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THE NEXUS BETWEEN ENERGY POLICIES AND SUPPLY: A DESCRIPTIVE EVALUATION OF NIGERIA AND UK ENERGY SECTORS

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Abstract

Nigeria has failed to be among the twenty strongest economies in the world as envisaged in its vision 20:2020. Considering the strong linkage between energy consumption and economic growth, the country's per capita electricity consumption which is one of the lowest in the world apparently resulting from lack of appropriate energy policies contributed to Nigeria's failure to achieve its vision 20:2020. The country had its first electricity installations just 15 years after that of the United Kingdom. However, while the United Kingdom per capita energy consumption was 4,701kWh in 2020, corresponding Nigeria's consumption was 115kWh. Provision of the quantum of energy in UK was arguably achieved through implementing appropriate energy policies which Nigeria should have followed the footsteps of the UK on the basis of mutatis-mutandis. Thus, this study examined the effectiveness of energy supply policies designed by governments in Nigeria and UK spanning the period 1971-2020. Secondary data on energy supply policy acts and per capita energy consumption were source from relevant UK and Nigerian government web sites and the study uses descriptive statistics and analyzed the data. Results from the study indicated that past energy policies were not effective in solving Nigeria's energy supply needs as the highest per capita energy was 157kWh achieved in 2012 while UK's least is 4,373kWh in 1971. The study recommends that policy makers in Nigeria should establish enabling policies that will tackle the country's energy crises simultaneously. Similarly, the policies should ensure utilization of all energy sources for an efficient energy mix.

Key Words: Energy, Energy policies, Energy Supply, Energy Crises, Policy Analysis

JEL CLASSIFICATION: K32

1. Introduction.

Nigeria is a country blessed with oil and gas resources with proved oil reserves of 36.90 billion barrels and 193.30 trillion cubic feet of proved natural gas reserves as at end of December 2020 (BP, 2021). Similarly, the country has potentials of generating over 11,000Megawatts of electricity from small and large hydro while its annual solar energy availability is about 27 times that of the country's total fossil fuel resource.

Arguably, availability of enormous reserves of oil, gas and renewable energy resources should be utilized to ensure adequate supply of electricity energy in the country. Conversely, the country is facing acute shortage of energy to such an extent that estimated National demand of 40,000Megawatts is more than ten times current national output (Akpan, Ejoh, & Esiedesa, 2022). Nigeria's population is over 200million as at end of 2019 which is projected to grow over 401million as at

2050 (United Nations, 2019). There are empirical evidences of positive relationships between population growth and energy consumption and energy consumption and economic growth (Ibrahiem, 2017; Destek, & Okumus, 2017). Therefore, it is pertinent that Nigeria should ensure sufficient, secured and sustainable energy supply in the country to one; meet the energy demand of its growing population; two, achieve economic growth which will ensure prosperity for all citizens, peace and stability in the country. However, achieving this requires effective energy supply and security policies and being a former colony of the United Kingdom (UK), Nigeria being a former colony of the UK should arguably be following the good practices of the UK including on formulation and implementation of energy policies. Therefore, the main aim of this paper is to evaluate the effectiveness of Nigeria's and UK's past energy policies on energy supply. This is section one of the paper; the next section which is literature review is section two; methodology of the research is section three, results from the study and its discussions are section four while conclusions and policy implications of the study is section five.

2. Literature Review

2.1 Conceptual Issues

The goal of undertaking this conceptual literature review is to describe concepts relevant to this study and outline relationships if any between them (Frederiksen, Phelps, & Kimmons, 2018).

2.1.1 Energy Policies

Energy policy encompasses rules relating to energy sources, energy efficiency, energy prices, energy infrastructure, and issues dealing with climate and environmental aspects of energy production, transportation and utilization (Tosun, 2022). Similarly, energy policy has been described as the regulator and controller of energy development that serves as a guiding tool at the macro level and a management tool at the micro level to enable the public and the private sectors to adjust the relationship between the energy system and the socioeconomic/environmental systems (Liu, 2015). Energy policy is also looked at as involving interventions in the various sectors of energy such as

coal, electricity, oil and gas, as well as nuclear and renewable energy, and all other activities aimed at improving energy efficiency in supply and consumption (Prontera, 2009). Likewise, energy policy is regarded as a subset of economic, foreign, national and international security policies. In the traditional sense, energy policy is about the security of energy supply, its affordability, and limited impact on the environment. Thus, energy policy should focus on reliability, affordability, and environmental soundness of energy (Kohl, 2004). Energy policy is said to be a cross-sectoral or cutting across multiple boundaries; thus, it is affected by decisions taken in other policy domains and it also affects decisions taken in its domain. This cross-sectoral character of energy policy is reflected in how it is proposed, adopted, implemented, and evaluated. In undertaking analysis of any energy policy, the source of energy of interest to the domain being analysed must be taken into consideration. Within the context of this study energy policy denotes all efforts put in place by the UK and Nigerian governments to provide energy for their citizens 1971-2020.

2.1.2 Energy Supply

Energy supply is the quantity of available energy that suppliers can provide to end users (Hasanuzzaman & Kumar, 2020). Energy supply is also seen as the delivery of fuels or transformed fuels from point of production to point of consumption. Therefore, energy supply potentially involves the extraction, transmission, generation, distribution and storage of fuels. Energy is behind the developments experienced in all facets of human life over the past decades and having secure and accessible supply of energy is crucial for the sustainability of modern societies. Historically, the discovery of fossil fuels in their various forms, have been the main source of energy that supplied 87.90% of global total energy in 1973 (Asif & Muneer, 2007; International Energy Agency, 2021). However, concerns about global warming sequel to the use of fossil fuels, these sources of energy are considered environmentally unfriendly and are even unsustainable as they are not replenishable. Thus, the contribution of fossil fuels to global energy supply has reduced to 85.90% as at end of 2019. Conversely, the contribution of renewable sources

of energy increased to 14.10% as at end of 2019 against 12.10% in 1973 (IEA, 2021). Within the context of this study sources of energy supply are considered as all available energy sources to the UK and Nigeria.

2.2 Theoretical Framework

Public policy is about laws, regulations, procedures and administrative actions of governments and institutions that affect members of the public. Consequently, good or bad policies produced by governments and institutions normally affect the public; hence analysis of the policies of government and institutions referred to as public policy analysis is appropriate in establishing whether such policies are good or bad. Analysis of public policy is undertaken by evaluating the policies which could take one of four forms namely; one: formative, process, outcome or impact evaluations. Impact evaluation is about assessing the effectiveness of a programme in achieving its ultimate goals (Centre for Diseases Control and Prevention, 2015). Drawing from the fourth category of evaluation, this study descriptively evaluates the impact of Nigerian and UK governments' policies in their energy sectors towards ensuring adequate energy supply. Therefore, public policy analysis framework underpins the conduct of this study.

2.3 Empirical Review

Jonek-Kowalska (2022) assessed the effectiveness of energy policy implementation in 11 countries of the Central and Eastern European region. To undertake the evaluation, multi-criteria analyses of environmental, energy resource, economic and energy security were carried out for period of 21 years. The effectiveness of the policies is assessed as the degree to which the 2 key goals of environment and the level of energy independence provided in the energy policies are achieved. The study assumed that a higher average share of renewable sources means higher effectiveness of achieving energy policy targets and the higher the average share of non-renewables, the lower the effectiveness of energy policy. Results from the study revealed low level of implementation of environmental objectives in the analyzed countries and an average advancement of energy transformation in most of them. Consequently, result from the study is suggesting that

the most effective path of energy transformation is through the diversification of energy mixes achieved through the abandonment of non-renewable resources and their simultaneous replacement by hydropower and nuclear energy.

Peng AND Zheng (2021) conducted a study on the impact of green finance on energy efficiency and the intermediary effect of green technology innovations in achieving energy efficiency which is part of energy policies. To conduct the study, data on provincial economic development is obtained from the Statistical Yearbook of China and Statistical Yearbook of the sampled Provinces, provincial energy and environmental data is obtained from China Energy Statistical Yearbook and Environment Statistical Yearbook of China. Data on provincial financial data is obtained from China Financial Statistical Yearbook and China Insurance Yearbook while data on Chinese green patents come from the China Patent database, which is published by the National. After merging data sets a panel dataset of maximum of 510 province-year observations from 30 provinces/regions is obtained 2001 to 2017. Stochastic frontier analysis method was used to measure the energy efficiency of the sampled China's provinces 2001 to 2017. Results from the study revealed that green finance can significantly improve energy efficiency especially in provinces with rich resource endowments, high levels of economic development, and high degree of marketization. Likewise, Green finance can improve energy efficiency through the development of new energy technologies and disruptive green innovation, which provides important supports for formulating policies to optimize energy structure and improve energy efficiency.

Bertoldi (2022) conducted a study on policies for energy conservation and sufficiency that may be in agreement with the Paris Agreement (PA) in OECD countries by reviewing existing policies on energy conservation which is an important component of energy policy. Consequently, the study analyzed energy efficiency, energy conservation and energy sufficiency, barriers to energy efficiency, classification of energy efficiency policies, policies to address energy conservation, sufficiency and life style change,

information and communication instruments, energy and carbon taxes, and personal carbon allowances. The study contends that understanding these and coming up with policies that incorporates them may foster energy sufficiency and energy conservation, in the selected OECD countries. The study recommends that citizens should reduce their energy demand to a level that provides a decent living standard for all compatible with the Paris agreement goal. Similarly, there should be policies on personal or building (or organizations) carbon or energy allowances; energy saving feed-in tariff; progressive building codes and appliance standards.

Oduro, Gyamfi, Sarkodie and Kemausuor (2019) conducted a comparative study of the renewable energy policies of Ghana compared to South Africa and Morocco as both countries have been putting in place numerous policies to improve the uptake of renewable energy for electricity production and to ensure efficient use of electrical energy. To do this, the policy objectives of the various policies are matched against policy instruments and outcomes to assist in measuring what has been achieved. Results from the study on Ghana in particular revealed the existence of problems of policy implementation affecting grid and off-grid solar PV generators and the existence of barriers to renewable energy development in Ghana. Conversely, Morocco and South Africa have increased their renewable energy sector capacities, these are investigated for possible lessons to Ghana. The Government of Morocco has instituted regulations and laws to promote the utilization of renewable energy such as the National Renewable Energy and Energy Efficiency Plan launched in 2008. Established policies enabled Morocco to increase its renewable energy target from 10MW to 50MW. In South Africa also, governments have put in place policies to enhance renewable energy utilization such as the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP).

2.4 Comparison of Evolution of UK and Nigerian Energy Policies

The discovery of significant reserves of oil and gas in the North Sea in 1960's launched the UK into the rank of oil and gas resource rich countries. This discovery

enabled UK to become energy self-sufficient for some decades before becoming net importer again in 2004. The country is also endowed with renewable energy resources mainly from Onshore and Offshore winds; ground source heat pumps, air source heat pumps, biomass electricity and biomass heat (Soares, 2012). In 1700s, Great Britain as it is known then, promoted coal transport which brought down freight rates for coal making it available and affordable to citizens and this mark the beginning of formulating energy policies in the UK (Lepoutre, Tardieu, Woussen, & Molho, 2015). Consequent to providing the first street lighting in UK in 1881, privately sponsored Bills into the Parliament resulted in enacting the Electric Lighting Act in 1882 as the first legislative energy policy paving ways for subsequent policies.

Oil and gas were also discovered in Nigeria in 1958 and by early 1970's the country has become a net energy exporter. The first public electricity in Nigeria was put into use in 1898 and to uniformly manage the supply of electricity, the Nigerian Electricity Supply Company (NESCO) was established in 1929. This is perhaps the first energy policy in Nigeria which heralded subsequent policies. Therefore, while the UK started enjoying public electricity in 1881, Nigeria started enjoying it in 1898 that 17 years apart. Consequently, this study looked into developments of energy policies in the UK and Nigeria into four periods; first 1870 – 1949 referred to era of energy generation; second, 1950 – 1979 energy efficiency period, third 1980 to 1999 as energy market liberalization era and fourth, 2000 to 2020 as the era of conflicting interest between energy demand and environmental concerns (Werf, 2005).

First Period 1870 – 1949 (Energy Generation Era)

The electric lighting act 1882 was legislated to facilitate and regulate the procedures for the establishment of the electricity generating and supply industry in the Great Britain and Ireland. The Act allowed both public authorities and private companies to lay underground cables and erect overhead cables and to safeguard public interests; the local authority had the option to purchase private undertakings after 21 years of operation. However, the 21-year purchase option period was not sufficient to provide a satisfactory return to investors

which negatively affected capital investments and supply of electricity. Similarly, the act is embedded with patchwork of monopolies. To facilitate adequate investments and supply of electricity, the 1888 electric lighting act was enacted amending the 1882 act (United Kingdom, 2022). To reconstruct UK after the First World War, nationalization of the electricity industry was recommended, and the Electricity Supply Act (ESA) 1922 was enacted which established a five-member Electricity Commission (EC) that oversaw the nationalization program. To give the EC the needed financial power to discharge its responsibility, the Electricity Supply Act 1926 was enacted which established the Central Electricity Board [CEB] (ESA, 1926). Subsequently, the Electricity Supply Act 1935 was enacted authorizing CEB to make arrangements with authorized electricity undertakers for the purpose of ensuring adequate supply (United Kingdom, 2022).

To further strengthen the UK electricity industry, the Electricity Act was enacted in 1947 which nationalized 505 separate electricity generation and supply organizations in the Great Britain and brought them under 12 Area Boards. The act also provided for the establishment of British Electricity Authority (BEA) or Central Electricity Authority (CEA) and Area Electricity Boards (AEB). Thus, the 1947 electricity act represents the major parliamentary instrument that nationalized the UK electricity industry and is followed by the 1957 Electricity Act (United Kingdom, 2022). This means that eight acts were enacted in the UK energy sector to address issues of energy supply and other related issues. Conversely, over this period of time, Nigeria put in place the Nigerian Electricity Supply Company (NESCO) was established in 1929 to uniformly manage the supply of electricity in the country. Then, the Nigerian Government Electricity Undertaking (NGEU) was established in 1946 as an arm of the Public Works Department to take over the assets and liabilities of electricity supply in Lagos (Awosope, 2014). Thus, these are the only two policy efforts towards addressing energy supply in Nigeria over this period. Therefore, while eight acts as policy instruments were enacted in the UK energy sector to address issues of energy supply and other related issues, only two

policy actions were put in place to address energy supply in Nigeria.

Second Period 1950 – 1979 (Energy Efficiency Period)

The 1957 electricity act provided for the establishment of a Central Electricity Generating Board (CEGB) and an Electricity Council (EC) that retains all the powers and functions of CEA; provided for the establishment of 12 Electricity Consultative Councils (ECCs). As further efforts to ensuring adequate energy supply in the UK, the world's first civil nuclear power station was commissioned at Calder Hall Windscale, England, in 1956. To enhance the financial capacities of EC's, EB's, GC and the Area Boards, the Electricity and Gas Act 1963 was enacted which was followed by the Gas and Electricity Act 1968 (United Kingdom, 2022). Following the Arab-Israel conflict and oil embargo of 1973, to ensure energy sufficiency and security the UK parliament enacted the Fuel and Electricity control Act 1973. Then the Energy Act 1976 was enacted for regulations, supply or use of crude liquid petroleum, natural gas and petroleum products. As a buildup measure on energy supply, the UK parliament enacted the Nuclear Safeguards and Electricity (Finance) Act 1978 (United Kingdom, 2022). Hence, five energy acts and ten statutory instruments were also put in place to enhance energy supply and efficiency in the UK 1950 - 1979.

During this span of time, the Federal government established Electricity Corporation of Nigeria (ECN) in 1950 taking over the assets of NESCO and vested with the responsibility of running electricity generating stations. This is followed by an Act of the parliament establishing the Niger Dam Authority (NDA) in 1962 saddled with the responsibility of constructing and maintaining hydroelectricity Dams in the country. Under this authority, the construction of Kainji Dam which started in 1962 was completed in 1968. It is through the collaborative efforts of NDA and ECN that electricity supply was interconnected through the national grid such that the entire existing thirty states and Federal Capital Territory (FCT) of Abuja are today connected to the national grid (Awosope, 2014). In 1972, an act establishing the National Electric Power Authority (NEPA) was enacted bringing the duties and

responsibilities of ECN and NDA under this Authority (National Electric Power Authority Act, 1972). Thus, Nigeria put in place only three policies on energy supply over the period 1950-1979. Therefore, while the UK put in place five energy acts and ten statutory instruments 1950 – 1979, Nigeria had only three.

Third Period 1980 to 1999 (Energy Market Liberalization Era)

The government enacted the Energy Act 1983 which liberalized the energy market by facilitating the generation and supply of electricity by persons other than Electricity Boards, and for certain other purposes all aiming at ensuring energy supply sufficiency. To further enhance energy supply, security and liberalization of the sector, an act that put the finances of the United Kingdom Atomic Energy Authority (UK AEA) on a trading fund basis referred to as the Atomic Energy Authority Act 1986 was enacted. Perhaps, consolidating the gains of liberalization achieved under the 1983 and 1986 acts; the Electricity Act 1989 was enacted. The 1989 Electricity Act provided for the privatization of electricity in the UK by making provisions for the appointment and functions of a Director General of Electricity Supply and of consumers' committees for the electricity supply industry (United Kingdom, 2022). Therefore, three energy acts and forty policy instruments were put in place in the UK energy sector dwelling on liberalizing the sector for enhanced supply. Conversely, Nigeria has put in place any policy in its energy sector 1980-1999.

Fourth Period 2000 to 2020 (Era of Conflicting Interests)

The Electricity (Miscellaneous provision) Act 2003 further broadened the privatization drive of the UK energy industry. This is followed by the Energy Act 2004 providing for activities relating to the civil nuclear industry for electricity generation among others. The Energy Act 2006 followed to purposely enhance the United Kingdom's contribution to combating climate change. Subsequent legislation was the energy act 2008 making provisions among others on matters relating to gas importation and storage. The Energy Act 2010 was enacted emphasizing on modern technologies of carbon capture and storage was enacted (United Kingdom,

2022). The 2011 Energy Act focusing on energy efficiencies, security of supplies, and generation of electricity from renewable sources was enacted. Subsequently, the 2013 energy Act was enacted making provisions for reforming the electricity market to encourage low carbon electricity generation among others. The Energy Act 2016 further deregulates the UK oil and gas industry as a major source of energy (United Kingdom, 2022). Thus, eight energy policy acts were enacted 2000-2020 in the UK.

Conversely, in Nigeria, the country launched the National Integrated Power Projects (NIPP) designed to establish seven medium-size gas fired power stations in the gas producing states were put in place in 2004 (Ade, 2022). Similarly, the Renewable Energy Master Plan aimed at achieving 10% renewable energy contribution to the national energy supply was launched in 2005. Then, the Electric Power Sector Reform Act 2005 created the Power Holding Company of Nigeria (PHCN) aimed at privatizing the energy sector resulting in unbundling of PHCN into 18 different companies composed of 6 Generating Companies (GENCOs), 11 Distribution Companies (DISCOs) and 1 transmission company referred to Transmission Company of Nigeria. This is followed by the Nigeria Electricity Regulatory Commission (NERC) established in 2005; thus, Nigeria had four policy efforts in its energy sector 2000-2020. Therefore, while the UK had eight energy policy acts enacted in its energy sector 2000-2020, Nigeria had only four policy efforts in its energy sector in the same period of time.

3. Methodology

The approach utilized in the process of conducting research which involves body of methods is referred to as methodology (Collis & Hussey, 2014).

3.1 Research Design

The overall strategy and analytical approaches chosen by a researcher to integrate in a coherent and logical way, the different components of the study thereby ensuring that the research problem will be thoroughly investigated is referred to as research design (University of South Carolina, 2023). This research is designed as an exploratory research which is aimed at descriptively getting an insight and familiarity on the influence of

formulated energy policies on energy supply in the UK and Nigeria 1971-2021.

3.2 Data and Sources

This study is evaluating energy policies on energy supplies in Nigeria and UK; therefore, within the context of this study, per capita energy consumption in Nigeria and UK 1971-2020 is the proxy of energy supply. The argument of using per capita energy consumption is that consumption can only take place if there is supply; thus, the consumption is invariably indicating supply and this could perhaps be indicating the effectiveness of formulated and implemented energy policies. The data is collected from the data base of World Bank 1971 to 2014 and from Index Mundi 2014-2020. The period 1971-2020 is used due to availability of complete data on all the variables for the two countries.

3.3 Method of Data Collection

The method of data collection for this study is by means of collecting soft copies of all energy policy Acts and documents in the UK and Nigeria 1971-2021. These collected documents are read thoroughly to understand what they are meant to achieve which in most cases succeeding policies are put in place to address the shortcomings of preceding policies. Similarly, data on

per capita energy consumption which are meant to signify the effectiveness of the formulated policies are collected. Both the energy policies enacted and the per capita energy consumption are divided into four periods for better comprehension of the collected data and its analysis.

3.4 Method of Data Analysis

Collected data on energy policies are descriptively analysed under the four periods these policies were divided while per capita energy consumption in UK and Nigeria 1971-2021 corresponding to the four periods are analysed by means of descriptive statistical tools of analysis in form of graph charts and tables showing the trends of the per capita energy consumption. In this way, increase in per capita energy consumption in a period is signifying the effectiveness of formulated policies. While decreasing per capita energy when policies are put in place for more energy supply is perhaps indicating the ineffectiveness of formulated policies.

4. Results and Discussion

This section presents results obtained by the study in form of trends of per capita energy consumption in the UK and Nigeria 1971-2021.

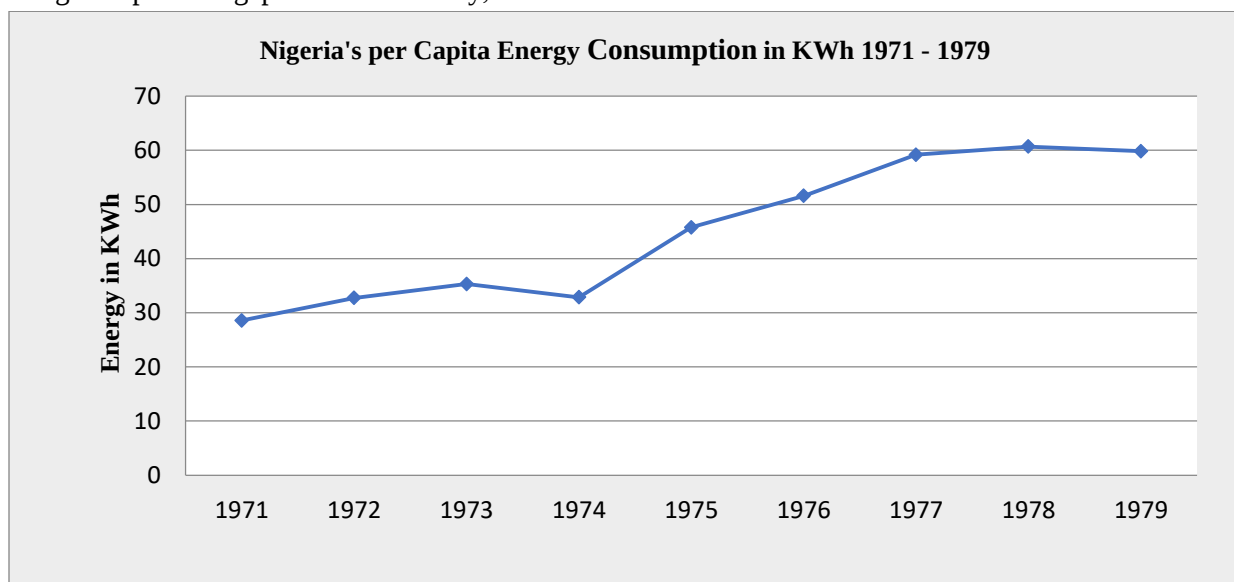


Figure 1 Energy Consumption per Capita (KWh) in Nigeria 1971 - 1979

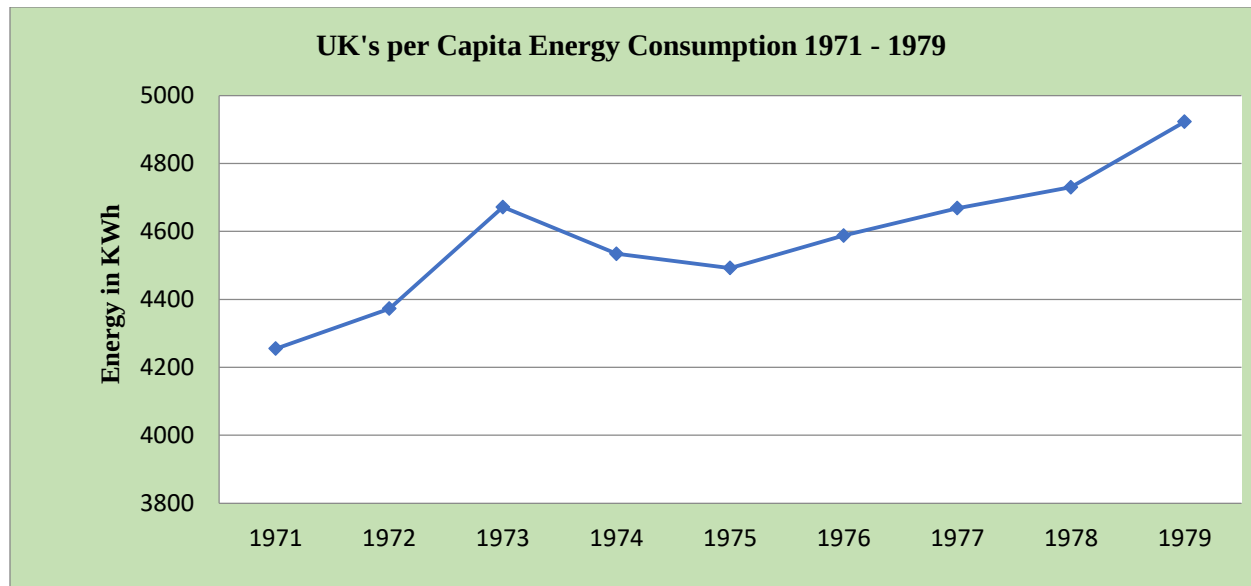


Figure 2: Energy Consumption per Capita (KWh) in UK 1971 - 1979

Energy consumption per capita in Nigeria in 1971 is just 29KWh while for the corresponding period it is 4,255KWh in UK. In 1971, Nigeria's population is over 57million people while UK's population is over 55million, although UK was an industrialized nation per capita energy of only 29KWh in Nigeria is too meager. Energy consumption per capita in Nigeria began to rise from 29KWh in 1971 to 33KWh in 1972 and 35KWh in 1973 while for the corresponding years in UK are 4,373KWh and 4,672KWh respectively. The sharp increases in 1973 in both countries could be attributed to increasing tensions that culminated in the late 1973 Arab-Israel conflict in the Middle East which is one of the major global sources of energy supply. Energy consumption per capita as an indicator of supply decreased in 1974 in both countries which may be attributed to the global energy shock although supplies in Nigeria is grossly low compared to UK at 33KWh and 4,534KWh respectively. Supplies denoted by per capita consumption then began to rise up 1975 to 1979 in both countries.

Per capita energy consumption in Nigeria was 46KWh in 1975, 52KWh 1976, 59KWh in 1977, 61KWh in 1978 and 60KWh in 1979. Energy consumption per capita in UK was 4,492KWh in 1975, 4,588KWh in 1976, 4,668KWh in 1977, 4,730KWh 1978 and 4,923KWh in 1979. Despite increasing

population and economic activities in Nigeria 1971 to 1979 which should have stimulated energy consumption (Ibrahiem, 2017) consumptions are very low on the overall. Within this time frame, only four energy policies were formulated in Nigeria and perhaps, this lack of adequate policies on energy supply 1971 – 1979 resulted in the paltry increases in per capita energy consumption in the country. This is consistent with Nigeria's position on global ranking of countries on energy consumption ranging 64th to 68th over the period (The Global Economy, 2019). On the other hand, perhaps realization of policy makers in the UK of the significant role of energy in sustaining the country's economic growth (Destek, & Okumus, 2017) and satisfying energy needs of its increasing population (Ibrahiem, 2017) resulted in the formulation and implementation of thirteen energy acts from 1882 to 1979. Similarly, ten policy instruments were put in place in the sector over this period of time. Formulation and implementation of these energy policies could be contended as the main drivers to the high energy per capita supplied and consumed in the country 1971 to 1979. This is perhaps confirmed by UK's position among the global ranking of top 20 energy consuming countries. Figures 3 and 4 are on per capita energy consumption in Nigeria and UK 1980 to 1999.

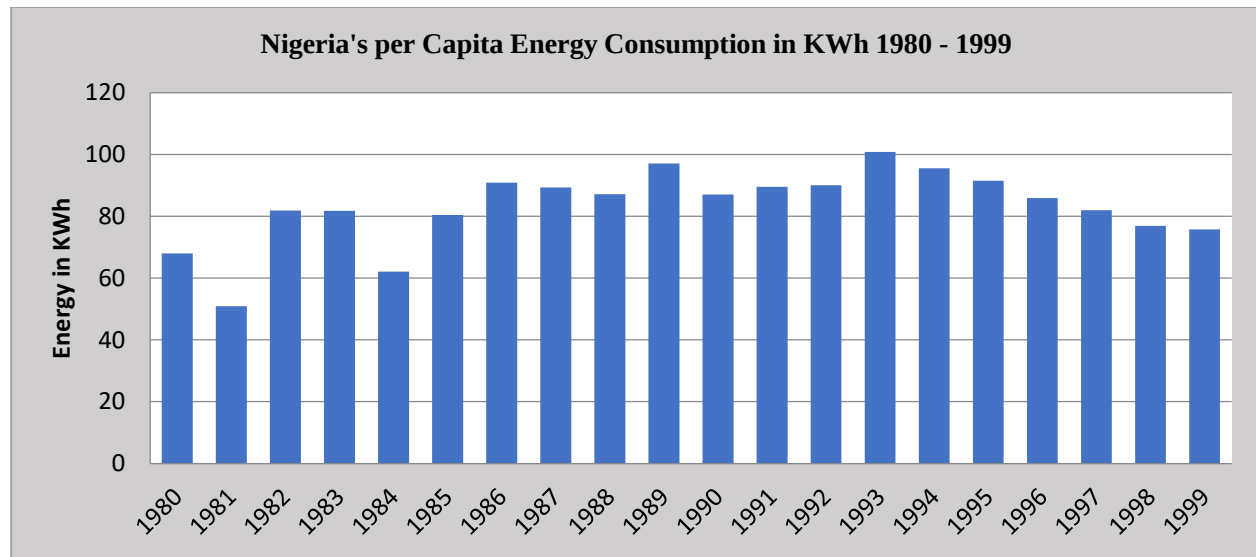


Figure 3: Energy Consumption per capita (KWh) in Nigeria 1980 - 1999

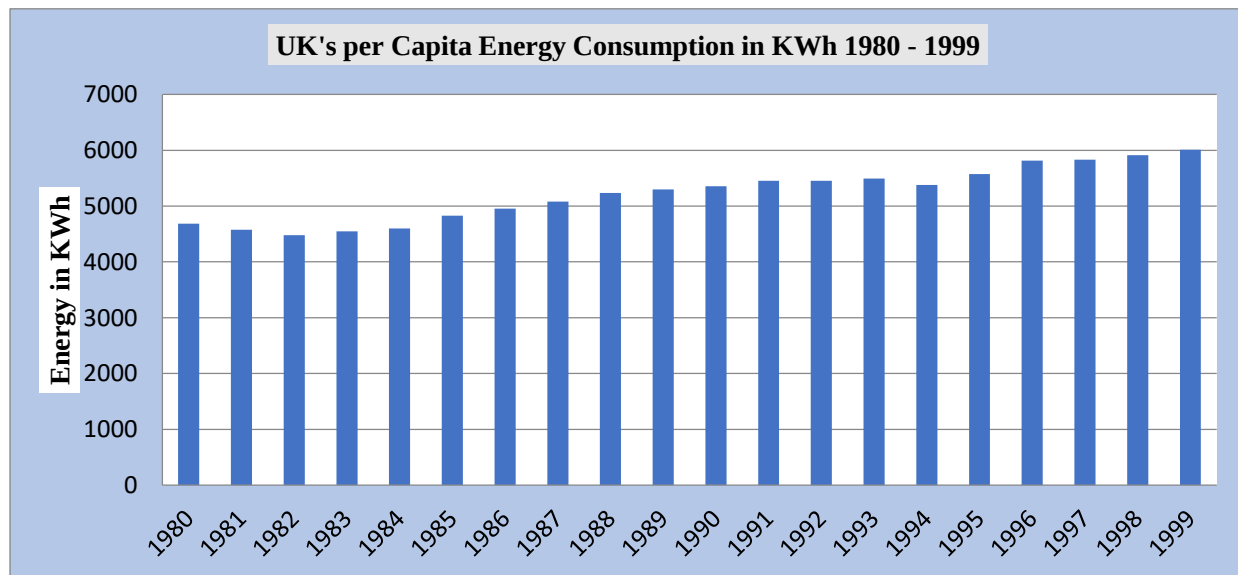


Figure 4: Energy Consumption per Capita (KWh) in UK 1980 - 1999

Energy consumption per capita in Nigeria as shown in Figure 5.3 was on fluctuating trends 1980 to 1999 despite the increase in population and economic activities which should have translated to more energy consumption (Ekeocha, Penzin, & Ogbuabor, 2020). It was 68KWh 1980, 51KWh 1981, 82KWh 1982, 82KWh again in 1983 falling down to 62KWh in 1984. Consumption per capita then rose to 80KWh in 1985, then to 91KWh in 1986, falling down to 89KWh in 1987, further falling to 87KWh in 1988 and rising to 97KWh in 1989. Supplies of energy measured by per capita consumption sharply dropped to 87KWh in 1990,

increasing to 90KWh in 1991 and 1992, and then increased to 101KWh in 1993 and dropping down to 96KWh in 1994. Consumed energy per capita in Nigeria continued to decrease in 1995 to 91KWh, 86KWh in 1996, 82KWh in 1997, 77KWh in 1998 and 76KWh in 1999. From 1980 to 1999 no single act was formulated in the Nigerian energy sector with a view to addressing the acute energy supply shortage in the country. Conversely, energy consumption per capita in the UK in 1980 was 4,684KWh decreasing to 4,573KWh in 1981 and 4,480KWh in 1982; then, started increasing to 4,549KWh in 1983 and 4,598KWh in 1984.

Consumption of energy per capita as an indication of adequate supply kept rising in the UK to 4.827KWh in 1985, 4,954KWh in 1986, 5,082KWh in 1987, 5,233KWh in 1988 and 5,295KWh in 1989. Similarly, 1990 to 1994, per capita energy consumption was on the rise; 5,357KWh in 1990, 5,452KWh in 1991, remaining constant in 1992, then, increasing to 5,492KWh in 1993 and slightly decreasing to 5,380KWh in 1994. Energy consumption per capita in UK steadily increases 1995 to 1999; it was 5,576KWh in 1995, 5,816KWh in 1996, 5,832KWh in 1997, 5,909KWh in 1998 and 6,007KWh in 1999.

Therefore, it could be noted that energy consumption per capita in Nigeria 1980 to 1999, do not perhaps showed encouraging supply of energy that could have resulted in increasing per capita energy

consumption as the country do not formulate any act on energy during the period. This is confirmed by the country's best position of 66th to worst position of 96th in global ranking of countries on energy consumption over this period (The Global Economy, 2019). However, per capita energy consumption kept increasing in the UK perhaps due to enactment of three acts and forty policy instruments put in place in the country. The country maintained excellent positions from 21st to 30th among global ranking of energy consuming countries and it could be argued that this coming at a period when energy efficiency measures have started yielding results in the country (The Global Economy, 2019). Table 1 is on per capita energy consumption of Nigeria and UK 2000 to 2020.

Table 1: Nigeria and UK per Capita Energy Consumption (KWh) 2000 - 2020

Years	Nigeria	UK
2000	74	6,115
2001	76	6,142
2002	105	6,143
2003	102	6,175
2004	124	6,139
2005	129	6,271
2006	112	6,201
2007	139	6,102
2008	127	6,016
2009	121	5,643
2010	136	5,701
2011	150	5,472
2012	157	5,449
2013	143	5,410
2014	145	5,130
2015	118	4,808
2016	124	4,732
2017	129	4,657
2018	134	4,552
2019	121	4,749
2020	115	4,701

Source: This Study

From table 1, energy consumption per capita in Nigeria in 2000 was down to 74KWh from 76KWh consumed in 1999; then, moving back to 76KWh in 2001;

consumption increased to 105KWh in 2002, coming down to 102KWh in 2003 and improving to 124KWh in 2004. Consumed energy per capita then increases to 129KWh in 2005, coming down to 112KWh in 2006,

increasing to 139KWh in 2007, then decreases to 127KWh in 2008, again decreasing in 2009 to 121KWh. Nigeria's per capita energy consumption showed progressive increases to 136KWh in 2010, 150KWh in 2011, and 157KWh in 2012, sliding to 143KWh in 2013, then improving to 145KWh in 2014. In 2015, Nigeria's per capita energy consumption further slide to 118KWh, improving to 124KWh in 2016, 129KW in 2017 and 134KWh in 2018. Energy consumption per capita is 121KWh in 2019 declining to 115KWh in 2020. On the other hand, over the same period, UK's per capita energy consumption was 6,115KWh in 2000, increasing to 6,142KWh in 2001, further increasing to 6,143KWh in 2002, and 6,175KWh in 2003 before sliding down to 6,139 in 2004. In 2005, UK's per capita energy consumption increases to 6,271KWh, then kept on sliding down to 6,201KWh in 2006, 6,102KWh in 2007, 6,016KWh in 2008 and 5,643KWh in 2009. Energy consumption per capita kept going down in UK to 5,701KWh in 2010, 5,472KWh in 2011, 5,449KWh in 2012; 5,410KWh in 2013 and 5,130KWh in 2014. Energy consumption per capita in UK showed further slides in 2015 to 4,808KWh; then to 4,732KWh in 2016; 4,657KWh in 2017 and 4,552KWh in 2018.

Total per capita energy consumption in 2019 is 4,747KWh declining to 4,701KWh in 2020. Thus, energy consumption per capita in Nigeria showed fluctuating trends 2000 to 2020. Similarly, energy supply in the UK has been steadily declining 2006 to 2020 despite steady growing economy and increasing population over the same period. The most widely advanced reasons for UK's declining energy consumption are energy efficiency technologies in household appliances and industrial machines and declining heavy manufacturing activities (United Kingdom, 2022). This is perhaps pointing to the success of UK's past energy policies that emphasizes on achieving energy efficiency. From 2000 to 2020 only one energy policy act was enacted in Nigeria while six energy policy acts forty-three policy instruments were put in place in the UK. Therefore, policy makers in Nigeria have not paid attention to formulation of policies that could have guided the country towards achieving adequate energy supply. Thus, the country's position

among global ranking of energy consuming countries ranges 93rd to 105th (The Global Economy, 2019). Conversely, the six energy policy acts and forty-three policy instruments enacted in UK 2000 to 2018 could be argued as drivers for the levels of energy consumed. This is perhaps confirmed by the country's positions of 25th to 40th among global ranking of countries on energy consumption (The Global Economy, 2019). Although range of these positions could be indicating low energy consumption, this could be attributed energy efficiency. Subsequent section six is conclusion of the study and its policy implications.

5. Conclusions and Recommendations

This section draws conclusions on the study and its possible policy implications which may be found useful by policy makers in Nigeria and the UK. Per capita energy consumption in Nigeria is among the worst globally despite its huge reserves of energy resources. From 1898 to 2020 only six acts were enacted to solve the country's acute energy supply shortage. Hence, it may be concluded that lack of adequate policies in the Nigerian energy sector is a key reason for the acute shortage of energy supply. The UK is among top energy consuming countries although its consumption over the last decade is declining due to energy efficiency still total of twenty-two acts and ninety-three policy instruments on energy supply, security and efficiency are put in place 1882-2020. Therefore, it could be concluded that adequate energy supply in the UK despite being a net energy importer was consequent to establishment of efficient energy policies. The policy implications of this study include the need for policy makers in Nigeria to focus on formulating and conscientiously implementing policies that will ensure adequate energy supply while tackling other problems in the sector. Similarly, copying from UK, the policies must be put in place on regular basis to be addressing observed lapses in existing policies. Likewise, policy makers should ensure that policies to be formulated are pragmatic enough to ensure efficient utilization of all viable energy resources available in different parts of the country for a robust energy mix. Provision of adequate energy supply will undoubtedly serve as a catalyst to the

economic growth of the country, ensure good standard of living for its growing population and bring more

peace and stability in the country.

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