

Financing Effects of Global Economic Crisis on Energy Investments in Nigeria: A Comparative Analysis of Pre-Crisis and Crisis Era

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Abstract

The energy sector is recognised as one of the most crucial real sectors in any economy, considering the dependent nature of other sectors' development on its growth. The emergence of the global financial crisis that engulfed most African nations is one of the greatest threats to energy development in terms of investment and financing options despite the "resource curse" confronting most of the resource-endowed economies like Nigeria. This has motivated this study to examine the impact of the global financial crisis on energy investment and financing in Nigeria between the pre-crisis era (2000-2005) and the crisis era (2006-2010). The descriptive and graphical analysis employed revealed that between the pre-crisis (2000-2005) and during crisis era (2006-2010) total energy investment by both private and public sectors declined by 75.2% and this negatively affected most energy development indicators such as the hydro power generation capacity from Kainji, Jebba and Shiroro; total electricity production per capita; total electric power consumption per capita; and net oil proceeds to national output in Nigeria. Following these findings, the study recommends that joint partnership agreement between the private (both foreign and local institutional investors) and public sectors should be implemented to undertake most of the abandoned energy projects due to lack of finance, via a "Build, Operate, and Control (BOC)" system in order to revamp the energy sector development by 2020.

Introduction/Issues of Concern

Statistics from the International Energy Agency (IEA) indicate that about 1.6 billion people worldwide have no access to electricity (IEA, 2008). These people live mainly on the African continent. Furthermore, 2.5 billion people use fuel wood, charcoal, agricultural waste, and animal dung to fulfill their daily energy needs (IEA, 2008). The consequences of the lack of access to modern energy technologies are severe (see Table 1.1). In many cases, fuels are burnt in poorly ventilated or enclosed spaces leading to indoor air pollution. The World Health Organisation (WHO) estimates that 1.6 million people die of indoor air pollution every year of which 400,000 occur in Africa (WHO, 2005). This is further accentuated by the recent global economic crisis. The global economic crisis could be traced to the incidence of credit crunch around the middle of 2007 which ravaged the global economy. It further developed rapidly from mid-2008 into a financial and economic crisis. The insolvency of Lehman Brothers on 15 September 2008 and the subsequent bankruptcies of other well-known financial institutions triggered a domino effect, causing more banks to close, stock markets to tumble, and entire industries to stagger. Access to finance for investment purposes became more difficult and expensive.

Owing to this global economic crisis, energy investment worldwide is plunging in the face of a tougher financing environment, weakening final demand for energy and falling cash flows. For instance, recent reports from the International Energy Agency (2008) clearly show that the recent capital spending and demand for energy across sectors and regions are on the downward trend. This recent sharp falls in the demand for energy has contributed to sharp decline in international prices of oil, natural gas and coal in virtually all the sectors of the economy.

It is instructive to note that both supply and demand side investments in energy are affected by the global financial crisis. Energy companies are drilling fewer oil and gas wells and cutting back spending on refineries, pipelines and power stations. Many ongoing projects are being slowed down and a number of planned projects have been postponed or cancelled for lack of finance and/or because of downward revisions in expected profitability. Also, from the businesses and households angle, spending is decreasing especially on appliances, equipment and vehicles, with important knock-on-effects for efficiency of energy use. Tighter credit (especially from formal financial institutions) and lower prices make investment in energy savings less attractive financially, while the financial crisis is encouraging end users to rein in spending across board, as a defensive mechanism.

The energy sector, like all other sectors in the economy, is being profoundly affected by the worsening business climate and credit crunch occasioned by the recent global financial crisis. A fall in the levels of investment and a change in the patterns of investment across the economy constitute central components of the process. The consequences for energy security and climate change will be far-reaching depending on how governments respond, and the net effects could be negative.

Table 1.1: Number of people without access to electricity and relying on fuel wood and charcoal in Selected SSA countries in 2006

S/N	Countries	Total Pop. (million)	No. of People without Electricity access and relying on fuel-wood and charcoal for cooking (million)	(%)
1	Angola	16.6	14.4	88.0
2	Cameroon	18.2	14.2	78.0
3	Chad	10.5	10.1	97.0
4	Congo	3.7	2.9	78.0
5	Cote d'Ivoire	18.9	11.6	61.0
6	Equatorial Guinea	0.5	0.4	73.0
7	Gabon	1.3	0.9	70.0
8	Mozambique	21.0	18.6	89.0
9	Nigeria	144.7	76.6	53.0
10	Sudan	37.7	26.9	71.0
	TOTAL	273.1	176.9	65.0

Source: Adapted from IEA, 2008

In an attempt to keep the financial system from collapsing, however, governments and central banks of various economies (Nigeria inclusive) in particular have stepped in with non-traditional measures and have reduced interest rates to almost zero. The energy sector had been managing to withstand the credit crunch better than many other sectors through the summer of 2008, due to high oil prices. But suddenly in September 2008 the energy sector started to feel the impact. Fear and risk-aversion began to infect the financial markets, making financing for clean energy projects hard to find.

Against this backdrop, however, the major research questions are: What is the impact of the recent global financial crisis on both the demand and supply of energy in Africa and in particular Nigeria? Does it have implications for energy financing and investment in Nigeria? This study, therefore, provides answers to these very important research questions. It is against this background that this study evaluates the possible effects of the global financial crisis on energy investments and financing in Nigeria, using a combination of both descriptive statistics and graphical analyses.

Literature Review

Conceptual Model

The conceptual model of the transmission mechanism of the global financial crisis to the energy sector is presented in this subsection. As a crucial link in the nation's energy supply, the oil industry makes many significant contributions to Nigeria's development by providing over 90.0 per cent of the foreign earnings to the Nigerian economy. However, the oil industry is not an island. As a core industry in Nigeria, it has a close relationship with other sectors and the entire economy. Once the crisis happens, there will be series of chain reactions in the economy. We provide a simple flow chart of the transmission mechanism to illustrate how the global financial crisis impacts on energy, specifically the oil industry (see Fig. 2.1).

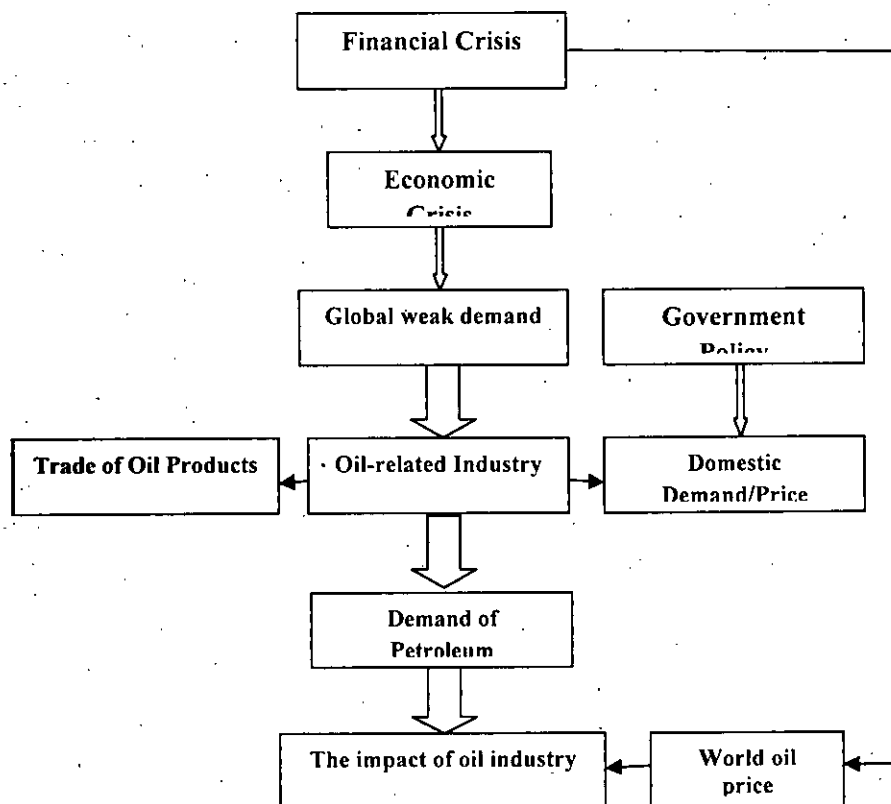
The mechanism of financial crisis and its impact on the oil industry can be divided into three phases:

The first phase: The transmission from global financial crisis to global economic crisis, which led to a global weak demand. As for evolution from the financial crisis to the economic crisis, the most important factor is the failure to operate the financial system normally which leads to a fracture of the financial chain.

The second phase: The transmission from oil-related industry to oil industry, and other factors such as oil price, currency appreciation, etc. For instance, the slow growth in energy-intensive industries and oil-related industries, including steel and iron, would no doubt drag down energy consumption. The fluctuations in international crude oil market have a far-reaching impact on Nigeria's oil market, embattled as it is with domestic problems of how to refine crude oil and to be integrated into global markets.

Furthermore, the profits of petrochemical companies are shrinking and the international trade amount is deteriorating. In addition, non-performing loans of energy investment are a problem to most of the oil companies; thus, petroleum companies began to re-evaluate their future investment projects.

Figure 2.1: A Schematic Transmission Mechanism of Global Financial Crisis to Energy Sector



The third phase: The transmission from economic crisis to social crisis, and the endeavours of the Nigerian's government. Social crisis mainly reflects in the labour market of oil engineering, which has atrophied both at home and abroad. It is a great challenge that the lower international demand for petroleum leads to a lower investment of petroleum and a lower demand for employees. To sum up, transmission of the financial crisis in Nigeria's oil industry is unique having its own specific characteristics. The market, the price, the government and the macro economy form a complicated and volatile environment that can change the whole oil industry.

Theoretical Review: Global Financial Crisis and Energy Sector Nexus

There is limited literature on the possible impact of global financial crisis on energy investment, consumption and financing. Most of the studies in this area only consider the implications of the global financial crisis on the entire energy sector. For instance, Ran (2010) examines the impact of the global financial

crisis on China's oil industry. According to the study, the oil industry is one of the industries that suffer from a direct impact and witness a fast spread of it. The article analyses the transmission mechanism of the global financial crisis and investigates factors that have influenced China's oil industry, thus giving targeted suggestions for the future plan and development of the oil industry in China.

A World Bank report in 2010 on the impact of the global financial crisis and the experience of India, Pakistan and Bangladesh clearly demonstrated the impact of the crisis on the electric power of these three countries. While all three countries are affected by the financial crisis, there has been a differential impact based on individual country circumstances which prevailed in late 2008. Pakistan was vulnerable because a difficult political and social environment had prevented the adoption of adequate policy measures to adjust to the earlier terms of trade shock. Additionally, the reliance on external funding had been relatively large. Bangladesh, on the other hand, had mostly been insulated from the first round effects of the financial crisis owing partly to sound macroeconomic management, but also because of its limited integration with world financial markets. In India, the financial crisis has not had a substantial impact on account of a number of factors: a fundamentally strong macroeconomy, proactive monetary policy management, prudent foreign debt management, substantial foreign exchange reserve cover, high savings rate, and a healthy financial sector. However, India plans to more than double its investments in infrastructure under its 11th and 12th Five Year Plans, and to draw heavily on private debt and equity capital to finance these investments at a time when the global financial markets are just beginning to come out of the crisis. This will need careful monitoring and management.

Empirical Review

Few empirical studies are available in the literature on the effects of the global economic or financial crisis. These studies are not on the effects of the global crisis on energy investment. For instance, a study by Akinguola and Sangosanya (2011) tried to evaluate the effect of the global economic crisis on industrial sector performance in Nigeria. The study employed structural stability regression models to capture the effect of the global economic crisis on industrial performance during the pre-crisis and crisis periods in Nigeria. The analysis revealed that industrial performance is negatively influenced by external shocks. The Chow breakpoint test revealed the existence of slight structural changes in industrial performance during the global economic meltdown. The study recommends the need for government intervention and other strategic policy options in order to lift the economy from recession through enhanced industrial performance.

Fritz-Morgenthal et al. (2009) carried out a study for the United Nations for Environment Programme (UNEP) on the global financial crisis and its impact on renewable energy finance. The study was carried out to get a more differentiated picture of the impact of the global financial crisis on the renewable energy sector

by determining changes and trends in investment flows for renewable energy technologies and companies as the cost of capital rises and access to credit becomes more difficult. The results from the study are based on both survey and empirical research and transaction-based data analysis. The study concluded that the year 2009 will be characterised by a mixture of consolidation and optimism. The study suggested that the clean energy sector should emerge strongly as a key component of a long-term stable low carbon global economy, provided governments acted to build and strengthen the framework conditions to make that happen.

Hemen et al. (2014) also examined the impact of the global financial crisis on economic growth on a developing economy. According to the study, the recent global financial crisis went a long way to revalidate the business cycle theory and therefore reminded us of its possible recurrence. The study used the Zivot Andrews test to check the strongest point of the structural break and then instrumental variable regression and OLS with dummy effects to test the significance of the crisis. The result suggests that 2009 was the structural break point, according to the Zivot Andrews test. Based on this result, the study opined that the global financial crisis affected economic growth, consumption and investment negatively, but is significant only on investment and not significant on consumption and Gross Domestic Product.

From the above review however, it is clear that there is a dearth of studies on the possible impact of the financial crisis on energy investment, which is the preoccupation of this study.

Energy Situation in Nigeria

Research Methodology

Given the objective of this study, which is to evaluate the financing effects of the global financial crisis on energy investments in Nigeria covering the preCrisis and Crisis eras, a purely descriptive method of analysis is used. Data on important variables such as major hydro power schemes in Nigeria, the location, installed capacity (MW), Available capacity (MW) and the number of people without access to electricity and relying on fuel wood and charcoal are sourced from the International Energy Administration outlook. Other important energy variables such as the electric power consumption, energy import, fuel exports, electricity production, crude petroleum and natural gas, carbon emission and oil rents were sourced from the World Bank Development Indicators. Major macroeconomic variables such as inflation rate, monetary policy rate, solid minerals and the sectoral contributions to GDP were extracted from the CBN Statistical Bulletin.

Energy Investment Situation before the Global Economic Crisis

Energy development in Nigeria started in Lagos during the early days of colonial rule. Later, in the provinces, isolated thermal stations operated by Public Works Departments (PWDs) dotted the nation. The first hydro-electric station was established in the Jos Plateau to serve small industries and domestic needs by the mining companies. In 1958, an offshoot of PWD became the Electricity

Company of Nigeria (ECN). A few years later, the Northern Regional Government in association with the ECN, commenced the development of the Niger Dam at Kainji via an Act promulgated in 1962. Thereafter, the ECN commissioned a study for large hydro dams at Shiroro and Jebba. In 1972, the Niger Dam Authority and ECN were merged to form the National Electric Power Authority (NEPA). Upon creation in 1972 of the Federal Ministry of Water Resources (FMWR), with statutory responsibility for water resources development, a National Council on Water Resources was promulgated with all State Commissioners for water resources and NEPA as members. Overall energy resources of the country are managed by the Energy Commission of Nigeria under the Federal Ministry of Power and Steel. The Commission is responsible for policy formulation and implementation, and coordinates energy development in the country.

During the 1970s there were major developments in the energy sector. The Shiroro and Jebba projects were commissioned (see Table 3.1), and numerous hydro sites were identified at Lokoja, Makurdi and Ikom on Niger, Benue and Cross River, respectively, and the Gembu, Zungeru, Katsina, Mambilla and Onitsha hydro dams.

Table 3.1: Major Hydro Power Schemes in Nigeria before the Crisis

S/N	Location	Installed Capacity (MW)	Available Capacity (MW)	Availability Factor %
1	Kainji	760	174	22.8
2	Jebba	540	501	86.6
3	Shiroro	600	454	75.7
TOTAL		1,900	1,129	61.3 (Av. Value)

Source: International Energy Administration Outlook (2008)

Thermal stations were sited at Sapele, Afam, Egbin, Delta and Ijora-Lagos and additional thermal sites identified at Eket, Lagos-Imore (Nuclear), Onitsha, Makurdi and Ajaokuta.

Energy Investment Situation during the Global Economic Crisis

Nigeria has the largest population of all African countries. According to the World Bank (2011), more than half of the 145 million Nigerians live below the poverty line of 2 dollars per day. Nonetheless, the national GDP increases between 7 and 9 percent per year. Nigeria heavily depends on the national oil sector, making up 95 percent of the country's total export revenues.

In 2007, oil production decreased by 40 percent due to sabotage and political conflicts. In 2004, the energy consumption in Nigeria was largely based on oil (58 percent), followed by natural gas (34 percent) and hydro power (8 percent). The share of renewable energies was only marginal. Between 1984 and 2004, the share of oil in energy consumption was reduced from 77 percent to 58 percent (IEA, 2007). In the electricity sector, the total installed capacity was of 5.9 megawatts (MW) of which only half was available.

Power outages occur frequently as the installation of new capacity does not keep pace with increasing demand. In addition, power losses in the electricity distribution system account for 34 percent of total power generation. Consequently, commercial and industrial consumers, as well as wealthy citizens, prepare for power cuts by privately operating diesel generators. This privately owned capacity exceeds by far the public electricity supply. Only in Lagos, the most populous Nigerian city - with 15 million people – there are one million large diesel generators in operation. Due to the shortcomings of the national energy system, the administration of former President Yar'Auda planned to encourage the development of renewable energies. The government was eager to tackle the energy crisis and drafted a master plan for renewable energies. However, despite all the efforts of the Yar'Auda government, the energy situation has not significantly changed.

Generally, Nigeria went through severe energy crises in the past, as energy demand increased more rapidly than energy supply. In addition, rising prices for fossil fuels and very high costs for nuclear power plants leave politicians with little alternative to renewable energies. In many cases, even large scale hydro power projects are no feasible alternative to "new" renewable energies, such as wind power, solar PV, biomass or geothermal power. It is important to note that the potential for hydro power has already been tapped and due to environmental and human rights concerns, the focus is laid on smaller projects. However, the major energy developments recorded between the 1970s and 1980s in Nigeria have significantly declined due to low energy investment, mismanagement and corruption. Since the mid-2000s, hydro power generation has declined (see Table 3.2) more than expected as a result of the global financial crisis that has resulted in low foreign capital inflow and low foreign investment partnership.

Table 3.2: Major Hydro Power Profile in Nigeria during the Crisis

S/N	Location	Installed Capacity (MW)	Available Capacity (MW)	Availability Factor %
1	Kainji	760	159	20.9
2	Jebba	540	240	44.4
3	Shiroro	600	220	36.7
TOTAL		1,900	6196	32.6 (Av. Value)

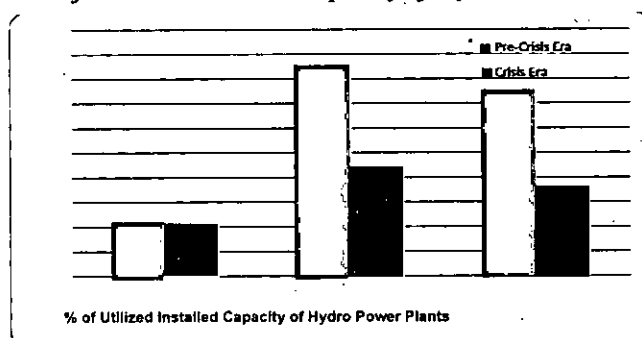
Source: International Energy Administration Outlook (2011)

The Jebba and Shiroro hydro power plants, which were earlier generating 86.6% and 75.7% of their total installed capacity before the global financial crisis (see Table 3.1), could no longer generate that much due to the crisis. Because of the global financial crisis (2006) and 2010, the Jebba and Shiroro hydro power plants utilisation rate of its total installed capacity had declined by 48.7% and 51.5% from their pre-crisis peak (see Figure 3.1). Among the major hydro power plants, Kainji is found to be the least utilised before and during the global financial crisis, generating 22.8% and 20.9% of its total 760MW installed capacity respectively. As shown in Figure 3.1, the available generated

hydro power from Kainji plant declined by 8.3% between the pre-crisis era and during the crisis era in Nigeria.

The declined trends of the Kainji, Jebba and Shiroro hydro power plants utilised capacity during the global financial crisis reflected the low energy investment in the sectors by both public and private stakeholders. Despite all efforts to revamp the energy sector to its peak through increased foreign investments and technological transfers, no significant outcomes have been recorded and energy development has been faced with myriad problems among which include corruption, low public investment and commitment, mismanagement, poor macroeconomic policy frameworks. In addition, ineffective energy policy plans have been compounded by the emergence of the global financial crisis.

Figure 3.1: Plot of Utilised Installed Capacity of Hydro Power Plants



Source: International Energy Administration Outlook (2011)

Impact of Global financial Crisis on Energy Investment and Financing

This section of the paper succinctly reviews the trend of energy investment and financing, energy indicators, and energy contribution to national output in Nigeria between 2000 and 2010. The reviewed periods were categorised into pre-global financial crisis era and during the crisis era ranging from 2000-2005 and 2006-2010 respectively. The average growth rate of the considered energy indicators relative to Gross National Investment (GNI) and Gross Domestic Product (GDP) in Nigeria are shown in Table 4.1, while the trend plots are presented in Figure 4.1-4.3.

The World Bank (2011) estimates revealed that investment of both private and public in the energy sector has astronomically grown between 2000 and 2005 (this covers the pre-crisis era) by average growth rate of 1061.5% (see Table 4.1 and Figure 4.1). This investment covers infrastructure projects in energy (electricity and natural gas transmission and distribution) that have reached financial closure and directly or indirectly serve the public. Moveable assets and small projects such as windmills are excluded. The types of investment projects included are operations and management contracts with major capital

¹ The average growth rate is computed from the data shown at the appendix

expenditure, Greenfield projects (in which a private entity or a public-private joint venture builds and operates a new facility), and divestitures. The total investment commitments are the sum of investments in facilities and investments in government assets, while investments in facilities are the resources the project company commits to invest during the contract period either in new facilities or in expansion and modernisation of existing facilities. Also, the investments in government assets are the resources the project company spends on acquiring government assets such as state-owned enterprises, rights to provide services in a specific area, or the use of specific radio spectrums. However, by the emergence of the global financial crisis (2006-2010), the public and private energy investments in Nigeria declined by 75.2% to US\$280 million from the peak of US\$1,129 million in 2005 (see Figure 4.1).

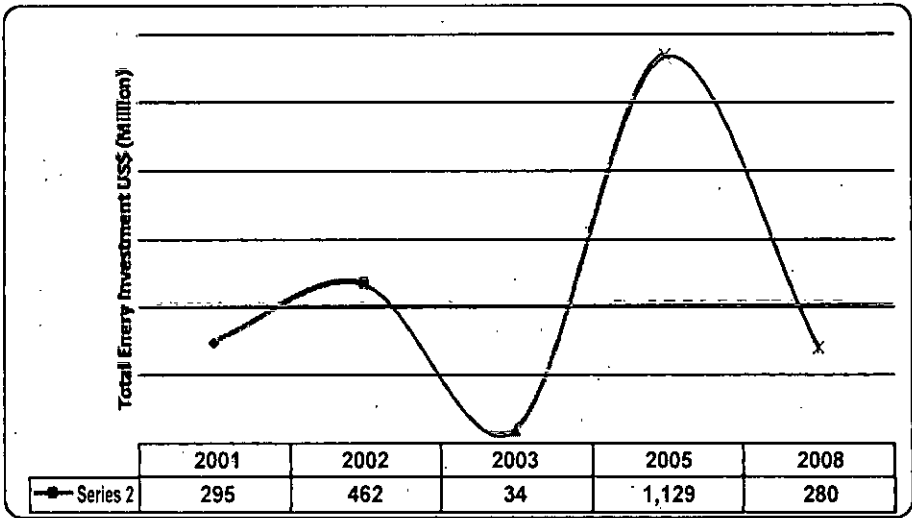
Table 4.1: Energy Indicators relative to Gross National Investment and Output in Nigeria

Energy Indicators	(% Average Growth Rate)	
	Pre-Crisis 2000-2005	Crisis Era 2006-2010
Investment in energy (public & private participation (current US\$))	1,061.5	-75.2
Adjusted savings: energy depletion (% of GNI)	11.4	-5.0
Adjusted savings: energy depletion (current US\$)	34.4	10.2
Adjusted savings: natural resources depletion (% of GNI)	11.5	-5.2
CO2 emissions from liquid fuel consumption (% of total)	-7.8	-3.2
CO2 emissions from solid fuel consumption (% of total)	59.5	2.9
Electric power consumption (kWh per capita)	10.4	0.9
Electric power consumption (kWh)	13.1	2.3
Electric power transmission and distribution losses (% of output)	-9.4	-7.1
Electric power transmission and distribution losses (kWh)	-1.6	-6.9
Electricity production (kWh)	7.8	-1.8
Electricity production from oil sources (% of total)	86.6	2.0
Electricity production from oil sources (kWh)	116.7	-0.9
Energy imports, net (% of energy use)	2.0	-1.9
Energy use (kg of oil equivalent per capita)	0.5	-0.7
Fossil fuel energy consumption (% of total)	2.3	-1.8
Fuel exports (% of merchandise exports)	-0.3	-2.1
Fuel imports (% of merchandise imports)	166.0	-20.2
Oil rents (% of GDP)	7.2	-5.0
Crude Petroleum & Natural Gas (% of GDP)	6.4	-3.7
Oil Refining (% of GDP)	35.3	9.7

Source: World Bank Development Indicators (2011)

The energy investment trend in Nigeria clearly revealed the negative effect of the global financial crisis on energy investment and financing in Nigeria and this has also significantly affected the development of energy development in Nigeria as shown by its barometers (see Table 4.1 and Figure 4.2-4.3) reported by the World Bank Development Indicators (2011).

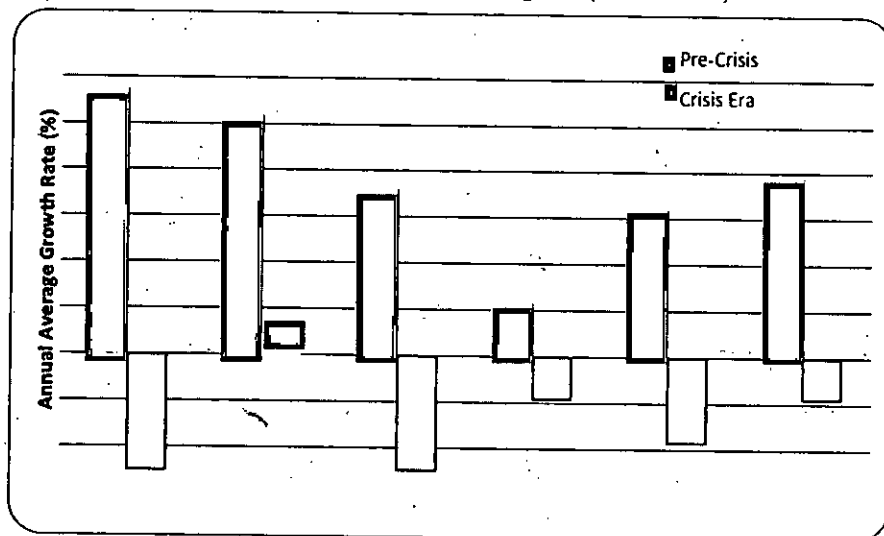
Figure 4.1: Trend of Energy Investment in Nigeria (current US\$)



Source: World Bank Development Indicators (2011)

A precise comparative analysis of the trend of energy investment in Nigeria vis-à-vis selected energy indicators as shown in Table 4.1 and plots presented in Figure 4.2 indicated that most of the considered energy development indicators worsened significantly during the global financial crisis periods (2006-2010) compared to the development position before the crisis era (2001-2005), using the average annual growth rate technique. The reported estimates revealed that adjusted savings of energy depletion as percentage of GNI (EGYD), which measures physical quantities of crude oil, natural gas and coal extracted, declined from an average growth rate of 11.4% in the pre-crisis era to -5% in the crisis era, representing 143.9% decline in total energy extraction to gross national investments; adjusted savings of natural resources depletion as a percentage of GNI (NRDP) that covers the net forest depletion, energy depletion and mineral depletion was found to decline by 145.2% between the pre-crisis and crisis era; total electricity production (ELPD) that covers hydropower, coal, oil, gas, and nuclear power, geothermal, solar, wind, tide and wave energy, and combustible renewables and waste energy generation was also found to decline by 123.1% between the pre-crisis and crisis era from an average growth rate of 7.8% (2001-2005) generation capacity to a decline of -1.8% average growth rate (2006-2010).

Figure 4.2: Trend of Energy Indicators in Nigeria (2000-2010)

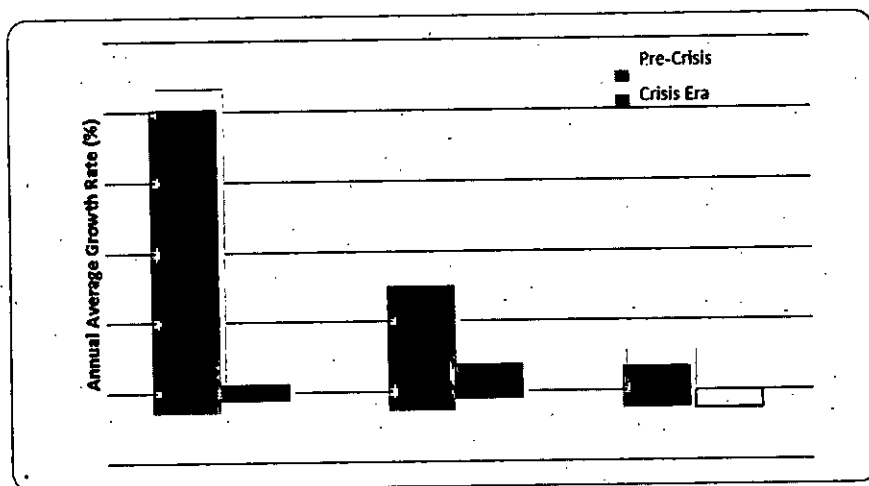


Source: World Bank Development Indicators (2011)

In addition, between the pre-crisis and during the global financial crisis era the average annual growth rate of oil rents as a percentage of GDP (OILR) that measure the net crude oil production proceeds declined by 72.5%; electric power consumption per capita (ECPC) as a proxy for the production of power plants and combined heat and power plants per person declined by 91.3%; fossil fuel energy consumption that comprises coal, oil, petroleum, and natural gas products as a percentage of total energy consumption reduced by 178.3%; and crude petroleum and natural gas contribution to total national output was found to decline by 157.8% (see Table 4.1 and Figure 4.2).

Also, Table 4.1 and Figure 4.3 revealed that electricity production from oil sources as a percentage of total production grew at an average annual rate of 86.6% and 2% during the pre-crisis and crisis eras respectively. This indicates that oil-based generated electricity production in Nigeria declined by 97.7% during the global financial crisis. This is attributed to diminished energy investment and total electricity production and thus hampered the performance of real output growth as a measure of economic growth and other macroeconomic indicators in Nigeria (see Table 4.2) during the global financial crisis emanating from the low contribution of crude petroleum and natural gas, and oil refining output to total Gross Domestic Product (see Table 4.1 and Figure 4.2-4.3).

Figure 4.3: Trend of Oil based Electricity Production, Oil Refining Output and Resource Depletion Average Growth Rate in Nigeria (2000-2010)



Source: World Bank Development Indicators (2011)

Conclusion and Policy Suggestions

The bursting of the United States housing bubble remains the major root cause of the calamity that engulfed economies around the world, inclusive of Nigeria in sub-Saharan Africa. The global financial crisis that spread across African countries remains one of the most severe threats of all time despite the “resource curse” confronting the economies prior to the crisis. Foreign capital inflows and private investments participation in the real sector of the economy, especially in the energy sector considering its multi-dynamic links with other real sectors, were greatly affected by the global financial crisis. Nigeria, as one of the most populated and resource-endowed countries in Africa, is selected for the appraisal of the impact of the global financial crisis on energy investment and financing between 2000 and 2010.

The descriptive and graphical analysis revealed that energy investment by private and public entities were negatively affected during the global financial crisis in Nigeria. Public and private energy investments were found to have declined by 75.2% from a peak of US\$1,129 million in 2005 (prior to the global financial crisis) to US\$280 million in 2008 (during the global financial crisis) to US\$280 million in 2008 (during the global financial crisis). The reduced energy investments and financing during the crisis periods further significantly affected most energy development indicators as the hydro power generation capacity from Kainji, Jebba and Shiroro fell from 61.3% to 32.6% of the total installed capacity. Other energy development barometers found to be negatively affected include savings of natural resources and energy depleted relative to gross national investment, total electricity production per capita, total electric power consumption per capita, and net oil proceeds to national output in Nigeria.

Table 4.4: Macroeconomic Performance in Nigeria before the Crisis and during the Crisis Era

Indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Real GDP Growth (%)	0.4	5.4	8.4	21.3	10.2	10.5	6.5	6.0	6.4	6.0	6.7
Inflation Rate (%)	6.9	18.9	12.9	14.0	15.0	17.9	8.4	5.4	11.5	12.4	12.1
Monetary Policy Rate (%)	13.50	14.31	19.00	15.75	15.00	13.00	12.25	8.75	9.81	7.44	9.75
Deposit Savings (%)	10.67	9.98	16.50	13.04	13.3	10.82	8.35	8.10	11.84	13.3	13.11
Max. Lending Rate (%)	21.55	21.34	30.19	22.88	20.82	19.49	18.70	18.36	18.70	22.90	23.19
Sectoral Share of Real Gross Domestic Product											
Agriculture (% GDP)	36.7	35.8	34.3	43.9	42.6	41.0	41.2	41.7	42.0	42.1	41.8
Industrial (% GDP)	35.4	37.0	36.0	28.5	31.4	29.7	28.3	26.0	23.9	21.8	20.6
Crude Petroleum(% GDP)	30.8	32.5	31.5	24.5	27.5	25.7	24.3	21.9	19.6	17.3	16.0
Sub-Sectors Share of Industrial Output											
Crude Petroleum (%)	86.9	87.7	87.5	85.8	87.6	86.7	85.7	83.9	81.9	79.6	78.0
Solid Minerals (%)	0.8	0.8	0.8	0.9	0.8	0.9	0.9	1.1	1.2	1.4	1.6
Manufacturing (%)	12.2	11.5	11.6	13.3	11.6	12.4	13.4	15.0	16.8	19.0	20.4

Source: Central Bank of Nigeria (CBN) Statistical Bulletin (2011)

In an attempt to revamp the energy sector in Nigeria, the government should give more priority to the sector by adopting a more aggressive expansionary fiscal policy framework considering the interdependence of other real sectors on its development. Also, joint partnership agreements between the private (both foreign and local institutional investors) and public sectors should be implemented to undertake most of the abandoned energy projects due to lack of finance via a "**Build, Operate and Control (BOC)**" system. This framework is expected to guarantee investors' returns on their investment, despite the high risk and uncertainty associated with most investments during the global financial crisis era. Also, a check on corruption and mismanagement in the public-private arrangement will help to boost the development of the energy sector. If these suggestions are carefully implemented, the energy sector can develop to the expected multi-sectoral dynamic stage by 2020.

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