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# **An inquiry into the political economy of the global clean energy transition policies and Nigeria's federal and state governments' fiscal policies**

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**Abstract:** In order to implement clean energy transition programmes, the national and sub-national governments in Nigeria will incur some cost. In the same way, failure to implement the policies will come with some costs. This paper therefore considers the fiscal policy implications of Nigerian governments' implementation of clean energy transition policies in the country. The analysis also reveals that the observed reluctance of Nigerian governments in implementing the policies is obviously unconnected with their dependence on oil revenues. The paper further presents the fiscal policy implications of Nigerian governments' inaction even when other countries implement their clean energy transition policies.

**Keywords:** fossil fuel, clean energy, federal government, state governments, fiscal policies, fiscal shocks

**JEL classification:** H50, H72, Q38, Q42

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## 1 Introduction

There is currently a common problem facing all economies of the globe—developed and developing economies alike. The problem can only be solved by the collective efforts of the nations of the globe. In the views of the European Renewable Energy Council (EREC) (2004), climate change is the major challenge to sustainable development worldwide. Climate change manifests in various forms and affects various aspects of each of the economies. The effects of climate change propelled the United Nations (UN) to convene a summit that discussed the implications of the issue of climate change and how best to tackle the problem. The resolution of the summit is today referred to as the Kyoto Protocol to the UN Framework Convention on Climate Change (UN 1998).

It is true that the protocol stipulates some specific objectives targeted at reducing the prevalence of climate change within a set amount of years. However, it is also clear that not all those objectives can be achieved within the set-time without profound commitments of the national governments that make up the UN. For instance, EREC (2004) recognizes that one of the key tasks faced by all the national governments in mitigating climate change is a profound transformation of the current energy system over the next few decades, replacing fossil fuels with renewable energies, and dramatically increasing energy efficiency. This implies that the national governments are challenged to create a future energy/environment policy in order to react to the need of sustainable development and adequate economic growth.

However, practical experience shows that the actual level of commitment to the implementation of the Kyoto Protocol may vary significantly from the required level of commitment. Some such deviations are seen from the point of economies that depend more on fossil fuel for energy and revenue. To such economies, moving away from the use of fossil fuel means reduction in their current revenues and that may come with overbearing consequences on the national governments.

Nigeria is one of the UN member states that signed the Kyoto Protocol. It is also one of the developing economies that depend significantly on revenues from fossil fuel. The prominent place of revenue from crude oil in Nigerian national government can be seen in the proportion of its annual revenues that comes from oil revenue. As statistical figures from Central Bank of Nigeria (CBN) (2012) shows, the contribution of oil revenue to Nigeria's total federally collected revenue oscillated between 60 and 70 per cent per annum in the early 1980s. There was an astronomical growth in the contribution of oil revenue to total federally collected revenue in mid-1980s, and the trend was sustained up to mid-1990s. Within this decade of continuous growth in the contribution of oil revenue to total government revenue in Nigeria, the proportion of oil revenue contribution to total revenue stood at an average of 75.5 per cent. However, the contribution reached an all-time peak of 88.6 per cent of total revenue in 2006 and maintained a prominent place since then. Even the figure presented by CBN (2013) does not mean much deviation from the status quo. According to the figure, about 30 per cent of total federally collected revenue came from non-oil sources, implying that oil revenue still contributed to about 70 per cent of total federal government's revenue in 2013.

Given this level of dependence of the government of Nigeria on oil revenue, it becomes imperative to enquire into the willingness and implications of their implementing the Kyoto Protocol. Eleri et al. (2013) observed that the federal and state governments in Nigeria have outlined several policies and programmes in response to the achievement of clean energy policies. However, the scholars also observed that there is a general lack of capacity or political will to implement the outlined policies and programmes. Some of the policy documents like the

Renewable Energy Master Plan and the National Energy Policy are yet to receive legislative attention or presidential endorsement. Although the National Policy on Climate Change and Response Strategy (NPCC-RS) was approved in 2015, implementation has yet to take place.

Many developed and developing countries are fast transitioning to clean energy. For example, countries in North America imported a total of 3.083 million barrels of refined petroleum products per day in 2005, but with emphasis on clean energy transition, the countries imported only 1.678 million barrels per day as of 2012. This means that their petroleum energy imports reduced by almost 50 per cent between 2005 and 2012. On the contrary, Nigeria imported a total of 154,324 barrels of refined petroleum products per day in 2005, and increased to 180,921 barrels per day in 2012—17 per cent increase. On the other hand, countries in North America consumed 276.675 thousand barrels of bio-fuels per day in the same 2005, but increased the same to 941.86 thousand barrels of bio-fuels per day as of 2012 (EIA 2015). Therefore, the decline in petroleum energy imports may not be attributed to reduction in total energy needs of the countries in North America, but a function of a shift from fossil fuels to bio-fuels due to investment in clean energy sources. The same trend is observed in energy imports of other developed regions of the world. This explains why a sharp decline in global market oil prices of 2014 until now is attributed to a shift in energy demand from fossil fuel to clean energy sources.

On this ground, it is not out of place to wonder what could be the factors behind the lack of political will needed to implement the energy policies and programmes outlined by the federal and state governments in Nigeria. It is therefore pertinent to ask some critical questions and investigate the situation properly.

- One of the necessary questions to ask has to do with how prepared governments in Nigeria are to handle the fiscal shocks that will be associated with the implementation of clean energy transition policies.
- Another pertinent question has to do with the implication of deciding not to implement the clean energy transition policies especially when other national governments are fast implementing policies.

Therefore, this working paper hopes to provide evidence-based answers to the questions posed above. This entails critically reviewing the various policy and programme documents, gathering available documents that show the extent of implementation, and showing how the nature of the policies could be the impediment to implementation of the policies and programmes as outlined. The paper further seeks answers to the other question that enquires into the preparedness/readiness of the Nigerian federal and state governments with respect to handling the fiscal shocks that may be associated with clean energy transition along with the implications of the preparedness or otherwise of Nigerian governments, especially as many national economies are fast investing in Research and Development (R&D) targeted at hastened transition of global economies to clean energy so as to mitigate the effects of climate change.

As such, it is clear that the success of the implementation of the Kyoto Protocol depends critically on the readiness and willingness of national governments. Without such readiness and willingness, the convention will be mere paper work that is not translated to any sustainable development of the global environment. Therefore, this paper helps to reveal the extent of readiness of the Nigerian government. Moreover, we aim to show Nigerian governments the necessary steps to take in implementing their clean energy policies without having adverse effects on their fiscal policies.

## 2 Literature review

This section is devoted to reviewing the various literature arguments that exist in the area of clean energy transition on one hand, and global/national political economy on the other. The section starts with the theoretical arguments before proceeding to the empirical ones.

### 2.1 Conceptual issues

#### 2.1.1 *Concept of climate change*

Climate is the average weather in terms of its mean and variability over a certain period of time and a given area (IPCC 2001). When there are significant changes in these major climate variables, climate change occurs. It is also referred to as global warming. The concept of climate change has been viewed by different researchers in different ways. According to the IPCC (2007) Fourth Assessment Report, 'climate change is a change in the state of the climate that can be identified from changes in the mean and/or the variability of its properties persisting for a long period usually for decades or longer'. Adejuwon (2006) defined climate change as 'observed changes in climate caused directly or indirectly by human activities, changing the composition of the global atmosphere, as well as natural climate variability observed over a given time period'. Climate change is a negative change in the world's climatic condition as has been proved by scientists. Climate change can be caused by human and natural factors. The activities of the natural factors include change in solar radiation, while the human factors include agricultural activities that lead to over use of land, high levels of deforestation, industrial and technological activities leading to shifts from organic fuel to high use of fossil fuels, land and air traffic, etc.

Climate change has been differentiated from climate variability or fluctuation. Climate fluctuation or variability is defined as 'the variations in the mean, standard deviations, the occurrence of extremes, etc. of the climate on all spatial and brief periods but beyond weather events' (Umar and Ibrahim 2011). Umar and Ibrahim (2011) went further to note that climate change and variability may be internal variability as a result of natural internal processes within the climate system or external variability, variations in natural or anthropogenic external forces. The major differences between climate change and fluctuation are mainly the time, the degree of variability, and the impact of variability. For all these factors, climate change is sterner. Climate variability are mainly astronomical factors such as changes in the eccentricity of the earth's orbit, changes in the obliquity of the plane of ecliptic, changes in orbital procession, and extra-terrestrial factors such as the quality and quantity of solar radiation (Odjugo 2010).

#### 2.1.2 *Climate change mitigation*

The concept of climate change mitigation is closely related to climate change adaptation. Climate change mitigations are actions put in place to reduce the intensity of radioactive emissions in order to reduce the potential effects of global warming. It is actions put in place to reduce the variability in climate through the control of sources of climate change. This is however different from global warming adaptation, which is simply tolerating the effects of global warming/climate change. Most often, climate change mitigation scenarios involve reductions in the concentrations of greenhouse gases (GHG), either by reducing their sources or by increasing their sinks. According to the UN Framework Convention on Climate Change, mitigation in the context of climate change is human interventions to reduce the sources of climate change or enhance the sinks of GHGs. According to the IPCC (2001), climate change mitigation is defined as attempt by humans to reduce the anthropogenic force of human behaviour on the climate system using such measures as reducing GHG emissions as well as their relative sinks. Mitigation of climate change can be accomplished using low carbon sources, such as renewable energy, the use of

energy efficient technology, or the protection of natural environment such as forests (Nordensvärd and Urban 2011).

IPCC (2007) defined adaptation as the ability for a system to adjust to climate change to moderate damage and cope with some of the results. Thus, climate change adaptations are adjustments in the ecosystem or human system of activities in response to changes in climate. It is concerned with responses to changes that pose risk to life and increases damage-related costs of climate change such as effects on rainfall and sea levels. It seeks to reduce the impacts of climate change, make the negative effect moderate, and exploit beneficial opportunities (Faraut et al. 2011). Adaptation is a proactive measure while mitigation is a corrective measure.

## **2.2 Theories of climate change**

The theories of climate change are basically concerned with the major causes of the change in climate. Several scientists have come up with studies to prove the principal factor behind climate change. These include the Anthropogenic Global Warming (AGW), Bio-Thermostat, human forces besides GHGs, Planetary Motion theory, Ocean Current, and Solar Variability theory.

Anthropogenic Global Warming (AGW) is the most common of the theories. This theory holds human emission of GHGs (carbon dioxide (CO<sub>2</sub>), methane, and nitrous oxide) through activities such as burning wood and fossil fuels, and cutting down or burning forests as the main causes of climate change. This is accomplished through the mechanism called, enhanced greenhouse effect. IPCC (2007) maintains that water vapour is identified as the major greenhouse gas, responsible for about 36 to 90 per cent of the greenhouse effect, while CO<sub>2</sub> accounts for about 26 per cent. While it is believed that other external factors such as variation in solar radiation can lead to climate change, they argued that the effect could not account for rising temperatures. They also argued that although the forces of man-made gases are small, the cumulative positive feedback they exert leads to great climate change (IPCC 2007).

The Bio-Thermostat theory states that the negative effect of biological and chemical actions offset the effects of rising carbon through the mechanism global bio-thermostat, which is what keeps the earth temperature in equilibrium. Carbon enhances the productivity of plants, thus the more there is, the better the plants will grow. The theory thus concludes that neither carbon nor the biological processes are harmful to earth.

Another theory on climate change believes that the highest human influence on climate is the transformation of earth through deforestation, urban formation from population growth, as well as coastal developments. In line with this theory, the IPCC estimated that about one-quarter to one-third of anthropogenic CO<sub>2</sub> emissions are due to deforestation.

Following this theory is the Ocean Current theory. It posits that changes in global temperature are highly attributed to the slowdown of the ocean's Thermohaline Circulation (THC).

The Planetary Motion theory of climate change states that climate change is mainly attributed to the natural gravitational and magnetic oscillations of the solar system. These oscillations alter the solar system and influence the earth to cause a change in climate. This theory was first published by Milankovitch in 1941.

The Solar Variability theory is another major theory of climate change. It states that solar variations account for most or all, global warming. The effect of the variation in the sun affects the earth through solar wind on cosmic rays, which affects ocean surface temperatures and wind patterns.

## 2.3 Global political and policy issues on climate change mitigation

### 2.3.1 *Global political economy of climate change mitigation*

The efficacy of climate change mitigation requires a global agreement. Actions need to be taken by different nations, such that the level of commitment of a nation will be at least proportional to its level of development and the level of emissions. There is resistance to a comprehensive global approach and global political acceptance has been seen as a major obstacle. The political will to implement some of the policies of mitigating climate change is very low because attaching prices to carbon emissions raised the price of energy, which has provoked reactions politically as well as consumers' resistance. While low-income countries are faced with financial constraints given the high cost of clean energy, high-income countries are faced with political and consumers' unwillingness to pay the high price for clean energy and many developing countries are against any level of commitment that will affect their ability to grow. Moreover, despite agreements by nations to reduce emissions, the high cost of clean energy left nations uninspired by the Kyoto Protocol's targets. For instance, as a result of the economic recession, the European Union easily met its goal of 20 per cent carbon cuts below 1990 levels by 2020 and has been struggling to create new reduction targets of 40 per cent below 1990 levels by 2030 (Stepp and Nicholson 2014). There is the global political argument that some energy-intensive sectors should be excluded from a climate change mitigation strategy because of the high cost implication and the massive job losses it will create. However, job losses may not be the end result because an increase in the prices of such goods could lead to a fall in their demand. When the firms that produce such goods are forced out of the market, their financial resources can be channelled to other sectors. It was also argued that excluding these sectors will put more pressure on the other sectors that are experiencing mitigation actions and this might constrain the global target.

Bailey and Preston (2014) opined that economic condition and structure of a country as well as the resource endowment determines management policies. This significantly affects the political acceptance of the country for low-carbon emission while the size and strength of the economy determines the resources available for the development of low-carbon energy as well as the political will to do so. Nations that are endowed with fossil energy will not be willing to carry out actions on low-carbon development because of the revenue accruing to the government. For instance in Russia, 28 per cent of total government revenue comes from fossil energy (Bailey and Preston 2014), while in Nigeria, it accounts for about 70 per cent of federal government's revenue and about 90 per cent of foreign earnings (CBN 2013). Russia, as the fourth world largest greenhouse gas emitter, only ratified the Kyoto Protocol in November 2004, and placed a legal limit to gas flaring at five per cent from 2012 with implementation under way and estimated to be delayed by two to three years (Korppoo and Vantansever 2012).

Politicians will always pursue policies that they expect to gain or maintain support from political constituencies, thus they acquire more power by doing what the people will like rather than pursue climate change mitigation that will impose additional costs in the form of carbon tax and loss of jobs for those in the carbon sector. Bailey and Preston (2014) further noted that while high-income countries are focusing on jobs, real incomes, and deficits, middle-income countries are focusing on economic development, inequality, and expansion of services, and low-income countries are concerned with poverty reduction, health, and education. Hence, climate change mitigation only has little global political support.

The global awareness of climate change is also very low and the lack of information and knowledge about climate change has also led to reluctance in the acceptance of the reality in most of the developing countries, Nigeria included. People are undereducated on carbon pricing,

carbon tax, or other tools for the reduction of emission rates. This is also affecting public will, which influences political decisions. Moreover, as a result of general mistrust of politicians on the climate change issue, there is high level of scepticism concerning political motivations behind the application of the various channels of emission reduction.

Thus apart from the problems associated with global frameworks, the domestic political economy in the various countries matters much. This is because many countries only depend on the domestic support they can muster from among their citizens in order to implement a global treaty of this magnitude. This is most especially the case in a situation where a current administration is seeking re-election. The desire to please the citizens so as to win their votes may even lead the administration to accept irrational policies that may be contrary to global clean energy policies. Therefore, any discussion on global clean energy transition policies must also consider the national political economy angle in the subject matter (Löschel et al. 2010).

### *2.3.2 Conflicts between national policies and global policies*

Mitigating climate change has not witnessed much commitment as compared to the expectation from Kyoto Protocol in 1997 of reduction in emissions to about 30 per cent below what would have occurred under business as usual. After the UN Framework Convention on Climate Change in 1992, the international policy concentrated on reducing greenhouse gases using new innovations.

In 1997, the Kyoto Protocol was signed with legal commitment given to developed countries to reduce carbon emission by five per cent below 1990 levels over a five-year period. This was followed by Copenhagen in 2009. German Watch (2011) noted that since the Copenhagen negotiations in 2009, many countries have not been able to deliver on their commitments to the climate change campaign as compared to the early years of the campaign. Mitigating climate change has been identified as a public good with its complex externality problem. As a public good, it is characterized with the free rider problem hence each country will be expecting the other to shoulder the responsibility while they concentrate on their own national policies. Auerswald et al. (2011) noted that a unilateral reduction in emissions by one country reduces the uncertainty associated with emission-related damages. Two major factors have been identified affecting the commitment level of countries towards the mitigation of climate change. One is the category that the country falls into, whether Annex 1 countries or not (i.e. industrialized and transition economies or otherwise). The other is the source of GHG emissions, whether from energy use in the form of transport and other related acts or from industrial and agricultural processes, such as deforestation and industrial wastes, or a combination of both. While majority of the Annex 1 countries are working on all policies effective in the reduction of the causes of climate change, Non-Annex 1 countries are only looking at available policies as recommended by Kyoto. This can be attributed to the fact that the Non-Annex 1 countries were not made to pledge their commitment given their level of development (Ekins and Speck 2011). While some countries are attempting to reduce global carbon emission, many others are subsidizing fossil fuels. Data from International Monetary Fund (IMF) showed that in 2011, total global fossil fuel subsidies was about US\$500 billion and by estimation, this rose to US\$544 billion in 2012. The policy makers supporting subsidies believed that it is needed for price stabilization and economic security (Clements et al. 2013 in Stepp and Nicholson 2014).

Domestic policies conflicting with global policies are evident in some countries that are major greenhouse gas emitters, major economies, and have a heavy reliance on fossil fuels due to abundant domestic resources such as the US, China, and Malaysia (Nordensvärd and Urban 2011). They have not been able to introduce a low carbon economy despite their efforts even when they consider the importance of the establishment of a low carbon economy for their

domestic economy and their international competitiveness. For instance in the US, the government has failed to provide strict national policies on climate change. It was observed that while the United States (US) accepted the UN Climate Change Convention in 1992, they failed to accept the Kyoto Protocol of 1998. They have only presented a weak target of 17 per cent reduction in carbon emissions as compared to other developed countries. Malaysia is at odds with their desire to promote climate change mitigation versus the government's national policy aimed at enhancing their level of economic growth, which encompasses exploiting natural resources and utilizing fossil fuels through palm oil production. This has encouraged massive deforestation on the one hand, while on the other, has helped in conserving the nation's resources and creating policies of environmental protection and development. The country is thus faced with a conflict between their national policy and global policy. Hiding under the coverage of Non-Annex 1 countries, Malaysia has been unwilling to commit itself to tackling climate change. Though the country has accepted both the UN climate change convention and the Kyoto Protocol since 2002, it has not accepted the Copenhagen Accord. Furthermore, the country is yet to develop any national climate change policies (Nordensvärd and Urban 2011).

It is observed that energy-intensive countries, for instance the US and Nigeria, are more concerned with policies that will make their industries more competitive. Thus if they carry on the global policies of mitigating emissions, they would be disadvantaged in comparison to other competitors who have done nothing. Moreover, the actions of the few countries carrying out the global policy would not be able to reduce global emissions as expected as a result of high emissions from non-participating countries thus the participating countries may be discouraged. This is particularly obvious within the European Union, Australia, and the US. The political will of some nations are contrary to global policies. This is particularly applicable to most developing countries that highly depend on these natural resources as a source of revenue and for growth. The major national policy of these countries is enhancing growth, which will entail the use of these resources thereby emitting more into the climate. For instance, Ozor (2009) observed that Nigeria had no effective climate change policy, and bills that should enhance good practices for sustainable environment were yet to be implemented. This is evident in the fact that the deadline to stop gas flaring in Nigeria was moved from 2008 to 2009 and then 2011.

Dolsak (2001) opined that the existence of conflict in policies to be implemented between the public and private sector in some countries has led to conflict between national policies and global policies. This has made some countries chose to continue in their old ways of energy use, others ready to act but requesting international financial assistance, and yet others ready to spend their own resources and publicly committed to the reduction of emissions. All these are seen in the different domestic policies in the respective countries. There is thus need for national policies to be in line with international policies if the global goal of mitigating climate change will be achieved. These inconsistencies in and conflict between national policies and global policies greatly hinders effective global policy implementation and the target set at the international level for clean climate.

In all the above reviewed literature, one thing is common. The conflict between global climate change policies and the national governments' energy policies make it difficult for total compliance. Many of the countries that produce fossil fuel find it difficult to implement policies that are targeted at transitioning to clean energy. This is contrary to the fact that many of those countries have also ratified the various global protocols on climate change mitigation.

## **2.4 Empirical studies**

Several studies have been carried out on climate change ranging from the economic implication of its impact to the different national and global policies of mitigating climate change. These

studies seem to present conflicts between national policies and global policies towards climate change. There is also the question on people's acceptance of the conclusions reached by climate scientists. Furthermore, major issues on the magnitude of the effect of climate change on the countries used for the studies have been raised. Dolsak (2001) carried out an empirical investigation on factors affecting the level of commitment of different countries on the mitigation of climate change for 91 countries, both developing and developed. This was assessed using the variance between the signature and ratification of the Framework Convention on Climate Change and its actual implementation. Applying a logistic regression model, the result of the study showed that the level of commitment of a country is more significantly affected by incentives to the national government than the national government's ability to affect global climate change through the various mitigation actions. It was also found that the economic benefits from climate change do not affect a country's commitment to the mitigation of climate change.

In a study carried out by Löschel et al. (2010) on the empirical assessment of demand for climate protection using Germany, the researchers noted that policies towards climate change have political dimension and national policies on it have to be politically accepted. The attitudes of the individuals were also noted to be of importance such that policy options of the individual may be at conflict with national policy and /or global policies. The study employed the willing to pay (WTP) approach for climate protection to examine willingness of the individual to climate protection. The result of the study found that the willingness to pay was very low amounting to about €12 per tonne of CO<sub>2</sub>.

Speck (2010) analysed the debate between climate change policies, politics, and the media in Australia. In a pilot study using interviews from some leaders, it was found that climate change mitigation action has been very slow in Australia because of the media's information about uncertainty in the climate change science, weak leadership in the country, as well as the unpleasant cost of policies towards climate change mitigation from their political view even when such policies were found effective at the national and international levels. Meanwhile Nordensvärd and Urban (2011) carried out an appraisal on the role of corporations in climate mitigation using China, Malaysia, and the US. The study found that there exists a complexity between the role of the state and corporations in the mitigation of climate change given the contradiction between politics and business. They thus suggest that achieving global climate change mitigation requires the formation of public-private partnership where the roles of each are made clear.

The study of Ayinde et al. (2010) analysed the impact of climate change on agricultural productivity in Nigeria examining the linkage between agricultural productivity and climate change parameters. Employing time series data for the period 1975 to 2005, a descriptive statistics and granger causality analysis were carried out on the data for the variables. The result showed that the climatic parameter (changes in rainfall) positively affected agricultural production while temperature was found relatively constant and does not affect agricultural output.

Koblowsky and Speranza (2010) analysed the institutional challenges to developing an effective climate change policy in Nigeria. The roles of existing and planned institutional and legal frameworks in promoting or hindering policy implementation were reviewed. An evaluation of literature and primary data collected between autumn 2009 and spring 2010 were used. The study found that there has been lack of agreement between political initiatives and institutions. The study also found a weak implementation of environmental laws and directives. They concluded that a policy framework on climate change is still non-existent for Nigeria as a result of divergent interest among the parties.

Furthermore, Akura et al. (2013) carried out a study on the impact of renewable energy deployment on climate change in Nigeria. Specifically, the study reviewed the energy sources used in Nigeria as well as their impact on climate change. Findings from the study showed that Nigeria is over-dependent on fossil-generated energy, which has had adverse effects on the environment. They thus recommended the integration of renewable energy into Nigeria's energy use while Amobi and Onyishi (2015) looked at the public policy perspective of governance and climate change in Nigeria. They pointed out the problem of climate change within the governance scope. They showed that there is a direct relationship between the characters of the state and governance system on the one hand and Nigeria's response to climate change on the other.

### **3 Methodology and data**

This study is purely empirical in nature. Most of the analyses carried out in this study are qualitative in nature based on the use of charts, bars, tables, and graphs. These tools have been found to be useful to us in presenting the facts as they pertain to the global political economy of clean energy transition and how the global transition policies affect Nigeria's domestic fiscal policies.

As a way of ensuring reliable information that guides this study, data were sourced from the Central Bank of Nigeria (CBN), the Budget Office of the Federation (BOF), the Federal Ministry of Finance (FMF), the Federal Ministry of Power, and the Federal Ministry of Science and Technology. These are ministries and agencies of the Federal Government of Nigeria that are saddled with the responsibilities of keeping information that relate to fiscal policies and other energy related policies.

In order to ensure that we answer our research questions, we focused on the period of 1999–2014. This period is the same as democratic dispensation in Nigeria. The military handed over power to democratically elected government in 1999. Coincidentally, this is also the year following the ratification of the Kyoto Protocol, coupled with the fact that the following year (i.e. 2000) was the beginning of the MDGs target period. This means that the period of transition to democratic government in Nigeria coincides with the period when the issue of global climate change became an issue of discourse among the nations of the globe. However, some of the issues raised in this paper encompass the years from 1981 to 2014. This is to consider both the periods the country was under military administration and the period of democratic rule. The period is also stretched to such point in order to establish a trend and a pattern in terms of the policy behaviours of the country.

### **4 Findings**

There are many issues with the political economy of clean energy transition of Nigeria's governments—national and sub-national alike. Some of the issues have to do with fiscal policy implication of such transition policies. On one hand, we can assume that the country is very willing and ready to transition. The readiness and willingness come with heavy fiscal policy implications. On the other hand, we can assume that the country is not very willing and may not be ready to transition to clean energy. The absence of readiness and willingness also come with their own fiscal policy implications.

Since this paper is not about assumptions, it is imperative to find out the current situation in Nigeria as it relates to global clean energy transition and fiscal policy stance. This section is

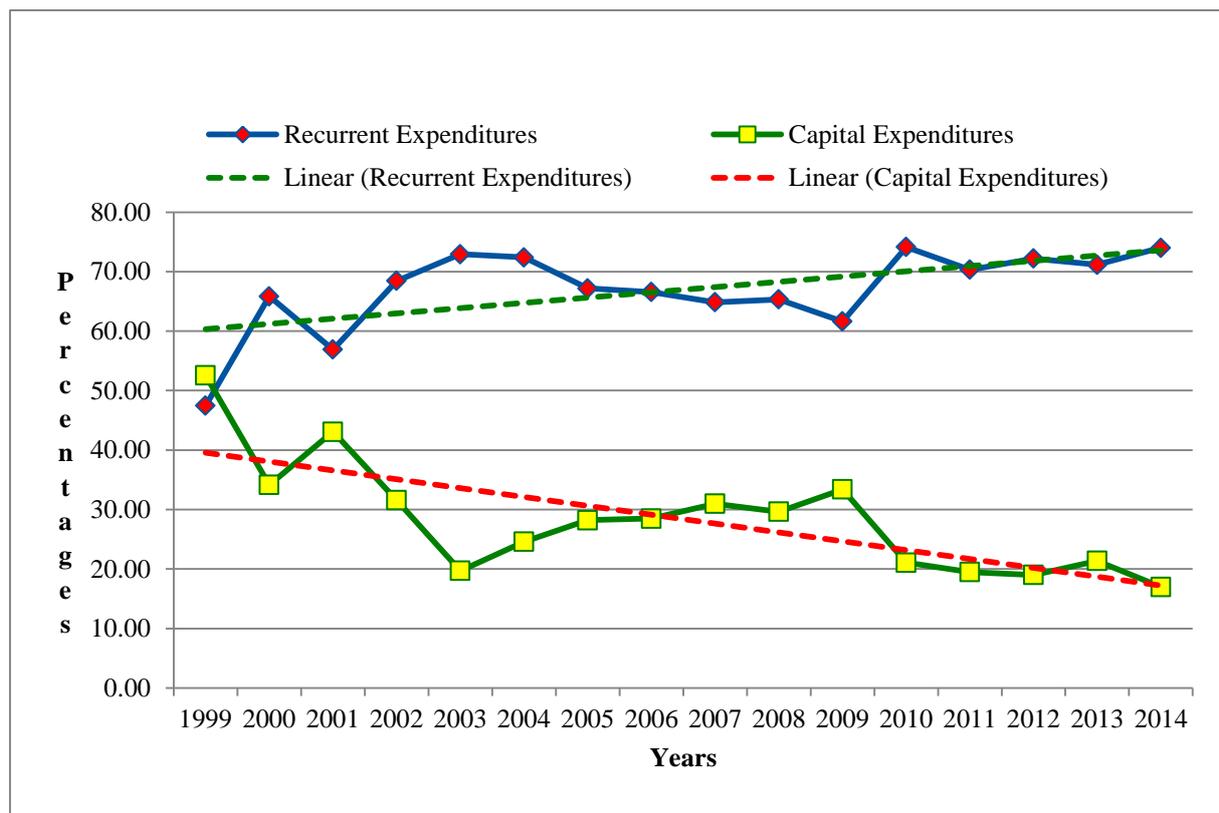
therefore focused on presenting the current situation. The section is sub-divided into three sub-sections beginning with the current situation and efforts of the governments. It further discusses the possible factors that explain the current rate of transition to clean energy in Nigeria. Finally, the last section discusses fiscal policy implications of the current efforts.

#### 4.1 Nigeria’s fiscal policy stance and current efforts towards clean energy transition

In order to transition from the current fossil energy regime to a more environmentally friendly energy regime, governments ought to take some specific steps towards clean energy transition. One such step is in the area of fiscal policies. The role of fiscal policy in determining the political economy direction of any government cannot be overemphasized. Therefore, it is pertinent to ask two very important questions: What is the current fiscal policy stance of Nigerian governments and how do their fiscal policies translate to clean energy transition efforts. The discussions below focus on providing answers.

It is suitable to open the discussion with the observed skew in the two broad categories of expenditures among Nigerian governments—recurrent expenditures and capital expenditures. This is because of the importance attached to each of the categories. It is important to have some personnel that will run government institutions (recurrent expenditures), while it is equally important to plan for relevant activities of the institutions that will deliver the policy mandates of the governments (capital expenditures).

Figure 1: Shares of expenditure classifications in total expenditures of federal government of Nigeria



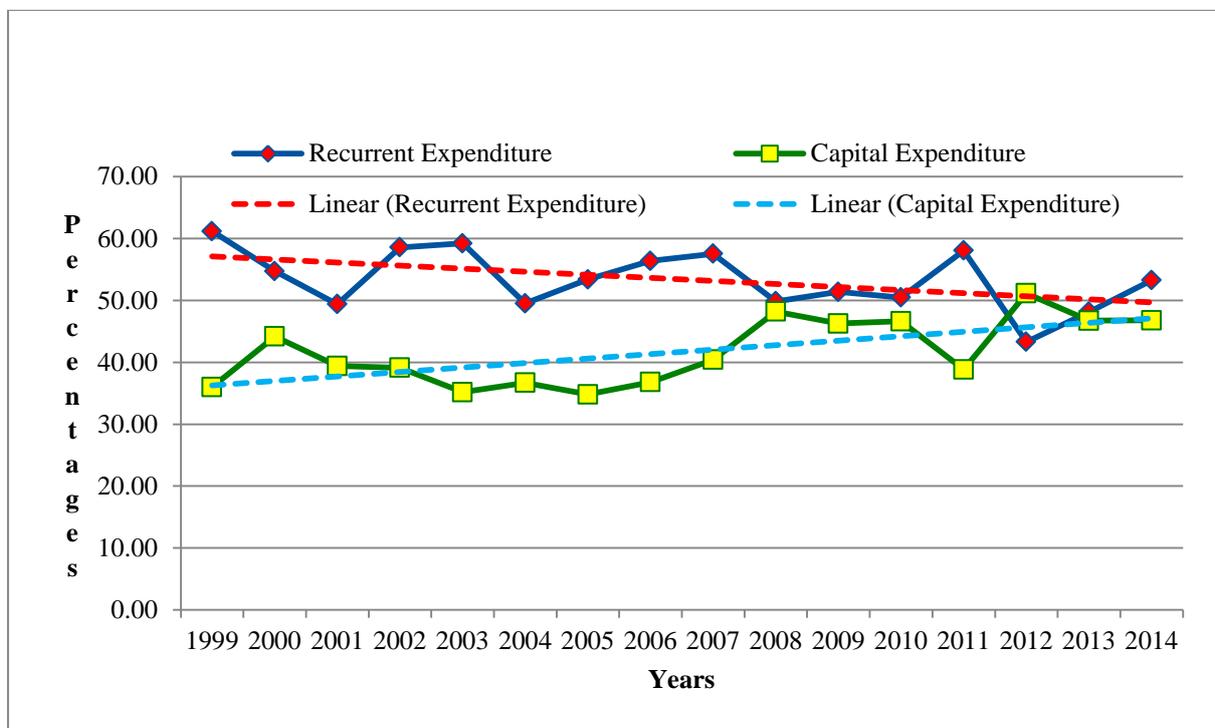
Source: CBN Statistical Bulletin (2014).

From Figure 1, it is clear that the proportion of capital expenditures in total expenditures of the Federal Government of Nigeria consistently declined in the first democratic era of 1981–83. However, the proportion was still better than what was obtained in subsequent years. Buhari’s

military administration of 1984–85 maintained an almost stable but lower proportion of capital expenditures. Babangida’s military regime of 1985–93 maintained erratic but low proportion of capital expenditures throughout the period. Abacha’s military regime of 1993–98 continued raising the proportion of capital expenditures on annual basis. However, the tempo could not be sustained after his exit as Abdulsalami’s military regime of 1998–99 lowered it a bit. Notably, since the return of democracy in 1999, the proportion of capital expenditures in total expenditures has decreased and remained very low. Of particular interest to us is the case of 2014, when the proportion of capital expenditures reduced to as low as 17 per cent of total expenditures of the federal government. Interestingly, while the proportion of recurrent expenditures in total expenditures of the government maintained an upward trend between 1999 and 2014, the share of recurrent expenditures in total expenditures of the government maintained a downward trend within the same period.

It may be important to establish a link between the issues presented in Figure 1 and the main point of discussion. Clean energy transition policy in every economy of the globe demands heavy financing. This heavy financing may not necessarily entail increase in total expenditures of the government, refocusing the items that take greater proportion of the expenditures. This is why this study maintains that greater proportion of recurrent expenditures in total expenditures than that of capital expenditures may not really guarantee the needed financing for research and development in Nigeria’s clean energy transition programme. This is especially true given the fact that the cost of governance takes a very large chunk of the recurrent expenditures as in the case of Nigerian Federal Government (BOF 2014a). Clean energy transition programmes of Nigeria must necessarily affect the size of government, thereby reducing the recurrent cost of governance. This is the only way of effectively investing in alternative or clean energy sources and reducing the reliance of the country on fossil fuels as both source of energy and source of revenue.

Figure 2: Shares of expenditure classifications in total expenditures of states’ governments in Nigeria



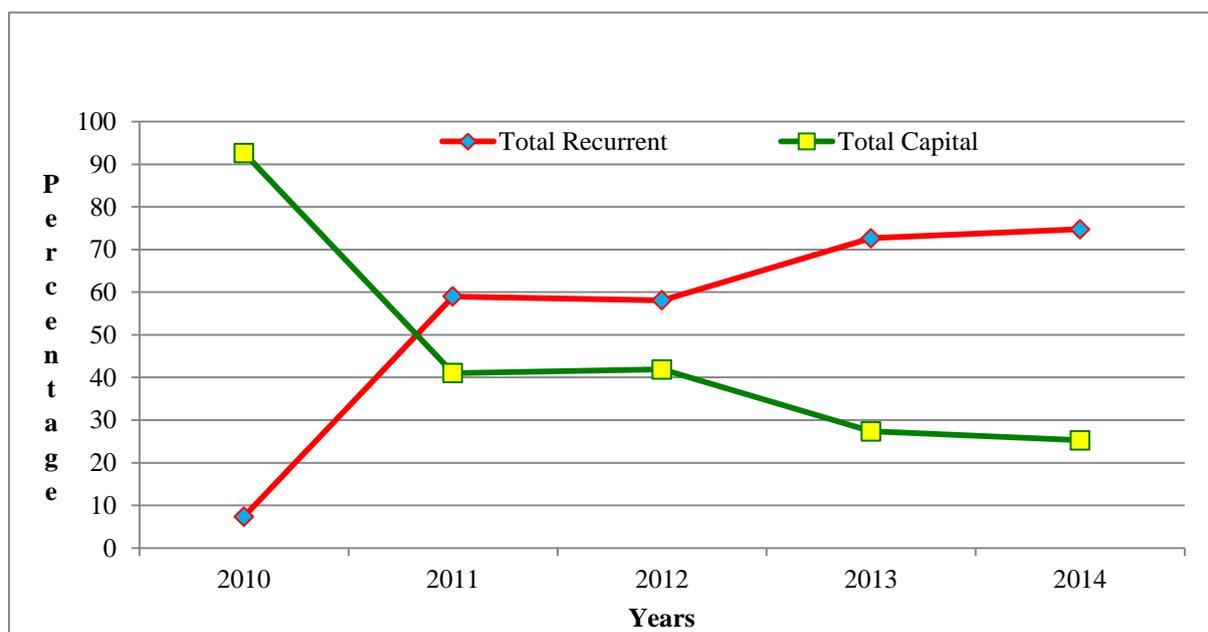
Source: CBN Statistical Bulletin (2014).

The fiscal policy stance of State governments in Nigeria stands in direct contrast with that of the Federal Government of Nigeria within the study period. At the beginning of the study period (1999), there was a wide gap between the shares of capital expenditures of State governments and those of the recurrent expenditures of the same tier of government (see Figure 2). This was not the case with Federal Government expenditure profile (as shown in Figure 1). The gap between the two classifications of expenditures continued to decline until 2012, when the proportion of capital expenditures in total expenditures exceeded the proportion of recurrent expenditures. It is necessary to emphasize that the State governments in the democratic era of 1999–2014 seem to commit more proportion of funds to capital expenditures than the federal government did within the same period. This is evident in the fact that while the proportion of Federal Government's capital expenditures in total expenditures maintained a downward trend, as shown in Figure 1, the proportion of State governments' capital expenditures in total expenditures maintained an upward trend as shown in Figure 2. It may be argued that the upward trend of State governments' capital expenditures was not a sharp one. Unlike the case of capital expenditures, the proportion of Federal Government's recurrent expenditures in total expenditures maintained an upward trend in Figure 1, while the proportion of States governments' recurrent expenditures in total expenditures maintained a downward trend in Figure 2.

The information derived from Figures 1 and 2 have established the existence of greater proportion of recurrent expenditures than that of capital expenditures in total expenditures. It is not clear how this trend of expenditures can affect the overall goal of clean energy transition policies of the governments in Nigeria.

In order to take appropriate steps towards clean energy transition, the federal government of Nigeria has set up several agencies and commissions charged with the responsibilities of researching alternative energy sources. One such agency is the Energy Commission of Nigeria (ECN) with the mandate of coming up with alternative sources of energy. However, one of the major challenges of the federal government of Nigeria is the duplication of institutions with similar responsibilities. For example, the law that established the ECN provides that the commission shall consist of fossil fuel department, nuclear energy department, solar energy department, and any other energy department that the government may determine from time to time. This implies that atomic energy may as well be determined to be relevant and therefore be made a department of the energy commission of Nigeria. However, instead of following this law, another commission was established with the mandate of developing and promoting nuclear technology. This other commission is known as the Nigeria Atomic Energy Commission (NAEC). With such duplication of institutions and agencies, it leaves the federal government of Nigeria with the option of committing insufficient funds to each of the agencies and leaves the agencies with little to no output. Figure 3 shows the case of ECN.

Figure 3: Percentage distribution of annual budgets of Energy Commission of Nigeria between capital and recurrent items



Source: Authors' computation based on data compiled from Federal Government Budgets (BOF 2010, 2011, 2012, 2013, 2014a).

Following the same trend that was observed in Figure 1, Figure 2 reveals that greater proportion of the annual budgets of Energy Commission of Nigeria goes to recurrent than to capital. As of 2014, about 75 per cent of the total budget of the commission went to recurrent expenditures leaving only about 25 per cent to capital. This means that the main responsibilities of the commission may not be achieved; as such, proportion will be too insignificant to invest in renewable energy or renewable energy research.

Where 75 per cent of the total money committed to the institution is for recurrent expenses, it becomes necessary to ask if the whole idea of establishing such a commission is for employment or output. Supposing the idea for establishing the commission (as shown in the enabling laws) is to promote and develop renewable energy sources in Nigeria, it becomes necessary to restructure the expenditure pattern of the commission in order to allow for efficiency. It is also possible that one of the factors contributing to the nature of expenditure is the existence of a parallel institution. Supposing the money committed to the two different institutions is channelled to only one, the ratio might have changed, as there would have been reduction in personnel costs, thereby reducing the share of recurrent expenditures of the single commission.

It may be disturbing to observe the nature of budgeted expenditures of the commissions established to research clean energy in Nigeria. However, it is worse to understand that actual expenditures widen the gap between capital and recurrent expenditures. For instance, Energy Commission of Nigeria is an agency of the government under the Federal Ministry of Science and Technology. The 2014 budget implementation report of the Budget Office of the Federation (BOF) (2014b) reveals that only 48.19 per cent of all the budgeted capital expenditures of the Federal Ministry of Science and Technology and its agencies were released and cash-backed. Given the nature, manner, and timing of the releases and cash-backing, only 93 per cent of the released funds were utilized. This implies that as at 2014, only 45.21 per cent of budgeted capital expenditures of the Federal Ministry of Science and Technology and its agencies were utilized.

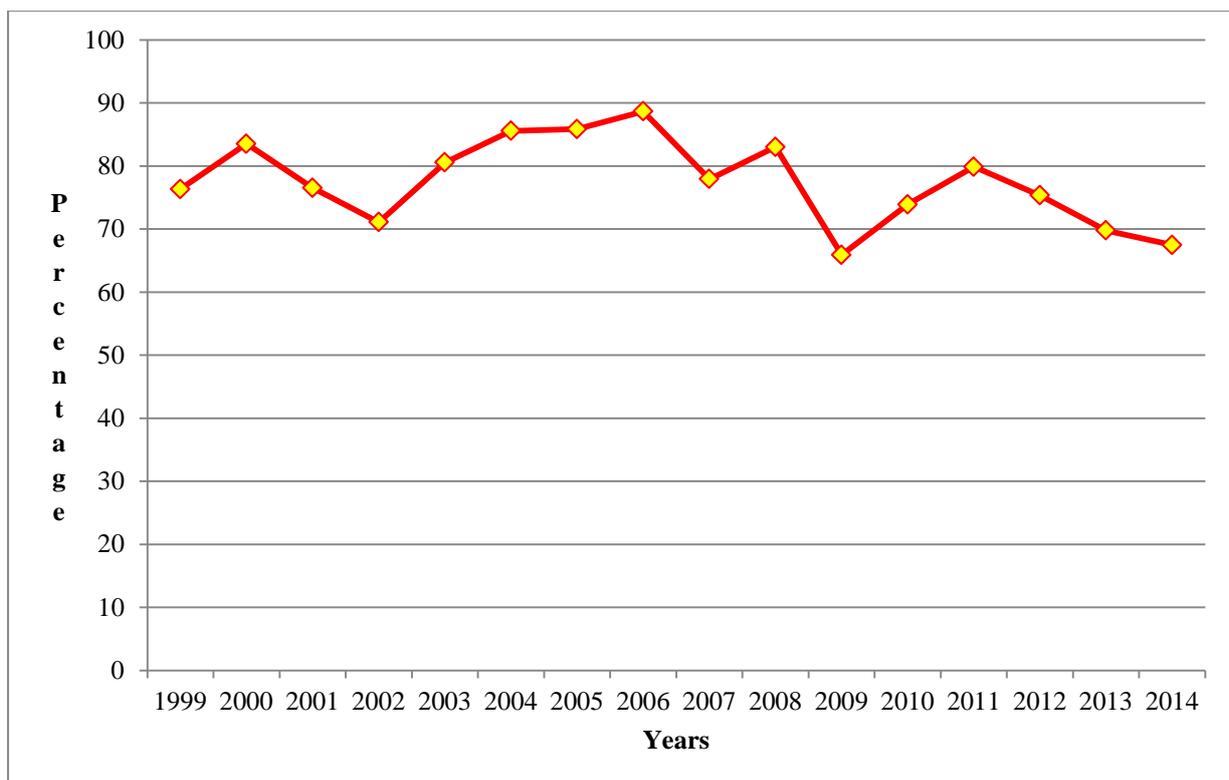
The same report shows that almost 100 per cent of the budgeted recurrent expenditures of most Ministries, Departments, and Agencies of the government were released.

The implication is that the gap between recurrent expenditures and capital expenditures of the energy commissions is so high that the commission may not fully discharge its statutory obligations. Based on the issues raised above, we may say that Nigeria’s public institutions established for renewable energy may not have been effective due to lack of funds. However, the lack of funds could have been alleviated by streamlining the institutions based on their statutory functions and responsibilities.

#### 4.2 Possible factors of the observed efforts towards clean energy transition in Nigeria

The focal point of all the issues presented in the previous sub-section is that the institutional framework set up by the Government in order to promote clean energy transition in Nigeria has not been strengthened enough in order to carry out their statutory obligations. Therefore, it is pertinent to find out if the inability of the government to strengthen these institutions is connected to the governments’ dependence on oil revenue. Figure 4 presents the level of dependence of the federal government of Nigeria on oil revenue.

Figure 4: Oil revenue as percentage of total federally collected revenue (per cent)



Source: Authors’ computation of figures from CBN Statistical Bulletin (2014).

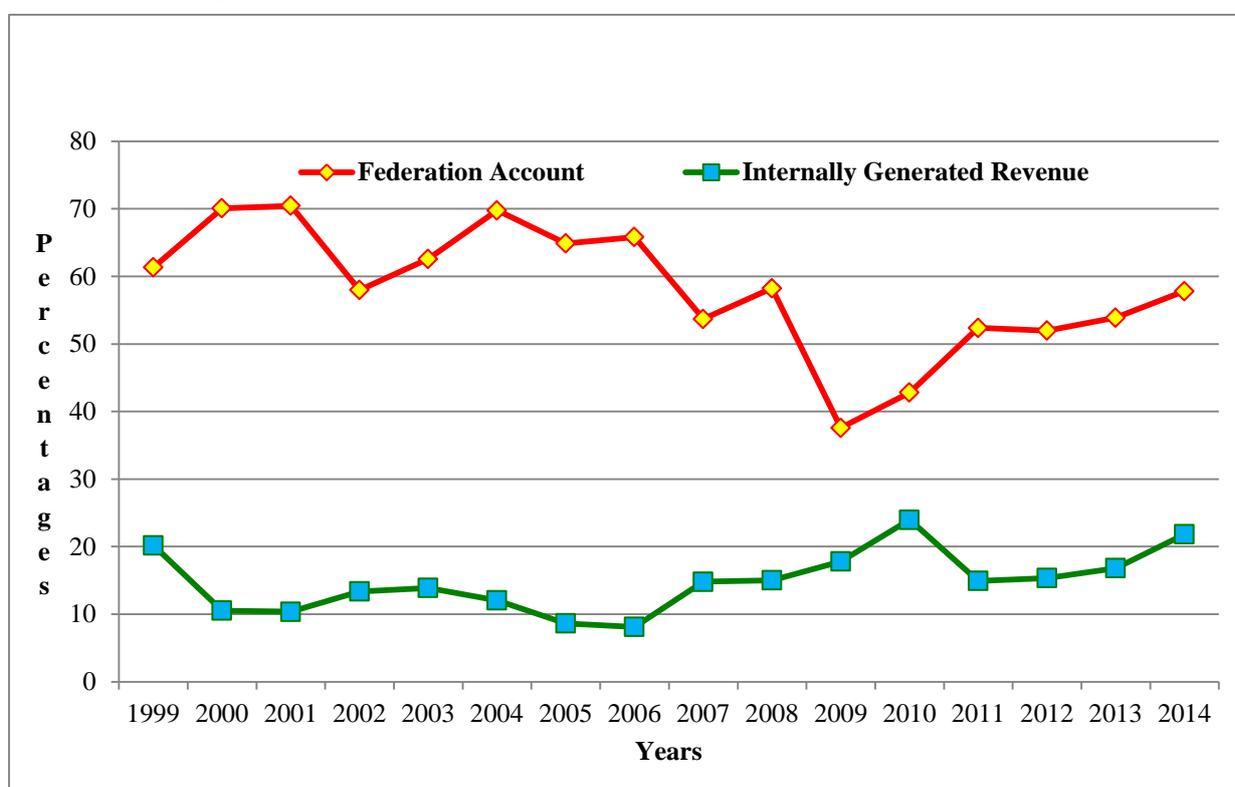
Sachs and Warner (2001) observed that it has been empirically proven that countries with abundant natural resources tend to perform poorly in terms of growth. Figure 4 shows that Nigeria has been reliant on revenue from fossil fuel. The proportion of oil revenue in total federally collected revenues oscillated between 62 per cent and 89 per cent from 1999 to 2014 fiscal years. This proportion reached its peak in 2006 at 89 per cent of total federally collected revenues. Sachs and Warner (2001) explained the reason for such poor performance as

crowding-out effect of natural resources—otherwise referred to as natural resource curse hypothesis.

The crowding-out effect manifests in two ways in Nigeria as: (1) absence of accountability and efficiency of government, and (2) neglect of the productive sector. In the previous sub-section, we showed how much of federal and state governments’ expenditures go into recurrent expenditures, especially administration costs (i.e. executive, legislative, and judicial arms). John (2011) shows that in countries where natural resources account for more than 80 per cent of total government revenue, there is the tendency for the government to neglect the productive sector since the government does not really depend on them for taxes. In such a situation, the private sector operators that are rarely taxed will not have any moral right to hold the government accountable to the people. This means that there is a connection between neglect of the productive sector and absence of accountability in government.

As shown in Figure 5, the situation of over-dependence on oil revenue also prevails among the sub-national governments in Nigeria.

Figure 5: States’ major sources of revenue as percentages of states’ total revenue (per cent)



Source: Authors’ computation of figures from CBN Statistical Bulletin (2014).

Just like the Federal government, State governments in Nigeria depend more on revenue from the federation account (which is funded mainly from oil revenues). Based on Figure 5, the proportion of revenue from federation account in the total revenues of all the States in Nigeria reached a peak level of 70.5 per cent in 2001 and the lowest level of 37.6 per cent in 2009. The proportion remained very high throughout the period of 1999–2014, though with some oscillations.

The existence of several institutions of government with overlapping responsibilities without much relevant output may still be connected to the resource curse hypothesis. It is true that the

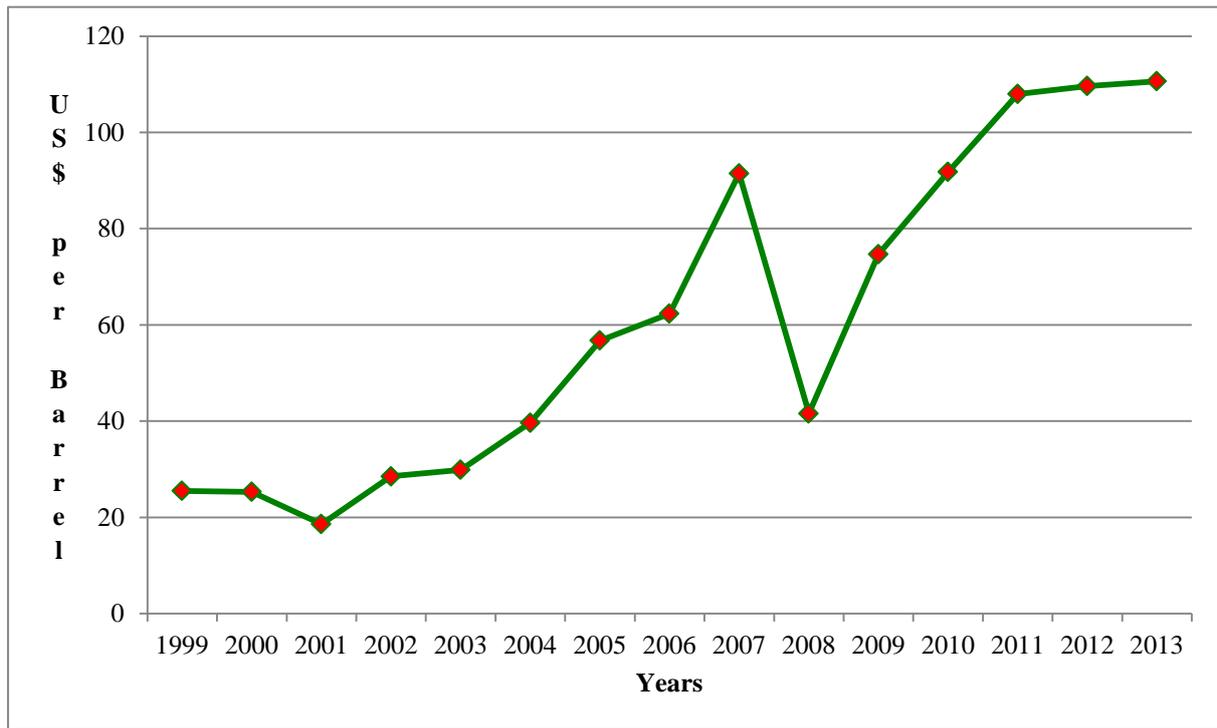
governments in Nigeria (national and sub-national alike) depend heavily on oil revenues; there has not been much effort on the part of the governments to invest in alternative energy sources. The shift in global emphasis from fossil fuel to renewable energy due to climate change effect should have sent a serious warning to the governments in Nigeria to diversify their energy sources. Instead, several institutions have been set up with none of them able to come up with any clear output on alternative energy sources.

One important observation is that the federal government of Nigeria has not taken the issue of transition to clean energy seriously until the second half of 2014, when the global oil price moved in a downward trend. It also dawned on the sub-national governments in Nigeria that fossil fuel may soon remain abundant in Nigeria, yet not demanded in the global market given the current trend in research into alternative energy sources. This reawakening made many sub-national governments start emphasizing internally generated revenues against the previous reliance on federation accounts. The federal government of Nigeria has started emphasizing non-oil revenue. The change in emphasis has spurred the governments to involve private sector operators in their decision making process through consultations. The current cooperation between private sector operators and the government will likely produce greater commitment to the implementation of the renewable energy master plan than is currently experienced in the country. This means that if the price of oil in global market had continued rising, Nigerian governments would have continued treating the issue of clean energy transition with reluctance.

#### **4.3 Fiscal policy implications of Nigeria's delayed transition while other economies transition to clean energy**

Other nations of the globe are fast transitioning to renewable energy sources. Such transition holds opportunities and threats to the Nigerian governments in terms of fiscal policy regimes. It is therefore important to determine fiscal policy implications of the current rate of transition policies in Nigeria while other national governments are fast shifting to clean energy regime.

Figure 6: Annual closing prices of crude oil (US\$/barrel)



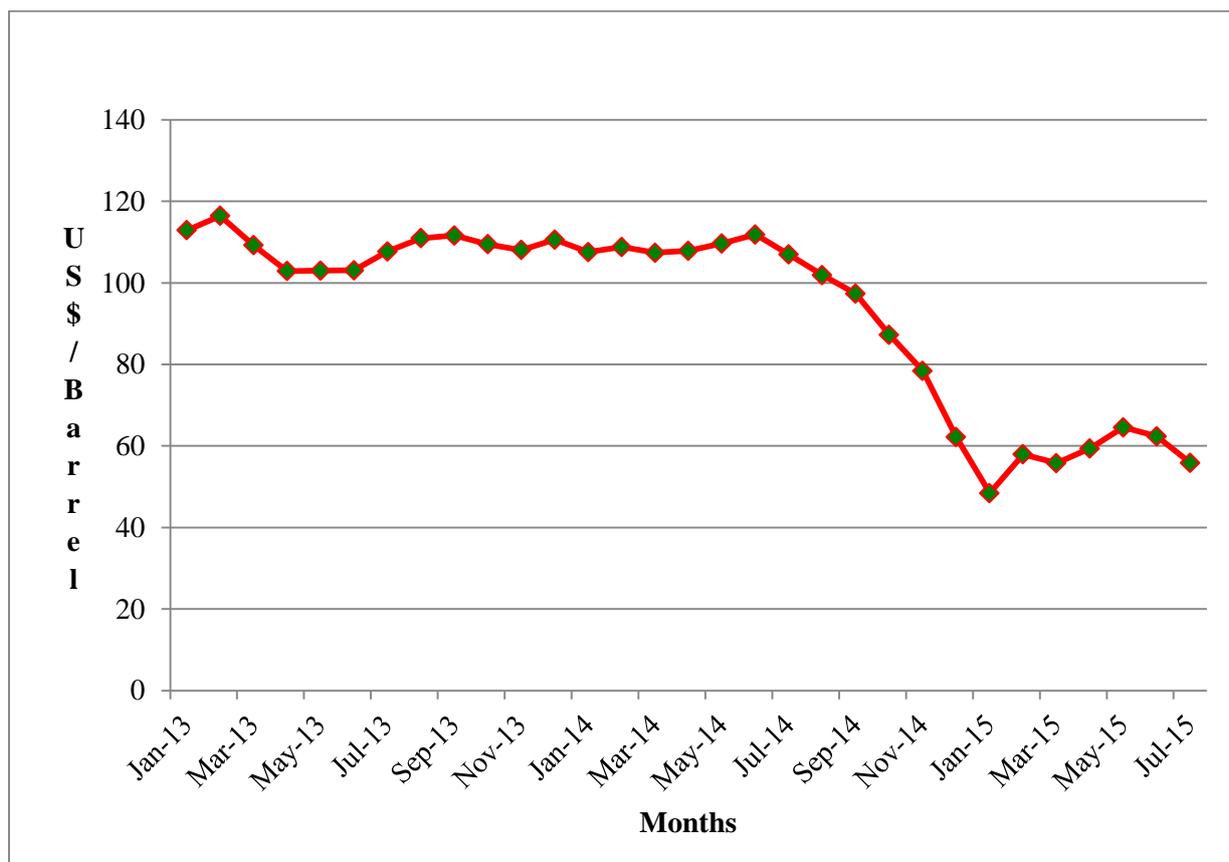
Source: Authors' computation of figures from Index Mundi (n.d.).

Global oil price remained low between 1999 and 2003 (between US\$20 and US\$30 per barrel). However, the price started increasing on annual basis from 2004 until 2007 (when it exceeded US\$90 price per barrel). As an erratic market, the price was affected by the global economic/financial crisis of 2008–09 by forcing a sharp decline in the price in 2008 from about US\$90 per barrel in 2007 to about US\$40 per barrel in 2008. Nevertheless, the global oil price picked up again from 2009 and continued on an increasing trend up to 2013.

From Figure 6, it may be inferred that the period of 2008–11 seemed to be a period of incubation of concerted efforts towards renewable energy sources. The period of 2011–13 seemed to be the period of investment in efficient renewable energy sources. Such investments may take time to yield results, while others started yielding results in very short time. This could explain the relatively stable price of oil in the period 2011–13. This also implies that once the global investments in alternative energy sources start yielding expected returns, then the price of oil is bound to fall.

Figure 7 presents the most recent happenings in the global oil market in terms of oil prices between 2013 and 2015.

Figure 7: Monthly crude oil prices from January 2013 to July 2015 (US\$/barrel)



Source: Authors' computation of figures from Index Mundi (n.d.).

From Figure 7, it seems the global investments in alternative/renewable energy sources have started yielding returns. The figure shows that global oil price has been on the decline with highest rate of decline recorded between June 2014 and January 2015. Within the 6-month period, global oil price declined from about US\$112 per barrel to about US\$48 per barrel—a decline of about 57.14 per cent within such a very short time.

The fiscal policy implications of such severe decline in global oil prices are great for Nigerian governments. First, with a decline of 57.14 per cent in the price of the major source of revenue for Nigerian governments, it therefore means that about 40 per cent of federal government of Nigeria's revenue has been eroded by a fall in global oil prices (taking the average of 70 per cent of total revenue in Figure 4). Secondly, this decline implies that there is a shift in demand from fossil fuel to alternative energy sources. This means that as long as Nigeria does not invest in alternative energy sources, the country will soon move from being an energy exporting country to an energy importing country. This scenario will pose great threat to the fiscal survival of the governments in Nigeria, especially in light of severe decline in revenue base.

Nigeria is a net exporter of energy (especially crude oil, though the country imports refined petroleum products). Most of the country's imports (including energy imports) are funded with proceeds from oil exports. However, US EIA (2015) shows that many developed countries are shifting their demand for fossil fuels to demand for renewable energy. The implication is that renewable energy will soon replace fossil fuels globally. Therefore, should Nigeria not invest heavily in clean energy, it will soon move from net energy exporter country to net energy importer country, which has severe implications on the fiscal policy stance of the country at all levels of government due to the relevance of oil revenues as shown in the figures.

As a net exporter country, Nigeria has not been able to fund clean energy programmes and projects appropriately. It therefore seems difficult (if not impossible) for Nigeria to finance clean energy research and development as a net energy importer country. This is especially true for a country that depends heavily on energy (fossil fuel) as a source of government revenues.

## 5 Conclusion

From all that have been presented in the findings above, we can conclude that Nigerian governments' future fiscal outlooks could be considered threatened except there is a major departure from the current expenditure pattern. We have shown that recent occurrences in the global scene have forced global oil prices down. There is the possibility of further decline in oil prices in the near future. This means that Nigerian governments' current disposure in handling the fiscal shock associated with fluctuations in the global oil market may no longer be adequate. As a way of absorbing the fiscal shocks that may be associated with fluctuations in the global oil market, the Federal Government of Nigeria sets Oil Price benchmark below the minimum projected oil price for the year during the annual budgeting. Whatever is sold in excess of the benchmark price is deposited in the Excess Crude Account. However, the account has been mismanaged in recent times, leading to depletion of the savings.

To be able to survive the fiscal policy shocks that are (and will still be) associated with the current global clean energy transition policies, here are some of the policy recommendations that Nigerian governments should not ignore:

- Since oil revenues collected by the federal government are shared among the various tiers of government, investment in energy sources should not be restricted to only the federal government. Every tier of government should be concerned. This means that instead of having only the Energy Commission of Nigeria and Nigerian Atomic Energy Commission, funded by the Federal Government of Nigeria, the State governments should be free to have their various energy centres where research into clean energy is funded and their outputs form part of the policies of the sub-national governments.
- The current trend of expenditure among the various tiers of government in Nigeria, in favour of recurrent expenditures should be revised. Emphasis should be placed on capital expenditures with the target of equipping the energy institutions and agencies to come up with home-grown alternative energy sources. This will help in making Nigeria a net exporter of renewable energy in the nearest future.
- Streamline most of the institutions and agencies that have overlapping responsibilities so as to ensure efficiency.
- Effective and efficient tax regime should be adopted to increase the volume and proportion of non-oil revenues in the face of dwindling oil revenue in order to meet up with the demand of the required investment for clean energy transition.

## References

- Adejuwon, J.O. (2006). 'Food crop production in Nigeria. II. Potential effects of climate change'. *Climate Research*, 32: 229–45.
- Akuru, U.B., O.I. Okoro, and E. Chikuni (2013). 'Impact of renewable energy deployment on climate change in Nigeria'. Paper presented at AFRICON, 9–12 September, Pointe-Aux-Piments, Mauritius. Available online at: <http://www.erc.uct.ac.za/jesa/Volume26/26-3jesa-akuru-okoro-chikuni.pdf> (accessed on 26 January 2016).

- Amobi, D., and T. Onyishi (2015). 'Governance and climate change in Nigeria: A public policy perspective'. *Journal of Policy and Development Studies*, 9(2). Available online at: [http://www.arabianjbm.com/pdfs/JPDS\\_VOL\\_9\\_2/17.pdf](http://www.arabianjbm.com/pdfs/JPDS_VOL_9_2/17.pdf) (accessed on 26 January 2016).
- Auerswald, H., K.A. Konrad, and M. Thum (2011). 'Adaptation, mitigation and risk-taking in climate policy'. Working Paper 3320. Munich: CESifo.
- Ayinde, O.E., O.O. Ajewole, I. Ogunlade, and M.O. Adewumi (2010). 'Empirical analysis of agricultural production and climate change: A case study of Nigeria'. *Journal of Sustainable Development in Africa*, 12(6).
- Bailey, R., and F. Preston (2014). 'Stuck in transition: Managing the political economy of low-carbon development'. Energy, Environment and Resources Briefing Paper 14/01. London: The Royal Institute of International Affairs (Chatham House). Available online at: [https://www.chathamhouse.org/sites/files/chathamhouse/home/chatham/public\\_html/sites/default/files/20140200LowCarbonBaileyPreston.pdf](https://www.chathamhouse.org/sites/files/chathamhouse/home/chatham/public_html/sites/default/files/20140200LowCarbonBaileyPreston.pdf) (accessed on 14 August 2015).
- Budget Office of the Federation (BOF) (2010). 'FGN 2010 approved budget'. Abuja: BOF Publications.
- Budget Office of the Federation (BOF) (2011). 'FGN 2011 approved budget'. Abuja: BOF Publications.
- Budget Office of the Federation (BOF) (2012). 'FGN 2012 approved budget'. Abuja: BOF Publications.
- Budget Office of the Federation (BOF) (2013). 'FGN 2013 approved budget'. Abuja: BOF Publications.
- Budget Office of the Federation (BOF) (2014a). 'FGN approved budget'. Abuja: BOF Publications.
- Budget Office of the Federation (BOF) (2014b). 'Quarterly budget implementation report—fourth quarter 2014'. Abuja: BOF Publications.
- Central Bank of Nigeria (CBN) (2012). *Statistical Bulletin*. Abuja: CBN Publications.
- Central Bank of Nigeria (CBN) (2013). *Annual Report and Statement of Accounts*. Abuja: CBN Publications.
- Central Bank of Nigeria (CBN) (2014). *Statistical Bulletin*. Abuja: CBN Publications.
- Dolsak, N. (2001). 'Mitigating global climate change: Why are some countries more committed than others?'. *Policy Studies Journal*, 29(3): 414–36.
- Ekins, P., and S. Speck (2011). 'The fiscal implications of climate change and its policy responses'. Technical Report prepared for UCL Energy Institute. London: University College London. Available online at: [http://www.mca4climate.info/\\_assets/files/ClimatePolicy\\_FiscalSustainability\\_Final\\_Report\(1\).pdf](http://www.mca4climate.info/_assets/files/ClimatePolicy_FiscalSustainability_Final_Report(1).pdf) (accessed on 21 August 2015).
- Eleri, E., P. Onuvae, and O. Ugwu (2013). *Low-Carbon Energy Development in Nigeria: Challenges and Opportunities*. London: International Institute for Environment and Development (IIED) Publications. Available online at: <http://pubs.iied.org/pdfs/G03555.pdf> (accessed on 30 April 2015).
- European Renewable Energy Council (EREC) (2004). 'Renewable energy—A key solution to climate change'. Online Report of the Council. Available online at:

- [http://www.erec.org/fileadmin/erec\\_docs/Documents/Publications/ClimateChangeBriefing.pdf](http://www.erec.org/fileadmin/erec_docs/Documents/Publications/ClimateChangeBriefing.pdf) (accessed on 10 March 2015).
- Farauta, B.K., C.L. Egbule, Y.L. Idrisa, and V.C. Agu (2011). 'Farmer's perceptions of climate change and adaptation strategies in northern Nigeria: an empirical assessment'. Research Paper 15. Nairobi: African Technology Policy Studies Network. Available online at: <http://www.atpsnet.org/Files/rps15.pdf> (accessed on 27 July 2015).
- Federal Ministry of Environment (2009). 'Nigeria and climate change: Road to Cop15; Achieving the best outcome for Nigeria'. Nigeria: Federal Government of Nigeria. Available online at: <http://www.mrl.uk.com/casestudies/sites/nigeriaatcopenhagen/pdf/Nigeria%20Cop%2015%20Dec%2009.pdf> (accessed on 26 January 2016).
- German Watch (2011). 'Climate change performance index 2010'. Available online at: [www.germanwatch.org/klima/ccpi2010.pdf](http://www.germanwatch.org/klima/ccpi2010.pdf) (accessed on 27 July 2015).
- Index Mundi (n.d.). 'Crude oil (petroleum): Dated Brent, US\$ per barrel'. Available online at: <http://www.indexmundi.com/commodities/?commodity=crude-oil-brent&months=360> (accessed on 30 April 2011 and 22 August 2015).
- Intergovernmental Panel on Climate Change (IPCC) (2001). *Climate Change 2001: Synthesis Report*. Cambridge: Cambridge University Press.
- Intergovernmental Panel on Climate Change (IPCC) (2007). *Climate Change 2007: The Physical Science Basis*. Cambridge: Cambridge University Press.
- John, J.D. (2011). 'Is there really a resource curse? A critical survey of theory and evidence'. *Global Governance*, 17: 167–84.
- Koblowsky, P., and C.I. Speranza (2010). 'Institutional challenges to developing a Nigerian climate policy'. Paper presented at the Berlin Conference on the Human Dimensions of Global Environmental Change: Social Dimensions of Environmental Change and Governance, 20 September. Available online at: [http://www.diss.fu-berlin.de/docs/servlets/MCRFileNodeServlet/FUODOCS\\_derivate\\_000000001408/Koblowsky-Institutional\\_challenges\\_to\\_developing\\_a\\_Nigerian\\_climate\\_policy-394.pdf](http://www.diss.fu-berlin.de/docs/servlets/MCRFileNodeServlet/FUODOCS_derivate_000000001408/Koblowsky-Institutional_challenges_to_developing_a_Nigerian_climate_policy-394.pdf) (accessed on 26 January 2016).
- Korppoo, A., and A. Vatansever (2012). 'A climate vision for Russia: From rhetoric to action'. Policy Outlook. Washington, DC: Carnegie Endowment for International Peace.
- Löschel, A., B. Sturma, and C. Vogt (2010). 'The demand for climate protection—An empirical assessment for Germany'. Discussion Paper 10-068. Germany: Centre for European Economic Research. Available online at: <http://ftp.zew.de/pub/zew-docs/dp/dp10068.pdf> (accessed on 27 July 2015).
- Nordensvärd, J., and F. Urban (2011). 'The ambiguous role of corporations in climate change mitigation: an explorative appraisal of corporations in China, Malaysia and the US'. Working Paper 373. Brighton: Institute of Development Studies.
- Odjugo, P.A.O. (2010). 'General overview of climate change impacts in Nigeria'. *Journal of Human Ecology*, 29(1): 47–55.
- Ozor, N. (2009). 'Implications of climate change for national development—the way forward'. Enugu Forum Policy Paper 10. Enugu: African Institute for Applied Economics.
- Sachs, J.D., and A.M. Warner (2001). 'Natural resources and economic development: the curse of natural resources'. *European Economic Review*, 45: 827–38.
- Speck, D.L. (2010). 'A hot topic? Climate change mitigation policies, politics, and the media in Australia'. *Human Ecology Review*, 17(2): 125–34.

- Stepp, M., and M. Nicholson (2014). 'Beyond 2015: An innovation-based framework for global climate policy'. A Technical Report to Centre for Clean Energy Innovation. Available online at: <http://www2.itif.org/2014-beyond-2015-innovation-framework-global-climate-policy.pdf> (accessed 15 September 2015).
- Umar, H.S., and H.Y. Ibrahim (2011). 'Mitigating climate change through organic agriculture: a case study of farmers' participation in organic farming practices in Nasarawa State, Nigeria'. *Journal of Life and Physical Science*, 4(1): 44–52.
- United Nations (UN) (1998). *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. Available online at: <http://unfccc.int/resource/docs/convkp/kpeng.pdf> (accessed on 30 April 2015).
- United States Energy Information Administration (EIA) (2015). International Energy Statistics. Available online at: <https://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=79&pid=79&aid=1&cid=regions&syid=2000&eyid=2012&unit=TBPD> (accessed on 30 December 2015).