigeria economic growth (i.e., industrial output or gross domestic product) operates through total factor productivity (A). Since this study intends to examine the impact of energy dynamic on economic growth in Nigeria, we thus assumed that total factor productivity (A) is a function of electricity power outage (PO – difference between electricity power demand and supply), electricity pricing per capita (EPPC), Real interest rate (INT), and Disposable income (dY).

Hence, following the model of Romer endogenous growth and the empirical study of Sarwat, Faiz and Saadia (2011) that investigated the dynamic relationship between energy and economic growth of eight developing countries, this research study will modify the model by incorporating other key variables like electricity pricing, disposable income, commercial bank lending rate and power outage in other to have a better result. Thus, the model is represented symbolically in its functional form as: GDP = f(PO, EPPC, INT, dY) 3.1

Where;

GDP = Gross Domestic Product

EPPC = Electricity Pricing Per Capita

PO = Power outage (Gaps in Electricity Demand and Supply)

INT = Commercial bank lending rate

dY = Disposable Income

This relationship can be captured in its linear function as represented below,

$GDP = b_o + b_1PO + b_2EPPC + b_3INT + b_4dY + U_t$ 3.2

Where;

b_o = constant term/parameter intercept

b_1, b_2, b_3 and b_4 = coefficients of the parameters estimate.

U_t = Error Term

As efforts will be made to rescale the data, the log function is thus expressed as follows:

$L(GDP) = b_o + b_1LPO + b_2\,LEPPC + b_3LINT + b_4LdY + U_t$ 3.3

Estimation Procedure

The Estimation Procedure focused on ECM.

Following the results of unit root and cointegration tests, the Error Correction Mechanism (ECM) is employed to estimate the short-run dynamics while preserving the long-run equilibrium relationship among the variables. The ECM is suitable when the variables are integrated of order one, I(1), and cointegrated, as it allows for the modeling of both short-run deviations and the speed at which they converge back to long-run equilibrium.

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

The rationale for choosing the ECM lies in its ability to correct disequilibrium in the dependent variable caused by shocks in the independent variables. Specifically, the ECM integrates both the differenced (short-run) components and the lagged residuals (error correction term) derived from the cointegration equation. The coefficient of the error correction term (ECM_{t-1}) represents the speed of adjustment—indicating how quickly deviations from long-run equilibrium are corrected in subsequent periods. This approach aligns with the theoretical framework of Engle and Granger (1987), which advocates for the use of ECM in the presence of cointegrated series to ensure valid inference and avoid spurious regression results. By including both lagged differences and the error correction term, the ECM offers a robust specification that captures temporal dynamics without losing long-run structural information.

Therefore, the ECM is appropriate for this study because it enables us to disentangle short-run fluctuations from long-run trends in Nigeria's energy-economic growth relationship, particularly in the context of electricity pricing, outages, bank lending rates, and disposable income.

3.3 Data Collection Source.

Secondary source of data is used as the main method of data collection. The relevant data for this study made used of annual time series data covering the period (1980 – 2021), obtained from Central Bank of Nigeria (2000), Central Bank of Nigeria Statistical Bulletin (2021), National Bureau of Statistics (NBS) and World Development Indicator (WDI 2022). OECD/IEA (2022) (http://www.iea.org/stats/index.asp),subjecttohttps://www.iea.org/t&c/termsandconditions/

Definitions:

Definition of Electricity consumption: This entry consists of total electricity generated annually plus imports and minus exports, expressed in kilowatt-hours. The discrepancy between the amount of electricity generated and/or imported and the amount consumed and/or exported is accounted for as loss in transmission and distribution.

Definition of Electric power consumption: This refers to the price measures of the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants (International Monetary Fund, World Bank Indicator, 2022).

Definition/Discussion of data used in the Study:

Gross Domestic Product (GDP): Gross Domestic Product represents the total monetary value of all goods and services produced within a country's borders in a specific time period. It's a comprehensive scorecard of a nation's economic health and an indicator of its standard of living. GDP is commonly used to compare the economic performance of different countries and to track economic growth over time.

Power Outage: A power outage, also known as a blackout, is the temporary loss of electrical power in a specific area. For instance; from 'Appendix 1' in 1980, Energy demand was 7.38 billion kilowatt-hours (KWH) less Energy supply which was 6.62 billion KWH which gives us 0.76 billion KWH (which is the Energy Gap or PO). Also, if we check that 2015; Energy demand is 25.67 KWH less Energy supply at 21.76KWH, then PO is3.91KWH. This can be caused by various factors such as natural disasters, technical faults in the power grid, or maintenance work. Power outages disrupt daily life and business operations, often leading to economic losses, decreased productivity, and inconvenience for both households and businesses.

Electricity Pricing Per Capita: Electricity pricing per capita refers to the average amount spent by each individual on electricity within a country. This metric varies widely depending on the country's energy resources, efficiency of its electricity infrastructure, and government policies. High electricity costs per capita can indicate either high consumption rates or inefficiencies and higher prices in the energy sector.

Structural Breaks.

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

A structural break refers to a sudden and unexpected shift in the underlying pattern, mean, or parameters of a time series, typically triggered by significant events such as policy changes, shifts between military and democratic rule, wars, or economic crises. Such breaks can render previous models invalid, leading to forecasting errors. The term' $\sum e^2_p$ represents the pooled unexplained variations across two periods: 1980–1986 and 1987–1993, and between 1994 and 2005, corresponding to military and democratic governments, respectively. $\sum e^2_1$ denotes the unexplained variations in electricity supply during the military government (1986–1999 and between 1985–1999), while $\sum e^2_2$ refers to unexplained variations during the democratic government (1999–2005). The variable n1 indicates the number of observations during the military period (1980–1983 and 1985–1999), and n2 represents the number of observations during the democratic period (1983 and 1999–2005). The parameter k stands for the total number of coefficients, including the intercept, and the degrees of freedom are given by n1 + n2 – 2k. For non-parametric testing, the Geary test and the kernel density test (k-density) are used to assess the stability of structural breaks in electricity supply dynamics and economic growth in Nigeria, utilizing STATA10.0.(https://coda.grammarly.com/d/STRUCTURALBREAK_dE2NRXdVNmc/Untitled-page_suYnJj0m#_luC8MbVg)

RESULTS AND DISCUSSION

This section focuses on the presentation and analysis of the result to address the issues of Energy dynamic and economic growth in Nigeria. This analysis is based on standard econometric techniques such as;

- Descriptive statistics: Means, Median, Skewness, Kurtosis, standard deviation, probability and Janqen-Beran normality test (Pre-estimation test).
- Series and Group test: Unit root test, Cointegration tests, and Error Correction Mechanism test.
- Residual diagnostic test: Breush-Godfrey Serial autocorrelation test, Heteroscedasticity test, Cusum stability test etc.

Descriptive Statistics:

The descriptive statistics test was conducted to check the degree of variation in the data used in this research study.

Table 1:Descriptive Result

	LGDP	LPO	LEPPC	INT	LDY
Mean	8.693707	0.468776	4.642035	17.05524	7.935906
Median	8.939338	0.157004	4.590430	17.38000	7.794341
Maximum	12.07867	2.094330	5.096813	29.80000	8.822377
Minimum	4.493680	-0.776529	3.926123	6.780000	7.031534
Std. Dev.	2.495879	0.778126	0.297883	4.865736	0.599751
Skewness	-0.249613	0.677369	-0.154911	0.132207	0.181402
Kurtosis	1.617549	2.384036	2.120396	3.396526	1.492722
Jarque-Bera	19.98088	27.15341	1.521962	0.397508	4.206150
Probability	0.000046	0.000001	0.467208	0.819751	0.122080
Sum	365.1357	19.68857	194.9655	716.3200	333.3081
Sum Sq. Dev.	255.4059	24.82467	3.638094	970.6908	14.74773
Observations	42	42	42	42	42

Source: Researchers Computation

INTERNATIONAL JOURNAL OF LATEST TECHNOLOGY IN ENGINEERING, MANAGEMENT & APPLIED SCIENCE (IJLTEMAS)
ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

From table 1 above there seems to be evidence of significant variations as shown by the huge difference between the minimum and maximum values for the variables under consideration.

- The skewness of the data series indicates an asymmetric or non-normal data distribution as the series relatively deviates from normality maintaining positive skewness (values above 0.5), as evidenced by the variation in the minimum and maximum values of the variables.
- The kurtosis statistic equally shows that all the variables have leptokurtic distribution. This means that GDP, PO, EPPC, INT and DY has higher influence on Nigeria's economic growth.
- The Jarque-Bera test is a test of normality. Based on our results using the P-values associated with the Jarque-Bera statistics, GDP and PO are normally distributed while EPPC, DY, and INT are not.

Proper Estimation

In order to avoid a situation of spurious and misleading result various test were conducted to examine the order of integration of each of the variables in the model, their long run relationships and their short-term speed of adjustment to fluctuation in the short run to long run equilibrium.

The unit root test, Johansson cointegration test, and ECM test will be conducted accordingly in this subsection.

Unit Root Test

In other to test for the presence or absence of unit root in the data used for the empirical analysis, Augmented Dickey-Fuller (ADF) test was employed to check the trend in the data. The optimal lag length is automatically determined based on Akaike Information Criterion (AIC) or Schwartz Bayesian Criterion (SBC), or more usefully by the lag length necessary to whiten the residuals (Asteriou and Hall, 2007). The test result of the ADF is as presented below:

Table 2: Unit Root

Augmented Dickey Fuller Result at Level and First Difference, Trend and Intercept

Variables	ADF @ Level	1st difference	Critical value (5%)	Order of integration	Remarks
D(LGDP)	0.141878	4.293894	3.526609	I(1)	Stationary
D(LPO)	2.041428	5.366100	3.540328	I(1)	Stationary
D(LEPPC)	3.515006	9.429010	3.526609	I(1)	Stationary
D(LDY)	2.924916	5.809312	3.526609	I(1)	Stationary
D(INT)	3.054882	6.456097	3.529758	I(1)	Stationary

Source: Researchers Computation

The unit root test results as shown in Table 2 above shows that none of the variables were stationary at level, as their ADF statistics in absolute terms are less than at the 5% critical values (e.g., |0.141878| < |3.526609| for GDP). However, after first differencing, all variables became stationary, with ADF statistics exceeding the 5% critical values (e.g., |4.293894| > |3.526609| for GDP), indicating they are integrated of order one, I(1). This confirms the absence of unit roots and eliminates the risk of spurious regression.

Stationarity is essential for valid time series modeling, and without addressing it, forecasts become unreliable (Iyoha, 2004; Gujarati, 2003). As noted by Pesaran and Shin (2001), when variables are I(1) and cointegrated, the appropriate approach is to estimate using an Error Correction Model (ECM). Therefore, since all variables are I(1), the study proceeds with cointegration and ECM analysis to capture both long-run relationships and short-run adjustments.

Cointegration Test

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

Cointegration test was used to test for the long run relationship among the variables. For this purpose, the Johansen cointegration test was adopted. In Johansen's method, the Eigen value statistic is used to determine whether cointegrated equations exist among the variables. Cointegration is said to exist if the values of computed statistics are significantly different from zero or if the trace statistics is greater in absolute value than the critical value at 5 percent level of significance. The model with lag 1 was chosen with the linear deterministic test assumption and the result is presented below.

Table 3: Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.668511	83.73255	69.81889	0.0026
At most 1	0.338922	39.56616	47.85613	0.2384
At most 2	0.285571	23.01085	29.79707	0.2455
At most 3	0.165763	9.559992	15.49471	0.3161
At most 4	0.056125	2.310462	3.841466	0.1285

Source: Researchers Computation

Recall that according Pasaran and Pasaran (1998) and pasaran and Shin (2001), if variables are stationary at level normal OLS can be used to estimate the parameters which is the most desirable form of estimating the relationship between series under consideration. But if series are not stationary at level but are stationary at same order, they recommend that co-integration test and error correction mechanism test should be conducted to determine the longrun and short speed of adjustment disposition.

The reason is because as a result of differencing the data, some vital information about the variable is lost during the process. In this study, the most desirable case of all variables being integrated of the same order was evident. The unit root test result shows that all the variables are integrated of the order, *I(1)*. The research therefore proceeded with the cointegration test. From table 3 above, since the computed trace statistic i.e. (83.73255) is greater than the critical value (69.81889) at 5% levels of significance the null hypothesis (H_0) is rejected and concludes that there is at least one co-integrating equation and that all the variables are cointegrated. Hence, putting it differently, there is a sustainable long-run relationship (i.e. steady-stated path) between gross domestic products (GDP), Power outage (PO), Electricity pricing per capita (EPPC), Commercial bank lending rate (INT), and Disposable income (dY).

The long run Equation

GDP = 34.97088 - 0.669923PO + 5.092949EPPC+ 0.144729INT - 5.661470dY

(0.44247) (1.44756) (0.04075) (0.77251)

The result above is the coefficient of the explanatory variables which indicate the direction of strength of the relationship between explanatory variables and economic growth in the long run. The figures in the parenthesis were the asymptotic standard error.

The long-run relationship displayed above revealed that there is a negative long-run relationship between the change in power outage (PO) and Nigeria's Gross Domestic Product (GDP), in the economy during the period of observation. The implication is that, in the long-run, a unit change (increase) in power outage (PO), will decrease the value of the Nigerian economic growth by (0.669923 billion) respectively, over this period of observation (1980-2021).

The result further revealed that one billion increases in Nigeria electricity price per capita will bring about ₦5092949 increase on the gross domestic product. One billion increase in disposable income will lead to (bring about) 5.66 decrease in Gross Domestic Product (GDP). And lastly, an increase in commercial bank lending rate will bring about 0.1447 unit increase on the Nigeria's gross domestic product, all other things being equal.

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

Error Correction Mechanism

The existence of a long- run co-integrating equilibrium provides for short-term fluctuations. In order to strengthen out or absolve these fluctuations, an attempt was made to apply the Error Correction Mechanism (ECM). As noted, the ECM is meant to tie the short-run dynamics of the co-integrating equations to their long-run static dispositions. Table 4 below shows the error correction mechanism result.

Table 4. Error Correction Model Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.90436	2.160646	-10.60070	0.0000
LPO	-0.760818	0.240829	-3.159168	0.0020
LEPPC	-1.319743	0.670076	-1.969542	0.0573
INT	0.051503	0.019903	2.587664	0.0143
LDY	4.659579	0.349460	13.33367	0.0000
ECM(-1)	-0.113962	0.019207	-5.933358	0.0311
R-squared	0.960758	Mean dependent var		8.992334
Adjusted R-squared	0.954812	S.D. dependent var		2.331482
S.E. of regression	0.495614	Akaike info criterion		1.574600
Sum squared resid	8.105898	Schwarz criterion		1.830532
Log likelihood	-24.70469	Hannan-Quinn criter.		1.666426
F-statistic	161.5863	Durbin-Watson stat		1.978261
Prob(F-statistic)	0.000000			

Source: Researchers Computation

The result of the Error Correction Model (ECM) in Table 4 shows that the error correction term (ECT) has a coefficient of –0.113962, which is statistically significant. This implies that approximately 11.4% of the short-run disequilibrium in GDP is corrected each year, confirming the presence of a stable long-run relationship. The negative sign of the ECT aligns with theoretical expectations, indicating that any deviation from equilibrium is adjusted over time by the explanatory variables.

The coefficient of determination (R^2) is 0.9608, suggesting that about 96% of the variation in GDP is explained by the model's independent variables—namely, gaps in electricity demand and supply (LPO), electricity price per capita (LEPPC), lending interest rate (LINT), and disposable income (LDY). This reflects a high model goodness-of-fit, with only 4% of variations attributed to external factors not captured in the model.

Key Variables

- **Electricity Demand-Supply Gap (LPO):** The coefficient is negative and statistically significant ($p = 0.0020$), indicating that larger electricity shortfalls reduce GDP. Specifically, each million MWh of unmet electricity demand is associated with a GDP decline of approximately ₦760.8 billion.

- **Electricity Price Per Capita (LEPPC):** Though negatively signed, this variable is not statistically significant ($p = 0.0573$), suggesting that electricity pricing policy reforms could influence growth, but current pricing effects are weak or delayed.

- **Interest Rate (LINT):** Contrary to Keynesian theory, the coefficient is positive and significant ($p = 0.0143$), indicating a direct relationship with GDP. This suggests credit availability may be growth-inducing despite higher rates, possibly due to inflationary pressures or structural banking constraints.

- **Disposable Income (LDY):** The coefficient is positive and highly significant ($p < 0.0001$), confirming that higher household income levels foster economic growth—consistent with theoretical expectations regarding consumption and capital formation.

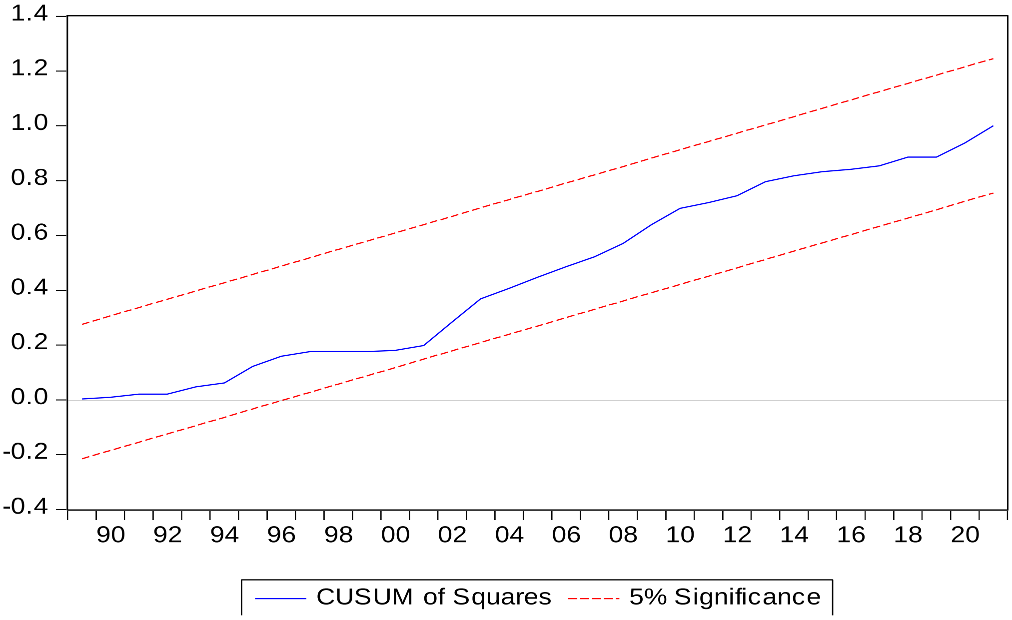
ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

The DW statistics of 1.98 falls within the expected range of between 1.9 and 2.1. Thus, the model is free from the problem of serial autocorrelation. This was further confirmed by Breush-Godfrey Serial autocorrelation test.

Table 5: Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.222050	Prob. F(2,28)	0.8023
Obs*R-squared	0.562071	Prob. Chi-Square(2)	0.7550

Source: Researchers Computation (See Appendix)

From the result in Table 5 above, since F-statics P-value 0.8023, also Obs*R-squared had a P-value of 0.7550 are greater than 5% (0.05) level of significance, we conclude that there is no autocorrelation in the series and as such the findings can be helpful in making policy decision. The absence of serial autocorrelation in the data makes it fit for policy option by the economic and political actors. This assertion is further collaborated by the result of the Cusum test.



The Cusum square test revealed that the model exhibits a great level of stability as the blue line falls between the red lines. What this means is that the relationship between energy dynamics variable captured by gaps in electricity demanded and supplied [LPO], electricity price per capita [LEPPC], average lending interest rate [INT] and Disposable Income [DY] and Nigeria economic growth is stable over long period of time. A stable relationship is necessary to enable prediction of economic phenomenon.

Heteroskedasticity Test

Table 6: Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.895730	Prob. F(5,33)	0.1218
Obs*R-squared	8.702426	Prob. Chi-Square(5)	0.1215
Scaled explained SS	3.256025	Prob. Chi-Square(5)	0.6606

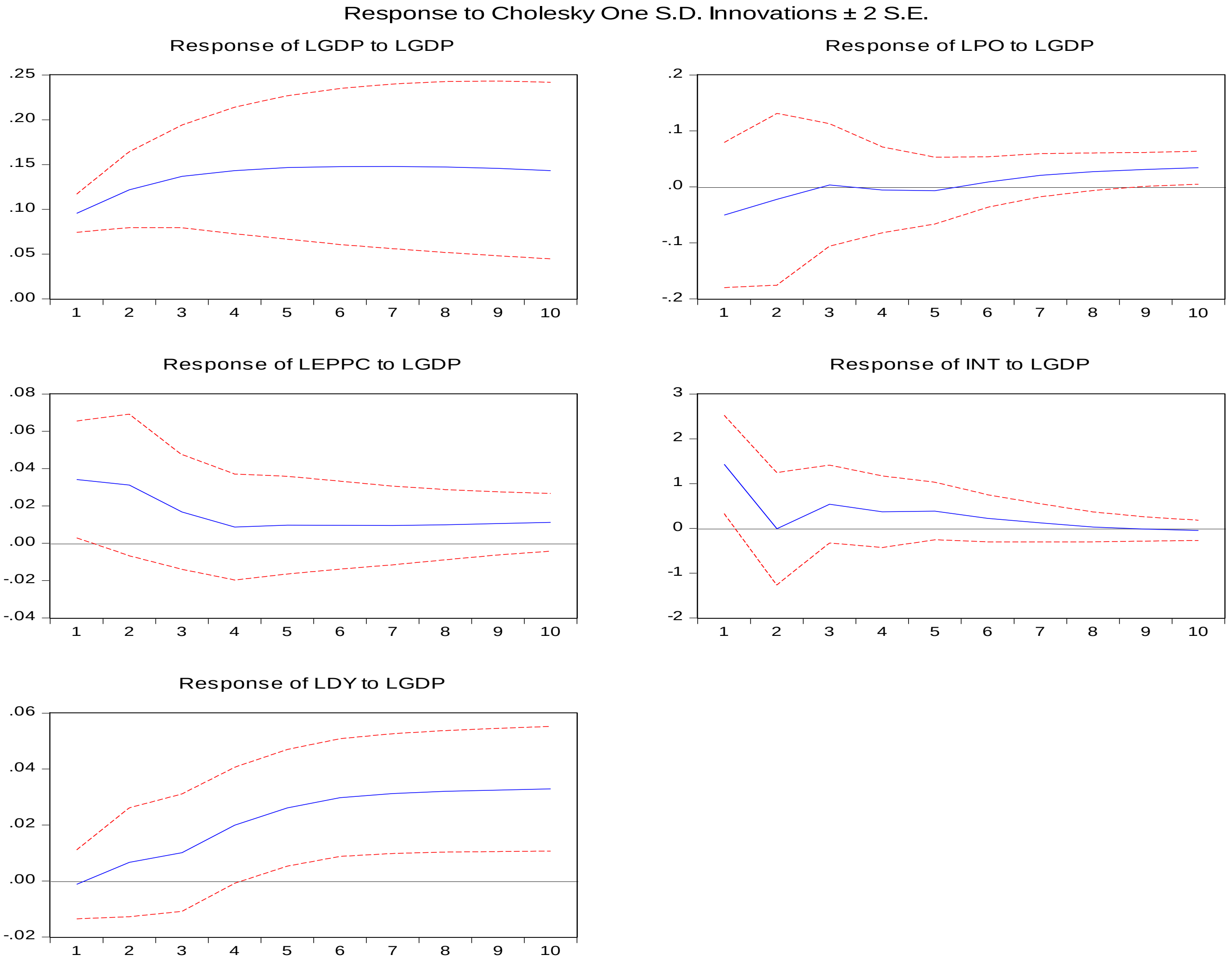
Source: Researchers Computation

The result presented in Tables 6 shows the Obs*R-squared (8.702426) had a P-value of 0.1215. Also, the F-statistics (1.895730) had a P-value of 0.1218. The rule of thumb is that if the probability statistics is less than 0.05, then there is a problem of heteroscedasticity in the estimated model. Since the probability statistics is greater than 0.05, we conclude that the model is free from the problem of heteroscedasticity. As such, the estimated model can be used for making decisions and policy recommendations.

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

Impulse Response test of Energy Dynamic

Impulse response functions (IRFs) are used to test for the effects of shocks on the adjustment path of the variables under consideration. Impulse response functions is mostly represented by and can also be graphically presented showing the effect of shocks on the current and future path of the variables under consideration. In essence, IRs show how these variables react to different shocks in the model.



The impulse response test above revealed that GDP negatively respond to gaps between electricity demand and supply but positively respond to disposable income. What this means is that increase in the power outage in Nigeria will drastically have negative influence on the economy. However, the result revealed that gross domestic product does not have any significant either positive or negative on electricity price per capita and lending interest rate.

The IRF test further revealed that power outage captured by gaps between electricity price has an inconsistent response to GDP, while electricity price par capital revealed low or no response at all to GDP. In overall, one can conclude that Nigeria economy captured by gross domestic product has positive relationship with energy dynamics.

CONCLUSION AND POLICY RECOMMENDATIONS

This study examined the impact of electricity supply dynamics and economic growth in Nigeria, evidence from an error correction model (1980-2021); focusing on electricity pricing, power outages, interest rates, and disposable income. The findings highlight that electricity pricing per capita showed an inverse relationship with growth, the result was statistically insignificant, suggesting the need for cautious pricing reforms that balance cost recovery with affordability.

The strong, statistically significant negative impact of power outages confirms the critical role of reliable electricity in driving productivity and economic performance. Addressing outages is essential for industrial competitiveness and national development. Interestingly, lending interest rates showed a positive correlation with economic growth—contrary to theoretical expectations—possibly reflecting increased credit demand during periods of economic optimism. Additionally, the strong positive impact of disposable income aligns with expectations, reinforcing the importance of household financial health in stimulating economic activity.

Overall, the study underscores the urgent need for reforms in Nigeria's electricity and financial sectors to achieve sustainable, inclusive growth.

i) It is recommended that urgent attention be paid to investment in Nigeria's electricity infrastructure with a balanced pricing reform, and income-enhancing fiscal and monetary policies in Nigeria to boost increase in power supply to meet the demand in the country.
ii) Increase on investment in the energy sector will reduce power disruptions and support industrial productivity as well as promote inclusive economic growth in Nigeria.
iii) power outage otherwise known as a blackout, is the temporary loss of electrical power in a specific area, for instance in 1980, Energy demand was 7.38 billion kilowatt-hours (KWH) less Energy supply which was 6.62 billion KWH which gives us 0.76 billion KWH (which is the Energy Gap or PO). Also, in 2015; Energy demand was 25.67 KWH less Energy supply at 21.76KWH, then PO is3.91KWH. This can be caused by various factors such as natural disasters, technical faults in the power grid, or maintenance work. Power outages disrupt daily life and business operations, often leading to economic losses, decreased productivity, and inconvenience for both households and businesses. It is therefore recommended that government should invest more on solar energy in the country in order to improve on the power outage /blackout all over in the country.
iv) Government should encourage public – private -partnerships (PPP) by allowing the private investors to participate in the energy sector. This should be encouraged in order to reduce the Electricity pricing per capita, which is the average amount spent by each individual on electricity within a country.
v) The government should expand the country's energy resources, efficiency of its electricity infrastructure, and its policies. This can be done to reduce the high electricity costs per capita which indicate either high consumption rates or inefficiencies and higher prices in the energy sector. It is therefore recommended that through the increase in the solar energy investment government can reduce the pricing per capita in the country.

Funding Statement: it is Not applicable as it is self-funding by all the authors.

International Review Board Statement: Not applicable.

REFERENCES

1. Aghion, P., & Howitt, P. (1998). Endogenous Growth Theory. MIT Press.
2. Akinlo, A. E. (2009). Electricity consumption and economic growth in Nigeria: Evidence from cointegration and co-feature analysis. Journal of Policy Modeling, 31(5), 681–693. https://doi.org/10.1016/j.jpolmod.2009.03.004
3. Akuru, U. B & Okoro, O. I. (2011). A prediction on Nigeria's oil depletion based on hubbert's Model and the Need for Renewable Energy. ISRN Renewable Energy, 11.
4. Ali, H. S., Nathaniel, S. P., Uzuner, G., Bekun, F. V., & Sarkodie, S. A. (2020). Trivariate modelling of the nexus between electricity consumption, urbanization and economic growth in Nigeria: fresh insights from Maki Cointegration and causality tests. Heliyon, 6(2), e03400. doi:10.1016/j.heliyon.2020.e03400
5. OECD Countries. International Journal of Energy Economics and Policy 3(3), 247-261 www.econjournals.com
6. Awodumi, O. B., & Adewuyi, A. O. (2020). The role of non-renewable energy consumption in economic growth and carbon emission: Evidence from oil producing economies in Africa. Energy Strategy Reviews, 27, 100434. doi: 10.1016/j.esr. 2019.100434

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

7. Barro, R. J. (1991). Economic Growth in a Cross Section of Countries. The Quarterly Journal of Economics, 106(2), 407–443. https://doi.org/10.2307/2937943
8. Calderón, C., & Servén, L. (2010). Infrastructure and Economic Development in Sub-Saharan Africa. Journal of African Economies, 19(suppl_1), i13–i87. https://doi.org/10.1093/jae/ejp022
9. Central Bank of Nigeria (2000). The changing structure of the Nigerian economy and implications for development. Lagos: Realms Communications Ltd.
10. ____________ (2021) Statistical Bulletin .CBN Abuja : Research and development unit.
11. Dai, L.; Jia, R.; & Wang, W. (2022). Relationship between economic growth and energy consumption from the perspective of sustainable development. Journal of Environmental and Public Health. 1-10 https://doi.org /10.1155/2022/6884273
12. Engle, R. and Granger, C. (1987), Cointegration and Error Correction: Representation , Estimation and Testing. Econometrica.55.251-276. http://dx.doi.org/10.2307/1913236 .
13. Erbaykal, E. (2008). Disaggregate energy consumption and economic growth: Evidence from Turkey. International research Journal of Finance and Economics 20, 172-179.
14. Galadima, M.D & Aminu, A.W. (2020) Nonlinear Unit root and nonlinear causality in natural gas-economic growth nexus: Evidence from Nigeria. Energy, 116415.doi: 10.1016/j.energy.2019.116415.
15. Gujarati, (2003). Basic Econometrics. 3rd Edition. New York: McGraw-Hill, Inc.
16. Imandojemu, K., & Tonuchi, J. E. (2021). Contribution to the empirics of electricity blackouts and productivity in Nigeria. Energy Economics Letters, 8(1), 60–69.
17. Inuwa, N., Adamu, S., & Sani, M. B. (2022). Natural resource and economic growth nexus in Nigeria: a disaggregated approach. Lett Spat Resour Sci 1(5), 17–37. https://doi.org/10.1007/s12076-021-00291-4
18. Joseph, T. E. (2019). Investigating renewable energy potentials in solving energy crisis in Niger Delta riverine communities, Nigeria. International Journal of Research in Electronics and ComputerEngineering(IJRECE).https://www.academia.edu/download/61043706/IJRECE_G524.pdf
19. Lawal, A. I., Ozturk, I., Olanipekun, I. O., & Asaleye, A. J. (2020). Examining the linkages between electricity consumption and economic growth in African economies. Energy, 118363.
20. Lucas, R. E. (1988). On the Mechanics of Economic Development. Journal of Monetary Economics, 22(1), 3–42. https://doi.org/10.1016/0304-3932(88)90168-7
21. Nathaniel, S. P., & Bekun, F. V. (2020). Electricity consumption, urbanization, and economic growth in Nigeria: New insights from combined cointegration amidst structural breaks. Journal of Public Affairs, e2102. doi:10.1002/pa.2102
22. OECD/IEA.2022(http://www.iea.org/stats/index.asp),subjecttohttps://www.iea.org/t&c/termsandconditions/
23. Romer, P. M. (1990). Endogenous Technological Change. Journal of Political Economy, Chicago: University of Chicago Press. 98(5, Part 2), S71–S102. https://doi.org/10.1086/261725
24. Sarwat, R., Faiz. B., & Saadia S. (2011). Dynamic relationship between energy and economic growth: Evidence from D8 Countries. The Pakistan Development Review 50(4), 437–458
25. Tonuchi, J. E., & Ariolu, C. (2022). Renewable energy deployment and economic transformation in Sub-Saharan Africa: Opportunities and constraints. African Economic and Management Review, 2(1), 22–36.
26. UNIDO (2016). Economic Report on Africa: Greening Africa's Industrialization. United Nations Industrial Development Organization. https://www.unido.org/resources/publications
27. Wang, Z., Asghar, M. M., Zaidi, S. A. H., Nawaz, K., Wang, B., Zhao, W., & Xu, F. (2020). The dynamic relationship between economic growth and life expectancy: Contradictory role of energy consumption and financial development in Pakistan. Structural Change and Economic Dynamics, 53, 257–266.
28. Yang, X. & Khan, I. (2022), Dynamics among economic growth, urbanization and environmental sustainability in IEA Countries: The role of industry value-added. Environmental Science and Pollution Research, 29 (4), 4116-4127. https://doi.org/10.1007/s11356-021-16000-z

APPENDIX 'I'

DATA FOR REGRESSION

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

YEARS	Energy Demand Billion (KWH)	Energy Supply Billion (KWH)	Energy Gap Billion (PO) (KWH)	Electricity Price (KWH) Per Capita	**dY** Disposable Income	GDP (N'Billion)	INT Rate
1980	7.38	6.62	0.76	67.80	1131.765	89.45	6.78
1981	8.36	7.37	0.99	50.71	1454.079	139.31	7.75
1982	8.34	7.88	0.46	81.58	1487.247	149.05	10.25
1983	7.68	6.68	1.00	81.41	1429.263	158.75	10.00
1984	9.63	8.45	1.18	61.82	1411.542	165.85	12.50
1985	9.45	8.98	0.47	80.13	1534.983	187.83	9.25
1986	10.62	9.45	1.17	90.52	1388.954	198.12	10.50
1987	11.72	10.23	1.49	88.93	1235.195	244.68	17.50
1988	10.44	9.56	0.88	86.78	1335.547	315.62	16.50
1989	11.86	10.56	1.30	96.66	1435.065	414.86	26.80
1990	12.63	11.25	1.38	86.71	1630.702	494.64	25.50
1991	13.45	12.89	0.56	89.22	1674.026	590.06	20.01
1992	13.48	12.79	0.69	89.67	1719.787	906.03	29.80
1993	13.23	12.23	1.00	100.45	1796.384	1,257.17	18.32
1994	12.70	11.56	1.14	95.15	1848.887	1,768.79	21.00
1995	12.33	13.23	1.00	91.09	1877.957	3,100.24	20.18
1996	14.78	13.56	0.78	85.52	2002.549	4,086.07	19.74
1997	14.50	13.39	1.11	81.63	2087.287	4,418.71	13.54
1998	14.75	13.75	1.00	76.61	2159.163	4,805.16	18.29
1999	14.70	14.80	1.10	75.41	2193.223	5,482.35	21.32
2000	14.75	13.72	1.03	74.13	2351.152	7,062.75	17.98
2001	18.76	17.37	1.39	75.20	2504.941	8,234.49	18.29
2002	15.94	14.77	1.17	104.13	2645.992	11,501.45	24.85
2003	15.67	14.55	1.12	101.40	2938.698	13,556.97	20.71
2004	15.67	14.55	1.12	122.98	3196.949	18,124.06	19.18
2005	19.85	18.43	1.42	128.64	3490.059	23,121.88	17.95
2006	15.59	14.46	1.13	111.14	3792.451	30,375.18	17.26
2007	19.06	17.71	1.35	138.14	4132.512	34,675.94	16.94
2008	22.11	15.85	6.26	126.53	4429.456	39,954.21	15.14
2009	22.11	15.85	6.26	119.95	4733.295	43,461.46	18.99
2010	21.92	19.21	2.71	135.64	5127.719	55,469.35	17.59
2011	21.92	19.21	2.71	149.31	5342.438	63,713.36	16.02
2012	20.13	18.14	1.99	155.85	5519.3	72,599.63	16.79
2013	18.82	17.66	1.16	141.87	5745.702	81,009.96	16.72
2014	24.87	20.38	4.49	142.67	6031.42	90,136.98	16.55
2015	25.67	21.76	3.91	145.98	6100.21	95,177.74	16.85
2016	26.35	21.08	4.47	146.33	6206.34	102,575.42	16.87
2017	28.32	22.46	4.51	147.21	6442.35	114,899.25	17.56
2018	28.64	23.01	4.73	147.68	6784.37	129,086.91	19.33
2019	29.56	24.54	5.02	148.23	6587.49	145,639.14	15.53
2020	27.42	19.65	7.77	162.05	6416.10	154,252.32	12.32
2021	32.35	24.23	8.12	163.50	6383.34	176,075.50	11.37

Source: CBN Statistical Bulletin 2021, World Bank Indicator 2022, IEA Statistics © OECD/IEA 2022 (http://www.iea.org/stats/index.asp), subject to https://www.iea.org/t&c/termsandconditions/

DEFINITIONS

Definition of Electricity - consumption: This entry consists of total electricity generated annually plus imports and minus exports, expressed in kilowatt-hours. The discrepancy between the amount of electricity generated and/or imported and the amount consumed and/or exported is accounted for as loss in transmission and distribution.

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue VI, June 2026

Definition: Electric power consumption price measures the production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by heat and power plants (International Monetary Fund, World Bank Indicator, 2022).

Definition/Discussion of data used in the Study:

i) **Gross Domestic Product (GDP):** Gross Domestic Product represents the total monetary value of all goods and services produced within a country's borders in a specific time period. It's a comprehensive scorecard of a nation’s economic health and an indicator of its standard of living. GDP is commonly used to compare the economic performance of different countries and to track economic growth over time.

ii) **Power Outage:** A power outage, also known as a blackout, is the temporary loss of electrical power in a specific area. For instance; from ‘Appendix 1’ in 1980, Energy demand was 7.38 billion kilowatt-hours (KWH) less Energy supply which was 6.62 billion KWH which gives us 0.76 billion KWH (which is the Energy Gap or PO). Also, if we check that 2015; Energy demand is 25.67 KWH less Energy supply at 21.76KWH, then PO is3.91KWH. This can be caused by various factors such as natural disasters, technical faults in the power grid, or maintenance work. Power outages disrupt daily life and business operations, often leading to economic losses, decreased productivity, and inconvenience for both households and businesses.

iii) **Electricity Pricing Per Capita:** Electricity pricing per capita refers to the average amount spent by each individual on electricity within a country. This metric varies widely depending on the country's energy resources, efficiency of its electricity infrastructure, and government policies. High electricity costs per capita can indicate either high consumption rates or inefficiencies and higher prices in the energy sector.

iv) **Commercial Bank Lending Rate:** The Commercial Bank Lending Rate is the average interest rate that commercial banks charge on loans to customers. This rate is crucial for economic activity as it influences consumer and business borrowing costs. A higher lending rate can dampen economic growth by making loans more expensive, while a lower rate can stimulate growth by reducing borrowing costs.

v) **Disposable Income:** Disposable income is the amount of money an individual or household has available for spending and saving after income taxes have been deducted. It is a key indicator of financial health and consumer spending potential. Higher disposable income usually suggests greater economic well-being and can lead to increased consumer spending, boosting economic growth.