

We take learning and research beyond the usual boundaries.

*Imagine the possibilities.
Unlock your potentials.*



Experience:

- Rich blend of Faculty/ World Class Curriculum
- Innovative Teaching Research
- Stable Academic Calendar

• CPEEL is a unique programme that takes learning and research beyond the usual boundaries. We are progressive, and our courses are designed and developed through ongoing industry, policy and academia input.

• The flagship of the Centre is graduate training leading to the awards of Master and Doctorate degrees in Energy Studies with different specializations. The Centre in collaboration with the Faculty of Law also offers LL.M and Ph.D. in Energy Law.

• Potential students require varied background degrees ranging from Engineering, the Social Sciences, Basic Sciences and Law.

Programmes available at the Centre include:

- M.Sc. (Energy Studies), with specialization in:
 - Energy and the environment | Energy Economics | Energy Finance | Energy Policy | Oil and Gas Economics Economics of the Power Industry | Renewable Energy
 - LL.M (Energy Law)

PhD (Energy Studies), with specialization in:

- Energy and the environment | Energy Economics | Energy Finance | Energy Policy | Oil and Gas Economics.
- Economics of the Power Industry | Renewable energy
- PhD (Energy Law)

www.cpeel.ui.edu.ng



CENTRE FOR PETROLEUM, ENERGY ECONOMICS AND LAW

University of Ibadan, Ibadan, Nigeria

Email: cpeel@mail1.ui.edu.ng

Phone: 08103279807



NAEE Energy Forum

April, 2016

A Publication of Nigerian Association for Energy Economics

4th Edition



Message from the President



I am very much honoured to have been elected as the President of the Nigerian Association for Energy Economic (NAEE) and Chair of the NAEE Council at the 8th NAEE/IAEE held at the University of Ibadan, Ibadan in April 2015. I sincerely appreciate the cooperation of all NAEE members, thus far, since I assumed the NAEE presidency. I accepted to serve as the NAEE President, having served previously as the 2008 President of USAEE and the 2014 IAEE President in order to sustain the prominence of NAEE as an estimable affiliate of IAEE and a formidable stakeholder in the energy sector in Nigeria and beyond. It is therefore appropriate to formally use this medium to commend again the erudite Professor of Energy Economics and the Immediate Past President of NAEE, Professor Adeola Adenikinju, for the tremendous work he has done over the years with respect to the admirable status of NAEE in the Nigerian energy sector and among energy professionals in IAEE Affiliates worldwide.

NAEE recorded as high as 300 members at one time or the other since its inception and the growth in student membership over the last decade makes NAEE's future tremendously promising. I sincerely hope we can grow our membership to 500 members before the expiration of my term of office. New strategies to grow NAEE membership through institutional membership in the public, academia and private sectors; and invitation to new and keeping existing members to foster a closer interactions between these sectors are essential to accomplish NAEE long term goal. The long term strategy to accomplish this goal is entwined with the IAEE strategy to advance knowledge, promote understanding and applications of economics across all aspects of energy issues, challenges and outlook. NAEE shall endeavour to position itself strategically to facilitate information flow on energy economics and policy issues amongst energy professionals in government, industry, and academia in Nigeria. Its overall expected outcome is to remain a solid bridge that links custodians of knowledge and tools for energy economics education with the users of knowledge and tools to solve energy problems confronting Nigeria, Africa and in the world in general.

Thus, NAEE inaugurated a World Energy Day Celebration for the first time in Nigeria on 21st October 2015. Several dignitaries from the energy sector participated in the energy walk designed to mark the day. The VP Publications and Conferences, Dr. Hassan Mahmoud of the Central Bank of Nigeria (CBN), the Treasurer, Mrs. Priscilla Ekpe of Petroleum Products Pricing Regulatory Authority (PPPRA), and the entire NAEE Local Organizing Committee of World Energy Day celebration are highly commended for the success of the event. NAEE looks forward to coordinating the celebration in 2016 as well. Furthermore, NAEE has successfully hosted eight International Energy Economics Conferences in Nigeria since 2008. The 9th NAEE/IAEE International Conference themed "Energising Emerging Economies: The Role of Natural Gas and Renewable Energy" will be held on 24-26 April 2016 at Sheraton Hotels, Abuja. The conference is poised to discuss the energy supply options for energising emerging economies like Nigeria. Energy, by global consensus, is the bedrock for economic development of any nation. Thus, treating oil and gas resources primarily as sources of energy tend to promote economic growth and development faster than treating oil and gas resources as income or revenue sources. The latter approach tends to encourage income redistribution and transfer payments with limited impact on sustainable economic development thereby heightening the resource curse phenomenon.

(Continued on page 2)

Perhaps, you will permit me to use this opportunity to reiterate some perspectives that I have offered or shared severally in the past, on the declining trend in crude oil prices and its implications on the economy of Nigeria within the context of the quest for access to affordable, sustainable and secure energy. There is no doubt that access to affordable energy is vital for human survival and economic development of the human race. It is well known that over a billion people around the globe, especially in developing sub-Saharan Africa countries, and in rural areas are without access to basic energy services. Thus, falling oil prices makes access to energy affordable to a large extent, at least in the short run. There is an indirect correlation between oil consumption and economic growth in countries with pragmatic petroleum policies that are geared towards maximisation of national interests rather than personal interest. This implies that when the price of oil goes down, oil consumption can be expected to rise, *ceteris paribus*, and for the most part, economic growth and development can be expected to rise as well.

Furthermore, I hasten to add that falling oil prices should be viewed as an opportunity to diversify the economy of Nigeria and to do away with the gorilla called petroleum subsidy. We have been here before in the early to mid-1980s and Nigeria survived. Let me opine also that falling oil prices offers Nigeria an opportunity to cut wastage in spending, to set aside fiscal irresponsibility, to reduce overdependence on oil permanently, and to get rid of bloated governance spending expenses. Further, with the requisite political will, Nigeria needs to take advantage of the low global oil price decline to allow the pump price of petrol in the Nigerian petroleum product market to determine the prevailing market clearing price or adopt petroleum product export parity pricing mechanism to set its price. This will facilitate bidding farewell to petroleum subsidies forever and ever in Nigeria. It also offers a unique opportunity to deregulate the downstream oil and natural gas markets.

In closing, I would like to bring to your attention several upcoming IAEE International conferences worldwide. The 39th Annual IAEE International Conference will be held 19-22 June 2016 at the Norwegian School of Economics (NHH) in Bergen, Norway. The conference theme in Bergen, Norway is, "Energy: Expectations and Uncertainty." I also would want to bring to your attention other and remaining IAEE endorsed or sponsored Conferences in 2016. The 34th USAEE/IAEE North American Conference will be held in Tulsa, Oklahoma on 23-26 October 2016. The theme of the Conference is, "Implications of North American Energy Self-Sufficiency." There is also the 1st IAEE Eurasian Conference, which will take place in Baku, Azerbaijan between 28 and 31 August 2016, and will focus on energy economic issues of the Caspian region. The theme of the Conference is, "Energy Economics Emerging from the Caspian Region: Challenges and Opportunities." Please visit IAEE website for more information on these conferences. I certainly hope several NAEE members would take advantage of these capacity development opportunities.

Finally, I would like to sincerely offer my great appreciation, delight and gratitude, on behalf of the NAEE, to his Excellency, the Vice President of the Federal Republic of Nigeria, Professor Yemi Osinbajo (SAN). His Excellency hosted members of the NAEE Council on a courtesy call at the Presidency despite his busy schedule on 18th February 2016. NAEE also appreciates his Excellency for accepting, official duty permitting, to be our Distinguished Guest of Honour to declare open the 9th NAEE/IAEE International Conference. It is also appropriate to recognise NAEE Conference sponsors and supporters, over the years, including but not limited to the following institutions and individuals: Nigerian National Petroleum Corporation (NNPC), CBN, Nigerian National Petroleum Corporation (NNPC), Energia, PPPRA, Shell, Chevron, National Petroleum Investment Management Services (NAPIMS), Nigerian Petroleum Development Company (NPDC), Nigerian Electricity Regulatory Commission (NERC), Platform Energy, Seplat, Schlumberger, Centre for Petroleum, Energy Economics and Law (CPEEL) University of Ibadan, Emerald Energy Institute University of Port Harcourt (EEI UNIPORT), Energy Commission of Nigeria (ECN), International Association for Energy Economics (IAEE), Dr. Emmanuel Egbogah, Engr. Fisoye Delano, Professor Adeola Adenikinju, Professor Akin Iwayemi, and others.

Thank you for reading NAEE Energy Forum and may God bless the Federal Republic of Nigeria.

PROFESSOR WUMI ILEDARE
NAEE President



NAEE Mission Statement

Mission Statement

The Association is a nationwide nonprofit organization with a membership drawn from business, government, the academia and other professionals and a mission to advance the understanding and application of economics across all facets of energy development and use, including theory, business, public policy, and environmental consideration.

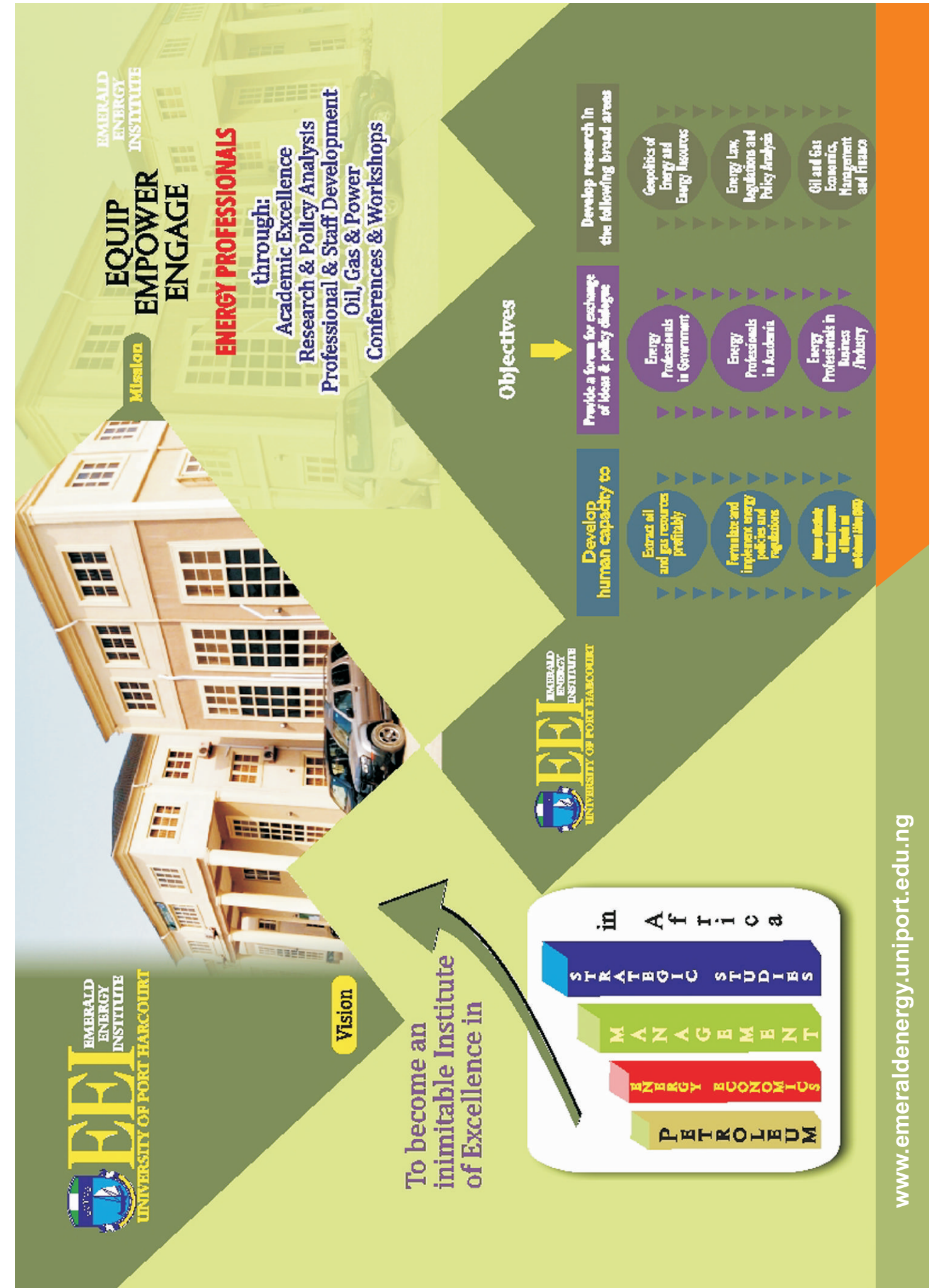
To this end, the Association:

- * Provides a forum for the exchange of ideas, advancement and professional experiences in energy economics;
- * Promotes the development and education of energy professionals;
- * Fosters an improved understanding of energy economics and energy related issues by all interested parties; and
- * Provides a forum for contribution to national discourse on energy policy issues in Nigeria.



The Nigerian Association for Energy Economics NAEE
c/o Professor Omowumi O. Iledare, Ph.D.,
Chirota and Emmanuel Egbogah
Distinguished Professor and
Director, Emerald Energy Institute,
University of Port Harcourt,
Rivers State, Nigeria;
Phone: +234-805-765-7494
Email: president@naee.org.ng
wumi.iledare@yahoo.com

Administrative Officer
Nigerian Association for Energy
Economics (NAEE)
Email: admin@naee.org.ng





Editor's Note

Welcome to the fourth edition of the NAEF Energy Forum, the official Newsletter of the Nigerian Association for Energy Economics (NAEE). What a year 2015 had been! In our third edition, members raised concerns with regard to the impact the volatility in the international oil market would likely have on the economies of countries heavily dependent on oil for income, countries like Nigeria. In some instances, predictions for tough times were made. Past forward to 2016, some of these predictions, as they relate to Nigeria, have already proven extremely, and in some instances startlingly, accurate. We have witnessed a year in which the economy of Nigeria was described by some analysts as being in a state of stasis. A year when policymakers grappled with mounting challenges not only in the petroleum sector, where the price of crude oil in the international oil market remained stubbornly low, but also in the electricity sector where an almost total collapse occurred on 31st March 2016, with all the distribution companies receiving zero megawatts allocation from the system operator, the Transmission Company of Nigeria. Members of the Forum have therefore dedicated time and energy in uncovering some of the causes of the problems encountered and proffering creative and innovative solutions to the problems.

In his paper, Professor Wumi Iledare recalled, with nostalgia, the days when agricultural and solid mineral resources in Nigeria were the drivers of the nation's industrial revitalisation. While conceding that the oil and gas sector, though in turmoil, will continue to play a critical role, in the short term and medium term, in the national economy, he proffered some strategic options that would ensure the maximisation of the value of the sector, while at the same time diversifying the sources of income for the economic development of Nigeria.

Professor Adeola Adenikinju and Ayooluwa Adewole examined the impact on Nigeria of the lift of sanctions on export of Iranian oil. The authors posit that the influx of Iranian oil, which is likely to be doubled in the medium term, can lead to further saturation of the oil market and, in turn, further downward pressure on crude oil prices. The outcome could have significant implications on Nigeria's economy on multiple fronts. One of such fronts is the nation's budget where downward revision of the oil benchmark, a necessity in the current convoluted situation, will result in a wider budget deficit. They advocate for vertical and horizontal restructuring of the oil industry in order to optimally benefit the economy.

The inextricable nexus between petroleum resources and the electricity industry in Nigeria, especially as it relates to the recurrence of persistent shortages of both vital commodities simultaneously, is explored by Professor Akin Iwayemi. The double-pronged approach identified salient factual and statistical reasons for the supply conundrum in both sectors. The author succinctly articulates a step-by-step holistic framework for an efficient and sustainable exit strategy from the "economically and politically embarrassing" situation of inadequate and epileptic petroleum and electricity supply in the country. He further advocates for evidence-based research to identify cogent approaches that would extricate Nigeria from the present dire economic crisis and prepare it for a viable post-oil era.

Terfa W. Abraham writes his views on the discourse on the pros and cons of the devaluation of Nigeria's currency, the Naira, relative to the United States dollar. In view of the dwindling crude oil price in the international oil market, the author analysed data on the all share indexes of the Nigerian Stock Exchange, crude oil prices, and exchange rate for two periods: 2008 – 2009 and 2012 – 2015. His findings and the policy implications of such findings are illuminating and profound.

In response to the call for novel solutions to the current insecurity of supply in the electricity sector in Nigeria, Obehi Ebebele explores the level of acceptability and preparedness of Nigeria for the introduction of Smart Metering in order to combat electricity losses in the industry. The author ran the outcome of deployment of the technology in other jurisdictions through a filter, sifted and itemised the advantages and



The Nigerian Association for
Energy Economics NAEF
c/o PROFESSOR OMOWUMI O. ILEDARE, Ph.D.,
Chirota and Emmanuel Egbogah
Distinguished Professor and
Director, Emerald Energy Institute,
University of Port Harcourt,
Rivers State, Nigeria;
Phone: +234-805-765-7494
Email: president@naee.org.ng
wumi.iledare@yahoo.com

Administrative Officer
Nigerian Association for Energy
Economics (NAEE)
Email: admin@naee.org.ng

disadvantages of the technology for the consideration of policymakers in Nigeria.

Balkisu Saidu and Safiyyah Ummu Mohammed examine the legal responsibilities of electricity supplier to the consumer, especially in cases of irregular power supply. Their findings indicate a disconnect between the mandatory provision of the Electric Power Sector Reform Act 2005, which requires the regulator to develop standards for the payment of compensation to consumers who do not enjoy regular power supply and the reality on the ground. They advocate for proper implementation of the legislation in order to bring the words of the law to life. The article by Adejola Adenike examines the level of 'electricity illiteracy' of Nigerians; illiteracy that results from failure to "acquire knowledge" on the cost and benefits of inefficient use of electricity. The author decried the prevalence of waste of electricity as a result of inefficient use through conscious and unconscious habits. She raised some critical questions that require the attention and critical thinking of every Nigerian in their resolution.

Ogunyiola Ayorinde Joshua analysed the implication of the development of shale oil in one of the world's largest importers of Nigeria's crude oil, China. Such development, according to the author, presents a double threat of decline in global oil price and dwindling market for Nigeria's oil export, which ultimately could lead to further deterioration of the Nigerian economy. He attributed the financial woes of Nigeria to its decades of over-dependence on crude oil for its revenue, exposing the country's economy to macroeconomic shocks: fallen crude oil revenue, rising external debt, depreciating exchange rates, declining foreign exchange reserves!

Toeing the same line of shale, Oluwasola E. Omoju and Terfa W. Abraham, while acknowledging that China stands to benefit from its shale oil development economically, socially and environmentally, they identified some constraints that China faces in its shale gas development plans. Comparable cost advantage of import of conventional gas, complicated pipeline access procedure, 'unfriendly' geology, limited expertise, inadequate transportation (pipeline) infrastructure, shortage of water supply, environmental concerns, lack of open and competitive business environment, all combine to make the shale gas production more difficult than usual.

Olusanya E. Olubusoye and Olaoluwa S. Yaya present a statistical time series analysis of the impact of volatility in the petroleum pricing markets. They applied the fractional integration techniques, symmetric and asymmetric volatility modelling, and Jump robust volatility modelling to estimate the persistence approach and determine appropriate volatility model for the log-returns of prices of crude oil and other petroleum products.

Apart from these captivating articles, the President's message captures information on up-coming events of the IAEE and NAE. We also have a section containing excerpt of events at the 8th NAE Annual International Conference held 26-28 April 2015 at the Trenchard Hall, University of Ibadan, in the historic city of Ibadan, Nigeria.

Let me also use this medium to congratulate our Administrative Officer at the NAE, Bukola Atinuke Elehin, and her hubby Opeyemi Emmanuel for their successful and colourful nuptials in the month of March 2016. This is wishing you blessed union and wonderful God-fearing children.

Our appreciation goes to all the contributors to this edition. We look forward to your continued contributions and support; and welcome suggestions, views and comments on all aspects of the Newsletter. We also welcome articles on any subject of interest to NAE members for publication in next edition, which issue will coincide with the NAE Tenth (10th) Year Anniversary. Articles should be in English using the MS Word (1997-2007) format and Times New Roman font style font size 12. Text layout should be kept simple, with regular headings, subheadings (where appropriate) and paragraphs. Articles should be in the region of 700-1,500 words; and should include the contributor's name, email address, phone number and affiliation. Pictures may be included in a separate file in JPEG format. Our contact email addresses are: admin@naee.org.ng and balkisaidu@yahoo.co.uk.

We remain grateful to you for your patronage!

DR BALKISU SAIDU
April, 2016

LIST OF CONTRIBUTORS

OMOWUMI O. ILEDARE, Ph.D.
Chirota and Emmanuel Egbogah Distinguished Professor and Director, Emerald Energy Institute, University of Port Harcourt, Rivers State, Nigeria; President, Nigeria Association for Energy Economics (NAEE).
Email: wumi.iledare@yahoo.com,
Phone: +234-805-765-7494.

AKIN IWAYEMI
Professor of Economics and Principal Investigator at the Centre for Petroleum, Energy Economics and Law (CPEEL), University of Ibadan, Ibadan, Nigeria.
Email: akiniwayemi@hotmail.com.

ADEOLA ADENIKINJU
Professor of Economics, University of Ibadan, Ibadan, Nigeria and Director Centre for Petroleum, Energy Economics and Law (CPEEL), University of Ibadan, Ibadan, Nigeria.
Email: adeolaadenikinju@hotmail.com,
adeolaadenikinju@yahoo.com;
Phone: +234-802-344-0018.

DR BALKISU SAIDU
Senior Lecturer, Department of Public Law and Jurisprudence, Faculty of Law, Usmanu Danfodiyo University, Sokoto, Nigeria.
Email: balkisaidu@yahoo.co.uk

TERFA W. ABRAHAM
Economist/Research Fellow II, National Institute for Legislative Studies (NILS), Maitama, Abuja, Nigeria.
Email: lorenzcurve@yahoo.com;
Phone: +234-806-209-1306.

OLUWASOLA E. OMOJU
China Center for Energy Economics Research (CCEER), Xiamen University, China.
Email: sholley@yahoo.co.uk

OBEHI EBWELE, MNSE
Emerald Energy Institute, University of Port Harcourt, Rivers State, Nigeria.
Email: obebewele@gmail.com
Phone: +234-805-885-0727.

OGUNYIOLA AYORINDE JOSHUA
Department of Economics, University of Ibadan, Nigeria.
Email: ayooogunyiola@yahoo.com
Phone: +234-706-382-7113.

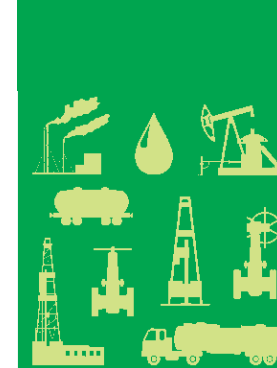
BARRISTER SAFIYYAH UMMU MOHAMMED
Lecturer, Department of Public Law and Jurisprudence, Faculty of Law, Usmanu Danfodiyo University, Sokoto, Nigeria.
Email: saf_ng@yahoo.com
Phone: +234-813-666-1854.

AYOOLUWA ADEWOLE
Centre for Petroleum, Energy Economics and Law (CPEEL), University of Ibadan, Ibadan, Nigeria.

OLUSANYA E. OLUBUSOYE
Department of Statistics, University of Ibadan, Nigeria.
Email: oe.olubusoye@ui.edu.ng

ADEJOLA ADENIKE
Emerald Energy Institute, University of Port Harcourt, Rivers State, Nigeria.
Email: rafiatadejola@yahoo.co.uk
Phone: +234-803-386-3130.

OLAOLUWA S. YAYA
Department of Statistics, University of Ibadan, Nigeria.
Email: os.yaya@ui.edu.ng



April, 2016

Petroleum and Nigeria Economy: Strategic Options for Sustainable Economic Development

Wumi Iledare, Ph.D. SFUSAAE, DFNAEE*

Background

Agricultural production, solid minerals trade and utilisation, before the discovery of petroleum, anchored Nigeria's economy. Coal met fully the needs of the railway system and electricity supply, while tin yielded substantial foreign exchange earnings for the nation and there were many employment opportunities in the nation. The potential of Nigeria to become a highly prosperous economic power, with its large human and natural resources, has over the years, remain elusive, perhaps, because of the following reasons:

1. Poor institutional governance structure—regulatory, policy, commercial;
2. Ineffective Federal character doctrine executed mostly through the prism of religion, ethnicity, and money;
3. Insecurity of assets, poverty of the mind, and elite capture mentality; and
4. Inadequate connectivity or linkage between petroleum and other sectors of the economy.

Thus, the aspiration of the Federal Government in Nigeria to be among the top 20 economies of the world by 2020 requires significant growth of its Gross Domestic Product (GDP). However, in order to expand the economy at about 10-12% growth rate in GDP, access to affordable, secure and clean energy—oil, gas, and power—is critical. I hasten to say that the engine to propel the Nigerian economy to the expected end in 2020 and beyond is primarily the oil and gas sector in the short to intermediate run.

Thus, it is imperative for the following to happen as quickly as practicable:

1. Expansion of the domestic natural gas market through accelerated gas development and utilisation are in order to get the full multiplier impact of oil and gas.
2. The petroleum industry reform of the oil and gas institutions and fiscal provisions is a necessary condition to re-energise the industry and the economy
3. Repositioning the national oil company for greater efficiency and effectiveness is also inevitable in the scheme of the expectation of accelerated development to be among the top twenty economies in the World.
4. Fiscal responsibility, transparency and accountability in the oil and gas sector are inevitable.

Impact of Petroleum Resources in Nigeria

According to the 2015 British Petroleum Statistical Review of World Energy, the estimated crude oil and natural gas reserves for Nigeria as at 1st January 2015 were 37.1 billion barrels and 180.1 trillion cubic feet (Tcf) respectively (BP, 2015). At the current production rate of over 2 million bpd, the estimated reserves life index is 43.0 years. The country ranks among the top 10 nations in liquid and gas reserves worldwide. The exclusive power and proprietary rights over mineral resource management, including oil and gas resources, belongs to the federal government.

Largely, the vesting of the ownership of oil and gas resources in the federal government, has significantly affected the governance of Nigeria economy and political structure as evidenced in the rendering of a democratic federal system of governance to a unitary systemic government scheme, in my opinion. Government revenue at every level of government in Nigeria is highly dependent on the capital-intensive oil and gas sector, but less than 25% of the national GDP, on average, from 1999-2014 is attributed to the petroleum sector. The sector also accounts for about 95% of foreign exchange earnings,

* Chirota & Emmanuel Egbogah Distinguished Professor/Director Emerald Energy Institute, University of Port Harcourt, Nigeria & President, Nigeria Association for Energy Economics (NAEE).
Email: wumi.iledare@yahoo.com,
Phone: 08057657494



98.8% of total exports, and 75% of federally collected revenues. Though Nigeria is a major oil exporter, it imports most of its refined products and flares its natural gas with an estimated loss of 18.2 million US\$ daily.

Strategic Value Creation and Sustainability Options

1. Management & Control of Petroleum Revenue: The question of “who is the best custodian of economic rent from mineral resources?” is a constant debate that needs resolution. As a step for value creation, the Federal government should be entitled to the direct income and revenue from mineral developers, State governments are to be allowed direct income and revenues from companies’ resident in the States while, the Local Government Councils are to be allowed property tax, sales tax or share of taxes, bonuses, royalty and other taxes. This is one reason why the constitutional mandate of who has the power to collect revenue needs a re-visit. The idea that all the money collected and deposited in the federation account is spendable the year it is collected is a case worth testing at the highest court of the land.

Equitable distribution of economic rents can facilitate contentment with the government and this will promote stability. Government increased spending would be targeted at certain infrastructures that could improve quality of life of the citizens. With an improved quality of life, productivity will increase; output will grow with stability in government and that would further enhance investments. Petroleum resources are exhaustible. A barrel of oil equivalent produced now is no longer available for future generations. It is therefore imperative for government to establish a foundation account or fund for the development of non-exhaustible projects including human capacity and infrastructure development. Finite resources such as petroleum come with generational issues and, as such, there is need for accountability and transparency at all levels of government. The local expectations ought to be based on knowledge and public education.

2. Indigenise Petroleum Resource Development: The participation of independents and homegrown investors has to be encouraged by making petroleum assets attractive and bankable. A timely agreement with leaseholders and government agencies would help. Government should provide and sustain favourable tariff regime, competitive taxation regime, incentives and tax holidays for local investors. International companies registered as local companies are also eligible for this strategic policy option for value creation. The involvement of local banks in the sector is critical for its development.

The inadequacy of domestic investments in local businesses constitutes the absence of a significant driving force to grow the local economy. An enhanced relationship between human capital formation and growth with savings accumulation and domestic investment is a necessity. The government is to enhance fiscal regime that will attract both local and foreign investors – sustainable under a transparent, independent and modern licensing system and administration. Human capital accumulation is a continuous process and its formation and growth through savings accumulation and domestic investment is imperative in this process of resource indigenisation at all levels. It is one thing to train and hire and it is another thing to use employees at full potential to sustain growth. Utilization of homegrown management staff and supervisors are also imperative. To this end, the provisions of the Nigerian Oil and Gas Industry Content Development Act 2010 should be implemented to the latter.

3. Emphasise Petroleum as a Source of Energy to Power the Economy rather than as a Source of Revenue to Govern: Promoting and marketing derived petroleum products in the global markets especially within the sub-region can create value. Resource derivatives, especially from liquid minerals by local people for domestic and regional markets may grow the economy faster than as a primary resource for cash. I hasten to say that treating petroleum resources primarily as a cash flow source has not propelled the economy of Nigeria to stardom. What such thinking—cash-flow mentality has resulted in the following unintended consequences of petroleum revenue dependency:

a. Constitutional and statutory funding guaranteed for the three levels of the federal systems with no accountability creates undue leakages in the economy.

- b. There is a preoccupation with revenue sharing at the expense of efficiency, effectiveness, ethics, and equity in resource allocations.
- c. Constituent units of the federation lack incentives to raise their own revenues because the central transfers are constitutionally mandated; virtually no unit feels obligated to account for the monies they received from the federation because the electoral process is too weak and dysfunctional to punish incompetent politicians (See Figures 1 and 2).

Focus on local and regional markets for natural gas, especially now that the Liquefied Natural Gas (LNG) market is soft is win-win policy option. Domestic Gas market with emphasis on electric power, commercial and industrial end-users is surely going to create value addition for sustainable economic growth. The permit process to build refinery should be for environmental and standard qualification only not for political gladiators. It is not conjectural to state that commercial energy use pattern leaves much to desire. For sustainable economic growth in Nigeria, the International Monetary Fund (IMF) and World Bank can be approached to grant loans to encourage regional markets to trade within regions for cost effectiveness and loan efficiency.

4. Establish, Empower and Engage Institutions and Parastatals: The role of the government would be to evolve resource development policies through the act of the National Assembly and let the Ministry of Finance become responsible for revenue verification and cost verification. The internal revenue service collects tax revenue on behalf of the government as necessary. The Ministry of Interior is to ensure the employment verification that facilitates knowledge transfer. I must add without mincing words that professionalised Ministries, Departments and Agencies (MDAs) for effective management of petroleum resources is a necessity if the emerging governance structure is worthy of expectations. One of the reasons of the limited impact of hydrocarbon development on the Nigerian economy is industry governance and the lack of transparency and accountability in the institutions that govern and manage the sector.

It is my opinion that the current institutional governance structure for the petroleum sector is amorphous, weak and confusing. Over the years, the policy, regulatory, and commercial institutions are not distinguishable. Therefore, the proper delineation of roles remains elusive (See Figure 3). The way forward is simple, see Figure 4. The agencies and parastatals responsible for the governance of resource sectors need to be autonomous and independent with adequate funding for operations. There should be an independent evolution of the sectors by legislators and its staff to facilitate efficiency, effectiveness and pragmatic guidelines.

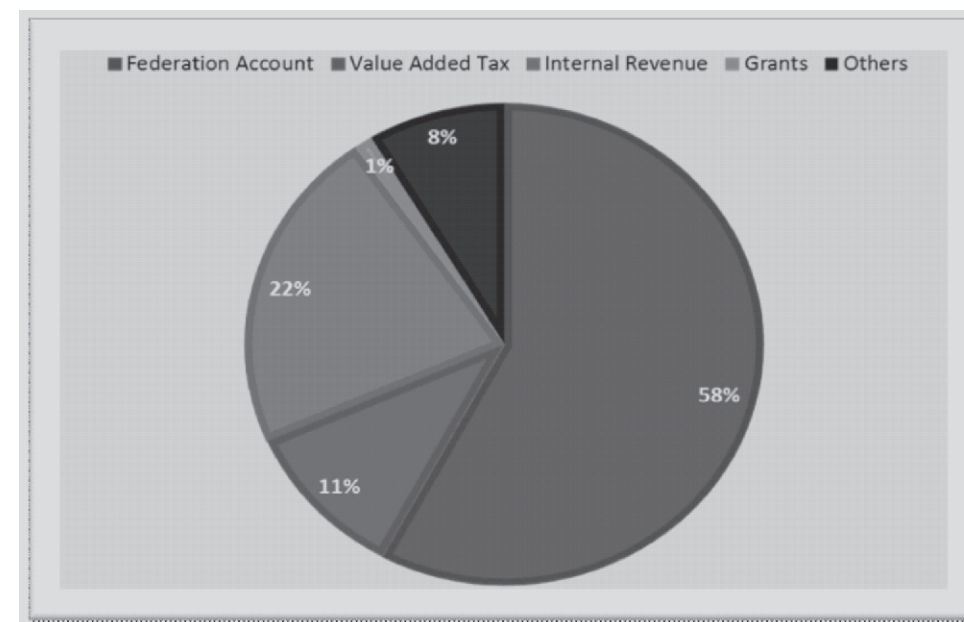


Figure 1: Components of State Revenue in Nigeria (CBN Statistical Bulletin, 2014)



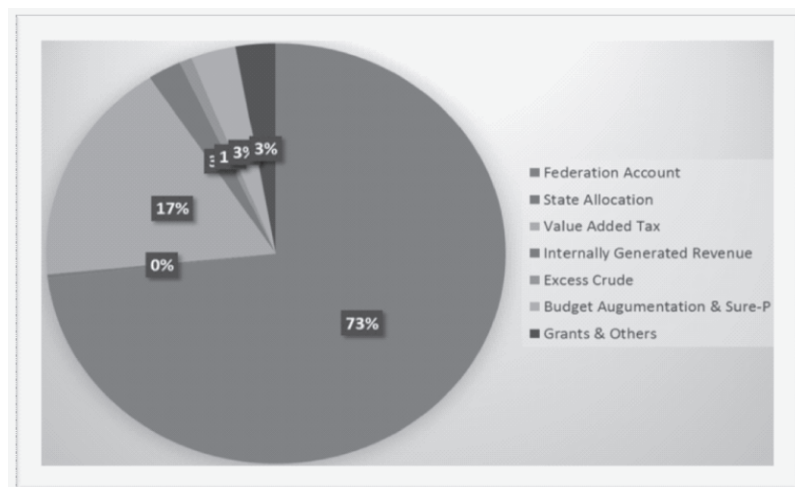


Figure 2: Components of Local Government Revenue (CBN, 2014)

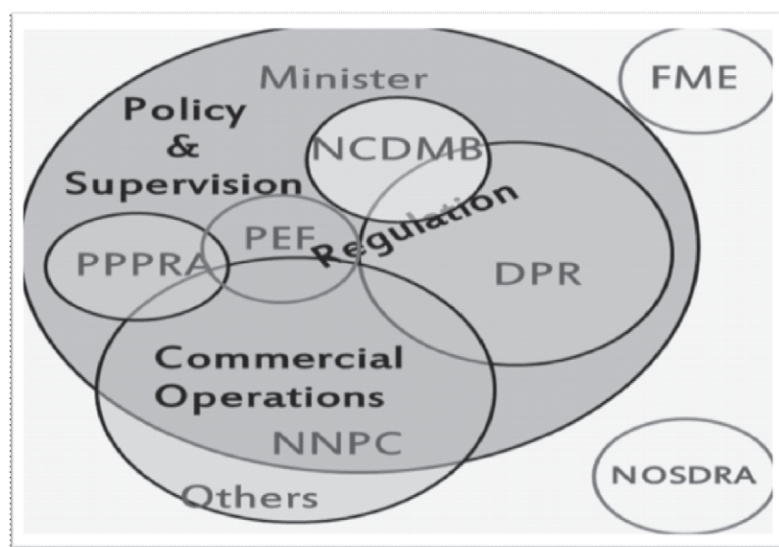


Figure 3: Tortuous Petroleum Industry Governance Institutions in 2016

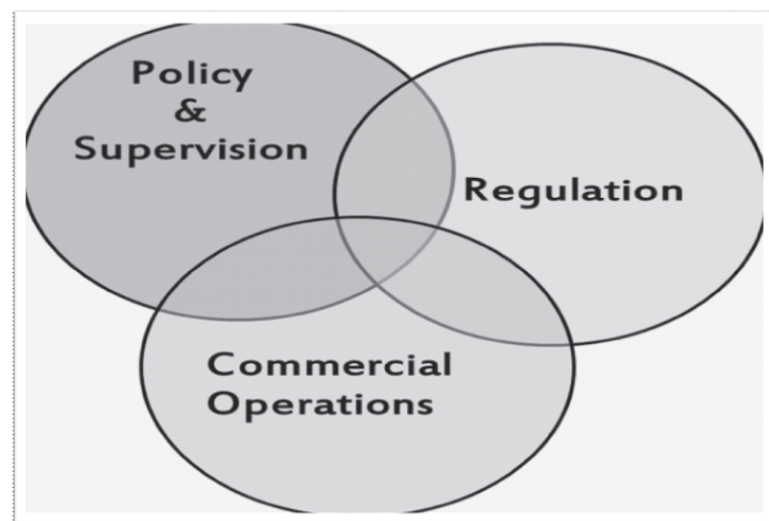


Figure 4: Proposed Petroleum Governance Structure (PIGB, 2016)



5. Embrace Transparency and Accountability Initiatives: Transparency and accountability are two sides of one coin (See Figure 5). While transparency facilitates easy access to intelligible information and data, which are relevant for specific useful purposes; accountability, on the other hand, purports a willingness to accept responsibility and liability for achieving or not achieving a set of goals. Mostly, public officers received delegated powers from the society and there must be the willingness of the former to relate to the latter by being transparent and accountable. Thus, citizens who would seek to hold them accountable use the flow of information about decisions and actions taken by government officials and politicians.

The consequences of the apparent lack of transparency and accountability in the petroleum sector in Nigeria are obvious. First, there is public discontent over the lack of national development based on the earning potential from the petroleum sector. Second, greed and power struggle among competing elites to control oil revenue sometimes lead to flux in governance. There are also public protests over inefficiencies in the petroleum sector, including domestic fuel shortages, inflated fuel prices, and fraudulent behaviour. Inequitable distribution of petroleum wealth, which exacerbates fraud and corruption abounds. It goes without saying that largely, lack of transparency and accountability did make national laws ineffective, unenforceable, consequently making regulatory regimes weak and business environment not conducive.

Interestingly, however, transparency encourages competition and competition enhances industry performance. Transparency discourages fraudulent behaviour and promotes effectiveness, equity, ethics, and efficiency and good governance. Good governance promotes institutional accountability. Accountability empowers institutions to grant rewards and sanctions without interference. It makes national laws effective, increase enforceability of contracts, and strengthens regulatory regimes. Accountability creates an efficient business environment.

Conclusion

The engine that grows an economy, if such growth is sustainable, has three components to it: capital accumulation through gross domestic investment; human capacity accumulation and technology acquisitions; and diversification of the economy. Petroleum resource development is a means of greasing these three components.

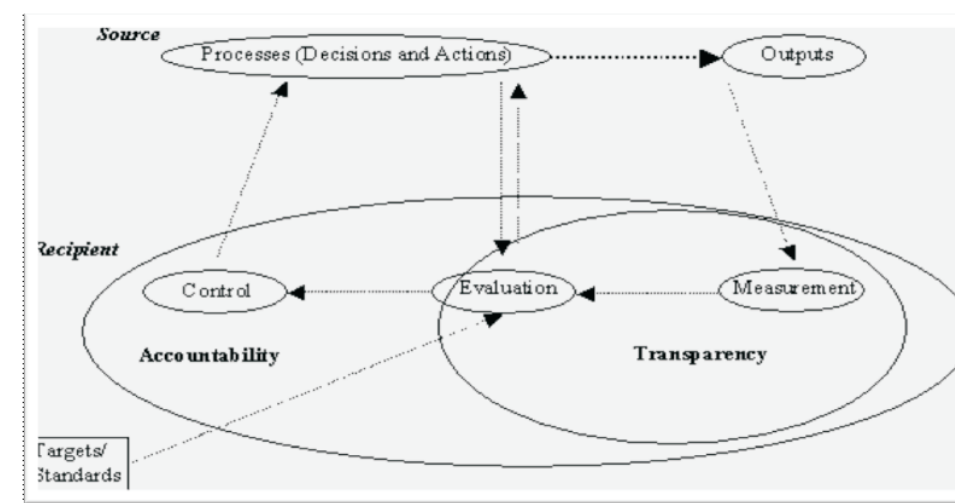


Figure 5: Transparency Accountability Loop

Thus, nations should grow and sustain their economy by consuming natural resources not by exporting raw resources. Petroleum resource development primarily as source of cash rather than being a source power for the expansion of economic output and employment is discomfiture. For sustainable economic growth and development, the underlying primary objective of petroleum resource development is society's welfare maximisation.



A policy thrust for income redistribution and foreign exchange earnings renders welfare maximisation through mineral rent extraction unattainable as evident in Nigeria over the last six decades. Let me quickly add, however, that there is nothing wrong with income redistribution *per se*, but it does not possess the multiplier capability inherent in the desire to grow and develop the economy steadily. In fact, most often, resource rent redistribution only creates an elite class with increased preference for overseas goods and services. This preference in itself constitutes another barrier to growth and development that many third world economies are experiencing. Usually private consumption as a fraction of GDP is high for sustainable growth and it could even be higher with goods and services locally manufactured for local and regional consumption.

Transparency and accountability really matter. It ensures that the rule of law flourishes in the society. An informed society through transparency and accountability initiatives is a vibrant society with a sound fiscal policy framework for managing the nation's mineral wealth—oil based budget rule, excess oil savings, mandated infrastructural dedicated spending, etc. Such initiatives in the end make it easy for the empowerment of the society. It also makes fiscal responsibility and efficiency mechanisms apolitical.



Impact of the Lifting of Iranian Oil Sanctions on Nigeria

Adeola Adenikinju* and AyoOluwa Adewole**

Introduction

In late 2011 and 2012, the United States (U.S.) and European Union imposed economic sanctions on Iran with attendant consequences on both the economy of Iran and its position as a major player in the global oil and gas market. The sanctions resulted in a ban of all Iranian exports to the West, and all Iranian assets in Western Banks were frozen. However, the sanctions were lifted as part of a nuclear agreement with the U.S. that also resulted in a prisoner swap by both countries. The lifting of the sanctions came into full effect after Iran agreed to terms of the agreements that will significantly alter the directions of its nuclear programme. The agreement was signed on Saturday, 16th January, 2016.

Iranian crude oil exports before the sanctions were by about 2 million barrels per day (bpd), however, these declined to around 1 million bpd by the end of the sanctions. Iran, has stated on Sunday, 17th January, 2016, a day after the sanctions were officially lifted, that it is ready to increase exports by 500,000 bpd and a further 500,000 bpd in the coming weeks in order to regain its status as the second largest oil-producer in Organisation of the Petroleum Exporting Countries (OPEC). This is expected to increase its total oil exports to over 1.3 million bpd. The International Energy Agency (IEA) also estimates¹ that Iran has about 38 million barrels of oil in its floating reserves, ready to enter the market.

Overview of Iranian and Nigerian Energy (Oil and Gas) Resources

Some of the largest proven reserves of oil and natural gas are situated in Iran, a country with a population of about 77million. According to EIA² Iran is ranked as the fourth-largest reserve holder of oil in the world with 157.5 billion barrels of proven reserves and the second-largest reserve holder of natural gas with proven reserves of 34,020 billion cubic metres.

Nigeria, with a population of about 178million people is the largest oil producer in Africa and is also among the world's top five exporters of Liquefied Natural Gas (LNG). Data from Energy Information Administration (EIA)³ shows that Nigeria has the second largest amount of proven crude oil reserves in Africa estimated at 37 billion barrels which also ranks as the 10th highest in the world. Proven Reserves of Natural Gas in Nigeria stood at 180 Trillion Cubic Feet as at 2015 and this is the 8th largest reserve in the world.

A comparison of both countries' macroeconomic indices reveals that Iran has a GDP per-capita of \$5,226 whilst that of Nigeria is at \$3,150 as at 2015. Iran's GDP at market prices is \$404,132 million whilst Nigeria's stands at \$561,600 million. Nigeria had 2015 exports valued at \$83,897 million with oil exports accounting for over 90% of this at \$76,925 million. Iran on the other hand had its 2015 exports valued at \$98,981 million with oil exports accounting for \$53,652 or 54% of its exports as the table below reveals.

*Professor of Economics, University of Ibadan, Ibadan, Nigeria and Director, Centre for Petroleum, Energy Economics and Law (CPEEL), University of Ibadan, Ibadan, Nigeria.
Email: adeolaadenikinju@hotmail.com, adeolaadenikinju@yahoo.com;
Phone:+234-802-344-0018.

**Centre for Petroleum Energy Economics and Law, University of Ibadan, Ibadan, Nigeria

¹Oil Market Report - International Energy Agency: Available at <https://www.iea.org/oilmarketreport/omrpublic/>.

²Iran: International energy data and analysis. Available at: <https://www.eia.gov/beta/international/analysis.cfm?iso=IRN>.

³Nigeria: International energy data and analysis. Available at: <https://www.eia.gov/beta/international/analysis.cfm?iso=NGA>.



Table 1: Some Key Energy Indicators For Iran and Nigeria (2015)

INDICATOR	IRAN	NIGERIA
Population (million inhabitants)	77.34	178.27
Land area (1,000 sq km)	1,648	924
Population density (inhabitants per sq km)	50	193
GDP per capita (\$)	5,226	3,150
GDP at market prices (million \$)	404,132	561,600
Value of exports (million \$)	98,981	83,897
Value of petroleum exports (million \$)	53,652	76,925
Current account balance (million \$)	29,473	6,187
Proven crude oil reserves (million barrels)	157,530	37,070
Proven natural gas reserves (billion cu. m.)	34,020	5,111
Crude oil production (1,000 b/d)	3,117	1,807
Marketed production of natural gas (million cu. m.)	212,796	43,842
Refinery capacity (1,000 b/cd)	1,781	445
Output of refined petroleum products (1,000 b/d)	1,775	57.0
Oil demand (1,000 b/d)	1,846	396
Crude oil exports (1,000 b/d)	1,109	2,120
Exports of petroleum products (1,000 b/d)	470.0	49.0
Natural gas exports (million cu.m.)	8,360	26,778

- b/d (barrels per day)
- cu. m. (cubic metres)
- b/cd (barrels per calendar day)

Source: OPEC Annual Statistical Bulletin 2015. ⁴

Global Oil Markets in the Wake of the Lifting of Iranian Sanctions

Global oil prices have been on a free fall in recent times, arising from concerns of excess supply and waning demand coupled with a gloomy global economic outlook and a downturn in China, the world's largest energy consumer. Oil prices are likely to drop further in light of the expected rise in Iranian oil exports by about half a million barrels a day. The prospect of Iran entering the global oil market has seen prices fall below \$30 a barrel to a 12-year low of \$28.82 a barrel on Monday 18th January, 2016. Iran also has also stated that it is capable of producing oil at \$1 per barrel. Potentially, this could imply that the nation can put its oil on the market at a price below the market price if it wants to.

Excess supply in the market was caused by a rise in U.S. shale oil and following the decision by OPEC (led by Saudi Arabia) last year to maintain production levels in order to defend market share. Notwithstanding, rising production levels are still expected this year as production in North America, Saudi Arabia and Russia are showing no signs of falling soon. Additionally, there are already growing concerns about the recent lifting of a ban by the US Congress on oil exports which could offset the demand and supply balance in the market even further.

With the ongoing crash in oil markets, Wood Mackenzie⁵ estimated that 68 major oil related projects worth \$380 billion, or 27bn barrels of oil equivalent in reserves have been cancelled since 2014. The totality of cancellations will result in nearly three million barrels of oil production that will not come online over the next decade. A survey⁶ of 175 oil companies by United Kingdom (U.K.)-based Bank, Barclays, found that oil companies lost nearly 20 percent of their capital budgets totalling \$521 billion last year and will see investments drop by 3-8 percent in 2016, marking the first time since the mid-1980s that oil companies will reduce spending two years in a row.

Analysts also estimate that up to two million barrels of oil are being produced above demand every day and have pointed out that oil exporting nations that rely on a higher oil price to break even are suffering the most, such as Nigeria, Russia and Venezuela.

Implications of the Lifting of Iranian Sanctions on Nigeria

As crude oil prices continue to fall, the International Monetary Fund (IMF) sounded warnings, highlighting a possible market scenario with higher oil supply. These warnings are contained in a report⁷ where global oil supply is expected to be higher in 2016 resulting from the removal of economic sanctions on Iran and the production capacity of the country to produce over one million barrels of crude oil daily in the short term and nearly three million barrels of oil daily in the medium to long term.

With the IMF estimating that Iran can increase its output by one million barrels per day, even as the global market is already oversupplied by up to two million barrels a day, this can lead to further downward pressure on crude oil prices. Specifically, the implications of the lifting of Iranian economic sanctions on Nigeria could be examined in the following areas:

1. Budget

The first implication is on the 2016 budget which would face a fresh threat. The lifting of these sanctions on Iran would place Nigeria's 2016 budget under scrutiny following the now seemingly unrealistic crude oil benchmark of \$38 per barrel and a production estimate of 2.2 million barrels per day. The income of the country had fallen by about 70 per cent as a result of the crash in crude oil prices from a high of over \$114 per barrel in mid-2014 to below \$30 per barrel in 2016. With further fall expected, Nigeria would have to revise its oil benchmark much lower, resulting in a wider budget deficit. With deficit budget anchored on borrowing for implementation, a higher budget also spells higher borrowing. The situation now looks direr with the lifting of sanctions on Iran. The budget deficit is expected to be financed by a combination of domestic borrowing of ? 984 billion, and foreign borrowing of ? 900 billion – totalling ? 1.84 trillion, a figure that may now double if a lower oil benchmark is used. It is estimated that for every \$1 fall in the price of oil, annual revenue will fall by ? 158.2 billion, assuming the nation produces 2.2million dollars of oil daily.

2. Oil and Gas Investments

Last year, Nigeria through the Nigerian National Petroleum Corporation (NNPC) reduced its capital budget for joint venture oil operations by 40 per cent to \$8.1 billion from \$13.5 billion due to the slump in crude oil prices. The joint venture partners of NNPC include Shell, ExxonMobil, Chevron, Total and Eni (Agip). A report⁸ by the NNPC said: “The NNPC has informed the joint venture partners that capital expenditures be cut down by 40 per cent from the proposed budget of \$13.5 billion. \$13.5 billion was the level that has been maintained in the past three years, however, due to the drastic decline in oil prices that level cannot be sustained.” This reduction last year was announced at a time when oil prices were around \$50 per barrel. With today's market realities of an oil price around \$30 per barrel, there could be further reduction in investments in the oil and gas sector in Nigeria.

3. Exports

The re-entry of Iran into the international oil trade could also see India, Nigeria's top buyer of crude (India currently imports 750,000 barrels per day from Nigeria), look towards neighbouring Iran for its oil needs, further dipping Nigeria's revenue stream. India buys

⁴OPEC Annual Statistical Bulletin 2015. Available at: http://www.opec.org/opec_web/static_files_project/media/downloads/publications/ASB2015.pdf.

⁵Delayed Oil Projects Total nears \$400bn Available at: <https://next.ft.com/content/50bbaec2-ba0e-11e5-bf7e-8a339b6f2164>.

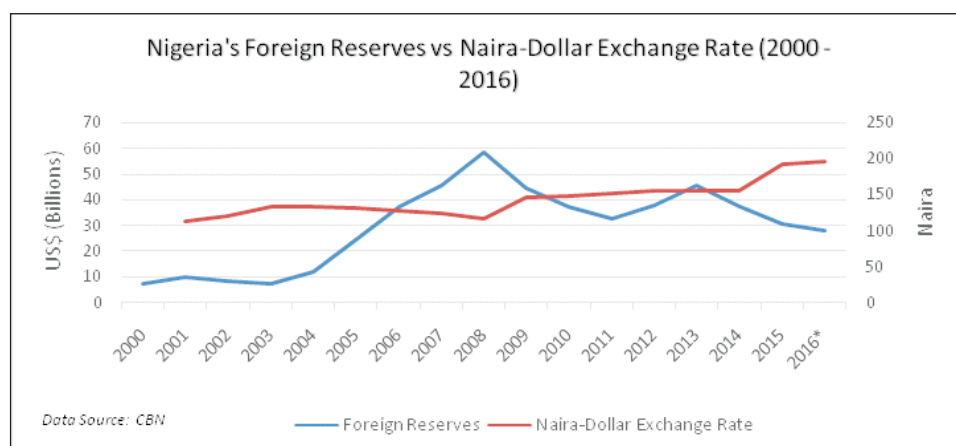
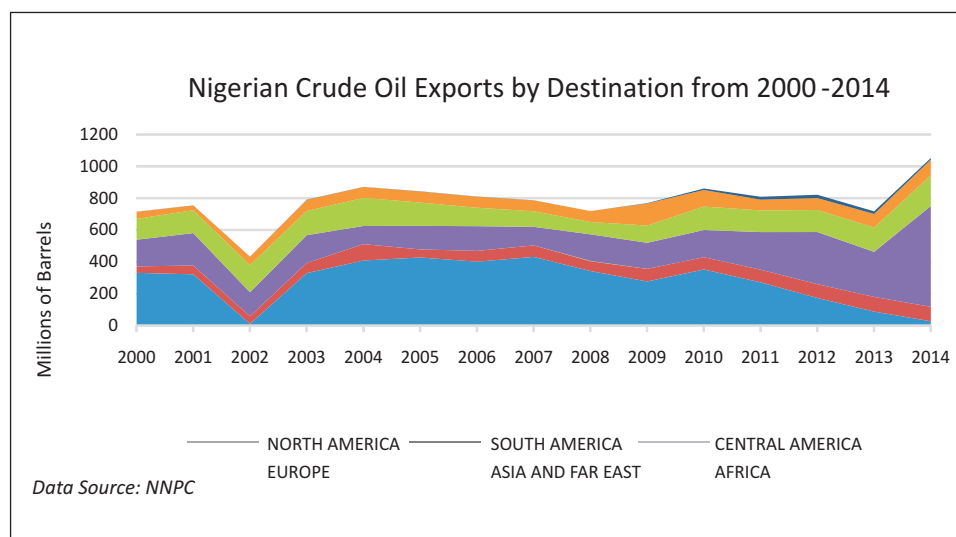
⁶Barclays: Oil companies to cut North American spending up to 15 percent next year Available at: <http://fuelfix.com/blog/2015/09/09/ba-reclays-oil-companies-to-cut-north-american-spending-up-to-15-percent/#26983101=0>.

⁷“IMF Executive Board Concludes 2015 Article IV Consultation with Iran”. Available at <https://www.imf.org/external/np/sec/pr/2015/pr15581.htm>.

⁸Nigeria Slashes 2015 Joint Venture Oil Capex by 40% to \$8.1 Billion. Available at <http://www.platts.com/latest-news/oil/lagos/nigeria-slashes-2015-joint-venture-oil-capex-26997557>.



about a third of Nigeria's daily production while the U.S. currently buys none. From the figure below it can be seen that recently, Nigeria has experienced declining exports to North America, primarily due to the increase in non-conventional oil such as shale oil in the U.S. and Tar sands in Canada. This shortfall in North American exports have been offset by rising exports to Europe, Asia and the Far East, with Europe replacing North America as the major region for Nigerian crude exports in 2012.



Another importer of Nigerian crude, South Africa (which has had heightened geopolitical tensions with Nigeria in recent years) has also gone on record to say that they could look away from Nigeria to Iran for crude oil imports. Since Iranian oil went offline, the country has imported oil from Nigeria, however, the lifting of the sanctions has caused South Africa to consider importing from Iran. The lifting of the ban on Iranian oil exports could signal a change in oil exports and receipts which the country would receive in 2016 as Iran could gain some of its lost market share by displacing Nigeria by selling to top buyers of Nigerian crude especially Asian and European countries which are located closer to Iran than Nigeria.

4. Currency Depreciation

A further drop in Nigeria's oil export earnings is likely to reduce the value of the naira below its present ? 305 to a dollar in the parallel market, a 43-year low. The currency was placed under restriction by CBN as there was a significant difference between the CBN official rate (? 197 to a dollar) and the rate at the parallel market. Another reason for the CBN restrictions were the shortfall in foreign reserves which declined below \$29.34bn in December, 2015.

An analysis of the foreign reserves and the Naira-US Dollar exchange rate shows that changes in foreign reserves seem to have an inverse relationship with the value of the naira. Meaning that each time the foreign reserves decline, there's a sharp decline in the value of the naira, however, a rise in the foreign reserves does not often lead to a corresponding rise in the value of the naira as seen in the Figure above. Oil revenues contribute hugely to the foreign reserves and a fall in oil prices resulting from Iranian-led oversupply might further strengthen downward pressures on the naira's value.

5. Employment

Since last year, oil firms have been taking measures to tackle the impact of the oil price slump. Data from the Petroleum Technology Association of Nigeria (PETAN) reveals that over 20,000 workers have been laid-off since the oil price crash in 2014. They also estimate that over 6,000 technical workers, including geologists, engineers and other ancillary workers have been sacked following oil price slump. Oil service companies employ about 20,000 technical workers with indirect employees of about 100,000. With new Iranian oil coming on board and further downward pressure expected on the price of crude oil, firms that provide technical services might see employment levels drop further, as cost-cutting measures would be taken by these firms.

Recommendations and Conclusion

In light of these developments, we believe that the Nigerian economy might come under pressure resulting from the lifting of the Iranian sanctions. However, there are various things the economic administrators of the country can do. Firstly, it should be noted that there has been a clamour for diversification away from oil to other sectors for revenue generation at this time of falling oil revenues for the country. While this is laudable, it can be recalled that successive governments in Nigeria have seen and proclaimed the diversification of the economy away from oil dependency. Hence diversification has been in the fore front of policy objectives of every successive government since the 1970's. Yet oil will continue to play a vital fiscal role in the short to medium term. Therefore, instead of focusing only on diversification, we propose that the nation needs vertical and horizontal restructuring to optimally manage the economy.

By vertical diversification, this means that the nation needs to do more to link the energy sector with the rest of the economy. That is within the oil industry itself, there are many benefits we can still take advantage of despite this period of low prices. We need to maximise the benefits accruable from oil. Research has shown that as many as 6,000 by-products can be derived from Petroleum. These can form the basis for developing petrochemical industry, fertilizer and ammonia industry, support the power sector and the pharmaceutical industry. The gas sector can be a source of LNG, Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG), fuel for power, etc.

With respect to horizontal diversification, the seemingly increased contributions of the services sector, albeit, mainly in low-value added activities, give a semblance of an economy that is being transformed. However, there is the need to close the tax loopholes, expand the tax-base (and probably introduce tax rate as recommended by the IMF), as well as increase revenue mobilisation drive from non-oil sources. Failure to do this would mean that oil would still continue to determine the fortunes of our economy. Sectors like Agriculture, Solid Minerals and Manufacturing, Tourism (just like the case of United Arab Emirates (UAE), another oil producing country), and even Sports can generate revenue for the country at this time of dire oil prices. As a country, we must overhaul our policies and regulations, removing those that hinder, rather than promote diversification. We must also align our education system, financial policies, attitudes towards investors and our overall strategy to diversification.

With respect to employment, the small and medium scale enterprises have already been given a tax incentive in the 2016 budget. Such incentives are welcome as they would boost employment in the economy, however there is the need for a strategic implementation of the policy to yield desired results. The nation can also consider the approach of Saudi Aramco which is considering an Initial Public Offer (IPO) which would make it the most valuable company in the world. If Nigeria adopts this strategy, then the NNPC would become a public limited company. The IPO could help generate revenue, even though indications from the government are that this would not happen in the nearest future.

In summary, the removal of economic sanctions and subsequent re-emergence of the Iran in the international oil and gas market poses numerous threats to the Nigerian economy. However, by the promotion of sustained, inclusive economic development as well as enabling and maintaining high level of investment, the economy can withstand the negative pressures that are expected.



“No Fuel, No Power”: Towards a Sustainable Exit Strategy from Nigeria's Persistent Energy Paradoxes

Akin Iwayemi*

Introduction and Background to the Problem

The theme “No fuel, no power” has dominated public agenda in the first quarter of 2016¹. This derives from the long queues at petrol stations across the country, unprecedented rise in fuel prices in the parallel fuel markets and severe power supply shortages. Perhaps, no development has been as embarrassing to the change agenda of the new Buhari government as the simultaneous occurrence of no fuel and no power. Arguably, one of the most profound untold stories of Nigeria's dismal socio-economic trajectory over the past four decades is lack of appreciation of the real opportunity cost of inadequate and unreliable provision of petroleum products and electricity to end users.

The persistence of Nigeria's double energy paradoxes under successive governments for several decades seems to suggest an inexcusable neglect of the adverse impact of inadequate and unreliable energy service provision on socio-economic development and quality of life of the population. Besides, had the real cost of the energy market disequilibria in the last three decades been given the consideration it deserved, it would have revealed shocking losses whether measured in economic, social, health and/or environmental terms. The recurrence of Nigeria's energy paradoxes is economically and politically embarrassing for three main reasons: Nigeria has enormous endowments of non-renewable and renewable primary energy resources; she is a leading world exporter of crude oil and natural gas which are essential inputs required to solve the energy problems; and the critical nature of reliable and adequate energy in rapid economic and social development.

Against this background and the need to provide a framework for an efficient and sustainable exit strategy from the recurring problem of inadequate and unreliable provision of petroleum products and electricity, three key issues demand insightful analysis.

1. Why has sub-optimal level of energy supply persisted for several decades in Nigeria?
2. How can the twin problems of inadequate and unreliable supply of petroleum products and electricity be eliminated in a sustainable way?
3. What are the roles of incentives and institutions in overcoming the persistent energy crises and the establishment of an efficient and sustainable energy supply?

The nature and content of the responses to these and related policy issues will largely shape the energy and economic future in the medium term.

The objectives of this paper are two-fold. First is to describe and then diagnose the nature of the energy problems. Second, and more important, is to provide a sustainable and holistic solution to the twin energy problems of epic economic, social, political and environmental proportions. In the paper, I propose that a sustainable exit strategy from the twin problems requires a paradigm shift in public policy and organisation of the energy sector. As the economy seeks a new post-oil era economic trajectory, strong political will in taking decisive action on the re-organisation of the two energy sub-sectors and overall energy policy direction to foster sustainable human development is central to a sustainable exit strategy from the dual energy puzzles.

The paper concludes with five main messages:

1. Energy prices matter in solving the crises in the energy market and therefore, the government and all stakeholders must give due recognition to the critical role that

incentives must play to eliminate the current energy challenges. Providing appropriate incentives to energy consumers and producers to sell and buy/use energy (fuel and electricity) efficiently to meet the consumption and production needs of the economy is essential to sustainability of the energy sector. Furthermore, price control is ineffective and very expensive when demand far exceeds supply or where supply disruption occurs regularly.

2. Sound legal, institutional and policy frameworks to guide the re-organisation of the two energy sub-sectors and also correct the inefficiencies in the current unbundling and deregulation of both the fuel and electricity industries must drive the sector for sustainability.
3. When the margin between the international and domestic prices is large, dual fuel market structure that allows smuggling and black marketer activities would thrive.
4. The strengthening of energy regulatory institutions to ensure that the interests of both consumers and producers are properly balanced in the regulatory processes must be coupled with credible enforcement of rules, regulations and standards. Establishing and strengthening institutions including the legal and regulatory institutions that will enhance efficiency, high productivity and transparency are essential to ending the paradoxes in the sector.
5. A properly phased energy market liberalisation driven by a credible and transparent privatisation programme is critical to achieving more competitive energy markets that eliminate the syndrome of no fuel no power. In order to achieve an efficient and sustainable energy supply, regulatory institutions must be credible, transparent and accountable in their decision making.

The Fuel Market Dimension

Six stylised facts summarise where we are and how we got there.

1. The fuel market is characterised by gross inefficiency in the domestic production and distribution systems. The resulting shortfall in supply has been a key factor in recurring supply side disequilibrium since the government took over control of the sector in 1973.² Key dimensions of the supply side inefficiencies are: poor performance of domestic production of petroleum products due to low operational performance of domestic refineries evident in very low capacity utilisation with average capacity utilisation rated among the lowest globally;³ massive fuel import dependence despite 445,000 barrels a day domestic refining capacity and Nigeria on the average exporting about 2 million barrels of oil per day in the past two decades;⁴ poor performance of product pipeline and storage depot network infrastructure which has resulted in extensive bridging (road transportation) of products from Lagos and Port Harcourt to petrol stations across the country.⁵
2. The structure, conduct and performance of petroleum products market remains far below global standards. The structure of the fuel industry consists of a mix of public and private organisations. The Nigerian National Petroleum Corporation (NNPC) and its subsidiaries, Product Pipeline Marketing Company (PPMC), and NNPC Retail, Department of Petroleum Resources (DPR) and Petroleum Products Pricing Regulatory Agency (PPPRA), are the government institutions/agencies in the sector. The other key participants that impact the conduct and performance in the industry include: petroleum products depot owners, suppliers, distributors and importers, members of the Major Oil Marketers Association of Nigeria (MOMAN), members of Independents Petroleum Marketers Association of Nigeria (IPMAN) and dealers, tanker owners (National Association of Road Transport Owners - NARTO), Nigerian Labour Congress (NLC), Tanker drivers (members of National Union of Petroleum and Natural Gas Workers - NUPENG), and members of Petroleum and Natural Gas Senior Staff Association of Nigeria (PENGASSAN).

The effectiveness of government policy in the industry depends substantially on the behaviour of these stakeholders in the industry. Apart from eight major marketers, which control about 50% of the products market, there are about 1200 independent indigenous retail companies. There is a multiplicity of fuel stations owned by independent marketers. These



²The petroleum products shortages, which though have been diminishing in frequency in recent years, can be explained by three major factors, namely: inadequate energy supply infrastructure and fuel import-dependence and associated fuel import planning and management failures and large scale smuggling. Also important in recent times are the delays in subsidy payments to fuel importers due partly to the need to screen the high level of fraud in subsidy claims as the recent fuel scam saga clearly demonstrates and partly to fiscal constraints. The poor sector performance has made the energy policy objectives difficult and expensive to achieve in the past four decades.

³Nigerian refineries are grossly inefficient by all standards. The sharp decline in domestic production and deterioration in supply facilities are due in part to poor maintenance, resulting from poor funding and rent-seeking activities by the government and its agents. The last full Turnaround Maintenance (TAM) in Port Harcourt refinery was in 1999, that of Warri was 2004 and Kaduna in 2009. Bringing capacity utilisation in Nigerian refineries closer to the international norm illustrated by about 92 percent in the European Union plus Norway, 89.9 percent in the United States, 97.8 percent in the United Kingdom and 94.8 percent in Japan would require fundamental industry restructuring and rehabilitation.

⁴For the past several weeks, virtually all domestic supply is imported as government-owned and operated refineries remain shut down for a variety of reasons including pipeline vandalism.

⁵During the extensive transportation (bridging) of fuel across the country through trucks large volumes of fuel regularly disappear to feed the highly profitable parallel fuel markets in the country and neighbouring countries. In addition, the poor state of pipelines and storage depots magnifies the supply disruptions when production failures in the refineries occur or there are unanticipated delays in imports arriving.

* Akin Iwayemi is Professor of Economics at the Centre for Petroleum Energy Economics and Law, (CPEEL), University of Ibadan, Ibadan, Nigeria.

¹The exceptions are corruption as highlighted by Dasukigate and insecurity in the North East and the killings in the Agatu area of Benue State arising from the activities of cattle herders.



independents are largely single dealerships and have been identified as major sources of fuel leakages to illegal fuel markets that dot the country. There is no price-based competition in retail market for petrol and kerosene since the government fixes their prices. Despite the partial deregulation of the industry, the downstream segment of the petroleum industry is dominated by State Oil Company, PPMC through its subsidiaries, PPMC and NNPC Retail. The retail market for petroleum products is the only segment of the industry that has some semblance of competition. Overall, industry performance outcomes depend on the strategic interactions between these diverse institutions.

It is worthy to note that none of the eighteen refinery licenses issued to the private sector more than a decade ago has resulted in a new refinery, a reflection of the financial challenges faced by the licensees. It is expected that the privately owned Dangote refinery with a capacity of 650,000 barrels a day, expected to begin operation in 2018, should significantly change the structure, conduct and performance of the downstream industry towards the end of this decade.

The transition from state-control to a more deregulated market has been politically challenging because of the political economy issues related to the trade-off between efficiency and equity in energy policy. There is partial deregulation in the industry in the past decade. The market for the deregulated products, diesel and aviation fuel is more competitive, though largely a seller's market with far higher prices than for petrol and kerosene. The Petroleum Industry Governance Bill (PIGB) 2016 in its new form when passed into law should radically restructure the industry and more importantly drive a more competitive and better-performing industry. However, the stalling of the PIB (now PIGB) in the National Assembly for nearly a decade due in part to the omnibus nature of the Bill, has contributed significantly to the relatively sub-optimal performance with respect to the structure, conduct and performance of the industry. Finally, the failure of the National Assembly to pass a Competition Bill for more than a decade similar to the PIB has also exacerbated the problem of monopolistic and oligopolistic behaviour in the energy sector.

Petroleum product prices are determined by the government through the regulatory agency, the PPPRA. Since 1973, petroleum products pricing policy has been largely driven by making fuel relatively cheap for the citizen. Although the price of petrol has been fixed by PPPRA at N86 and N86.5 per litre at NNPC retail outlets and other retail outlets respectively since last year, the lowest level in recent years due also to the collapse in crude oil prices to less than \$40 per barrel, distributional considerations still drive product pricing to the neglect of the efficiency. However, the decline in the value of the naira against the dollar has put strong pressure on the imported products. Indeed, part of the current market disruption and the high prices in many retail outlets owned by independent marketers is foreign exchange linked. Only NNPC has easy access to foreign exchange to import and sell products at the officially determined price of N86 per litre. Previously, the official price of petrol was N97 per litre. The prices of the deregulated products, diesel, aviation fuel, residual fuel oil and LPG are significantly higher than petrol and kerosene which are still regulated.

5. Fuel subsidy payments since 2010 exceeded an astounding ? 4 trillion until its suspension since the new Buhari government. Subsidy payments were much abused during the previous Jonathan government. It has been a major source of rent seeking and corruption. Besides, Nigeria's record on corruption and governance especially as relates to the petroleum sector is poor.⁶ The subsidy issue may not be totally taken off the public agenda despite lack of provision for it in the 2016 budget. However, once crude oil prices begin to rise above ? 45 per barrel and the value of the naira remains low because of current account imbalance due to unimpressive lacklustre foreign exchange earnings from non-oil exports, this issue would re-emerge. In fact, in April 2016, barely three months after the removal of the subsidy on petrol, the Federal government recommenced its payment at the rate of ? 5.84 for every litre of premium petrol motor spirit consumed in the country. Only complete price deregulation in the industry would eliminate the subsidy issue permanently. The political economy of oil may constrain government's ability to do this especially given the current economic crises.

The demand for petroleum products in Nigeria is rising steadily, driven mainly by subsidised product pricing and economic growth. Subsidised domestic pricing of fuel shielded consumers from the significant changes in the world oil markets, and more importantly fueled inefficient use of petroleum products.⁷ The disequilibrium in the fuel

market which reflects the significant increase in demand in marked contrast to weak supply response was fundamentally driven by energy pricing policy that administratively set the market price below market clearing price. The chaotic market situation since the beginning of 2016 further demonstrates the fundamental economic principle that when demand is far greater than supply, non-market clearing mechanism is ineffective and inefficient. The prevalence of a regime of price controls which kept prices far below market clearing levels, contributed substantially in sustaining the supply shortages.

The Power Market Dimension

Six stylised facts summarise the context of the electricity market for the purpose of this article.

1. The large gap between installed and actual operational capacity for all generating plants is a reflection of the gross technical inefficiency in the supply system. Although nominal system generating capacity is about 7000 MW, less than half of this is available due to three major factors: inadequate equipment maintenance due to severe financial problems; gas supply disruptions to gas-fuelled generating power plants due to frequent pipeline vandalism; reduced hydro generation due to declining water volume in the River Niger and its tributaries due to climate change and factors associated with government control and ownership of transmission network.
2. Transmission and distribution network losses are large by international standards - three to four times the average technical losses under normal circumstances. The high average level of transmission and distribution losses captures an important aspect of the gross technical inefficiency in the electricity industry. Although the size of these losses have declined with the unbundling of the industry, they are still relatively high compared to global standards because the unbundled companies have not been able to carry out the scale of investment required to reach global standards. A steady reduction of the losses to single digit is a major challenge facing the Nigerian electricity industry. Yet, significant improvements in system operations to drastically reduce these losses are fundamental to overcoming the power crisis in the short to medium term.
3. Load shedding has become a regular occurrence. The average supply interruption rate often lasts for several hours per day. Of course, poor service delivery has rendered public electricity supply a standby source of power for consumers who cannot afford irregular and poor quality service. They substitute more expensive captive supply alternatives to minimise the negative consequences of power supply interruptions on their production and consumption activities and profitability. The crisis in the fuel markets in recent times coupled with the power blackout from the public supply system has made the cost of alternative power supply very expensive especially for small and medium scale enterprises (SMEs). The current level of demand underestimates the true level given the high level of suppressed demand associated with the high level of load shedding and significant level of un-metered electricity in majority of households in the different distribution companies (discos), suggest that the estimation of potential level and growth in power demand must incorporate these and other features.
4. The low level of electricity consumption in Nigeria compared to the more developed African economies such as South Africa, Libya, Egypt and Algeria is an issue. Ghana's consumption is almost twice that of Nigeria. Electricity consumption per capita in South Africa is about forty times that of Nigeria. Besides, while generating capacity in South Africa is 40,000 MW, Nigeria is hoping to achieve 10,000 MW by 2020. This defines the scope of the journey ahead.
5. With the Electric Power Sector Reform Act 2005 (EPSRA), which unbundled the state owned PHCN, the power industry has consisted of a mix of public and private business enterprises, 17 privately owned companies made up of eleven discos, six generation companies (gencos) (6), one state-owned Transmission Company (Transmission Company of Nigeria - TCN) and two regulators, Nigerian Electricity Regulatory Commission (NERC) and Nigerian Electricity Management Services Agency (NEMSA).⁸ The unbundling of the erstwhile state-dominated sector which effectively came into being with the privatisation of the industry in 2013, has dramatically changed the structure of the sector. Although there has been some improvement in industry performance before the recent crisis, the conduct and performance of the electricity supply industry remains far below global standards.

⁸NEMSA was set up in 2015 to deal with technical regulation standards. Its establishment generated much controversy given that NERC could also have carried out the same function without the setting up of a parallel regulatory agency.

⁶Nigeria has consistently ranked very low on global indices on corruption, accountability and good governance. See World Bank Transparency International Corruption Perception Index 2015

⁷In all the cases, NNPC figures are far less than those of these international energy organisations. The discrepancy in statistics also played out during the National Assembly presentation by the NNPC, Ministry of Petroleum Resources and the Ministry of Finance during the fuel subsidy debate of 2012.



Currently, due to a number of factors internal and external to the unbundled companies, and associated with the policy, the legal and institutional landscape has not produced the sustainable supply and delivery of electricity to end users.

From the perspective of electricity, the controversies that accompanied the unbundling of Power Holding Company of Nigeria into discos, gencos and the TCN, and the inadequate investment in the newly unbundled industry have contributed to the continued sub-optimal performance with respect to the structure, conduct and performance. The transition from state-control to a more deregulated market has been politically challenging because of the political economy issues related to the trade-off between efficiency and equity in electricity pricing policy. However, if EPSRA is well implemented, the outcome should be a robust and competitive electricity industry where unreliable and inadequate service would be the exception rather than the rule. Robust legal, regulatory and institutional frameworks coupled with security of life and property are essential for minimising high sector risks and attracting adequate long term finance and sector competitiveness that is required to drive the sector transformation making the desired goal of an efficient power sector feasible and achievable. In addition, the failure of the National Assembly to pass a Competition Bill for more than a decade, similar to the PIB, has exacerbated the problem of monopolistic and oligopolistic behaviour in the electricity industry just as in the petroleum industry.

6. The abysmal poor electricity service provision is one of the most pressing national problems of our time. Notably, billions of dollars have been spent in the power sector since 2000 yet no noticeable change can be observed in the quality and quantity of electricity delivered to end users in the country⁹ Indeed, one of the many paradoxes in Nigeria is energy/electricity poverty amid plenty. Despite being a world ranking exporter of LNG, Nigeria's gas-dominated electric grid experiences frequent collapse often times linked to inadequate gas supply. Gas pipeline vandalism associated with resource control-linked militancy in the oil producing Niger Delta has compounded the gas supply problem for gas-based generating stations.

Where We Should Be

An important question is where Nigeria should be energy-wise (fuel and electricity) in the current and medium term given its current position as the largest economy in Africa. The information in Tables 1 to 3 below provides some perspectives on this issue.

Table 1: Electricity Consumption Per Capita (Kwh/capita) 2015

Country	Electricity Consumption Per Capita(Kwh/capita)
Nigeria	141
South Africa	4,328
Brazil	2,583
Malaysia	4,474
South Korea	10,428
Mauritius	2,148

Source: International Energy Agency (IEA) Key World Energy Statistics 2015

Table 2: Fossil Fuel Consumption (% of Total) in 2012

Country	Fossil Fuel Consumption (% of Total)
Nigeria	18.77
South Africa	86.97
Brazil	56.55
Malaysia	94.78
South Korea	84.12
Mauritius	83.15

Source: World Bank WDI 2015

⁹“\$10 Billion Wasted on Energy” was how the Guardian Newspaper editorial of the Tuesday 28 January 2008 titled the issue. See page 18 of the Newspaper.



Table 3: Energy Consumption Per Capita (Million Btu per Person) 2011

Country	Energy Consumption Per Capita(Million Btu per Person)
Nigeria	4.99
South Africa	115.39
Brazil	60.19
Malaysia	108.76
South Korea	231.97
Mauritius	51.90

Source: US Energy Information Administration (EIA) 2015

How to Get There

Dysfunctional government interference in energy sector activities and enterprise management functions that encouraged gross inefficiency in production, distorted demand patterns driven by inefficient energy pricing and investment choices, induced endemic and expensive delays and cost overruns that encouraged widespread corruption in infrastructure construction and equipment and material purchases, lack of market responsiveness to changing demand and supply conditions through excessive regulations combined with institutional failures jointly produce the recurring failures in the energy markets. Eliminating these policy distortions is essential for a sustainable exit from the very disruptive social and economic impact of recurring energy crises.

What can be done to eliminate the twin problem in a sustainable way?

What are the roles of incentives and institutions in overcoming the persistent energy crises and the establishment of efficient and sustainable energy supply? What basic principles should guide the operation of a more competitive fuel market that guarantees an uninterrupted supply? Can market forces provide a reliable mechanism for efficient allocation of energy resources in Nigeria given the peculiarities of the society? What should be the sequencing option for fuel market deregulation? These are important questions that this section addresses.

Fuelling the Future: Key Elements of the Agenda for Change

In the short run, the agenda for change include:

- a. Transparent and accountable process of market liberalisation and deregulation. A poorly functioning energy market dominated by the government has been too expensive in terms of development.
- b. Full price deregulation in petroleum products market.
- c. Galvanising regulatory agencies to foster efficient energy markets operations with due recognition of the interests of both consumers and producers.
- d. A transition period of nine (9) months for full market deregulation.
- e. Domestic price linked to the international price until the elimination of price control completely by the end of the fourth quarter 2016.
- f. Automatic quarterly fuel price adjustment to reflect changes in international prices and the exchange rate.
- g. Open access to depots, pipelines, import terminals and other distribution facilities currently owned by the government by investors and entrepreneurs who will pay access fees for using such facilities.
- h. Fuel import liberalisation, but in the meantime the import system should be based on a transparent auction system.
- i. Strengthen the PPPRA to perform its price regulatory functions effectively.
- j. Product prices to reflect road user charges, and environmental pollution.
- k. Imposition of an oil import premium to reflect the security implication of fuel import dependence.
- l. To cushion the impact on low income households, a welfare support fund from which income will be targeted at such families can be funded.
- m. Re-establishment of the Ministry of Energy to bring energy issues (fuel and power) under the same jurisdiction.



In the Medium to Long Term

- a. Establishment of new refineries in addition to the Dangote refinery by private entrepreneurs and in the process export less crude oil and more of value added products from oil and gas. The history of government economic enterprises in Nigeria suggests strongly that the government should not get into the business of setting up and running refineries. Indeed, the shrinking fiscal space due to the collapse in government revenues will significantly constrain government capacity to engage in building new refineries
- b. The pipeline and distribution network should be privatised through a transparent auction system similar to the initial bidding process for telecommunication. The winning bidders/ investors would then engage in significant reinvestment in the network to be able to achieve greater product distribution efficiency
- c. Build up a strategic product reserves that would ensure 180 days of supply across the country as a public-private partnership.

Powering the Future: Key Elements of The Agenda for Change

In the short run, key elements of the agenda for change include:

- a. Declaration of a state of emergency in the power industry and the passing into law a Power Emergency Act that would empower the government to embark on strategic actions to restore power to normalcy including fast-tracking of existing power projects that are at various stages of completion. The cooperation and collaboration of the National Assembly and the Executive to drive this process in the next 12 to 18 months is required.
- b. Cost-reflecting tariff but with allowance for lifeline rates that is more generous than what is the current Multi-Year Tariff Order (MYTO) 2.
- c. The profitability of the industry must be guaranteed for supply sustainability
- d. Galvanising NERC and NEMSA to foster efficient electricity markets operations with due recognition of the interests of both consumers and producers.
- e. Provision of economic and technological incentives to induce supply competition with the ultimate objective of improving the quality and quantity of electricity output delivered to end users.
- f. To cushion the impact on low income households, a welfare support fund from which income will be targeted at such families can be funded.

In the Medium to Long Term

- a. A legislative agenda to amend the EPSRA 2005 to bring more competition to the industry including retailing of electricity beyond what the current law permits. This is the global best practise.
- b. Open access to distribution facilities currently owned by DISCOs to retailers who will pay access fees for using such facilities.
- c. Establishment of new power plants by private entrepreneurs and in the process ensure generating capacity significantly increase from the current 7,000 MW to 20,000 MW within five to ten years.
- d. Privatised the transmission network, the weakest link in the power system network. TCN should be privatised through a transparent auction system similar to the initial bidding process for telecommunication. The winning bidders/ investors would then engage in significant reinvestment in the network to be able to achieve greater transmission efficiency. The government does not have the resources to expand the transmission capacity to wheel the expected rapid growth in electricity demand as generating capacity steadily increases in the future.
- e. Encourage innovative approaches to establishing power generating stations beyond embedded generation using build operate and own (BOO), build operate and transfer (BOT) and other varieties of investment options backed up by economic and technological incentives to attract investors.
- f. Engage in a more diversified energy mix for electricity generation to overcome the recurrent crisis associated with the disruptive effects of pipeline vandalisation on gas-fired plants. Solar, wind, hydro, biomass, coal and nuclear.
- g. Engage in full development of hydro projects under the River Basin Authorities across the country.



- h. Engage in more aggressive development of decentralised energy with focus on renewable energy.
- i. The concepts of smart buildings and smart cities should permeate domestic architectural and town planning designs.
- j. Establishment of solar panel and wind turbine industries to meet decentralized energy needs.

Concluding Remarks

Summing up, a sustainable exit from the twin problem of the highly disruptive “no fuel no power” requires a paradigm shift in policy and organisation of the energy sector. However, one must acknowledge three major challenges to the way forward in eliminating the twin problem of “no fuel, no power.” These are: the political economy of energy pricing in an oil producing country; the power of labour unions, especially, NLC, PENGASSAN and NUPENG to fight against energy sector reforms, including market liberalisation; and current lacunae in the functioning of regulatory agencies in the sector. Overcoming these challenges is central to a successful exit from the current energy quandary. A more nimble PIB that focuses on downstream activities needs to be passed into law. Also, the 2005 EPSRA Act should be amended to re-invigorate the sector for greater competition and efficiency.

As the nation goes through another round of crises, and the government, the legislature, labour leaders and other stakeholders seek effective and efficient exit strategies, it must be pointed out that facile solutions are politically tempting, but fraught with serious problems as evident in the recurring problem for the past three to four decades. The general predisposition towards superficial and politically expedient solutions to the protracted energy market crisis has failed us as a people and as an economy. This requires a paradigm shift in the post-oil era.

The persistence of the crises strongly suggests the important question: What can research do in providing a sustainable and efficient exit to the multi-dimensional dual energy paradoxes? Some emerging research issues include but are not limited to the following:

- a. Determination of the appropriate price for fuel and electricity;
- b. Determination of an efficient quarterly adjustment mechanism for fuel prices;
- c. Transport energy demand estimation and their price and income elasticities
- d. Industrial energy demand functions and their price and income elasticities;
- e. Household energy demand functions and their price and income elasticities;
- f. Determination of the best methods for managing fuel imports;
- g. Analysis of the structure, conduct and performance of petroleum products market;
- h. Analysis of the structure, conduct and performance of electricity market;
- i. The economy-wide effects of fuel shortages;
- j. The economy-wide effects of inadequate and poor quality of electricity supply;
- k. The economy-wide effects of fuel price changes;
- l. The economy-wide effects of electricity price (MYTO) changes;
- m. Economy-wide effect of adequate energy supply;
- n. The impact of energy price changes on household welfare;
- o. Analysis of the cost and benefit of alternative mechanisms to mitigate the impact of price changes on poor households;
- p. Determination of the optimal strategy to achieve a sustainable energy development;
- q. Analysis of energy-economy-environment interactions given that Nigeria signed the Paris Climate Change agreement.

These research questions which are not exhaustive, suggest that in proposing solutions to the complex issues involved in the development of the energy sector in the post-oil era, evidence-based research must assume greater importance in policy design and implementation. This paper, which provides an overview of some of the key issues in the determination of the optimal exit strategy from the current energy paradoxes, is a preliminary contribution to the much needed and robust conversation that the country needs to have in designing and implementing an efficient and sustainable energy development pathway.



Exchange Rate Policy and Dwindling Global Crude oil Price: Implication for the Federal Government Stance on Naira Devaluation in Nigeria

Terfa W. Abraham*

Introduction

Polymakers in Nigeria are aware of the importance of paying attention to energy dynamics. Their actions, however, suggests otherwise. With the continuous fall of crude oil price at the international market accompanied by weak domestic industries/manufacturing activities, the Central Bank of Nigeria (CBN), against all signals emanating from the global and domestic economy, has maintained its stance on not to devalue the naira relative to the United States dollars. While it is part of the agenda of the present administration to maintain a healthy exchange rate, suppressing its value in the face of international energy and economic dynamics has its downside on economic activities. One aspect of the Nigerian economy that reflects the daily effect of such policy stance is the Nigerian capital market.

Issues From the Literature and Available Data

Oil price fluctuation affects the economy through a number of channels.¹ The financial market channel in particular, has gained the attention of various authors.² While the debate around this issue is often to examine the effect of crude oil price fluctuation on the volatility of financial markets, the direct effect on stock market performance and how adjustments in exchange rate policy,³ as observed since June 2014 in Nigeria, calls for further investigation. Using the stock market as a proxy for the responsiveness of the economy to price swings, this article examines the effect of crude oil price movement on the Nigerian economy and the role of exchange rate as a plausible countercyclical policy measure. The data used in this paper are daily all share indexes of the Nigerian stock exchange (NSE), crude oil prices and exchange rate, collected from the Nigerian stock exchange and the Central Bank of Nigeria for two periods: 2008-2009 and 2012-2015. Figure 1 and 2 presents the trend of the data.

*Economist/ Research Fellow II, National Institute for Legislative Studies (NILS), Maitama – Abuja (Nigeria) Email: Lorenzcurve@yahoo.com ; Mobile: +234 806 209 1306 ¹Eryigit, M (2012), 'The Dynamical Relationship between Oil Price shocks and Selected Macroeconomic Variables in Turkey' Economic Research (Ekonomikaistraživanja), Vol. 25 No. 2, pp 263-276 ²Le, T-H and Y. Chang (2011), 'The Impact of Oil Price Fluctuations on Stock Markets in Developed and Emerging Economies' Economic Growth Centre (EGC) Working Paper Series No. 2011/03 ³Basher S.A, A.A Haug and P. Sadorsky (2010), 'Oil Prices, Exchange Rates and Emerging Stock Markets' University of Otago Economics Discussion Papers No. 1014 (September)

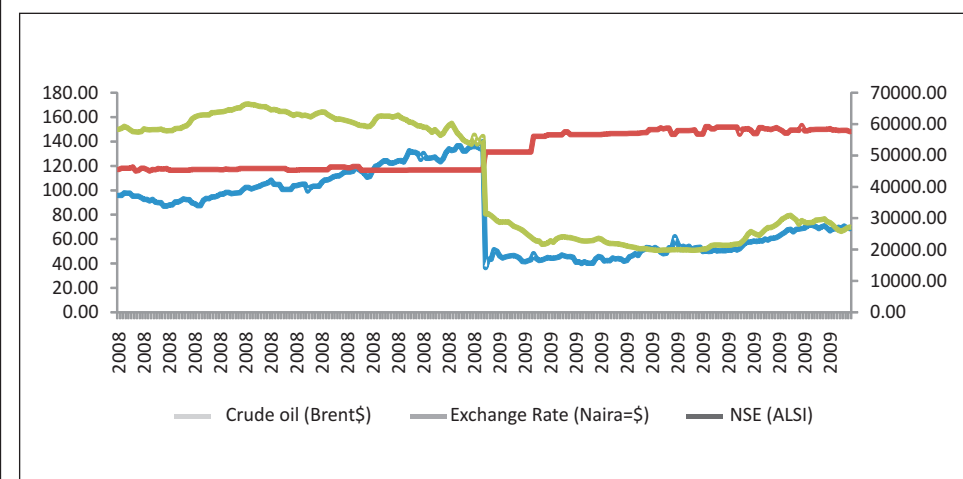


Figure 1: Trend of Crude oil, Stock Market and Exchange Rate (January 2008 to July 2009)

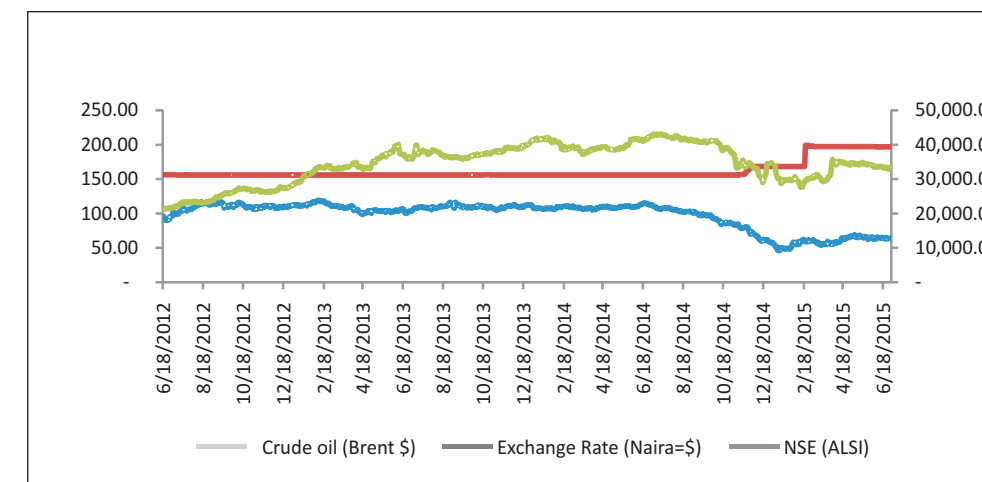


Figure 2: Trend of Crude oil, Stock Market and Exchange Rate (June 2012 to June 2015)

By inspection, Figure 1 shows that exchange rate was unstable, during the 2008 global financial crisis into 2009. Since the 2014 decline in crude oil price, however, the Central Bank of Nigeria had maintained a stable exchange rate (see Figure 2). Table 1 presents a time line analysis of how selected countries exchange rate and stock market have performed since the downward swing in global crude oil price. Table 1 presents a time line analysis of how selected countries exchange rate and stock markets have performed since the 2014 downward swing in global crude oil price. It also reflects the kind of policy action they have taken and identifies what Nigeria should be doing.

Table 1: Time Line Analysis of Crude oil Price, Stock Market and Changes in Exchange Rate

Source: Nigerian Stock Exchange, Central Bank of Nigeria and Bloomberg



Global crude oil price dropped between June 2014 and June 2015 by 43.68%. Between 1st June 2015 and 30th November 2015, it has further dropped by 31.15%. Since the swearing in of the Buhari administration, crude oil price has sustained its fall by 31.15%. Surprisingly, while in the supplementary budget to the 2015 appropriation submitted to the National Assembly the Buhari administration reviewed the crude oil benchmark price downwards to US\$48 (from US\$53), crude oil production benchmark downward to 2.2003 mbpd from the 2.2782 used in planning the 2015 appropriation; the 2015 supplementary budget retained the exchange rate benchmark of ? 190 to the dollar which was used in the 2015 budget. This implies that, the current administration did not recognise the dynamics of oil prices on the country's exchange rate.

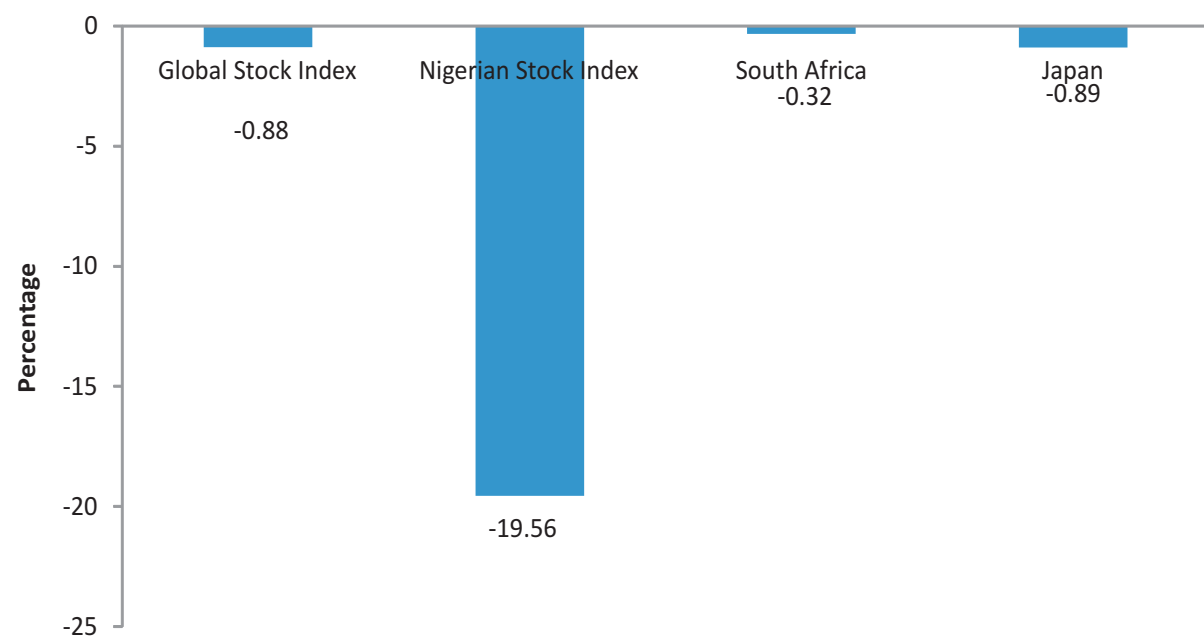


Figure 3: Performance of Selected Global Stock Markets as at November 2015 compared to a year ago
Note: Nigeria had the highest loss while South Africa had the lowest

Globally, an index which captured the close of all stock market globally (the S&P Global BMI), showed an improvement by 0.55% in the performance of all stocks as at 30th November 2015. This was arrived at by comparing its performance -1.43% a year ago with the performance of -0.55% recorded in November 2015. Since 1st June 2015 to 30th November 2015, however, the all share index of the Nigerian stock exchange has dropped by 19.56% and its market capitalisation as well by 18.58% (i.e. from 11.57 trillion naira to 9.67 trillion naira). On the contrary, South Africa in the face of the falling global crude oil price, has allowed its exchange rate to follow the global business cycle. As a reward, though this has weakened the nominal value of their currency relative to the dollar, its stock market (the Johannesburg Stock Exchange), increased by 1.46% from June 2014 to June 2015, and have only dropped by 0.32% within 1st June 2015 to 30th November 2015. The Nigerian Stock Exchange, however, has maintained a steady fall since June 2014; dropping by 17.23% within June 2014 to 2015, and by 19.56% from 1st June 2015 to 30th November 2015.

Outside Africa, Japan has been able to minimise the effect of the falling crude oil price on its stock market through free exchange rate policy as well. This has also led to the appreciation of its currency. Howbeit, the exchange rate has remained fixed in Nigeria. Rather, the CBN has continued to restrict the use of foreign currency as a means of keeping a hold of the situation.



Policy Implication

The policy deductions from this article are:

1. The Central Bank of Nigeria (CBN), should not maintain its stance on not to devalue the naira if the price of crude oil continues to fall. Making the naira to appear strong when it is not, will only starve the Nigerian economy of foreign investment required to complement domestic production.
2. The policy summersault around exchange rate management in Nigeria by the Central Bank of Nigeria that has kept the official exchange rate of the naira relative to the dollar at 197 is unhealthy. It profits black market activities in parallel market.
3. The supplementary budget that retained the naira exchange rate at 190 to the dollar used in planning the 2015 budget, but accounted for the downward slide in crude oil price is paradoxical. The medium term expenditure framework of the country should therefore provide for a much weaker exchange rate (? 220 at least – which is the average of the maximum parallel market rate and the official exchange rate as November 2015).
4. The overall solution in strengthening the value of the naira lies in boosting domestic production, short term measures to enhance the competitiveness of the economy requires that the naira is devalued amidst the persistent fall in global crude oil prices.

References

1. Abdalla, S.Z.S (2013), 'Modelling the Impact of Oil Price Fluctuations on the Stock Returns in an Emerging Market: The Case of Saudi Arabia' *Interdisciplinary Journal of Research in Business* 2(10): 10–20.
2. Hidhayathulla, A and R.B Mahammad (2014), 'Relationship between Crude oil price and Rupee, Dollar Exchange Rate: An Analysis of Preliminary Evidence' *IOSR Journal of Economics and Finance (IOSR-JEF)* 3(2): 1-4.
3. Imarhiagbe, S (2010), 'Impact of Oil Prices on Stock Markets: Empirical Evidence from Selected Major Oil Producing and Consuming Countries' *Global Journal of Finance and Banking Issues* 4 (4): 15–31.
4. Kumar, M (2014), 'The Impact of Oil Price Shocks on Indian Stock and Foreign Exchange Markets' *ICRA Bulletin Money & Finance* (February), pp 57–88.



Combatting Electricity Losses: Is Nigeria Ready for Smart Metering?

Obehi Ebewe, MNSE*

Introduction

It is no news that despite the successful privatisation of the Nigeria's Power Holding Company of Nigeria (PHCN) successor companies in November 2013, the nation has not witnessed significant improvement in electric power supply. Many challenges and constraints debilitating the improvement of power supply still persist and if not appropriately tackled, pose serious threat to the achievement of the overall purpose of the successful privatisation exercise. This discussion examines the crucial and current issue of the metering strategy for Nigeria's Distribution companies (Discos) as a solution to combatting electricity losses, and the policy implications.

The bottom line technical problem in Nigeria's distribution system is the presence of a disturbingly huge Aggregate, Technical, Commercial and Collection (ATCC) losses. Should the nominal electricity tariff rate be increased to reflect the huge cost of losses? The effect will be a case of inadvertently penalising the regular paying customers for the inability of the Discos to enforce commercial discipline on its inefficient system. Research carried out by the author on Ibadan Electricity Distribution Company (IBEDC) showed that for the Multi-Year Tariff Order (MYTO) 2 minor tariff increase of June 2013 by the regulatory body, the Nigerian Electricity Regulatory Commission (NERC), which was an increased financial cost to customers, the outcome was reduced actual collection from residential customers, of which an average of 96% were post-paid energy customers.

To reduce distribution losses and fight electricity theft given the present challenges, we need to seek for proven and optimal solutions which can be readily adapted to the situation of the Nigeria's electricity supply industry (NESI). It should be such that all stakeholders: the customers, Discos, NERC, and the government are satisfied. Thus, as opposed to the strategy of sheer tariff increases, another strategic option being considered is the adoption of smart metering. We will examine the pros and cons for smart metering and investigate if it is a good fix for combatting electricity distribution losses in Nigeria.

The Role of Smart Meters in Combating Losses

Smart meters work on an improved technology and scores over the normal prepaid meters. They communicate real-time electricity consumption data via a telecommunications network to a pre-programmed utility location.

Smart meters have the following edge/advantages over the prepaid meters:

1. They give the unique ability to detect power theft, meter tampering or power leakage and remotely connect/disconnect power supply; thereby drastically reducing commercial and collection losses.
2. With smart metering, Discos will be able to better manage their load distribution and reduce power outages by encouraging a shift in daily energy demand away from peak periods via time-of-use (TOU) tariffs.
3. Smart meters, through in-home display (IHD), give the utility customers detailed information about their energy consumption.

While exulting the merits of smart metering, we must critically examine if this novel technology is a fit for Nigeria, for its loss reduction and also customer satisfaction objectives. Worthy of note is that the Nigerian electricity customers are majorly metered with the analogue post-paid while the remainder have pre-paid meters.

Bottlenecks to Efficient and Reliable Smart Meter Roll Out in Nigeria

There exist several challenges to smooth transition from the traditional analogue post-paid and regular pre-paid metering to the smart metering environment in Nigeria. They are summarised below:

1. Lack of defined regulation for employment of smart meters. The Electric Power Sector Reform Act (EPSR) 2005 has no provision for regulations on smart meters and the smart grid. Such a novel technology ought to be routed first through the regulatory body for guiding policies and regulations. Its absence depicts uncertainty in the procedure for supply, testing and business operation of the smart meters by the Discos.
2. It has a very capital intensive and huge deployment cost, which will be inadvertently passed down to the customers. The post-privatised Discos are still cash strapped and, in many instances, have depended on the government's intervention avenues for procurement of regular prepaid meters.
3. It requires completely new levels of communication and customer relationship management to ensure customers' confidence in privacy protection and in clearly understanding the benefits of smart meters.

Major Arguments Against the Use of Smart Metering Technology

A research conducted in the United Kingdom has shown that the reduction in energy usage induced by in-home-displays (IHD) is rather insubstantial in the short-term and this reduction does not even persist in the long-term (Buchanan, 2015).

Other rising concerns/arguments against the roll-out of smart meters:

1. The achievement of grid-modernisation objectives does not compulsorily require the implementation of smart metering (AMI).
2. Implementation of the mandate for smart meter roll out will be unduly costly and cannot be rationally cost-justified in terms of net benefit for customers who will pay for the investment over the long term.¹
3. Smart metering pilot programmes across the United States (U.S.) have shown lack of customer interest in interacting with the distribution system and utilizing the functionality provided by the smart metering technology.
4. There have been significant health related issues and complaints made concerning the unregulated and repeated exposure to electromagnetic frequency radiation emitted by wireless technology in smart meters.
5. Smart meters have been proven vulnerable to hacking and intrusion which could make the Electric Grid more susceptible to terrorist attack, power disruption and electricity theft (by under-reporting energy use).
6. The existence of Ordinance and Resolution temporarily banning Smart Meter Installation in Camp Wood Texas and Fairfax, California in the U.S.² reflect erratic and uneven adoption pattern of the technology even in developed countries. Based on the stated bottlenecks and real hiccups being experienced with smart metering in areas of their deployment world-over, it is not out of place to say that adopting the smart metering technology in Nigeria will only compound the challenges already faced in the NESI, and plunge it into even more intractable problems.

The Prepaid Metering Edge

Therefore, although current deployment of regular prepaid metering may not present the merits of smart meter technology, it does not pose the serious threats to securitisation of supply and health challenges posed by smart meters. Prepaid metering also helps to solve a number of problems attendant with the analog post-paid metering system and there are proven and adaptable techniques to deal with its own shortcomings. Thus, replacing post-paid meters with prepaid meters should therefore remain in focus in Nigeria, being a step in the right direction.

Policy Options for Smart Metering Roll-out

Irrespective of these striking and valid arguments against the use of smart meters and its adoption and roll out in Nigeria, if for some other reasons, smart meters must be deployed in Nigeria, I will recommend the following:

¹See the legal submissions by two major utility companies in the US: NSTAR Electric Company and Western Massachusetts Electric Company, rejecting the "straw proposal" mandate issued by the Department of Public Utilities to initiate an accelerated implementation (installation) of smart meters. Available at <http://pucwatchdogs.com/noinstalleenergycompany.pdf>

²Ordinance 752 of Town Council of Fairfax, California and Ordinance No. 03-11-13-01, An ordinance of the city council of the city of Camp Wood in Texas, US which established a moratorium and stay on wireless Smart Meter deployment within the City of Camp Wood until all concerns pertaining to wireless Smart Meter health, safety, security, privacy and consumer benefit complaints are resolved by independent research, legislative action, and legal proceedings, and further action of the City Council of the City of Camp Wood. Available at http://psc.ky.gov/pscscf/2012%20cases/2012-00428/Public%20Comments/20140227_PSC_Response%20E-mail%20to%20Holloway.pdf

*Emerald Energy Institute, University of Port Harcourt, Nigeria. Email: obebebele@gmail.com Phone: +234-805-885-0727.



1. That there should be a solid policy and regulatory framework formed for its deployment and use which should have technical standards and procedural requirements well defined. The policy should enable maximisation of societal benefits in its implementation. It should also include a clause mandating that the Discos (utility companies) offer and install Smart Meters only upon customer's request.
2. A comprehensive and independent research should be conducted to examine how smart metering technology could be fit for Nigeria. This should give careful consideration in assessing the following salient issues:
 - a. The plausibility of inadvertently sidelining indigenous manufacturers of prepaid meters in importing smart meters and the legal implications of violating the extant Local Content Act, the Nigerian Oil and Gas Industry Content Development Act 2010.
 - b. The preparedness to effectively manage an unavoidable daily data deluge from each connected smart meter.
 - c. Our level of preparedness to tackle the intractable problems of Cyber Security and health-related issues witnessed in the developed countries where they are presently deployed.
 - d. The anticipated lethargic perception of Nigerian customers to an entirely new billing system of complex functionalities and operability, and the expected customer repulse to an unavoidable jump in tariffs.

References

Buchanan K. et al (2015), "The question of energy reduction: The problem(s) with feedback". Energy Policy 77, pp. 89–96.

Ebewele O. (2015), "Evaluation of Electricity Distribution Losses and Reduction Strategies: The Case of IBEDC in Nigeria."

T & D World Magazine, Lack of Customer Interest Biggest Obstacle for Smart Grid Implementation: Survey, 14 June 2011, retrievable at <http://tdworld.com/smart-grid/lack-customer-interest-biggest-obstacle-smart-grid-implementation-survey>.

EMF Safety Network, Smart Meter Health Complaints, retrievable at <http://emfsafetynetwork.org/smart-meters/smart-meter-health-complaints/>



Irregular Power Supply and The Legal Responsibility of Electricity Supplier to the Consumer in Nigeria

Balkisu Saidu* and Safiyyah Ummu Mohammed**

Introduction

Prior to the passage of the Electric Power Sector Reform Act (EPSRA) 2005, the principal legislations governing the Electricity Supply Industry (ESI) in Nigeria were the Electricity Act 1929 and the National Electric Power Authority (NEPA) Act 1972. The two acts, *inter alia*, provided for the development and maintenance of an efficient, coordinated and economical system of electric supply for all parts of the Federation. Together, they regulate the operation of the ESI under a monolithic utility which protected the suppliers, at the expense of the consumers.

With the passage of the EPSRA 2005, a move was made to gradually and progressively introduce competition in the industry and allow for choices to consumers. The regulator, the Nigerian Electricity Regulatory Commission (the Commission), was assigned the role of regulating the responsibility of suppliers of electricity to the consumers.

Legal Responsibility of Electricity Supplier to the Consumer

Under the EPSRA 2005 and the regulations made pursuant to it, the distribution companies (discos), as the suppliers of electricity to consumers in Nigeria have the following responsibilities to their customers:

1. Provision of New Connection within ten (10) working days of receipt of request;
2. Restoring Electricity to Customers' Premises, within twenty four (24) hours whenever a fault is reported during working hours;
3. Provision of three (3) working days notice to consumers before any planned supply interruption;
4. Resolution of Voltage complaints within a minimum of 24 hours and maximum of forty eight (48) hours of receipt of the complaint;
5. Resolution of Meter disputes within a minimum of 3 and maximum of five (5) working days and repositioning customer's Meter, where requested, within 5 working days;
6. Reconnection of disconnected customer within 24 hours of payment of outstanding bill (or agreed arrangement for such payment) plus reconnection charges;
7. Provision of response to complaints received during working hours on pre-paid Meters and resolution of same within 24 hours;
8. Obtain actual reading of every customer Meter (that is not pre-paid) every month, where possible, but not later than once every 3 months; and
9. Monitor its customer service standard performance on the set standards and bring the results of such monitoring to the notice of its customers through a public notice.

See Regulations 1, 2, 4, 5, 6, 7, 8, 9, 10, 12 & 13 of Nigerian Electricity Regulatory Commission Customer Service Standards of Performance for Distribution companies 2007.

The Commission, by virtue of section 80 of the EPSRA 2005, is mandated to develop codes of practice for the operation of licensees in the conduct of their operations with regard to specific areas of dealings with consumers. The section, *inter alia*, provides that:

- (1) The Commission shall develop, in consultation with the licensees, the following materials:
 - a. Consumer Service Standards;
 - b. Consumer Complaint Handling Standards and Procedures;

*Dr Balkisu Saidu
Senior Lecturer, Department of Public Law and Jurisprudence, Faculty of Law, Usmanu Danfodiyo University, Sokoto, Nigeria.
Email: balkisaidu@yahoo.co.uk

**Barrister Safiyyah Ummu Mohammed
Lecturer, Department of Public Law and Jurisprudence, Faculty of Law, Usmanu Danfodiyo University, Sokoto, Nigeria.
Email: saf_ng@yahoo.com
Phone: +234-813-666-1854.



- c. Codes of Practice for the provision of assistance to special needs consumers, such as the blind or disabled, the elderly or severely ill;
- d. Procedures for dealing with, and assisting where necessary, customers who have difficulty in paying bills;
- e. Procedures for applying for electricity service;
- f. Procedures for disconnecting non-paying customers or for those in breach of other terms and conditions of an applicable tariff or contract; and
- g. the information to be provided to consumers and the manner of its dissemination;

(2)

(3) The Commission shall establish standards for compensation to consumers who do not enjoy regular power supply.

In addition, as part of its objects and functions, the Commission is “to ensure that adequate supply of electricity is available to consumers” and “ensure the safety, security, reliability, and quality of service in the production and delivery of electricity to consumers.” See Section 32 (1) (c) and (e) of Electric Power Sector Reform Act 2005.

Level of Implementation of Statutory Responsibilities

Pursuant to this mandate, the Commission has established several Codes, Standards, Manuals and Regulations for the protection of consumers. It is however important to note that the standards referred to in section 80(3) are yet to be developed by the Commission. There are 36 such documents available on the website of the Commission as at April 2015 and there are certain procedures therein that consumers of electricity could follow in order to complain about poor service delivery. Yet, none of those Regulations relate to the payment of compensation by the suppliers in cases of irregular power supply.

For the benefit of customers, Regulation 3 of the Nigerian Electricity Regulatory Commission (NERC) Customer Complaints Handling Standards and Procedures 2006 provides that every Distribution Licensee is to establish a Customer Complaints Unit within its premises to deal with complaints from customers. However, these regulations are rarely followed. An examination of the service standards available for each of the 11 Distribution companies in the Nigerian ESI show that a number of these companies do not have adequate avenues for customers to lay complaints and none of them have provisions for compensation to consumers who receive irregular supply of electricity.

It is worthy of note that such standards are different from those adopted in other jurisdictions where there are clear guidelines for the payment of compensation to consumers. Here in Nigeria, “licensees” are required to pay fines as penalties for failure to perform obligations. There is a world of difference between compensation and fine. Compensation, according to Black’s Law Dictionary is “Indemnification. ... That which is necessary to restore an injured party to his former position” In theory,¹ “compensation makes the injured person whole.”² Fine, on the other hand, means “a pecuniary punishment or mulct.”³ Whereas compensation is paid directly to the consumer to ameliorate his loss, suffering, or inconvenience, fine is paid to the regulator as a penalty for failure to perform an obligation.

Conclusion

In light of the foregoing, it is essential that the consumer should benefit from the protection afforded by the law. Currently, losses due to irregular power supply are borne solely by the consumer due to failure to adhere to the provisions of section 80 (3) of the EPSRA. According to the World Bank, 90 per cent of commercial establishments in Nigeria are compelled to rely on expensive backup generators that add as much as 25 per cent to the total costs of industrial enterprises.⁴

Attempts by the legislature to come to the aid of consumers has not yielded the desired outcome. The deliberate use of the word 'shall' in section 80 (3) of the EPSRA 2005 connotes imperativeness. In the case of JOHN V. IGBO-ETITI L. G. A,⁵ it was held that the use of the word 'shall' 'has the invaluable significance of excluding the idea of discretion and imposes a duty which must be enforced.' As a result, neglect or tardiness on the part of the regulator in



complying with the provisions has resulted in a breach of its objects and functions.

Adherence to the provisions of section 80(3) EPSRA 2005 as they relate to establishment and enforcement of compensation for irregular power supply would ensure that providers of electricity services strive to deliver regular supply to consumers as any payment of compensation for failure to do so would affect their bottom lines.

Lawmakers have passed legislation, the executive has appointed the regulator, the judiciary has given its interpretation of the import of the wordings contained in the legislation, what remains is for the regulator to meticulously close all existing loopholes in the implementation of the laws and to ensure that suppliers in the ESI are held to the highest standard of operation in the industry.

In as much as electricity consumers cannot expect to enjoy steady supply of electricity without the concomitant payment of charges to the supplier, the supplier cannot expect to enjoy regular payment of bills charged in the absence of regular supply of electricity to the consumers in compliance with established laws and regulations.



Electricity Illiteracy “Capture”

Adejola Adenike*

Having power and using it as desired is not all there is to it. Being able to identify its' source, how it is distributed and accounted for will help the consumer practice a better power utilisation habit. However, this is not the order of the day for most Nigerians who exhibit a nonchalant attitude towards having a basic knowledge on power generation, transmission, distribution and accountability. This attitude describes the power illiteracy “capture” which is not strikingly observed until there is a power failure. All that is clamoured for then is “let there be light.” How can we clamour for what we do not understand? After all, it takes 'two to tango'? We are part of the problem because part of the power outage resulted from “wasted” energy due to our inefficient use of the highly prized commodity. Power is “wasted” through conscious and unconscious habits of utilisation.

Why a 'lighted street' (from security lights) during the day in Nigeria? Why excited about a 'tokunbo'(second hand) cheaper purchase of imported home (or industrial) appliances such as iron, fridge, kettles, laptops and air conditioners which consume more power? Why buy a new, yet higher consuming power home appliance at a higher price? Why continuous charging and use of lamps, phones and laptops? Why subject a switched on TV to a 'ghost' audience? Why is electricity inefficiency not limited to the uneducated but highly prevalent among the elite also? In all, why are most Nigerians ignorant, non-aware and uncommitted about efficient use of electricity?

Honest answer, asking myself these questions is that I have not quantified its cost and benefits. Also, policy implementation on efficient electricity use seems lacking. However, neighbourhood answers to my questions include: 'after all, there has been power failure for days and now that there is light, let me enjoy it;' 'it helps me to quickly know if there is light before getting home and hence, I am happier.' While some do not know why they practice bad habits of power utilisation and are not interested, others need to show off their wealth (ignorance?), or how else will you know they are wealthy if their fanciful terrace lights are not on during the day?

For whatever reason most Nigerians 'enjoy' electricity inefficiently, it leads to high power generation and utilisation costs, pollution, ineffective allocation and distribution of resources, increases energy consumption trends, higher electricity bills (if meter is working accurately), energy 'waste,' a leak in income and so on.

A sure way to jolt many of us out of our doldrums is the prepaid meters. Just like its mobile telecom counterpart which uses prepaid recharge cards, prepaid meters will go a long way to “change” how most Nigerians use electricity. Other ways of becoming “electricity wise” culled from International Energy Agency (IEA) “25 Bright Ideas” include:

1. Track your spending. Calculate your monthly power bills to track your electricity costs.
2. Engage the whole family and or employees on how to reduce household/industrial electricity utilisation when cooking, washing, producing, entertaining and so on.
3. Shop wisely; buy more efficient items (e.g. Compact Fluorescent Lamps and bulbs) by looking for energy ratings and performance endorsement labels (e.g. Energy Star).
4. Make sure your refrigerator and freezer doors have tight seals, are positioned in a cool place and are not blocked with frost.
5. Apply power saving features on your computer and laptops and always switch off screens when you are done. “Screen Savers” do not save electricity.
6. Devices that “beep” in the night use huge amounts of energy and power continues to

*Emerald Energy Institute,
University of Port Harcourt,
Rivers State, Nigeria.
Email: rafiatadejola@yahoo.co.uk
Phone: +234-803-386-3130



travel through the cable for appliances that are connected to a network. Therefore, completely switch off or unplug appliances and entertainment systems when they are not in use.

7. Turn off the lights when you leave a room.
8. You will get more light from clean lamps. Therefore, regularly clean light fittings, reflectors and lampshades.
9. At work, establish a best energy saver award for the employee that comes up with ideas that save the company the most energy.
10. Spread the information on how to be “electricity wise.” Here, even the uneducated Nigerian in the remote villages should be considered. This information must get to him/her.

One can only hope that with the new boss “FASH” at the helm of power affairs, a true change for the best has come to stay in the power sector and power efficiency will not be left out.



An Analysis of Shale Oil Development and its Implications for OPEC Exporting Nations: Evidence from Nigeria¹

Ogunyiola Ayorinde Joshua*

Introduction

In recent times, there have been discoveries and developments in shale gas and tight oil in the United States (U.S.), China and different parts of the world, leading to a game changer in the global energy market. Until the advent of shale gas as an unconventional natural gas resource, crude oil and natural gas have been the major global energy resource; with Organisation of the Petroleum Exporting Countries (OPEC) contributing about 40% to the world oil output (see Hou *et al.* 2014 and The Economist, 2014).

Currently, the US is the leading producer of shale gas, followed by China. However, China has the largest shale gas reserves and has set targets for its production by 2015. Ukraine is expected to begin exploration shortly. These developments are ominous for OPEC countries, as most shale producing nations are the largest energy consumers.

This development will influence not only energy dependence in the United State but also global energy prices and market share for OPEC and non-OPEC countries. Prior to shale gas development, the United States was the world's largest importer of Nigeria's crude oil, accounting for about 40% of the country's oil export. However, preliminary data from the U.S. Department of Energy suggests that Nigeria has stopped exporting crude oil to the US since June, 2014. The loss in American patronage in the short term may not pose large threats as there are promising new existing markets to explore. However, further exploration by US and other endowed shale gas nations such as China, Ukraine, India and South Africa, amongst others, in the near future serve as threat to energy pricing and market competitiveness for Nigeria's oil exports.

Structural Shifts In Global Energy Market

The analysis documents recent patterns of energy market. Energy has consistently been pivotal to economic changes and development. World Economic Forum (2013) suggests that as the economy changes overtime, so also the energy mix that fuels it.

The development of a modern world has generally been characterised by:

1. The desire for energy efficiency (cleaner forms of energy),
2. Energy resource pricing,
3. Evolving new technology to harness energy,
4. Demographic growth and changes in consumption,
5. Economic growth, and
6. Energy policies that lead to a consistent shift in global energy mix.

The world energy market has been changing. The change may be propelled by two forces:

1. The growth in U.S. shale production, and
2. The demand of energy in Asia.

The future for shale oil development is much dependent on a number of economic and technological factors. Four factors will be particularly important:

1. Oil price
2. Technology and economies of shale oil production
3. Energy policy, and
4. Environmental impacts (Drabenstott *et. al* 1984).

Shale oil production has increased global oil output. U.S. shale oil production increased to 11,415 Billion Cubic Feet (bcf) in 2013 from 1,293 (bcf) in 2007 representing a 782.83% increase in production. The immediate effect of increased shale production is evident from the declining crude oil import. Between 2007 and 2013, U.S. imports declined by 26.80%. Imports declined to 299,871.2 thousand barrels (tb) in 2013 from 409,663.1 (tb) in 2007. This development has made the U.S. a more energy secure nation with a projections to become the largest global oil producer overtaking Saudi Arabia, making the North America country a net exporter around 2030 (see IEA, 2012).

Implication of Shifts in Global Energy Market for Nigeria

The analysis about the changing global energy market has implications for the Nigerian economy as it depends on crude oil export for its revenue as mentioned earlier. The implications on Nigeria's economy can be analysed from an observed perspective.

The growth in shale oil production in the U.S. has led to growth in world oil production and supply. This has triggered a decline in global oil price, having a multiplier effect on the Nigerian oil dependent economy as revealed in table 1. Nigeria's budget which is anchored on the price of international crude oil has made budgeting difficult as oil price continue to decline. The federal government had forwarded three different Medium Term Expenditure Framework to the National Assembly on three separate occasions between September and December, 2014 with crude oil benchmark proposed at \$77, \$ 73 and \$65 per barrel.

Table 1 reveals deteriorating state of the Nigerian economy. Crude oil revenue has declined over the years. Exchange rate has been depreciating, in annual terms the currency depreciated about 3.78% between 2013 and 2014. Similarly, external reverse was 547,355.35 billion in 2013 depreciating by 24.66% in 2014. From the analysis, it is clear that over dependence on crude oil of the Nigerian economy has led to increased macroeconomic shocks.

Table 1: Observed Implications

-

Source: Compiled from Central Bank of Nigeria Statistical Database 2014

Conclusion

The study analysed implications of shale oil development in the U.S. for OPEC exporting nations with reference to Nigeria. The author is of the view that the structural shifts in the global energy market are as a result of two factors:

1. Advancement in technology (horizontal drilling and hydraulic fracking) as a result of high global crude oil price making shale production cheaper to explore, and
2. Increase of crude oil demand from Asia.

¹The full paper was presented at the 8th annual conference of the Nigerian Association for Energy Economics on the future energy options: policy formulation, assessment and implementation, April 2015.

* Department of Economics, University of Ibadan, Nigeria
Email: ayoogunyiola@yahoo.com
Phone: +234-706-3827113



Further, U.S. import data from the U.S. Energy Information Administration reveal US oil import declined by 26.8% between 2007 and 2013. The US import trend is reflected on Nigeria's export of crude oil. Nigeria's crude oil export to US declined consistently from 52.57% in 2007 to 9.70% in 2013.

The analysis further reveals an increase in supply in global oil which has had multiplier effects on Nigeria's economy. Bonny light oil price has fallen by 47.2% between January 2014 and February 2015. As a result, Nigeria's crude oil revenue has also declined. Simultaneously, external debt is rising and exchange rates are depreciating. This therefore reveals that macroeconomic condition in the short run is negative. Nigeria may not be able to finance its fiscal activities as a result of declining foreign exchange reserves and crude oil revenue and may result to borrowing in the long run. The policies that will stabilise the Nigerian economy should be geared toward diversification of the economy from over dependence on oil revenue.

References

CBN Statistics Database: www.statistics.cbn.gov.ng
Drabenstott, M., Duncan, M., & Borowski, M. (1984). Oil Shale in the United States: Prospects for Development. Economic Review, Federal Reserve Bank of Kansas City.
Hou, Z., et al (2014). The Development Implication of the Fracking Revolution. Overseas Development Institute. Stockwatch Bulletin.
IEA, 2012. *World Energy Outlook*.
The Economist, (2014). OPEC Flexing
www.economist.com/blogs/graphicdetail/2014/11/dailychart-15 November 26th, 2014.



Prospects and Challenges of Shale Gas Development in China

*Oluwasola E. Omoju and Terfa W. Abraham**

The discovery and exploration of shale gas and oil in the United States (U.S.) has revolutionised the oil and gas sector in terms of unconventional sources, and also made U.S. one of the largest producers of natural gas in the world. Over the past few years, the output of oil and natural gas in the U.S. has risen dramatically. According to the Wall Street Journal in its November 2013 edition, oil and natural gas output in the U.S. in July 2013 was equivalent of about 22 million barrels per day, compared with Russia's forecast of 21.8 million barrels a day of oil and natural gas in 2013.

Despite Russia and the U.S. topping the world chart in terms of oil and natural gas production from unconventional sources, countries such as China, Australia, Canada and Argentina have vast resources of unconventional energy. However, the prospects of developing shale gas in China has gathered interest in recent times, considering the need to meet the country's growing energy demand, reduce foreign energy dependence, facilitate energy security and mitigate environmental degradation. The U.S. Energy Information Administration (EIA) 2011 Report estimated that China had 1,275 trillion cubic feet of recoverable shale gas, the largest of all the countries surveyed in the report (EIA, 2011), but the 2013 edition of the report downgraded the estimate to 1115 trillion cubic feet (EIA, 2013). The majority of China's shale reserves are in three basins – Sichuan, Tarim and Yangtze Platform.

The opportunities and benefits of shale gas production in China are numerous, ranging from economic, social to environmental. Domestic shale gas production in China will lead to a reduction in energy costs and imports, improve its energy security status, create job opportunities, generate government revenue, enhance local development and reduce environmental degradation by substituting coal. But despite these potential benefits, shale gas production has not increased as expected. China Petroleum and Chemical Corporation (Sinopec) has achieved some success in the Sichuan Basin, but shale gas production is still unlikely to meet gas demand, as the country continues to make efforts to diversify its supply sources through deals with Russia and other Central Asian gas producing countries. The fact that China has enormous shale gas resources is not in doubt; the key question is why China is not producing shale gas in large commercial quantities like the U.S. This article discusses some of the factors constraining shale gas development in China.

The first issue is related to the cost of producing shale gas compared to other conventional gas. China presently has reliable gas supply from Russia, Myanmar, and the Middle East, which is aided by key pipeline infrastructure. Importing gas from these countries may be more economically viable than domestic production. However, considering the need to diversify natural gas supply to mitigate the potential impact of unfavourable developments in any of these countries, China may well take shale gas production seriously. Volatile political situations in the Middle East where China has huge stake may impact negatively on China's energy security in the future. The cost challenge associated with shale gas production will be addressed in the long term as more technology and know-how are promoted and an open market system is developed in the sector.

Another potential constraint to shale gas production in China is the complicated pipeline access procedure and geology, which makes shale gas extraction very difficult and expensive. China's shale layers are heavily faulted, which makes it difficult and expensive to drill. Gas reserves in the Bakken oil shale in North Dakota and the Marcellus gas shale in Pennsylvania are just about a mile below the surface. This is in contrast to the Sichuan shale reserve which is three

*Oluwasola E. Omoju, China Center for Energy Economics Research (CCEER), Xiamen University, China.
Email: sholley@yahoo.co.uk.

**Terfa W. Abraham, Economist/Research Fellow II, National Institute for Legislative Studies (NILS), Maitama, Abuja, Nigeria Email: lrenzcurve@yahoo.com;
Phone: +234-806-209-1306.



miles below the surface and in structures warped by active faultlines. This makes transportation and installation of heavy equipment and exploring shale gas in China much more difficult, time consuming and expensive. Contributing to this challenge is the limited expertise on hydraulic fracturing technology in China compared to the U.S.

Another challenge for competitive shale gas production in China is infrastructural constraint in terms of pipeline for gas transportation. China at present lacks the type of pipeline network that U.S. possesses, which transcends the entire North America, and makes transportation of shale gas less difficult. While China may be able to produce large volume of natural gas from its shale fields, transporting them to the market would be a huge challenge. Thus, the government has to place emphasis on developing and improving infrastructure that is conducive for shale gas production and transportation.

Shortage of water supply could also be another factor constraining shale gas production in China. Shale gas production requires large amount of water supply. This is because the technology used involves pushing large volume of water, sand and chemicals into the shale formations with high pressure. But, water scarcity already poses environmental challenges in some parts of China, and using available water resources to power the fracking technologies used in shale gas production will further aggravate the problem of water scarcity. Some areas with promising shale gas reserves, such as the Tarim Basin, have very limited water supplies for fracking.

Another factor that may undermine the production of shale gas in commercial quantities in China is its reported environmental effects (Ng, 2013; EIA, 2013). Environmentalists have argued that the technology and process used in shale gas exploration and production could result in environmental problems, particularly with severe impact on water supply and pollution. There are concerns that the fluids and chemicals used in fracking could pollute surface or underground water sources. Given the grave situation of water supply in some part of China deemed to be rich in natural gas resources, local environmentalists, residents and landowners in these communities may be opposed to shale gas production. Thus, companies may have to compensate residents and landowners in these communities, making the cost of exploration and production higher. Furthermore, there are research findings showing that shale gas emits larger amounts of methane than conventional gas (Moniz et al, 2011; Osborn et al, 2011). There is need for China to enhance the regulatory and legal frameworks on the environmental impact of shale gas development.

Lack of an open and competitive business environment, mature legal structure and private land ownership are the biggest impediment to shale gas production in China (EIA, 2013). The US shale gas production has succeeded to a large extent as a result of the open and competitive market that allows for competition, efficiency, reduced costs, innovations and improvements. The US shale gas success was largely initiated by the country's small and medium-sized oil and gas companies, supported by a rich expertise of several oil services firms. In contrast, shale gas development in China has been overtly dominated by state-owned companies – CNPC, Petro China and Sinopec, and foreign oil firms need to have a partnership with one of these companies to participate in shale gas production. The government plays a dominant role in the energy sector of China unlike in the U.S.

Energy prices in China are largely regulated by the government and do not reflect scarcity or the cost of production. In addition, the regulated price fails to incorporate environmental concerns which have been a serious issue in China in the past few years. All these significantly impact on the development of the energy sector in China, and also discourage private investment in shale gas production. Reforming the energy sector through energy market liberalisation is crucial to the development of the sector (EIA, 2013). Private investors will be willing to invest in shale gas production if they are convinced that prices will be determined by the market.

In conclusion, there is vast potential for shale gas production in China as the U.S. The exploration and production of shale gas holds strategic advantages and benefits for China in terms of energy supply, security and environmental concerns. However, the production of shale gas could be undermined by such factors as geology, inadequate pipeline infrastructure, water scarcity, environmental concerns, technical expertise, energy market structure, macroeconomic governance, and coal to gas technologies. While the issue of technology can be easily addressed, the current economic system in China that undermine and stifle private sector investment in the



oil and gas sector may be the greatest constraint. This has to be addressed pragmatically and comprehensively before China can boost shale gas production like the U.S.

References

EIA (2011). World Shale Gas Resources: An Initial Assessment of 41 Regions outside the United States, Energy Information Administration.

EIA (2013). Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries outside the United States, Energy Information Administration.

Moniz, E.J., Jacoby, H.D., Meggs, A.J.M. et al. (2011). □The Future of Natural Gas: An Interdisciplinary MIT Study. Massachusetts Institute of Technology.

Ng, E. (2013, Nov. 22). China turns increasingly to Unconventional Energy Production such as Shale Gas, South China Morning Post, <http://www.scmp.com/news/china/article/1363225/china-turns-increasingly-unconventional-energy-production-such-shale-gas>

Osborn, S.G. Vengosh, A., Warner, N.R. et al. (2011). Methane Contamination of Drinking Water accompanying Gas-well Drilling and Hydraulic Fracturing. *Proceedings of the National Academy of Sciences of the United States of America*, 108 (20): 8172–8176. doi:10.1073/pnas.1100682108.



Time Series Analysis of Volatility in the Petroleum Pricing Markets: The Persistence, Asymmetry and Jumps in the Returns Series

Olusanya E. Olubusoye* and OlaOluwa S. Yaya**

Introduction

Energy issue will continue to receive considerable attention in the global sustainable development agenda in many years to come. This is due to the fact that energy pricing significantly impacts on the economic growth, and this consequently affects poverty level (UNDP, 2005). Crude oil and petroleum products are major global energy sources. These products are affected by market forces, and in that case, their prices are volatile. The demand for the products are seasonal as well, for example there is higher demand for gasoline during the summer, while there is higher demand for heating oil during winter. Recent downward trend in the pricing of crude oil has gingered researchers towards studying the dynamic time series data as well as stability in pricing, that is, the market volatility.

It is therefore interesting to study the properties in price level and variance of prices of crude oil and its products at the international market. These, as we know affect the world economies at large, and the prices are affected by the prevailing exchange rates as well as stock price index (Gil-Alana and Yaya, 2014). Recent innovations by financial time series experts and econometricians have therefore concentrated on studying the variability in prices, rates and values of these economic and financial data, at both national and international markets. This variability is termed volatility, and as a result, quite a number of models to support this stylised fact have been proposed in the literature. The persistency level of volatility in these transformed series is therefore determined using the semi-parametric approach.

It is very common to consider both symmetric and asymmetric volatility models types in time series data, but recent innovations have shown that jump is another inherent property in financial data, for example in prices of oil and other petroleum product. A special asymmetric volatility model is the Asymmetric Power GARCH (APARCH) of Ding et al. (1993) which converges to seven special cases of other GARCH variants as a result of inbuilt Box-Cox transformation. Still, this model cannot capture correctly jumps/outlying returns in the volatility series. As a result of these, Generalised Autoregressive Score (GAS) models are introduced in Harvey and Chakravarty (2008) and Harvey (2013). Other variants of the models are the Exponential GAS (EGAS) and Asymmetric Exponential GAS (AEGS).

Review of Literature

Empirical applications of oil prices, persistence and volatility are found in few papers. Gil-Alana and Yaya (2014) examined fractional persistence and cointegration between Brent crude oil and stock price in Nigeria and obtained significant evidence of a positive relationship between the two variables though with a very short memory effect. Alom, Ward and Hu (2012) examined the asymmetry and persistency of volatility in the prices of crude oil, heating oil, gasoline, natural gas and propane using GARCH-type model and observed different volatility persistence level. They further carried out forecasts performance tests, in which the best parametric model could not produce the best forecasts. Charles and Darne (2014) observed structural changes as well as outliers in volatility persistence of crude oil from Brent, West Texas Intermediate (WTI) and Organisation of Petroleum Exporting Countries (OPEC) markets. The outliers were investigated using the intervention analysis and the outlying points were likened to particular events over the sampled years. They further suggested that the inclusion of outliers, that is, jumps in the volatility modelling process could

improve the understanding of crude oil markets volatility. These jumps are as a result of the arrival of new economic information in the pricing of oil (Elder, Miao and Ramchander, 2013).

Rationale

The classical GARCH variants are not robust to capturing these occasional jumps in financial markets, and therefore, they underestimate the magnitude effect of the returns. Also, persistence effect of volatilities across markets can be measured using either fractional integration or GARCH based approaches. In this paper, we estimate the persistence in the spot prices of crude oil and petroleum products using the fractional persistence approach, and as well determine the appropriate volatility models among jumps, symmetric and asymmetric volatility models for the log-returns of prices of crude oil and other petroleum products.

Methodology

Literature on persistence in crude oil and volatility has been growing in recent times. Time series persistence is first observed in Granger and Joyeux (1980) when the fractional integrated (FI) processes are proposed. The proposition has led to many applications of the FI processes, in economic and finance, engineering, mathematics, hydrology, medicine, and lots more. In Box and Jenkins (1976)'s proposition, integrating parameter which assumes values 0 and 1 for 'pure' stationary and nonstationary time series, respectively, and in that case, the series are said to be $I(d=0)$ and $I(d=1)$ respectively. The case of FI assumes the integrating parameter to be non-integer, that is, lies in the open set $d \in (-0.5, 0.5)$ for invertible and stationary time series. Velasco (1999) re-defined FI process in the nonstationary range $d \in (-0.5, 1.5)$. In this study we employed the following methodologies: fractional integration techniques; Symmetric and asymmetric volatility modelling; and the Jump robust volatility modelling.

Data and Empirical Analysis

The data used are the daily spot prices for Crude Oil and Petroleum Products obtained from the website of United States Energy Information Administrations (<http://www.eia.gov/>). The Gasoline, Heating oil, Diesel, Kerosene and Propane are popular crude oil products, and the crude oil price influences prices of these products. Table 1 presents the results of persistence in volatility (returns) series. The absolute log-returns and squared log-returns series are used as proxies for the volatility series. We observe that the GPH approach underestimates the persistence estimates as compared to the estimates by the Whittle method. This happens in the two results for absolute and squared returns, and as observed the estimates by the squared returns are quite lower than those computed using the absolute log-returns. The results obtained are in the long memory range ($0 < d < 0.5$), even based on the computed confidence intervals. Closer look indicates that the persistence estimates for crude oil and gasoline prices are lower than the estimates for the remaining petroleum prices (Heating oil, Diesel, Kerosene and Propane).

Table 1: Estimates of d in the I(d) setting for both the Absolute and Squared log-returns series

Table with 2 columns: Product, Absolute log-returns, Squared log-returns. The table content is mostly obscured by a large grey watermark.

In bold, the most significant estimates of d. In parenthesis the 95% confidence intervals

* Department of Statistics, University of Ibadan, Nigeria. Email: oe.olubusoye@ui.edu.ng
** Department of Statistics, University of Ibadan, Nigeria. Email: os.yaya@ui.edu.ng



Table 2 gives the model specification results. Here, the Jump models are the GAS, EGAS and AEGAS models. The results indicate the competitiveness of asymmetric APARCH model to Jump robust volatility model. In the main analysis, Jump robust models defeated all other classical asymmetric volatility variants.

Table 2: Results of Model specification

Model	Specification Results
GAS	Competitive
EGAS	Competitive
AEGAS	Competitive
APARCH	Most Competitive
Jump Robust	Most Competitive
Classical Asymmetric	Less Competitive

Conclusion

The persistency and volatility pattern in the prices of petroleum products are investigated. Due to high demand of gasoline at the global market, the market behaviour, pricing and demand significantly affect the prices of the main crude oil and other products. The persistence of volatility for both crude oil and gasoline are similar, and these values are lower than the prices of other four petroleum products. This is due to the fact that gasoline has highest demand among other products, and volatility in the crude oil prices greatly affects its markets.

The results of the volatility modelling indicate the competitiveness of APARCH model with the jump robust models (GAS, EGAS and AEGAS). As we observe that the model competed well with the jump robust models in predicting the time series. As a way of extending this work in the future, pairwise prediction comparison test, say Diebold and Mariano (DM) test can be carried out between the APARCH model and any of the GAS variants in order to determine the real optimal model for predicting the volatility in the prices of other petroleum products, even though that of crude oil prices is confirmed as Jump volatility model, AEGAS.

References

Alom, F., Ward, B.D. and Hu, B. (2012). Modelling Petroleum Future Price Volatility: Analyzing Asymmetry and Persistency of Shocks. *OPEC Energy Review*, 36(1): 1-24.

Charles, A. and Darne, O. (2014). Volatility Persistence in Crude Oil Markets. *Energy Policy*, 65: 729-742.

Ding, Z., C.W.J. Granger and R.F. Engle (1993). A Long Memory Property of Stock Market Returns and a New Model. *Journal of Empirical Finance*, 1: 83-106.

Elder, J., Miao, H. and Ramchander, S. (2013). Jumps in Oil Prices: The Role of Economic News. *The Energy Journal*, 34(3): 217-237.

Gil-Alana, L.A. and Yaya, O.S. (2014). The Relationship between Oil Prices and the Nigerian Stock Market: An Analysis based on Fractional Cointegration. *Energy Economics*, 38: 463-469.

Glosten, L., Jagannathan, R. and Runkle, D. (1993). On the Relation between the Expected Value and the Volatility of the Nominal Excess Return on Stocks. *Journal of Econometrics*, 48: 1779-1801.

Harvey, A. (2013). *Dynamic Models for Volatility and Heavy Tails: With Applications to Financial and Economic Time Series*. Cambridge University Press, London.

Harvey, A. and Chakravarty, T. (2008). Beta-t-(E)GARCH. Working paper series. University of Cambridge.

UNDP (2005). *Energy for Sustainable Development*. New York: UNDP.



Chairman and Keynote Speaker of Each of the Past NAAE Conferences in Nigeria, 2008-2015

CONFERENCE	THEME	KEYNOTE SPEAKERS	CHAIRMAN	DATE AND VENUE
1st Annual Conference	DEVELOPING AND SUPPORTING CRITICAL ENERGY INFRASTRUCTURE FOR VISION 2020: CHALLENGES, CONSTRAINTS AND PROSPECTS	CHIEF P. C. ASIODU, CON	Ambassador Baba Gana Kingibe, former Secretary to the Federal Government of Nigeria	29th-30th April, 2008. Transcorp Hilton Hotel, Abuja
2nd Annual Conference	ENERGY INDUSTRY: RESTRUCTURING INTERACTIONS BETWEEN BUSINESS, ECONOMICS AND POLICY	Dr.Taiwo Idemudia, former Head, Economic Section OPEC	Engr. Mutiu Sunmonu MD, Shell Petroleum Development Corporation of Nigeria	23rd -24th April, 2009 Sheraton & Towers, Abuja.
3rd Annual Conference	ENERGY, ENVIRONMENT, AND ECONOMIC GROWTH	Prof. A.S. Sambo, FNAEE, Director General, Energy Commission of Nigeria and Special Adviser to the President on Energy	Dr Emmanuel Egbogah, Former Special Adviser to the President of Nigeria on Petroleum Matters.	19th - 20th April, 2010. New Chelsea Hotel, Abuja.
4th Annual Conference	GREEN ENERGY AND ENERGY SECURITY: OPTIONS FOR AFRICA	Mr. Osten Olorunsola, former Vice President, Gas, Shell Africa, former Director, DPR	Engr. Chima Ibenechie, former Managing Director, NLNG	28th – 29th April 2011, Sheraton Hotel & Towers, Abuja.
5th Annual Conference	ENERGY TECHNOLOGY AND INFRASTRUCTURE FOR SUSTAINABLE DEVELOPMENT.	Professor Einar Hope, 2010 IAEE President	Prof. A.S. Sambo, FNAEE, Director General, Energy Commission of Nigeria and Special Adviser to the President on Energy	23rd – 24th April, 2012, Sheraton Hotel, Abuja.
6th Annual Conference	ENERGY RESOURCE MANAGEMENT IN A FEDERAL SYSTEM: CHALLENGES, CONSTRAINTS AND STRATEGIES.	Chief Philip Asiodu, CON, Former Minister of National Planning	Dr Emmanuel Egbogah, Former Special Adviser to the President of Nigeria on Petroleum Matters.	22nd-23rd, April, 2013, Sheraton Hotel, Lagos.
7th Annual Conference	ENERGY ACCESS FOR ECONOMIC DEVELOPMENT: POLICIES, INSTITUTIONAL FRAMEWORK AND STRATEGIC OPTIONS	Professor Yinka Omorogbe, Nabo Graham Douglas Distinguished Professor of Law, Nigerian Institute of Advanced Legal Studies (NIALS), Abuja.	Professor Soji Adelaja, John. A. Hannah Professor of Land Economics, MSU, & Special Adviser on Economic Intelligence	16th -18th, February 2014, Sheraton Hotel & Towers, Abuja.
8th Annual Conference	FUTURE ENERGY POLICY OPTIONS: ASSESSMENT, FORMULATION AND IMPLEMENTATION TRENCHARD HALL, UNIVERSITY OF IBADAN, IBADAN, NIGERIA	Austin O. Avuru, FNAPE, MD/CEO, SEPLAT Plc	Dr. Emmanuel Egbogah, OON, P. Eng. Chairman, Emerald Energy Resource &, Former Special Adviser to the President on Petroleum Matters	Trenchard Hall, University of Ibadan, Ibadan, Nigeria



ABOUT NIGERIAN ASSOCIATION FOR ENERGY ECONOMICS (NAEE)

The Nigerian Association for Energy Economics (NAEE) is the Nigerian affiliate of the International Association for Energy Economics (IAEE) with a presence in over 100 Countries all over the world. The NAEE is however the first affiliate of the International Association for Energy Economics in Africa. The NAEE was formally inaugurated in Nigeria in December 2006 at the Nigerian National Petroleum Corporation (NNPC) Towers, Abuja.

MISSION STATEMENT

The Association is a nationwide nonprofit organization of business, government, academic and other professionals that advances the understanding and application of economics across all facets of energy development and use, including theory, business, public policy, and environmental consideration.

To this end, the Association:

- * Provides a forum for the exchange of ideas, advancement and professional experiences in energy economics.
- * Promotes the development and education energy professionals and;
- * Fosters an improved understanding of energy economics and energy related issues by all interested parties.
- * Provides a forum for contribution to national discourse on energy policy issues in Nigeria.

Activities of the NAEE

The NAEE will achieve its objectives through the following activities:

- * Publication of Professional Journal, Books, Newsletter and Press release.
- * Organizing seminars, Conferences, Workshops, Public Lectures and other similar fora.
- * Meeting and such other activities that will promote the objectives of the Association.

MEMBERSHIP

Membership of NAEE is open to interested persons from the academia, corporate sector, scientific fields and government. According to the IAEE Bylaws, to which NAEE subscribes, any person interested in economics of energy and willing to pursue the objectives and abide by the policies of the Association is eligible for membership.

The Association has the following categories of Membership:

- * Direct Members
- * Student Members
- * Honourary Members
- * Institutional Members

Membership of NAEE confers one with the following Benefits:

1. Receiving periodic issues of the Energy Journal as well as Economics of Energy & Environmental Policy
2. Participating in Energy Forum
3. Access to Online Worldwide Membership Directory and Online Conference Proceedings
4. IAEE Energy Blog
5. Keeping members informed of conferences and events within the energy industry.
6. Workings Paper Series
7. Placement Service
8. Student Programs
9. Member Publication Listing

10. IAEE Merchandise
11. IAEE Website
12. IAEE membership
13. NAEE Membership Directory
14. Free downloading of materials in NAEE Website
15. NAEE Membership
16. Receiving Nigerian Energy Newsletter

HOW TO BECOME A MEMBER

Any person interested in the economics of energy and willing to pursue the objective of the Association is eligible for membership.

1. Membership shall be accomplished by submission of a written application (by completion of association's membership form) and payment of the first year's dues.
2. Each member shall have one vote, members may vote at meeting of the members in person or by written proxy

Membership Dues

1. Regular Member: N25,000
2. Student Member: N15,000
3. Institutional Members: N250,000

NAEE ACCOUNT DETAILS

Bank Name:

Guaranty Trust Bank Plc.

Account Name: Nigerian Association for Energy Economics

Account Number: 0110538168

Sort Code: 058152052

Bank Name: First City Monument Bank

Account Name: Nigerian Association for Energy Economics

Account Number: 1392531018

WEBSITE

The Nigerian Association for Energy Economics is on the World Wide Web and its address is www.naee.org.ng

The website has general information about the Association. You can also visit our website of the International body at www.iaee.org

Payment can be made online, Membership form can be downloaded from these websites.

Contact: for more information you can write directly to:
Nigerian Association for Energy Economics (NAEE)

c/oProfessor Wumi Iledare, Ph.D., DFNAEE, SFUSAE
Chirota and Emmanuel Egbogah
Distinguished Professor of Petroleum Economics & Director
Emerald Energy Institute,
UNIPORT, Nigeria.

Address:

7 Parry Road, Centre for Petroleum Energy Economics & Law,
University of Ibadan,
Ibadan, Oyo State.
Tel: +2348169209627
Email: president@naee.org.ng,
wumi.iledare@naee.org.ng

Programme Officer
Nigerian Association for Energy Economics (NAEE)
Email: admin@naee.org.ng

Nigerian Association for Energy Economics (NAEE) PUBLICATIONS

1. Energy, Environment & Economic growth (2010)
Price: N1,500.
2. Green Energy and Energy Security: Options for Africa (2011)
Price: N1,500.
3. Energy Technology and Infrastructure for Development (2012)
Price: N2,000.
4. Energy Resource Management in a Federal System (2013) Price: N2,500
5. Energy Access and Economic Development: Policies, Institutional Framework and Strategic Options (2014)
Price: N3,000
6. Solving Nigeria's Energy Puzzle: Why Economic Analysis Matters : N200

NOTE: These prices are only available at the conference.





Student participants at the public lecture with Dignitaries



Participants at the Dinner programme



NAEE Dignitaries in UI VC Office



Prof. Gurkan Kubaroglu



NAEE Dignitaries in UI VC Office



Ms Bolanle Onagoruwa, IBEDC Acting MD receiving Award from Prof. Adeola Adenikinju



Dr. Emmanuel Egbogah



Dr. Emmanuel Egbogah with the IAEE delegates during the courtesy visit to UI VC



Dinner and Award night



Dignitaries



Cutting of cake



Participants at the 8th NAEE/IAEE Annual Conference
Cross section of delegates



Awardees



The New Council Members



The immediate past president with the NAEE New Council Members



The deputy Governor of Oyo State with Prof. Akin Iwayemi at the 8th NAEE Annual Conference



Resource persons with Oyo State Deputy Governor



Prof. Iledare, Prof. Gurkan Kubaroglu, Prof. Adeola Adenikinju with his wife and Dave Williams, Executive Director of IAEE



Prof. Gurkan Kubaroglu, Prof. Wumi Iledare and Dave Williams



Prof. Akin Iwayemi with NESA Executives



Presentation of award to UI VC. Representative



Presentation of Award to representative of ECN Director



Presentation of Award to Prof. Omorogbe



Presentation of Award to Prof. Iledare



Presentation of Award to Dr. Tim Okon



Presentation of Award to Dr. Egbogah



Participants with IAEE representatives



Participants at the Conference