ALP BUSINESS REVIEW
Energy & Infrastructure
2015/16 Edition




The Future of the Nigerian Energy Industry: Issues Surrounding Localised Manpower Development
By Ibilola Amao, Ph.D., Lonadek Limited

Creating an Enabling Environment for Infrastructure Investment in Present Day Nigeria
By Opuiyo Oforiokuma, Managing Director/CEO, ARM-Harith Infrastructure Investment

Understanding Nigeria's Infrastructure Potential
By Ian Aruofor, MBA, and Kalu Balogun, MBA

Energy Access and Economic Development: Policies, Institutional Frameworks and Strategic Options
By Yinka Omorogbe, member FNAEE

The Impact Of Oil Prices And Other Global Dynamics On The Nigerian Oil And Gas Industry
By Alexander Ogbechie, Ernst and Young

Frequently asked Questions and Answers and Recommendations about the Nigerian Power Sector.
By John Delano, Akindelano Legal Practitioners

My Career Narrative: The Plight of the Engineering Graduate in Nigeria
By Asuzu John Asika, MSc, MBA

Gas-to-Power and the Role of Gas Compression in the Nigerian Energy Industry Current Challenges, Strategies, and Solutions for Sustainable Development
By Lucky Enajite Edjenekpo, CCP, PMP

ALP Business Review - Energy is a journal of Akindelano Legal Practitioners. It is published annually in conjunction with the ALP Seminar Series.

AKINDELANO
LEGAL PRACTITIONERS

AKINDELANO
LEGAL PRACTITIONERS

ALP Business Review - Energy is a journal of Akindelano Legal Practitioners. It is published annually in conjunction with the ALP Seminar Series.

CONTENTS

Acknowledgement and Thanks to
Nigerian Association for Energy Economics (NAEE) and
The Energy Institute (E.I.)

NAEE NIGERIAN ASSOCIATION for ENERGY ECONOMICS
www.naee.org.ng

energy institute
Nigeria

Published by
Akindelano Legal Practitioners
21, Military Street, Onikan-Lagos
Tel: 01-4605511, 08069334178
www.akindelano.com

Printing by
Limitless Print Global Resources

ALP BUSINESS REVIEW

Call for submissions

ALP Business Review is published Akindelano Legal Practitioners. It is a leading business journal devoted to issues of relevance to the local and international commercial, legal and academic community. The subject matter of the Review changes from year to year in conjunction with the ALP Seminar Series.

ALP Business Review welcomes submissions from potential contributors from the Nigerian and international corporate sector. Articles should deal with commercial topics affecting business in Nigeria. This could be approached from a local multi-jurisdictional or cross-border stand-point.

ALP Business Review articles should aim to break new ground on commercial issues and provide an in-depth discussion of current developments and timely issues which are of particular interest to our international readership.

Submissions should be 2,000-4,000 words long, although submissions may be considered, if they are below or above this word length. Full guidelines for contributors can be requested from the Content Commissioning Editor of the journal. Details are found on the inside back cover of this journal. All articles are peer-reviewed.

Articles should be sent as a Word document, to the Consent Commissioning Editor (john.delano@akindelano.com).

ALP Business Review is published once a year, in October. To be considered for publishing, an article must be received no later than the second week in June.

Contributors should note that submission of articles to ALP Business Review does not guarantee their publication.

FOREWORD

by Mr Opuiyo Oforiokuma
Managing Director/CEO ARM-Harith Infrastructure Investment

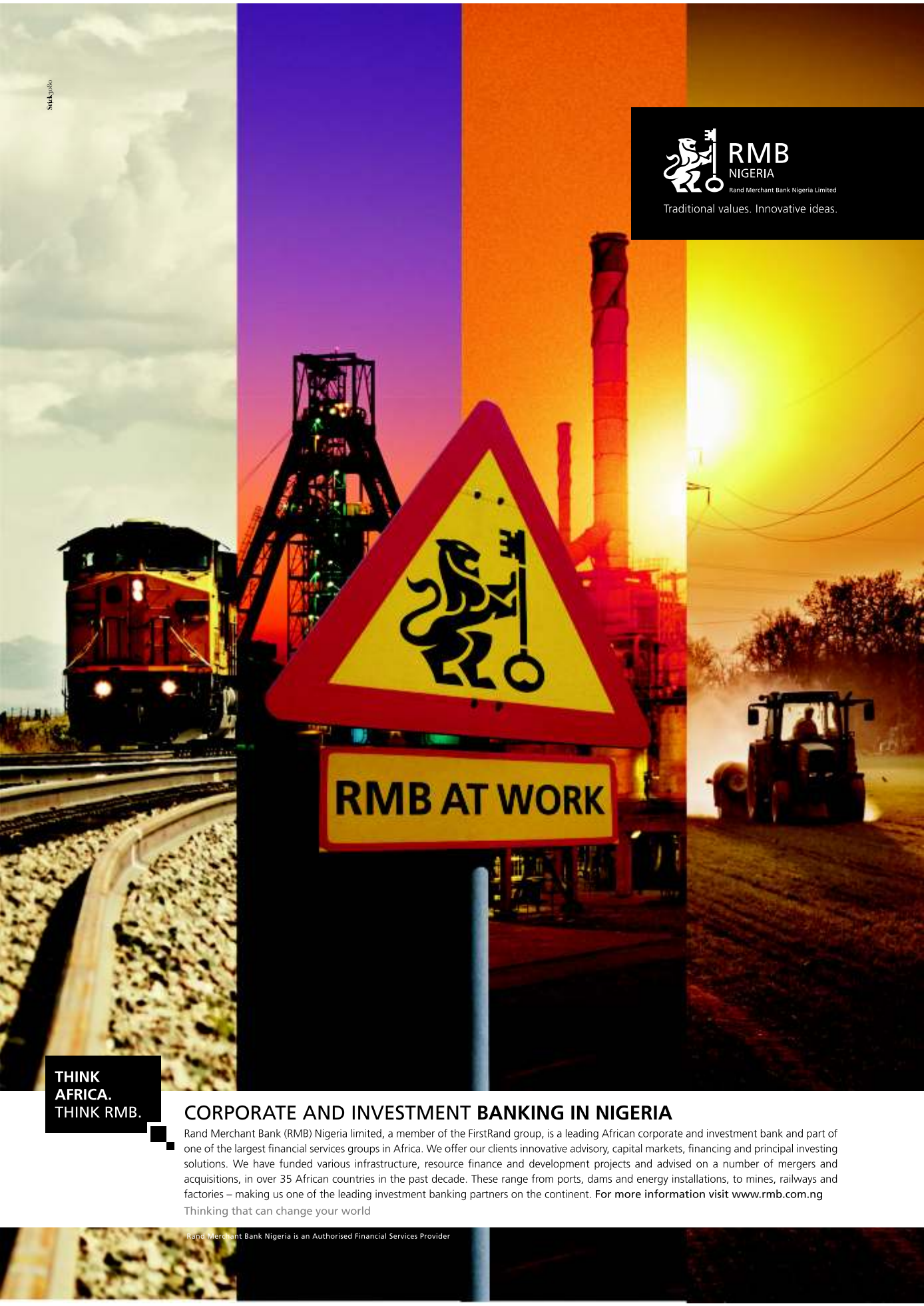
As I present this foreword for ALP's third version of the ALP Business review, I have to borrow from my own words by reiterating that dealing with Nigeria's infrastructure deficit is daunting but not impossible. I would categorically say that it is a challenge which can be surmounted if we - government and the private sector - adopt a planned and structured approach.

It is quite clear that the infrastructure gap is a major impediment to Nigeria's socioeconomic growth. Much more than the various problems highlighted by local and international financial organizations like the World bank, the UNDP, etc., the apparent inability of successive Nigerian governments historically to create sustainable programs for infrastructure development is a significant weakness that must now be addressed.

Infrastructure development, and any other kind of major long term projects, require careful assessment of the associated risks and benefits. There also needs to be provision for financial stability and for good stakeholder relationship management, during project execution. As the old adage goes: “Swallowing the elephant whole will lead to choking or indigestion; thus it's best to eat the elephant in bite-sized chunks". In essence, the import is that Nigeria's infrastructure gap must be approached in manageable segments, and in a structured and disciplined way.

The 30-year Nigerian Integrated Infrastructure Master Plan (NIIMP) estimates a requirement of US$3 trillion over the plan horizon, US$166 billion of which was forecast to arise during the first five years (2014 – 2018). In addition, 48% of the cost in the first five years was assumed to come from the private sector. Assuming the NIIMP figures to be a fair estimate, they translate into an average of US$100 billion annually over 30 years.

Two things should now be apparent to all who care to consider this issue : that the public private partnership model has a key role to play in dealing with Nigeria's infrastructure deficit, and that together, the Nigerian government and private investors must establish a system of funding that will enable the long term delivery of infrastructure projects in Nigeria. These and many other issues are dealt with in this edition of ALP Business review. Also kindly see my article amongst the various other good publications within. Happy reading!



RMB
NIGERIA
Rand Merchant Bank Nigeria Limited

Traditional values. Innovative ideas.

THINK AFRICA.
THINK RMB.

CORPORATE AND INVESTMENT **BANKING IN NIGERIA**

Rand Merchant Bank (RMB) Nigeria limited, a member of the FirstRand group, is a leading African corporate and investment bank and part of one of the largest financial services groups in Africa. We offer our clients innovative advisory, capital markets, financing and principal investing solutions. We have funded various infrastructure, resource finance and development projects and advised on a number of mergers and acquisitions, in over 35 African countries in the past decade. These range from ports, dams and energy installations, to mines, railways and factories – making us one of the leading investment banking partners on the continent. **For more information visit www.rmb.com.ng**

Thinking that can change your world

THE FUTURE OF THE NIGERIAN ENERGY INDUSTRY

Issues Surrounding Localised Manpower Development.

By Ibilola Amao, PhD., Lonadek Limited

"Critical to Nigeria's power-sector revitalisation is the availability of skilled, capable, and competent technicians, vocationals, and craftsmen."

Preamble

Today in Nigeria, productivity has been adversely affected because of deteriorating infrastructure, pollution (noise and air), and inadequate supply of electricity.

This has translated into a comatose manufacturing industry because of the inability to produce goods in large quantities in an affordable and sustainable manner. Improvements in the availability and supply of power would raise the efficiency of labour and reduce the cost of manufacturing quality goods and services, which translates to wealth and job creation.

Nigeria is currently challenged by her inability to provide uninterrupted power supply to her citizens, companies, and investors. The unavailability of power has resulted in a dysfunctional environment and deteriorating economy because power generated, transmitted, and distributed uneconomically has had adverse effects on the business environment.

In recent times, emergency generators are no longer on standby but have become the main source of power.

Not only does this mean Nigeria's residents are spending a lot of money providing their own power, but the cost of production for companies has become exorbitant, thereby making their goods and services expensive and unaffordable.

It is now predominantly more economical to import goods than to set up local manufacturing plants. This has resulted in a lot of job losses in Nigeria, Africa's most populous country, with larger manufacturing companies relocating to neighbouring countries.

The divestment of manufacturing industries, majorly multinationals, is no longer news because the affected companies could no longer bear the continued loss of business due to the deplorable power infrastructure in Nigeria.

Ghana is currently the safe haven for businesses with extensive electricity consumption. With the cost of production hitting the roof, many more companies plan to leave Nigeria to commence operations in a country like Ghana where reliable power supply can be accessed. While Nigeria, with over 6,000 megawatts (MW) of installed capacity of electricity power could barely generate 2,000 MW, Ghana has recently been enjoying uninterrupted power supply.

According to Oyedepo's Energy Sustainability and Society Chart of 2012 (See Fig. A), Nigeria, with a population of more than 140 million, needs over 60,000 MW to be self-sufficient in power supply.

The resulting multiplier effect is the sinking of the Nigerian economy with fragile gross domestic earning, massive unemployment, underemployment, and steadily weakening purchasing power. Goods can only be produced efficiently and supplied at a competitive cost if reasonably priced, uninterrupted power is readily available.

The problem of inadequate power can be traced to the absence of a suitable and sustainable power-development policy by successive governments, lack of quality energy professionals, and poor human capital strategy. The disconnects between the Ministry of Education (MoE), Ministry of Science and Technology (MST), Ministry of Youth Development (including National Youth Service Corp), Small Medium Enterprise Development Agency of Nigeria

(SMEDAN), Ministry of Power (MoP), Energy Commission of Nigeria (ECN), and Ministry of Petroleum Resources (MPR) remain a fundamental flaw in workforce development and engagement.

There is a need also for the National Power Training Institute of Nigeria (NAPTIN), the Petroleum Technology Development Fund (PTDF), and the Nigerian Content Development and Monitoring Board (NCDMB) to collaborate and ensure that they take charge of managing and harmonising capacity, capability, and competence-development initiatives that fall under their jurisdiction.

Nigeria should also endeavour to optimise gas utilisation for power generation if she is to achieve self-sufficiency. Additionally, local human capital development initiatives should be harmonised with support programmes from relevant organisations, institutions, societies, associations, and individuals in the medium to long term.

Nigeria needs accelerated programmes for education, with priority given to Science, Technology, Engineering, and Mathematics (STEM) education as succinctly illustrated in the STEMS Gaps in Higher Learning Institutions diagrams (below).

The need to promote Junior Engineers Technicians and Scientists (JETS) clubs in Nigerian secondary schools; improve upon the poor university education curricula, develop state-of-the-art facilities, laboratories, and workshops; motivate lecturers who have failed to upgrade themselves consistently; upskill through post higher education, industry-specific training with hands-on learning and development opportunities in the form of internships, mentoring, coaching, and succession planning, amongst many other strategies, cannot be over-emphasised.

A Background to Education and Training of the Local Workforce in Nigeria

There is no gainsaying that education remains the key to the sustainable development of any nation. The realization of this fact led to the formulation of the National Policy on Education (NPE) in 1977 geared towards self-realization and individual and national efficiency. Evidently, the level of one's education is insignificant if a person lacks the ability to translate skill to productive ventures/outcomes.

The growth of the Nigerian education sector according to Teboho Moja (2000) has mainly been in its size and not in its quality. Teboho further stated that the education system of Nigeria is still far from preparing students for the contemporary world. The educational sector has not been very effective in educating Nigerians and preparing them to apply science and technology for professional growth and self-reliance.

Educated Nigerians rarely possess problem-solving and numerical reasoning skills or knowledge.

The disconnect between our higher learning education system and societal needs is due to various factors, such as a lack of professional enhancement for the university lecturers, outdated teaching curricula, poor linkage between industry practices and what is taught in schools, a dearth of sabbatical attachments, poor affiliation with international certification bodies, and frequent strikes and industrial actions.

The ethos of learning and character building has vanished from our institutions of higher learning because of a deficiency in morals and morale of management of such institutions. In a recent professional and graduate assessment carried out by Lonadek Nigeria Limited (a consulting company focused on Power, Energy, Hydrocarbon, Infrastructure, Marine and Maritime, and Finance value chains for government agencies), the overall performance was greatly appalling.

The write-up of engineering graduates and professionals that enrolled in the test was fraught with avoidable mistakes and without context or content. This is a downward negative trend in the development of the Nigerian education framework given the huge financial resources that have supposedly been injected into the sector. (See: Appendix A.)

With the average number of students in a class in a regular Federal University being 300 – 400, the lecturers are overworked. Classroom

overload is a result of few tertiary institutions offering the courses that are relevant to the development of the nation. For a country with huge and diverse natural resources, vocational and technical colleges should be patronised more than universities; unfortunately, this is not the case. Parents look down on vocational education, neither considering nor selecting it as a second choice.

There are too few good and affordable educational institutions (Innovation Centres, Centres of Excellence, Colleges of Technology, Technical and Vocational Trade Schools, etc.). The ethics that students imbibe are extremely poor and a sad reflection of their families' and lecturers' values. Also, society and the management of the higher learning institutions have failed to implement discipline in ways that produce well-mannered graduates with ethics that suit the workplace.

Government-owned institutions and vocational centres do not have the required manpower in terms of experienced and certified lecturers to impact knowledge and transfer skills. The link between the relevant associations, societies, and institutions that are critical to developing certified energy professionals, vocationals, and technicians is lacking.

The education curricula of our institutions are neither up to date nor being reviewed regularly in keeping with the requirements of industries, global best practices, and international standards. The Nigerian University Commission (NUC) needs to forge partnerships with global bodies and local bodies for the accreditation of their local programmes.

Since the Federal Government of Nigeria privatized the Generating Companies (GENCOs) and Distribution Companies (DISCOs), the need to retrain and empower the vocationals, technicians, and graduates so they can work effectively and produce uninterrupted power for Nigerians cannot be overemphasised.

Manitoba Hydro International, a Canada-based company, was awarded the contract to manage the entire operations of the Transmission Company of Nigeria (TCN) in 2012. Within an appreciable milestone, Manitoba Hydro International is expected to turn TCN into a technically and financially efficient, stable, and sustainable company capable of optimally utilizing its generation and distribution capacity. Three years later, the targets are still a mirage, and the ownership transfer is subject to further questioning among experts.

However, TCN would require a cultural change aside from technology transfer and the development of local personnel. Unlike what is obtainable in developed economies where the workforce is trained to suit national needs and demands, a human capacity blue print that would deliver a minimum of 100,000 MW of power to Nigeria is yet to be conceptualised and implemented. Post-tertiary professional, technical, and vocational training is a requirement to actualise the implementation of an effective "national energy delivery plan".

Human Capital Development Challenges

There are several challenges facing the Energy and Power industry in Nigeria, which stems from not having the right type, calibre, and quality of skilled and competent human resources that can proffer strategic, tactical, and operational solutions that address the nation's power deficit. This, in turn, has resulted in a decline in the production of power (2,500 – 4,000 MW), which has adversely affected the type and quality of goods produced in Nigeria.

Also, the quality of service delivery has been impacted adversely due to high operational costs vis-à-vis salary, staff retention, and inadequate relaxation due to noise pollution (for those who cannot afford sound-proof generators or live amongst owners of noisy generators).

Aside from the problem of human capital, the problem of inadequate power has resulted from Nigeria's inability to utilise gas through a master plan that ensures zero-flare with Independent Power Producers' (IPPs) strategy of optimising treated gas to generate energy and ensure uninterrupted power supply.

The National Integrated Power Project (NIPP) was initiated in 2004 to boost electricity generation capacity by the opening of gas power stations across the country. The project was

formed to address the issues of insufficient electric power generation and excessive gas flaring from oil exploration in the Niger Delta region.

Seven power plants were designed in gas-producing states as part of the project.

Planned power plants included: Ihovbor, Benin, Edo State, Calabar, Egbema Imo State, Gbarain Yenagoa, Bayelsa State, Sapele, Delta State Omoku, Rivers State Ikot Abasi, Akwa Ibom, Alaoji Abia State, Omotosho II, Ondo State, Olorunsogo II, Ogun State, Geregu II, Kogi State. These power plants are at various stages of development and yet to be deployed fully into the national grid.

The energy challenges that Nigeria faces include:

1. Power Infrastructure Deficit (obsolete and dilapidated facilities)
2. Gas pricing vis-à-vis pricing of electricity tariff
3. The supply-demand problem with gas
4. Inability to harness other sources of energy and power (coal, wind, wave, solar, geothermals, renewables, etc.)
5. Employee deficit in the Ministry of Power since the 1988 employment embargo on employment
6. Migration of Power Holding Company of Nigeria (PHCN) staff to high technology generation and distribution companies
7. Infrastructure vandalism and inadequate security along the existing power infrastructure
8. Lack of continuity in the government's plan and contracting strategy
9. Poor deregulation and privatisation policies
10. Human Capital-related issues

According to Dr. Yemi Oke, the Nigerian state is characterized by a confluence of factors. Economic interests, political forces, capitalist entities, and bureaucratic institutions determine the political, economic, and social laws or policies suitable or adoptable for the Nigerian state.

The same situation that persists nationally also manifests vividly in the electricity sector. The problem of institutional imbalance and nepotism pervades the entire Nigeria set-up.

In his Energy Sustainability and Society chart of 2012, Oyedepo predicts that by 2020, Nigeria's electricity demand would stand at approximately 100,000 MW, and skilled human capital must be available to design, construct, commission, operate, and maintain the power and energy generating, transmission, and distribution assets.

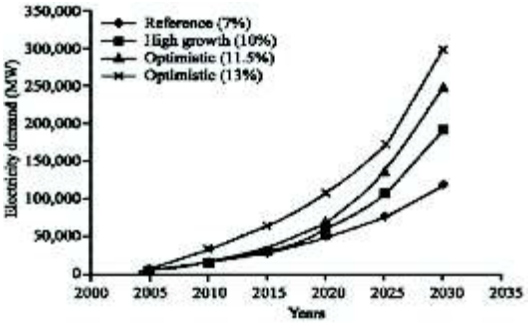


Fig. A Oyedepo's Energy Sustainability and Society chart of 2012

To breach the existing gap from the current less than 4,000 MW in 2015 to the required 100,000 MW in 2020 several interventions are required.

Background, Issues and Challenges in the Power Sector

Delays in government policy implementation are a major cause of the poor performance in the power sector. Although the idea of privatisation commenced in 1998, the Act that gave impetus to privatisation was not enacted until 2005.

Today the Power Generation Companies (GENCO's) and Power Distribution Companies (DISCO's) are yet to begin operations due to poor strategic planning. For example, the unavailability of gas is tied to poor monetisation of gas and the delay of the passage of the Petroleum Industry Bill by the Federal Government.

Former Minister of Power Professor Bartholomew Nnaji has emphasized the need for the government to speedily implement the Petroleum Industry Bill (PIB), saying its passage would help improve the power sector.

Furthermore, the Director-General of the National Power Training Institute of Nigeria, Reuben Okeke, is quoted as saying that the current effort to ensure stable electricity supply is threatened because of inadequate manpower: "The manpower planning undertaken by NAPTIN in 2012, estimates that to support 20,000 megawatts of power, nothing less than 6,750

engineers and 17,441 technical personnel would be required." (The Punch, August 31, 2014).

Furthermore, the Minister of Power, Professor Chinedu Nebo, recently said no electrical engineer has been employed in the Ministry of Power because of an embargo on employment in the PHCN since 1998.

At the May 2014 World Economic Forum on Africa (WEFA), Professor Nebo adjudged to the fact that: "Being among the MINT nations – Mexico, Indonesia, Nigeria, and Turkey – as the next emerging economic giants after the BRIC nations – Brazil, Russia, India, and China – the administration has enunciated a two-pronged approach to tackling the trend.

One of them is the reform of the electricity sector, and the second is access to electricity."

The minister stated that he projected double-digit movement of Nigeria's GDP when the effects of the power reforms became manifest, from a little above 6% in 2013.

National Power Training Institute of Nigeria (NAPTIN)

National Power Training Institute of Nigeria (NAPTIN) is the parastatal vested with the responsibility of manpower development of graduates, professionals, technicians, and craftsmen in the fields of engineering and relevant fields for energy and power sufficiency.

The NAPTIN - NOUN Technical Skills Acquisition Programme (NNTSAP)

NAPTIN, in collaboration with National Open University of Nigeria (NOUN), have developed and run non-graduate technical courses for technicians, artisans, and craftsmen, which include linesmen, cable jointers, electrical fitters, and Distribution Sub-station Operators (DSOs).

The NAPTIN Graduate Skills Development programme is designed to address identified skills gaps that will be needed by the various privatised and government power companies in the power industry.

The programmes focus on competence development in all categories, including generation, transmission, distribution, instrumentation and controls, safety, project management, communication technologies, etc.

NAPTIN Certified Renewable Training – Green

This training programme caters to all employees and personnel in the renewable energy sector. It focuses on persons in the design, installation, maintenance, and operations of renewable energy systems.

NAPTIN and SURE-P Collaboration

Conceived in January 2012, the Subsidy Reinvestment and Empowerment Programme (SURE-P) is the Federal Government's social decision to withdraw the oil subsidy and transfer a huge chunk of national resources from the hands of the privileged few to those of the disadvantaged Nigerians who constantly strive to break away from the burden of poverty and unemployment.

Collaboration with existing government bodies that relate to human capital development such as NAPTIN has helped ramp up on human capacity development for power.

To reduce unemployment, the SURE-P took steps to design programmes geared towards the mitigation of the immediate effect of the subsidy discontinuation. One such programme is designed to bridge the skills gap in the power and energy industry. Through a social safety net programme, the poor and vulnerable are exposed to Technical Vocational Education and Training (TVET).

The TVET programme is managed through the Federal Ministry of Labour and Productivity and supervised by the TVET Programme Subcommittee, headed by Comrade Peter Esele.

In the TVET skill-for-jobs demand analysis carried out by NAPTIN, an estimate of about 8,000 young engineers and technologists are currently required to support the power sector. This translates to 8,000 job opportunities. SURE-P, in collaboration with NAPTIN, is sponsoring TVET-developed skill acquisition projects to intervene in the training of many Nigerian youths who ordinarily would have been unable to afford the cost of the training on their own.

Through this intervention, many government-owned skill acquisition centres have

been upgraded to modern standard across the country, and many Nigerian youths have been trained in various trades. An estimated N2, 500,000 (which includes course fee, accommodation, and stipend for one year) is required to sponsor one engineering graduate throughout the duration of the NAPTIN training.

During the first quarter of 2015, the first batch of 220 young mechanical/electrical engineering graduates sponsored by SURE-P graduated, and a second batch of 150 were sponsored afterwards. Placement on projects and activities with the private DISCOS, GENCOS, and Transmission Companies (TRANCOS) ready to employ the SURE-P-funded NAPTIN trainees upon graduation is integrated into the programme.

Technical and Vocational Education and Training

Technical and Vocational Education and Training (TVET) is concerned with the acquisition of knowledge and skills for the world of work. TVET encompasses Apprenticeship Training, Vocational Education, Technical Education, Technical Vocational Education (TVE), Occupational Education (OE), Vocational Education and Training (VET), Professional and Vocational Education (PVE), Career and Technical Education (CTE), Workforce Education (WE), Workplace Education (WE), Skills Acquisition (SA), Competency Development (CD), etc.

Possession of requisite vocational technical education skills and its applicability will help to implement complex growth-inducing technologies and productivity-enhancing practices across Nigeria. This is an area where Nigeria needs to spend more resources and focus on for a turnaround in her economy.

The National Board for Technical Education (NBTE) is the principal organization of the Federal Ministry of Education specifically created to handle all aspects of Technical and Vocational Education falling outside university education. It was established by Act No. 9 of 11th January 1977.

In addition to providing standardised minimum guide curricula for TVET, the Board supervises and regulates, through an accreditation process, the programmes offered by technical institutions at secondary and post-secondary school levels. It is also involved with the funding of polytechnics owned by the Government of the Federation of Nigeria. NBTE's vision is to promote quality TVET for the sustainable development, growth, and leadership roles of Nigeria in African and global affairs.

The mission of NBTE is to promote the production of skilled and semi-skilled technical and professional manpower; revitalize and sustain the national economy; reduce unemployment and poverty through the establishment of appropriate quality assurance instruments for TVET; provide current and reliable information for planning and decision making, sourcing and disbursing of funds, and the establishment of adequate linkages between TVE Institutions and industry.

During the preparations for the Third National Development Plan, 1975-1980, the objectives for education were stated as follows, to:

- Expand facilities for education aimed at equalizing individual access to education throughout the country;
- Reform the content of general education to make it more responsive to the socio-economic needs of the country;
- Make an impact in the areas of technological education in order to meet the growing needs of the economy;
- Consolidate and develop the nation's system of higher education in response to the economy's manpower needs;
- Streamline and strengthen the machinery for educational development in the country; and
- Rationalise the financing of education with a view to making the educational system more adequate and efficient.

Currently, NBTE provides limited power-related courses, such as:

- Electrical/Electronic Engineering Technology under Engineering Technology, Post-HND (Full Professional Diploma)
- Electrical/Electronic Trades (Appliances Maintenance and Repairs, Electrical Installations and Maintenance Works, Instrument Mechanics, Radio, Television and

Electronics Work), which can form the basis of more advanced power-related certification.

There is still a need for highly skilled technicians and vocationals in Technical Electronics, Electrical Power, Electrical Project Management, Integrated Control Safety System (ICSS), General Electrical, Compressors Electricals, Electrical Field Work – Operations and Maintenance (O&M), Electrical and Instrumentation, Automation, Supervisory Control and Data Acquisition (SCADA), Instrumentation, Control Systems, Inspection, Electrical QA/QC, and High Integrity Protection Systems (HIPS) Dynamic Simulation.

In a nutshell, addressing the quality of lecturers simultaneously with redirecting interest from white-collar jobs to non-professional roles remains the major challenge. The key to any sector of the economy thriving is the availability of a competent, skilled workforce.

Critical to Nigeria's power-sector revitalisation is the availability of skilled, capable, and competent technicians, vocationals, and craftsmen. Lagos State's human capital initiatives for development in all cadres of the power workforce should be replicated in other states.

If Nigeria is to ramp up and achieve the required power-sector needs, solve the problem of unemployment, and grow her economy simultaneously, appropriate youth empowerment and engagement needs to be tackled through TVET.

In 2010, the Lagos State Government established the Lagos State Technical and Vocational Education Board (LASTVEB), through Law No. 12 of 2009 effective 3rd May 2010, giving LASTVEB its legal existence to carry out activities, such as:

- Provide relevant, functional, and accessible TVE for acquisition of relevant professional occupation.
- Advise the State Government on and coordinate all aspects of TVE and make recommendations necessary for the full development of TVE in the state.
- Prescribe standard skills to be attained and to continue to review such standards as may be necessitated by technological trends and the specific needs of the state.

The success of LASTVEB hinges on previous capacity developmental projects sponsored by key groups, who had earlier become aware of the need for a technical college in Lagos State, such as:

- The Lagos Chamber of Commerce and Industry (LCCI), the prime mover of Technical Education in Lagos State
- Manufacturers Association of Nigeria (MAN)
- Lagos State Ministry of Education (LSME)

The establishment of the Industrial Manpower Development Centre, now Government Technical College, Odomola, in 1984 was followed by Ado-Soba and Ikotun in 1985, then Ikorodu and Agidingbi (formerly in Lagos Island) in 1986.

The main purpose of the colleges is to produce craftsmen and technicians in the manufacturing, building, and engineering trades as well as business and the distributive trade areas, with a view to generating a pool of indigenous trained manpower sufficient to meet the needs of the economy.

The colleges provide courses of instructions and training, apply scientific knowledge, impart the necessary skills, and encourage individual initiatives, collective scientific creativity, and invention. The technical colleges serve as a resource avenue for technical and industrial educators and provide research facilities for the study of technical crafts.

Furthermore, from the private sector, Lagos State has the NITEL training school Oshodi, a PAN automotive training school, and the Nigerdock Training Centre, Snake Island.

Sustainable economic development can only be achieved by the development of vocational training of skilled blue-collar craftsmen, tradesmen, artisans, technicians, and vocationals. Unfortunately, Nigeria has focused more on white-collar qualification than on developing the technical, manual labour required to build and maintain efficiently run societies.

The need to develop a competent workforce that attains the right levels of National Vocational

Qualifications (NVQs) and National Vocational Certifications (NVCs) cannot be overemphasised.

Benefits of TVET

Technical and Vocational Education and Training has been greatly undermined in Nigeria. Going from the neglect of TVET and discouraging the emergence of technicians and vocationals, Nigeria has been unable to run an efficient Energy and Power sector. TVET:

1. Is an excellent instrument of making positive and systematic change in the life of individuals and the society.
2. Alleviates poverty.
3. Reduces the rate of unemployment through stimulating self-employment, entrepreneurship, and the evolution of small and medium size enterprises (SMEs).
4. Promotes national development and socio-economic transformation through the innovation and development of problem-solving characteristics of the trainees who are engaged in apprenticeship programmes.
5. Reduces the school dropout rate at various levels of education: primary, secondary and tertiary.
6. Empowers youths in line with their potential and talent.
7. Develops confident, well-rounded individuals who can communicate better because the competency-focused training methodology enables them to close gaps from their past.
8. Improves work ethic.
9. Restores the dignity of the trainees who otherwise may not fit into the mainstream educational system.
10. Achieves social interaction and workplace integration of trainees.

To handle the gas-to-power IPP projects, similar skillsets required in the hydrocarbon industry would be found to be necessary and extremely useful.

Most specifically for the power industry the following technical workforce initiatives are required.

Successful Initiatives and Potential Models

In 1950, U.S. President Harry S. Truman used the Point Four foreign policy to make the benefits of America's scientific advances and industrial progress available for the improvement and growth of underdeveloped countries.

America focused on knowledge and know-how empowerment for developing nations under the aegis of the African Scholarship Program of American Universities (ASPAU) programme.

Other programmes that developed capacity, capability, and competence for high technology industries include: the Shell Scholarship, Federal Government of Nigeria Scholarship, Commonwealth Scholarship, and Petroleum Technology Development Fund (PTDF) Scholarship.

These programmes produced the best and most competent for as long as the process remained meritocratic. Examples include Shell Scholarship: Chief Meshack Otokiti Feyide, Dr. Aret Adams, Funsho Kupolukun, Edmound Dakoru, and Egbert Imomoh; ASPAU: Engineer Alex Ogedegbe, Dr. Lalude, and Dr. Adegbola; and PTDF: Dr. Layi Fatona.

The initiatives that have been successful in empowering Nigerians holistically have been based strictly on merit and include:

1. Scholarships
2. Community Development Programmes
3. Graduate Empowerment Programmes
4. Short-term Training Schemes, e.g., NAPTIN in collaboration with SURE-P
5. Internship opportunities with international and local companies
6. Young Professional Networks of credible associations, societies, and institutions (e.g., Energy Institute, PennWell, Lonadek Young Professionals Network)
7. Routes to Chartership of credible associations, societies, and institutions
8. The Student Industrial Work Experience Scheme (SIWES) internship/industrial attachment programme, which was established by ITF in 1973 to address the lack of adequate practical skills requisite for

employment in industries by Nigerian graduates

The Future for Human Capital Development in the Gas and Power Industries

To solve the problem holistically, a multi-faceted and multi-dimensional effort is required by all stakeholders in the energy, power, and hydrocarbon industries simultaneously.

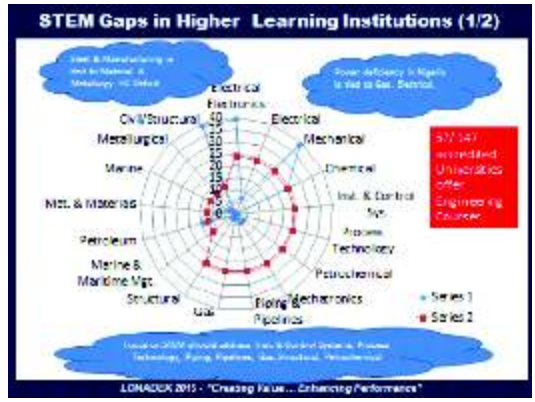
None should be in isolation of the other in building the capacity, capability, and competence required to deliver uninterrupted power supply to Nigerians and harmonising the various initiatives, programmes, and activities that have been successfully deployed in the past, with emphasis laid on collaboration, cooperation, and coordination of existing assets, facilities, and resources. (See Figure B.)

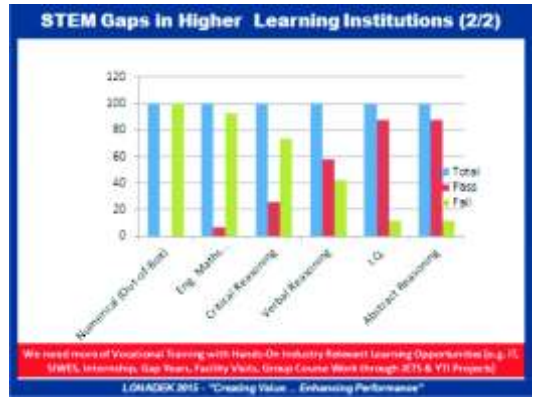
Figure B. Strategy for Harnessing Resources, HCD & Hydrocarbon Related Activities.

The need to promote professional development cannot be over emphasized. For example, the mandate for the Nigerian Institution of Electrical and Electronics Engineers (NIEEE), a division of the Nigerian Society of Engineers (NSE), is to:

- Standardize, promote, encourage, and maintain a high level of electrical engineering education, training and practice in Nigeria;
- Encourage research and development in engineering;
- Enhance the professional status of members in Nigeria;
- Develop and promote professional networking amongst members; and
- Carry out other activities consistent with the mission statement of the NIEEE.

Those who are tasked with improving on the status quo must be heavily relied upon to enhance the curriculum of the higher learning institutions whilst collaborating with international bodies such as the Energy Institute and the Institute of Electrical and Electronics Engineers (IEEE).





Gaps in Science, Technology, Engineering and Mathematics (STEM) Education

Of the 147 Accredited universities in Nigeria, only 57 offered engineering courses in 2014-2015. Furthermore, their products fail woefully in numerical reasoning, engineering maths (innovation), critical reasoning, and verbal reasoning. They do very well with Intelligence Quotient and Abstract Reasoning, are excellent at critiquing, and are intelligent overall, but they are without great opportunities to apply knowledge whilst studying.

The state of Nigerian universities should be addressed through government policy, public-private partnerships (e.g., GE-Calabar and Siemens Power Academy-Lagos), and increasing the number of Nigerian universities and higher learning institutions that develop energy, power, and hydrocarbon resources through aggressive STEM education.

The Professional & Competency Development matrix below outlines the various stages, relevant local and foreign professional bodies, and associations and stakeholders that are vital to the overall development of Nigerian professionals.

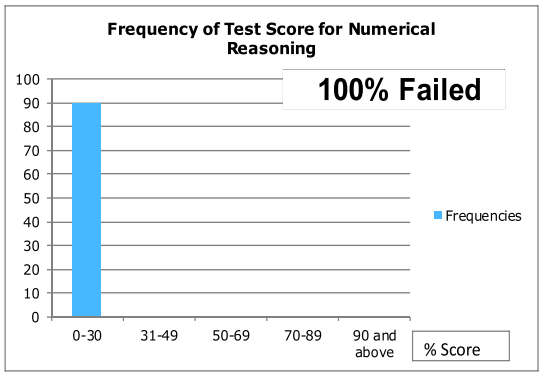
The future of Energy and Power-related training in Nigeria depends majorly on the following factors that cut across most sectors of the Nigerian economy:

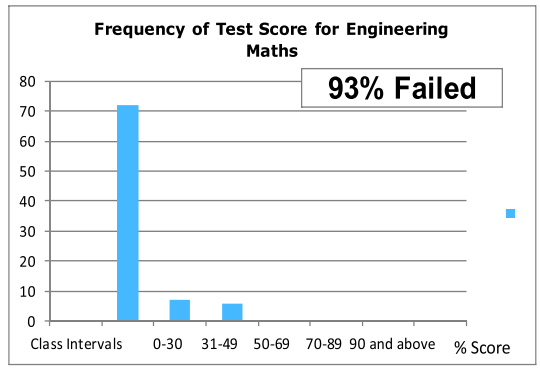
1. Exploiting the opportunity of training and developing Nigerians with the aim of exporting them as human capital to other emerging economies that have recently discovered crude oil.
2. Promoting Continuous Professional Development (CPD) and developing self-motivated personnel that thirst for knowledge, skills, and know-how.
3. Ranking of departments in terms of employability/engagement of graduates in such a way that an autonomous system results in Nigeria's tertiary institutions. (The regulation of these institutions by the government has had the effect of politicising the citadel of knowledge and reducing the academic capability of the institutions.)
4. Funding of university department chairs, grants, research and development programmes and increased collaboration between the academic community and the private sector.
5. Enacting laws that create an enabling environment for research and development.
6. Putting succession plans in place alongside expatriate quotas to ensure that expatriates transfer technology in the shortest possible time.
7. Encouraging collaborative efforts (public-private) between stakeholders such as the NAPTIN and SURE-P training programmes with GE, Alstom.
8. Integrating the Nigerian Content Development Monitoring Board (NCDMB) HCD initiatives into power-related courses and the running of gas-to-power related courses under the NAPTIN programmes.
9. Reducing the rate disparity and focusing on performance-based pay so that locals/expatriates who have the same skills and expertise can earn equally.

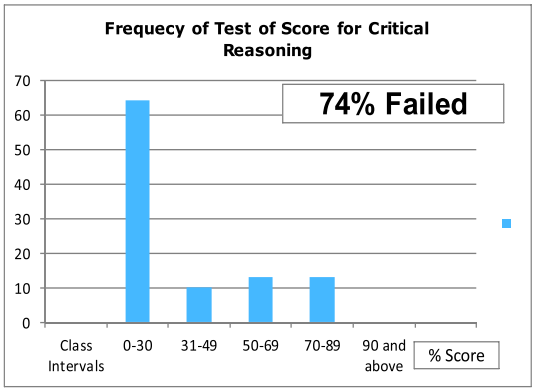
Dr. Ibilola Amao is the Principal Consultant with Lonadek Limited, a firm of local content consultants with their core competence in the area of Technical Talent Identification, Development and Engagement to achieve business productivity and profitability.

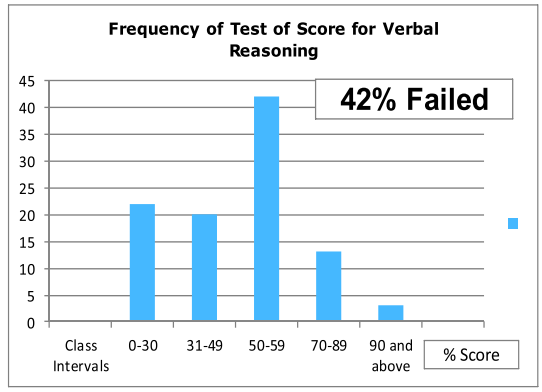
For more information or to reach Dr. Amao you can email her at lolaamao@lonadek.com or visit www.lonadek.com

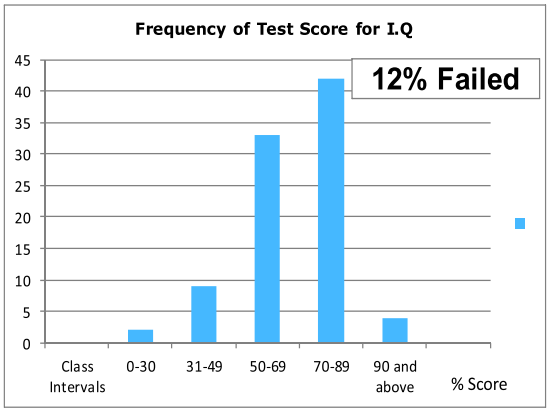
Performance of a Sample of Nigerian Graduate

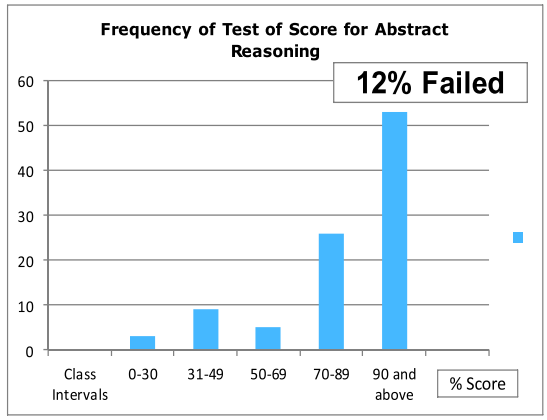












Appendix A: Performance of a Sample of Nigerian Graduates

NEED TO TRANSFER MONEY ABROAD ?

Send it in 24 hours or less with FirstOnline

FirstOnline enables you transfer money to a beneficiary abroad instantly using FirstTrade, our innovative foreign currency transfer platform.

- Quick and Easy Registration
- Secure Transactions
- Instant Local or international transfers within 24 hours

So think FirstOnline when next you need truly instant funds transfer locally or abroad – it's innovation at your fingertips

Visit www.firstbanknigeria.com for details

-You First-

Please ensure you do not reveal your online banking password(s), token number(s) and ATM PIN(s) to a third party. Do not open links, respond to suspicious calls, mails or letters requesting your banking details. These messages are fraudulent and are not from FirstBank.

Contact us: 01-4485500; 0700FIRSTCONTACT (0700-34778-2668228); firstcontact@firstbanknigeria.com

complaints@firstbanknigeria.com | www.firstbanknigeria.com | RC 6290 | SMS short code: 30012

FirstBankofnigeria @FirstBankngr Firstbankngr FirstBank Nigeria FirstBank Nigeria

ABU DHABI • BEIJING • DR CONGO • GHANA • GUINEA • JOHANNESBURG • LONDON • NIGERIA • PARIS • SIERRA LEONE • THE GAMBIA

FirstBank Since 1894

CREATING AN ENABLING ENVIRONMENT FOR INFRASTRUCTURE INVESTMENT IN PRESENT DAY NIGERIA

By Opuiyo Oforiokuma,
Managing Director/CEO ARM-Harith Infrastructure Investment

"Investors, whether local or international, are best encouraged by an environment that is predictable, transparent, cost-effective, and efficient to do business in."

Dealing with Nigeria's infrastructure deficit, whether in power, transportation, water, ICT, healthcare, etc, is a daunting but not impossible task to achieve if a planned approach is adopted.

There are various risks involved, nevertheless, which diminish some investors' appetite to take on infrastructure projects here. We have a large need for entirely new infrastructure in most cases, however, all that is needed in some is to rehabilitate or better maintain existing infrastructure.

An old adage says: "swallowing the elephant whole will lead to choking or indigestion; hence, it's best to eat the elephant in bite-sized chunks". In essence, deal with major challenges in manageable segments, and in a structured way.

Widely varying estimates of Nigeria's infrastructure financing needs have been made in the past, probably reflecting the difficulty of establishing a reliable figure of what is required. A consistent message though is that the need is large.

More recently, the 30-year Nigerian Integrated Infrastructure Masterplan (NIIMP) estimated a US$3 trillion cost over the plan horizon, US$166 billion of which was forecast to arise during the first 5 years (2014 – 2018). In addition 48% of the cost in the first 5 years was assumed to come from the private sector. Assuming the NIIMP figures to be a fair estimate, they translate into an average of US$100 billion annually over 30 years.

India's experience demonstrates the benefits of adopting a planned approach. As part of its eleventh five-year plan (2007 – 2012), the Government of India's infrastructure development programme depended on increasing the level of private investment in infrastructure through PPPs. Much like Nigeria's situation is today, long-term sources of finance, including from the private sector, were considered critical to the delivery of India's infrastructure plan. However, its long-term debt market at the time was underdeveloped.

The India Infrastructure Finance Company Ltd was therefore established to promote PPPs and to help raise long-term infrastructure finance through an Asian Development Bank-supported multi-tranche financing facility. This approach proved successful for India.

It is no surprise that the NIIMP assumes that a sizeable portion of Nigeria's future infrastructure financing will come from the private sector. It is now well understood globally that government on its own cannot finance all of a country's infrastructure needs. This has been evident in Nigeria for many years but will be all the more prevalent now given the current parlous state of the government's finances, and the much reduced value of oil, historically Nigeria's main foreign revenue earner.

Key focus now should be on what it will take to attract more private investment into infrastructure projects in Nigeria. Examples such as the ports privatization, the Lekki Toll Road Concession, Lagos-Badagry Expressway Concession, MMA2 Airport BOT, and privatization of the electricity generation and distribution companies, confirm that the private sector is interested in participating in Nigerian infrastructure projects. The investors' experiences have been mixed, however, and the levels of success achieved, inconsistent.

Policy should be designed to attract both local and international finance to fund Nigerian

infrastructure projects. While international finance often ensures that projects get to financial close owing to the more advanced skills and experience brought by foreign investors, local finance is critical to the long term sustainability of Nigerian infrastructure projects.

For example, local finance should be available to take out early stage finance (whether local or international), when that early stage finance needs to exit. International finance will at some point return home. International financiers also like to see local involvement in Nigerian projects, as such participation, besides bringing specific knowledge and experience of how to implement the project in a local context, also signifies confidence when local investors are prepared to take risk in their own environment ("skin in the game").

Accordingly, government policy designed to attract foreign investors should also include components that ensure that local investors are not crowded out, but are encouraged to play a meaningful role in financing Nigerian infrastructure projects alongside international investors.

Investors, whether local or international, are best encouraged by an environment that is predictable, transparent, cost-effective, and efficient to do business in. Key risks such as country risk, currency risk, political risk, regulatory risk, and financing risk, amongst others, need to be acceptable to investors if they are to seriously consider committing long term capital to Nigeria. The less volatile the environment is perceived to be, the lower the level of risk that investors will associate with that environment.

Investors will typically seek higher returns for higher levels of risk. There is also a level of risk (albeit relative to the investor) at which a country can be considered too risky for anyone to invest there. Visible action therefore needs to be taken to lower Nigeria's risk profile in order to encourage and sustain investment. It will not happen by accident.

Country risk encompasses anything that can prevent a country from meeting its international financial obligations, e.g., in respect of bonds, guarantees and borrowings. Political and economic volatility are indicators of country risk. There are factors inherent in doing business in Nigeria, which despite the country's enormous opportunities and potential, cause many investors to conclude that Nigeria is one of the most difficult places in the world to do business. Risks such as security, bureaucracy/corruption, and culture (the so-called "Nigerian Factor"), spring to mind, but there are more.

Boko Haram terrorism in the Northeast has stifled investment in that geopolitical zone for the past 6 years. Needless bureaucracy and corruption (which have been likened to "economic terrorism") have long been a serious impediment to Nigeria's development and growth. Bureaucracy, which often arises because of poor resourcing, inefficiency, and lack of skills/experience in public institutions, has habitually been used to introduce corrupt practices into government processes.

Corruption has become a cultural norm ("it is our turn") by people taking advantage of the lack of effective accountability, weak institutions, and processes, that exist in the country. Government's efforts to decisively deal with Boko Haram terrorism, and the current strong anti-corruption drive, are therefore significant welcome developments.

Negative branding of Nigeria and Nigerians, often by Nigerians themselves, does not help. The so-called "Nigerian Factor", for example, which is frequently used as an excuse to tolerate mediocrity, inefficiency, and corruption, sometimes appears to be celebrated as confirmation of the "peculiarity" of Nigerians, and therefore as confirmation of why nothing can, or should ever work, in Nigeria.

Such a characterization is a disservice to the efforts of hard-working Nigerians that toil and struggle daily to make ends meet, and who have hopes for a better tomorrow. Investors can be discouraged from committing to Nigerian projects even where projects are developed on principles that have worked successfully elsewhere, because of fear that the Nigerian Factor will either make them too expensive or impossible to implement. We collectively need to transform our mindset into a "yes we can" culture rather than maintain

the current default mindset that "it will never happen because of the Nigerian Factor". There are already some 'success stories' in the Nigerian infrastructure space, which while not perfect, still demonstrate that positive things can be done in Nigeria and by Nigerians.

Currency risk is a consequence of volatility in the value of the Naira relative to other currencies of exchange. This is a key issue for investors because many Nigerian infrastructure projects are financed using foreign currency loans (they are usually cheaper and offer longer tenors than are available in Naira).

Foreign equity can also be involved. However, the underlying income stream that ultimately provides the cashflow with which to service the foreign loans and equity is in Naira, thereby creating a currency mismatch. Financial instruments exist (swaps, forwards, options, etc) that investors can use to hedge against currency risk, however, investors will find it prohibitively expensive or impossible to obtain foreign currency hedges where the level of currency volatility is too high.

Foreign investors need to be confident of their ability to freely repatriate profits and other income out of Nigeria to the foreign jurisdictions of their choice, if they are to feel comfortable to bring investment into Nigeria. Ultimately, infrastructure investors desire long term stability and realism in the value of the local currency.

Although interventionist measures can be used to influence the value of a currency in the short term, as the Central Bank of Nigeria (CBN) has tried to do, it is well-known that the fundamental drivers underpinning the value of a country's currency arise from the country's balance of trade relative to other countries and their currencies.

It is also well known that 'you can't buck the market - the market will prevail!' Nigeria's foreign exchange policy is a delicate matter at the moment; hence, without seeking to add to the debate, I should emphasize that a realistically priced Naira foreign exchange rate is a key factor that policy makers should be mindful of - investors will be reluctant to invest in Nigerian assets if they consider them overpriced, or volatile in value.

One of the major hurdles to raising local finance for infrastructure projects in Nigeria is the cost of finance. Interest rates on loans are high, debt tenors are short, and debt security structures can be onerous. Maintaining a high benchmark interest rate in an environment where government is a major borrower has translated into high FGN bond yields and high commercial loan interest rates.

FGN bonds are risk-free securities; hence, high bond yields, besides averseness to infrastructure risk in general, have been a disincentive for alternative providers of capital (e.g., Nigerian Pension Funds) to invest in riskier infrastructure project instruments/vehicles when they can more easily shelter behind the safety of high-yield, risk-free FGN bonds.

Evidence of this crowding out is that about 70% of the over US$20 billion of Nigerian Pension Fund assets are currently invested in FGN bonds and Treasury Bills. Recognizing our present fiscal challenges, government may feel under pressure to borrow more to plug funding gaps. Policymakers are probably mindful, if not wary, of the correlation between interest and foreign exchange rates.

In addition, the ejection of the FGN Bond from the JPM Emerging Market Index is not ideal at this time as it adversely affects international confidence in the Nigerian economy besides leading to capital outflows. All this puts upward pressure on interest rates at a time when it would be helpful for infrastructure investment, if they were lower.

Creative policies are required to deal with these paradoxes. The recent 200 bps reduction in the Monetary Policy Rate (MPR), the first time in 6 years, and the reduction in the banks' minimum Cash Reserve Ratio (CRR), are most welcome. We need, however, to see Nigerian banks passing on the positive effects of these changes through to existing and new lending, which has not yet happened.

Political risks arise from the stance adopted by government, and the level of confidence or lack of it, that investors have in the will and ability of government to act in a consistent, predictable and transparent way. The tendency of new

government administrations to sometimes completely restart things when they come into power, ignoring foundations laid by previous administrations, increases the perception of political risk in Nigeria. This stop-start approach locks investors into relatively short cycles (4 years) that are more matched to the length of the new administration's tenure, than to the investment horizon that investors need to plan over (e.g., a 30-year infrastructure concession).

Government can sometimes over-politicize projects and interfere in technical or commercial matters that are best left to the technocrats and professionals to deal with. All this can prove very expensive for investors, some of whom find themselves stranded with projects into which they have already invested much money, but which become moribund owing to adverse political behaviour. It has therefore become typical for investment to noticeably slow down ahead of elections, hopefully to return when the incoming administration's policies and plans are clearly understood. Such slowdowns can endure for 12 months or even longer, and in more severe situations, investment may not come at all. It is therefore encouraging to see the new administration's commitment to the power privatization programme and to a number of other projects that it inherited from the previous government.

Reducing the political risk profile to make infrastructure projects more attractive to investors can be done through effective contractual risk allocation, government adopting the right behaviours, and the availability of political risk insurance, amongst other techniques.

Contractual risks should be allocated to the parties best able to deal with them; hence, government in seeking to engage private finance for infrastructure should understand that investors will be reluctant to accept some risks that they consider would be best retained by government. Government should desist from behaviours that create the perception that Nigeria political risk is high.

Government should instead demonstrate strong political will; respect the sanctity of contract; ensure consistency and continuity from one administration to the next; focus on the long term; avoid political interference in the execution of projects; and allow regulators to have the independence to apply the rules fairly, apolitically, and transparently. Political risk insurance can be purchased; however, the higher the political risk assessment, the higher the premium that will be paid to secure the cover.

This comes at a cost to the project and is therefore a drain on project returns. Government's adopting behaviours that investors are comfortable with will either reduce their desire to subscribe for political risk insurance cover, or will help keep the cost of the cover down.

Project bankability is essential where project financing is involved. Government guarantees or other forms of support are usually sought by private investors and lenders where concerns exist around the risks; where gaps exist in the cashflows; or where concerns exist around government's ability to perform.

Unfortunately, Nigeria's historically poor track record plus the relative infancy of our infrastructure sector (there are still many unknowns), place us in the high risk category. Private investors are therefore likely to be nervous for some time yet about participating significantly in Nigerian infrastructure projects without government guarantees or other support.

Government should consider this approach as part of its policies to attract further private investment into infrastructure projects; however, given the already parlous state of the government's finances, rules for limiting the level of guarantees that government provides should also be considered.

Government needs to review fiscal policy to ensure that expenditure and revenue are optimized. For example, cancelling the fuel subsidy could provide money to increase the size of the Sovereign Wealth Fund, to capitalize a National Development Bank, or for government to invest directly in infrastructure.

It could also provide a source of collateral against which government guarantees to back privately-financed infrastructure projects can be issued. More people and organizations should be

brought into the tax net, including from the informal sector.

Ultimately, the best way for Nigeria to make investors comfortable with infrastructure project risks here will be to demonstrate over the short/medium term that such projects can indeed be successfully implemented in the country. The more visible examples of successful infrastructure projects we can point to in Nigeria, the more we should see an increase in investor appetite to invest here. We should also see an eventual reduction in the requirement for government guarantees in all cases.

Government should continue implementing the power sector privatization, but resolve the existing challenges (e.g., gas availability, legacy debts, tariffs, transmission grid capacity, etc), to build confidence in the sector and to demonstrate government's commitment to the power privatization programme.

A number of flagship projects currently in the pipeline, but not yet at financial close, should receive government support to get them to close, and to ensure that they succeed post-financial close. An example of where the new administration is already doing this is the Azura-Edo IPP, a US$890M 459MW gas-fired generation plant being developed on the outskirts of Benin, which had previously been delayed by government not issuing guarantees required by the World Bank, IFC, and other prominent financial institutions committed to finance the project. The project is the first of a new wave of privately-financed greenfield IPPs currently being developed in Nigeria, and is the first Nigerian power project to benefit from the World Bank's Partial Risk Guarantee structure specifically created for emerging markets worldwide. This creates a template that other Nigerian power projects can follow.

Finally, we need to establish a culture of end users paying for infrastructure. Many Nigerians today believe it is government's obligation to provide infrastructure for free. Such beliefs are not in line with international norms, and it is not sustainable to expect government to provide infrastructure without citizens contributing directly or indirectly to the cost.

Nigerians have historically become accustomed to government being the key player in delivering public infrastructure; hence, the notion of private investors now being involved in this space is strange to some, aside from invoking suspicions about cronyism and underhand deals having been involved, understandably because of prior evidence of corruption and collusion between public and private sector organizations. Government must be proactive and forthright in addressing these misconceptions, and should seek to better align public expectations with what private investors and government are expected to deliver.

Identifying stakeholders that will be impacted by a project, and continuously engaging with them throughout all stages from inception to completion of the project, is essential. Such an approach is as much about change management as it is about ensuring that the project receives the support of those most affected by it, who will ultimately pay for it either directly (via tolls/tariffs) or indirectly (via taxes), and who will benefit from it.

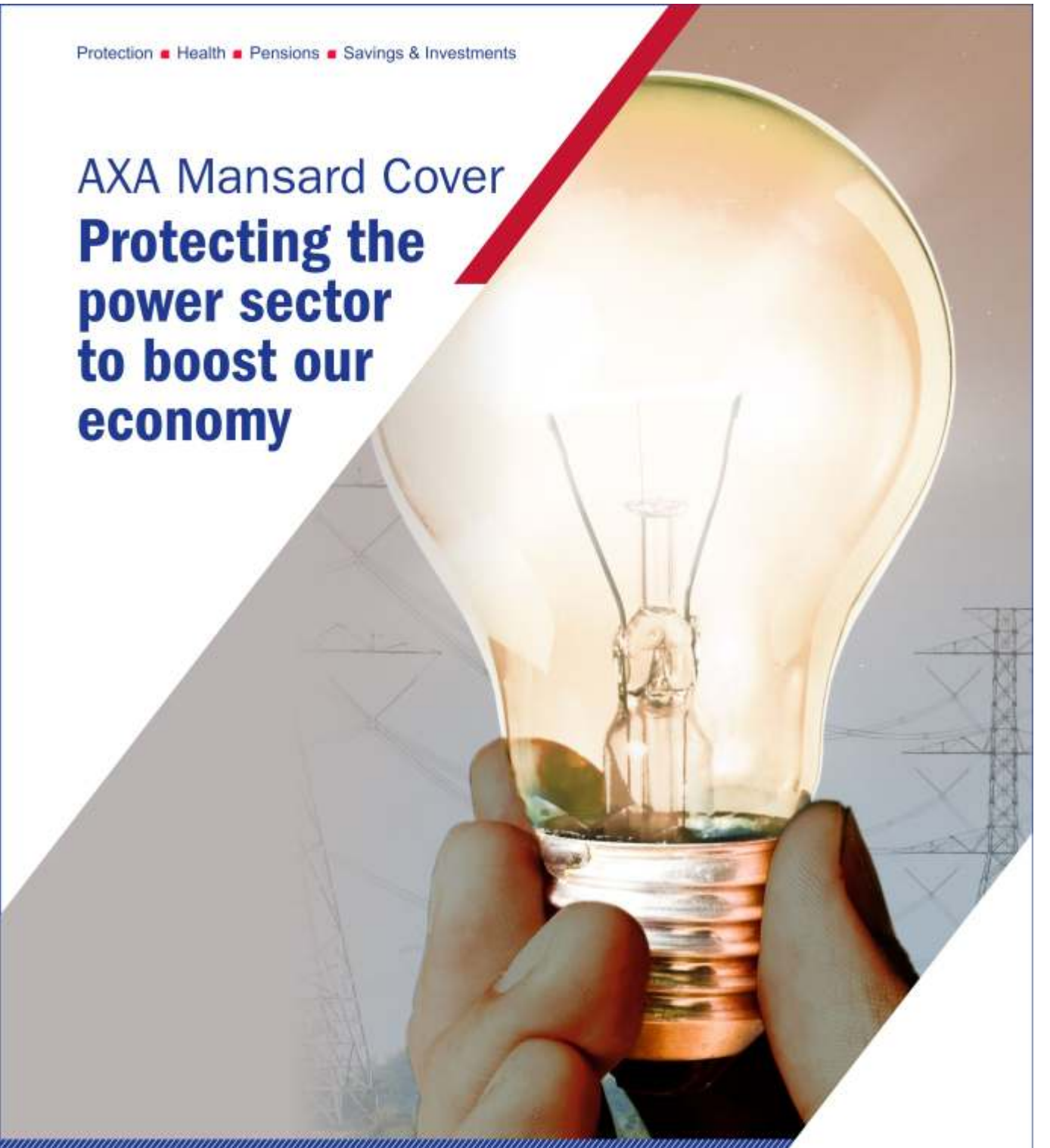
Change is already evident in Nigeria today. This provides a great opportunity for Nigerians to join hands in de-risking Nigerian infrastructure and tackling the deficit. Government has much to do to create the enabling environment; however, all Nigerians must work together for this common purpose.
es we can!

Opuiyo Oforiokuma has 25 years of experience in change management, business process re-engineering, M&A, and finance infrastructure. Currently Managing Director of ARM-Harith Infrastructure Investment Ltd, he manages the pioneering $250 million ARM-Harith Infrastructure Fund, a specialist PE fund focused on transport, energy, and utilities projects throughout West Africa, especially Nigeria. He holds a BSc (Econs) in Accounting and Financial Management from the University of Buckingham and is a member of the Chartered Institute of Management Accountants.

Protection ■ Health ■ Pensions ■ Savings & Investments

AXA Mansard Cover

Protecting the power sector to boost our economy



AXA Mansard Insurance plc
Call: 0700 AXA MANSARD, 01-270 1560-5
Email: insurancecare@axamansard.com
Website: www.axamansard.com
Social Media: AXA Mansard

AXA MANSARD

UNDERSTANDING NIGERIA'S INFRASTRUCTURE POTENTIAL

By Ian Aruofor, MBA, and Kalu Balogun, MBA

"With the global economic slowdown and key resource-dependent economies feeling the strains of the recent oil price drop, the Nigerian infrastructure sector provides the opportunity to create new asset classes for local and global investors and/or asset managers with potential for relatively high returns."

Nigeria's infrastructure today lags well behind that of the rest of the developed world, and while this presents a challenge to living and doing business in the country, it also offers a huge opportunity for investments.

With the country feeling the strains of the recent oil price drop, the infrastructure sector provides an opportunity to create much needed new asset classes for local and global investors and asset managers, given the potential for relatively high returns and the positive impact on the economy.

This is further buttressed in PwC's 2014 survey and report titled Trends, Challenges and Future Outlook: Capital Projects & Infrastructure in East, South & West Africa, which indicates an opportunity-filled future for infrastructure development in sub-Saharan Africa with infrastructure spending in the region estimated to reach $180bn (USD) per annum by 2025 and infrastructure spending specifically in Nigeria to grow from $23bn in 2013 to $77bn in 2025.

Nigeria is the largest economy in Africa and an owner of abundant natural resources with a growing consumer market, an increased urbanisation rate, and huge infrastructure deficits. This combination of factors is driving interests in infrastructure development and investment for both local and foreign players.

Nigeria's Infrastructure Opportunity

In 2014, Nigeria's economy (GDP) became the largest in Africa, worth more than $500bn, when the National Bureau of Statistics rebased the country's gross domestic product data. Nigeria overtook South Africa to become the world's 26th largest economy. By 2050, Nigeria is expected to move into the world's top 20 economies.

Against the backdrop of continuing economic growth, the need for enabling infrastructure is clearly evident. The growing middle class, strong demographic growth with a young population, and rapid urbanisation, as well as quick adoption of technology, has made Nigeria a more attractive investment destination for investors from across the world.

The recent peaceful transition in government to an opposition party has also boosted confidence from foreign investors who had a cautious to adverse view of the country's future in the months leading to the general elections in April 2015.

With infrastructure under significant pressure, Nigeria cannot adequately support her current and growing levels of population and economy without enhancing her infrastructure. The basic needs for power, water and sanitation, transport and logistics, housing and ICT top the demand list for most cities in the country.

To illustrate, the Nigerian power sector is undergoing a transformation that commenced over the last few years with privatisation and successful hand-over of government-run generation and distribution companies to private-sector investors. These private-sector investors

have returns objectives that serve as strong incentives to make the acquired utilities substantially larger and more efficient.

More than $3bn was realised by the government from the partial sale of generation and distribution assets. Furthermore, public and private agencies have estimated a yearly spend of $10bn over the next 10 years to “fix” the power sector. The ripple effect of getting this sector right is enormous. It is estimated, for example, that about 40% of manufacturing costs in some industries in Nigeria is spent on power generation today.

Nigeria has infrastructure-development statistics that are similar to or more challenged than the rest of sub-Saharan Africa. Data from the World Bank indicates that only about 55% of the population have access to electricity compared to 80% in other parts of the developing world; transport costs are about 100% higher; less than 20% of the road network is paved compared to the average of more than 50% in MINT countries (Mexico, India, Nigeria, and Turkey); the internet penetration rate is growing, especially mobile internet, but only roughly 7% have broadband access.

By developing infrastructure, Nigeria can diversify her natural resource-dependent economies (e.g., oil, cash crops, and solid minerals) and improve her balance of payments constructs. New linkages will be created to drive regional and international trade, which will, in turn, drive industrialisation and the emergence of new players in key industries. The population will experience substantial empowerment, and employment from direct and ancillary industries will be rejuvenated, while the government will see an increase in tax revenues.

With the global economic slowdown and key resource-dependent economies feeling the strains of the recent oil price drop, the Nigerian infrastructure sector provides the opportunity to create new asset classes for local and global investors and/or asset managers with potential for relatively high returns.

Key Challenges in Delivering Infrastructure in Nigeria Infrastructure development challenges in Nigeria are very similar to challenges faced in West Africa and across sub-Saharan Africa. Historically, these include inadequate project preparation, unmitigated project viability/bankability gaps, inadequate governance frameworks, and inadequate funding.

A prominent view is that limited access to funding is perceived as the most significant challenge in delivering large complex infrastructure projects. Interestingly, however, our examination of projects indicates inadequate project preparation/planning has been the most significant factor in failed project delivery in the country.

Poor project planning consistently leads to project concepts coming to market that haven't been adequately vetted. This, without doubt, results in bankability and viability challenges for the projects, and ultimately access to funding becomes limited or non-existent.

Recurrent characteristics of improperly planned projects that came to market and fail include: nonexistent or weak infrastructure master planning frameworks; limited capacity to assess and identify technically feasible and economically viable projects; limited technical and commercial expertise incorporated into the project preparation phase; and no risk mitigation strategies to address a clear mismatch between the long-term nature of infrastructure financing and the traditional short-tenure loans that local banks are accustomed to.

Robust and diligent project planning is perceived by project sponsors to be an expensive undertaking in the short run. But the shortcuts taken by these sponsors consistently result in very expensive project failures as well as improperly structured and/or executed capital projects. Such strategies have substantial unfavorable implications for the project sponsors/investors, financiers and the public.

Capacity or expertise issues in the public sector, a perceived lack of transparency or sound governance practices, and protracted bureaucratic processes that effectively reduce investor appetite and risk tolerance are also challenges that impact the growth of infrastructure stock in Nigeria.

Another inherent challenge in Nigeria

infrastructure development is reconciling relatively shorter "political life cycles" with often longer "infrastructure life cycles".

Finally, inadequate project monitoring and non-enforcement of performance contracts in Nigeria also lead to significant infrastructure quality issues.

Priorities for Improving Infrastructure Stock in Nigeria

Key themes that will accelerate sustainable infrastructure development in Nigeria include an enabling regulatory environment; developing and implementing robust infrastructure master plans; capacity building; harnessing the private sector; and expanding access for infrastructure finance.

Institutionalising Enabling Regulatory Frameworks

Infrastructure projects are long term in nature and involve a complex set of key stakeholders with diverse interests that, in certain cases, are potentially opposing (e.g., financial returns vs. social benefit). This makes it critical for countries to create enabling regulatory frameworks for sustainable infrastructure development complemented by policy frameworks and/or market rules that are enforceable and fair.

Certain project and sometimes sector-wide challenges experienced in Nigeria today illustrate a fundamental need for reforms to policy, legal, and regulatory frameworks. Addressing these issues will provide sponsors and financiers with a lot more comfort and confidence to take on risk, given the typical lifecycle of infrastructure investments.

Integrating National and Sub-National Infrastructure Master Plans

Infrastructure projects require considerable capital investments and the quantum of such investments could have significant impacts on public and private sector resources. To this end, it is imperative that a clear understanding of the prevailing state of infrastructure availability/ deficiency be established, and this understanding must precede any major capital investment. However, this is often done simultaneously at different government levels (national, state, and municipal/local) without adequate consideration for the interdependencies of these projects.

Establishing the business case for infrastructure projects should be carried out in a holistic fashion. Integrated infrastructure master plans for the nation should be underpinned by a sound evidence base, developed across state boundaries, and aligned with local or sub-national sector-based infrastructure plans. This holistic approach would ensure that infrastructure projects are subjected to rigorous needs tests, thereby avoiding the likelihood of over or under development.

Capacity Building of Key Stakeholders

Infrastructure development projects require a broad mix of diverse skills and competencies, including engineering, legal, regulatory, commercial, management, finance, and assurance. The level of competence locally available in a country is usually built as a result of the experience that comes with multiple successful project executions. Nigeria is challenged in this regard and as such we need to focus on systematically developing and deepening regional expertise in order to successfully build and sustain infrastructure.

Recent infrastructure acquisitions in Nigeria have seen increased technical relationships and agreements between local investors or financial sponsors and foreign/global experienced technical partners or advisors. This is absolutely necessary for credible infrastructure delivery in the country given current infrastructure delivery capabilities.

However, a keen focus must be maintained on marrying local talent with international expertise right from the start of the project to ensure appropriate skills transfer. Unending importation of expertise on a large scale is an incredibly expensive enterprise for the longer-term infrastructure development cycle. Sustainability requires a continued investment in building local competence alongside delivering successful projects.

The development of training centres for both private- and public-sector stakeholders is one of

the easier initiatives to implement that should be adopted by more knowledge-based organisations.

Harnessing Private-Sector Investment

Mobilising private-sector funding is crucial given the limitations on government finances in Nigeria. Nearly two-thirds of respondents in the PwC capital projects and infrastructure survey indicated external private-sector financing for capital projects as being critical. There is an increasing drive towards new funding models, such as public-private partnerships (PPPs) that are increasingly being adopted.

Leveraging private-sector funds and management expertise in the planning, delivery, operation, and maintenance of infrastructure projects is only achieved in a transparent, enabling political/legal/regulatory environment.

The key criteria for successful private-sector participation include strong political support, a committed sponsor, a sound regulatory framework, viable off-takers or source-of-service fees, support from users of the service, and appropriate allocation of risk amongst key stakeholders.

Expanding the Pie in Sourcing Infrastructure Finance

The Nigerian market is dominated by short-term financing provided by local financiers, usually commercial banks. Foreign commercial banks that may be able to provide longer-tenure financing are limited due to perceptions of country risk and inadequate hedging instruments for dollar-denominated financing.

There is a clear need to access and explore alternative means of funding for infrastructure projects. These include harnessing growing pension funds, Sovereign Wealth Funds, and insurance funds.

Project sponsors and developers must also look to structure their projects appropriately to be able to secure funding from Development Finance Institutions (DFIs) and International Development Agencies (IDAs).

Seizing the Opportunity

The lack of infrastructure affects productivity and raises production, transportation and transaction costs, which hinders growth by reducing the competitiveness of businesses and the ability of governments to pursue economic and social development policies.

Nigeria is making giant strides towards industrialisation to diversify her economy, which will, in turn, drive inclusive growth. The success of these initiatives, however, depends largely on improved infrastructure. With the recent smooth transition in government, there is increased optimism around the tremendous infrastructure investment opportunities.

With high expectations and willingness among key stakeholders to collaborate in driving economic growth, there is no better time to invest in unlocking the economic potentials of the country than now.

Ian Aruofor is a Partner with PwC and oversees the Deals Advisory practice in Nigeria. He holds a BSc in Economics for the University of Ibadan and an MBA from Emory University.

He can be reached at: ian.aruofor@ng.pwc.com

Kalu Balogun is an Associate Director with PwC and leads the Capital Projects & Infrastructure team in Nigeria. He holds a BSc in Computer Science from Obafemi Awolowo University and an MBA from Emory University. He can be reached at: adekalu.balogun@ng.pwc.com
ian.aruofor@ng.pwc.com

Insurance just got easier

INTRODUCING

L - Leadway

H - Household

A - Automobile

P - Personal accident

Py - Policy

L-HAPPy is the all-in-one policy that looks after everything you hold dear. From your cars to your home, from a liability cover to a personal accident cover that includes your domestic staff, L-HAPPy offers you affordable and convenient insurance in one tidy plan.

ONE PREMIUM
MULTIPLE COVER
• AFFORDABLE • CONVENIENT • RELIABLE

Call Zara toll free on 0800 CALL ZARA (0800 2255 9272) or email: easier@leadway.com

www.facebook.com/leadwayassurance www.twitter.com/leadwayinsure

LEADWAY
ASSURANCE COMPANY LIMITED

ENERGY ACCESS AND ECONOMIC DEVELOPMENT: POLICIES, INSTITUTIONAL FRAMEWORKS AND STRATEGIC OPTIONS

By Yinka Omorogbe, member FNAEE

"For people to be lifted out of poverty, they have first to be lifted out of energy poverty."

Introduction

First I must express my appreciation to the Nigerian Association of Energy Economics for honouring me with this invitation to deliver a Keynote Address at this very distinguished gathering, the 7th Annual NAEE/IAEE International Conference, on a topic that I am passionate about.

This is an association that has proved a spiritual principle that I regularly preach – that which you honour and esteem will always come near you. As an energy lawyer and specialist, if there is a discipline that I honour and which I regard as one of the most important in this area (apologies to engineers, I hope you'll understand my position before I am finished), it is the discipline of economics, particularly energy economics. Without a doubt, if as a nation we had honoured this specialization, I believe that the Nigerian Petroleum Industry would not be in its present position.

It is therefore gratifying that NAEE has been in existence for the last few years, and that during its short life span, it is now becoming a voice of substance in the Nigerian petroleum industry. We really need to listen to, and heed, the advice of energy economists.

The conference theme is topical, as Nigeria remains plagued with a comatose electricity system, characterized by blackouts for the 50% of the population connected to the electricity grid, and no electricity at all for the other half that lives outside the grid areas all around the country. Again, Nigeria has the unenviable status of being both one of the world's largest producers of crude oil and largest importers of petroleum products. It also has an opaque kerosene "subsidy" regime that is in the process of being exposed to the general public, resulting in kerosene prices lying outside the reach of the ordinary person. This is particular tragedy since the large majority of Nigerians rely on primitive biomass-leaves, wood, and waste as their primary energy source.

There is nothing as important as energy. It is the driving force of life in every sense of the word, and that is why it is a word that is used all the time in varying contexts that all somehow end up conveying the imperative of the word. For a few minutes, I am going to talk about energy and economic development, and to show why, as a nation, we have little or no energy, so to speak. What precisely do we mean when talking about energy, considering, as I have said, that the word is used in so many ways? Why is it so critical for a country and its people to have energy?

From an energy perspective, it must be recognized that a great gulf exists between the poor and those who are not. The poor live in a different energy world. That is the way it is primarily because of the amount of energy at their disposal. With no other alternative to biomass in its crudest form (wood and animal dung), they live at subsistence levels, with women and children suffering additional disadvantages because they are primarily responsible for the gathering of this biomass.

1. A play on my university lecture title, delivered in 2008 at the University of Ibadan: Yinka Omorogbe, "Why We Have No Energy", University of Ibadan Press, 2008

2. "Meeting the Challenge for Rural Energy and Development", www.worldbank.org.

The factors outlined above and others mean that these communities have greatly reduced productivity, with fewer opportunities for growth and to break away from the prevailing poverty, all of which further perpetuate the existing conditions of underdevelopment, and "help trap the user in poverty".

For people to be lifted out of poverty, they have first to be lifted out of energy poverty. It is now recognized that this is not possible if they do not have access to energy services. This, therefore, has to be a major plank of any development strategy, which in the first place should be geared towards sustainable development and not to economic development, which mean two different things. Economic development is, in my opinion, a sterile concept, which can often occur without appreciable impacts on the people.

The outcomes of both are often very different. Therefore, it is possible for the generality of the people to suffer from abject poverty and deprivation, even as economic development indicators are posting impressive growth percentages. I need to discuss "energy services", economic development, and sustainable development, clarifying why as will be seen, my concern is more about sustainable development, and not the clinical term "economic development" which, in my opinion, allows for empty and lopsided growth accompanied by few or no improvements in national development indicators.

Access to Energy

Energy access, or the lack of it, can be said to be one of the most pressing problems of the 21st century, because it is now a widely recognized fact that sustainable development or development in real terms is an impossibility in the absence of access to energy services. In recognition of this fact, the United Nations system designated 2012 as the year of Sustainable Energy for All (SEFA), and has followed this up with the designation of the decade 2014 – 2024 as the Decade of Sustainable Energy for All.

Energy access does not refer to access to a source of energy. It refers to access to the benefits derived from that source of energy to the services that it provides, referred to as energy services. Energy services include household access to electricity, to clean cooking facilities, and to energy that empowers work, making life easier, healthier, and safer. The benefits of "energy services" are derived from the use of efficient energy sources, over and above that derived from basic biomass, which is the fuel of the poor in developing countries, such as Nigeria.

These benefits make fundamental differences to peoples' lives and standards of living. With efficient energy for work, grinding foodstuff is done in a fraction of the time that would otherwise have been spent to do it manually. Efficient energy services provide light for reading and greater productivity at night; cooking safely and without the stress of having to regularly source firewood or other basic biomass; refrigeration so that one is free from having to buy food daily, or have needed food rotting away; telecommunications so that there is no longer the need to embark on costly and long journeys in pursuit of transactions that can easily be concluded over the phone; and transportation, without which the people will have to walk long distances, or travel by donkey, camel, horseback, or bicycles. Firewood, crop waste, dung, and wood shavings, as well as other energy sources used by the poor, cannot provide these and many other services.

Whilst millions of people now have access to modern energy services, one fifth of the world's population lacks access to electricity. Twice as many still rely on traditional uses of biomass for cooking. Cumulatively, more than 95% of those without modern energy access live in the developing countries of Asia, and of sub-Saharan

3. See Yinka Omorogbe, "Policy, Law and the Actualisation of the Right of Access to Energy Services", Kim Talus (Ed,) *International Energy Law Handbook*, Edward Elgar Press, 2014, Chapter 14 (in press).

4. "United National General Assembly declares 2014 – 2024 Decade of Sustainable Energy for All", General Assembly GA/11333 EN/274, December 21, 2012, available at www.un.org/News/Press/ docs/2012/ga11333.doc.htm

Africa, with the great majority residing in the rural areas. More than half of the populations in developing Asia and 80% of the population in sub-Saharan Africa exist without clean cooking facilities. In sub-Saharan Africa, the electrification rate is 31% and the number of people relying on biomass is 80%.

Out of a sub-Saharan population of 600 million without access to electricity, 84 million are Nigerians. Worldwide, this represents the largest number of people without electricity, after India, which has 306 million, or 25% of its population. It should be remembered that those regarded as having access to electricity are the people connected to the electricity grid, such as you and I. As we know, invariably no day passes without connections being disrupted, often several times a day, and sometimes, in some areas, for days at a time. So, even those with electricity are deprived, with at the most, partial connections. Generators provide backup for all who can afford them, at the levels that they can afford. So, in reality, the whole of Nigeria has limited access to electricity.

Regarding the use of traditional biomass, 122 million Nigerians, representing 75% of the population of this country, rely on traditional biomass for cooking. Nigeria ranks fourth on the worldwide list, after India, China, and Bangladesh. For sub-Saharan Africa, it tops the list, representing nearly 20% of the 696 million people cooking with traditional biomass in 2011. Again it should be remembered that amongst the 25% of the Nigerian population that does not use biomass, there are millions, mainly in urban areas, who rely primarily on kerosene, which is less efficient than either LPG or natural gas, and which has negative health effects. Nigeria can therefore be described strongly but aptly as a country in the throes of an energy famine.

It is now recognized that improved access to modern energy services for as many people as possible, is the single most important component of any development strategy, and that none of the Millennium Development Goals (MDGs) are capable of realisation without the use of efficient energy within the very poor communities of the world. Everyone needs access to energy services, which must be provided by a source of primary energy or an energy carrier that is capable of providing necessary benefits.

Economic Development

This Conference is about energy access and economic growth. In fact, energy access has a positive impact on growth, but is primarily about sustainable development. Therefore, by linking an economic development, which is primarily measured in terms of aggregated figures, with energy access, measured in terms of its impact on people and their livelihoods, the Conference is highlighting sustainable development and its importance to meaningful growth.

Economic growth is concerned with aggregated figures, whilst development is concerned with discernible and measureable impacts on as much of the population as possible.

A few decades ago, economic development was seen as synonymous with development. Now, no informed person would make that statement. Now, it is a clearly recognized fact that economic growth and development are not one and the same thing and therefore increased growth does not imply greater development.

In fact, growth often exists in places where there are great disparities in income distribution and which suffer from fundamental development deficiencies. This is the situation in several developing countries, including most of the sub-Saharan African countries, which have been experiencing rapid economic growth. In most of

5. See "Energy Access Database", available at www.worldenergyoutlook.org/resources/energy development/energyaccess database/. According to the World Economic Outlook 2010, which focused on the right of access to energy services, residential electricity consumption in that region (with the exception of South Africa) is roughly equivalent to consumption in New York. This means that the 19.5 million residents of New York use about the same amount of electricity as the 791 million people of sub-Saharan Africa.

6. Countries with the largest populations without access to electricity in 2010: Congo, Pakistan, Tanzania, Kenya and Uganda. Countries with the largest population relying on tradition biomass in 2010: India, China, Bangladesh, Indonesia, Nigeria, Pakistan, Ethiopia, Democratic Republic of the Congo, Vietnam and the Philippines. "Measuring Progress towards Energy for All: Power to the People?" in World Energy Outlook 2012, 533–4, available at www.worldenergyoutlook.org

these countries, growth has been driven by events and activities in the international economic and financial systems, and is occurring irrespective of the internal policies and actions of many of the countries concerned, which in fact are not pro-poor, and which do not encourage growth. This has given rise to a false optimism, premised on the equally false assumption that economic growth and development are one and the same thing. They are not. Great inequalities are prevalent in many of these economies, many of which have low and stagnating development indicators, clearly showing that the economic growth experienced has not led to improvement in living standards for most of the people, but has only benefitted a small percentage of the population. Ironically, as shown above, the majority of the world's energy poor are found in these fastest growing countries.

Nigeria provides a perfect example of this, with generally poor development indicators. It is common knowledge that we have been consistently ranked as a low human development country for years. In the Human Development Report 2013, we are 153rd out of the world's 190-plus countries, behind many African countries, such as Ghana (135) and the Congo (142). According to UNICEF, the deaths of newborn babies in Nigeria represent a quarter of the total number of deaths of children under-five.

According to Save the Children, 14 out of 1000 newborns die the same day they are born, with the majority occurring within the first week of life, mainly due to complications during pregnancy and delivery reflecting the intimate link between newborn survival and the quality of maternal care. Main causes of neonatal deaths are birth asphyxia, severe infection including tetanus and premature birth.

Similarly, a woman's chance of dying from pregnancy and childbirth in Nigeria is 1 in 13. Although many of these deaths are preventable, the coverage and quality of health care services in Nigeria are substandard, with less than 20% of health facilities offering emergency obstetric care and only 35% of deliveries attended by skilled birth attendants. UNICEF therefore states:

Every single day, Nigeria loses about 2,300 under-five year olds and 145 women of childbearing age. This makes the country the second largest contributor to the under-five and maternal mortality rate in the world.

Depressingly, the youth unemployment rate is 54%. By any standard, that is extremely alarming. Surely this is a sign that economic growth in Nigeria has not impacted on the economy as one would have expected it would? If it had, there would be more jobs, and less unemployment. These and other depressing non-achievements have led to our being described as the worst place in the world to be born in by the Economist.

The typical elitist Nigerian reaction to this is uninformed disbelief. Do your own research. Check out the facts for yourself, and then decide on the veracity or otherwise of the assertions made in this presentation. Of what use is growth that fails to address severe problems of planning and underdevelopment such as these?

For economic development to be meaningful, it must be accompanied by interventions that impact on the disadvantaged and that make a difference to the poorest of the poor, none of whom are in this room. Percentage points in growth are not only meaningless, they can be quite irritating, if there are no signs that the increased revenues being touted are accompanied by policies or strategies that positively impact on the disadvantaged Nigerian.

Since it is clear that we are gripped by an energy famine and the present economic growth cannot lead to development in the real sense if it remains unaccompanied by activities that positively impact on the people, how does one address this problem? In a nutshell, the solution lies in development planning that is actually adhered to, with ordinary people as the central focus. It also means that the entire energy sector must be developed strategically, in such away as to benefit the ordinary man or woman.

7. "The Lottery of Life: Where to be Born in 2013" November 12, 2012: www.economist.com/news /21566430-where-be-born-2013-lottery-life

The State of the Nigerian Energy Sector

The energy sector in any country is concerned with the frameworks and institutions of the various sources of energy that are utilized within that country for the provision of energy services.

In Nigeria, we should be referring to petroleum, hydropower, coal, renewable energy, and electricity, which uses one or more of the previously mentioned sources as feedstock for the electricity generation. These sectors are the concern of Nigeria's Energy Policy, which is currently undergoing revision after a decade of operation.

However, it is safe to say that energy has never been driven as a whole. Instead, the various energy subsectors have developed independently and sometimes at variance with each other, resulting in the present situation of energy poverty. It is my opinion that this is the major reason for the current state of the Nigerian energy industry.

This is a conference where many learned persons will offer their prescriptions for identified problems. I hope that it will highlight one pressing problem, which is that of coordination and cooperation in the sector.

This problem occurs at institutional and professional levels, a typical example being the various policies relating to the energy sector that have emanated from different ministries and institutions over the years from the Energy Commission of Nigeria, and the Ministries of Petroleum and Power. It is also evidenced by low levels of collaboration between the essential disciplines of the energy sector.

The Collaboration of Disciplines

The role of other disciplines in the energy sector has had a mixed reception. Using petroleum as an example, whilst geologists and engineers are necessary to know of the existence of petroleum deposits and how to get them out of the ground, what one does, and how one goes about developing the discovered resources, is now the province of other specialisations, notably the accountants, economists and lawyers.

All of them will, however, not get anywhere in the absence of seasoned managers and administrators, operating in line with the frameworks created by the law, based on the advice of the geologists, engineers, accountants, and economists.

The same applies to renewable or other forms of energy, solar, wind, coal, biofuels, etc., which require scientific knowledge and activity before exploitation is possible, but which then require the input of other complementary disciplines for the emergence of functional and development-oriented industries.

Therefore, the energy industry is one where collaboration of disciplines is vital if a conducive and development-prone environment is to emerge. This is yet to be the case in Nigeria, although we have come a long way.

For example, until recently, the role of the energy lawyer was barely acknowledged, not to talk of respected. The energy field remained dominated by engineers and geologists whom I have earlier described as operating as jacks-of-all-trades, as accountants, lawyers, and petroleum economists. Committees established to deal with purely legal issues would often be headed by an engineer or geologist.

The Memorandum of Understanding is the product of an engineer, which is why Nigeria ended up being in the peculiar position of having fiscal regulations within a private contract that was shrouded in secrecy, and not in legislation as is the practice practically everywhere else in the world. For the legal profession that jinx was broken with the emergence of the Oil and Gas Sector Implementation Committees established by Presidents Obasanjo and Yar-Adua in 2000 and 2007 respectively.

For both of them, the legal profession played a prominent role. Currently, legal documents continue to be drafted by technical persons, but the input of the lawyer is appreciated, and the feeling that the law is for the purpose of rubberstamping anything written is, hopefully, receding. Whilst it is important to know how to get a precious resource out of the ground, that is just the beginning. The framework for the optimal exploitation of the resource in question now assumes the utmost importance. For that resource to be useful, and for maximum benefits

to be derived, other specializations are necessary, or the structures that will allow for optimal development will never emanate.

There have to be laws that govern the use of the resources and that lay down rights and duties, privileges, incentives and benefits, so that investors, community dwellers, and other interested parties will understand and know what may or may not be done. Without clearly laid down laws and regulations showing fiscal requirements, and other matters that make up the investment climate, no serious investor will put in substantial money, irrespective of how many road shows that are undertaken (at taxpayers' expense).

Again, no meaningful laws can emerge without input from petroleum accountants and petroleum economists. We can draft the finest laws in the land, but if the fiscals are wrong, they will not achieve their purpose. For the fiscals to derive their ideal purpose of ensuring that as much economic rent as possible accrues to the sovereign state, without dis-incentivising the investor, you need the energy economist to bring her knowledge to bear, through analyses that examine the resource under different scenarios, nationally and internationally.

It is critically important to understand the economics of that resource and how to utilize it, even as it is important to appreciate how to derive maximum monetary and other benefits for the people.

Unfortunately, in Nigeria the imperative of these disciplines is yet to fully catch on, which is why, in Nigeria, we have recently been regaled with engineers attempting to state that numbers relating to the use and sales of petroleum and petroleum products are technical matters, further underscoring how the hegemony of the engineering profession has led to the present mess that Nigeria is in, as a resource country characterized by an inability to husband petroleum for the good of its people.

It is time to recognize and give voices and credence to the other disciplines that are vital for the growth and maximum impact of any sector to national development. All plans and strategies must incorporate input from all energy specializations, and those with expertise in management and administration.

Were it to be considered as a whole, the pertinent question should arise, such as: What is the ideal energy mix for Nigeria, if every Nigerian is to have access to energy services?

Petroleum and Nigeria's Energy Mix

We have an electricity sector that is dominated by reliance on the natural gas industry, which currently lacks structure and coherence due to the absence of a legal and regulatory framework that will provide the framework for development and implementation. The natural gas sector, which forms part of the petroleum industry, is itself hampered by the inertia in the area of petroleum industry reform.

The commencement of reform has remained an illusion for many years. The Petroleum Bill has been drafted and redrafted. Not only has the constant drafting been to no avail, but also there is clearly deterioration, as can be seen from a reading of the present draft. To put it simply, motionless motion is the best description of the current state of petroleum industry reform, with constant talk and allusions to the PIB.

There are even pole banners on Bill Clinton Drive, apparently placed by some government entity, advocating the passage of the PIB. What exact purposes do these banners serve? The saddest part of the constant noise and present perceptions about petroleum industry reform and the PIB is that the passage of the bill is only the beginning.

If the PIB is passed in its present state today, the natural gas industry will be no better, because the provisions of the present draft before the National Assembly do not adequately cater for gas. However, let us assume that it contained excellent provisions that allowed for natural gas use and development. That would be a significant milestone, but it would not in any way change the sector significantly in the absence of implementation.

A law that has not been implemented is the same as no law at all. This is something that the electricity sector bears witness to. The Power Sector Reform Act 2005 spent several years being

totally disregarded and unimplemented.

Implementation only commenced a couple of years ago, and it is still work in progress. Why is the country so slow to realize that an electricity sector that is dependent on natural gas will continue to function at substandard levels until the emergence of an appropriate framework for downstream natural gas? I am aware that there is talk of developing a framework for natural gas, and leaving the rest of the petroleum sector to continue to function as it is presently doing.

Simply put, that will be extremely difficult, and the result of any effectors in that direction will be just another variant of dysfunctional. Simply put, under present conditions in Nigeria, it is impossible to develop a framework for natural gas alone, and not for crude oil. The entire petroleum sector is in need of reform and there is no alternative to that. Recent revelations should have made that plain. Also, constant vandalism of gas pipelines provides further evidence.

The circumstances that allow constant pipeline damage cannot be addressed through any ring-fenced approach.

If Nigeria chooses not to create a functional and optimal petroleum industry, that does not mean the continuation of the present low levels of generation. There are options. We do not have to use natural gas as the primary feedstock for electricity. Before we became a mono oil economy, Nigerian relied on hydropower. Several countries generate electricity from several other sources, such as coal, hydropower, nuclear, wind and solar energy.

To give an example, Norway, notwithstanding its gas reserves, as a matter of policy, exports large volumes of crude oil and natural gas, and relies on an energy mix that includes substantial amounts of hydropower and to a growing extent, wind power. Several countries use coal-fired plants, such as the very different countries of Denmark and China.

Furthermore, the inaccessible communities in off-grid locations in Nigeria may never have electricity in the absence of an energy mix that utilizes renewables such as solar and wind energy. The present challenges are how to surmount the present obstacles resulting from poor natural gas supply, which has come about because of the continued failure to reform the petroleum industry; how to ensure that, within the decade of Sustainable Energy for All (SEFA), Nigerians are liberated from the present tyranny of self-generation; and how to ensure that as many Nigerians as possible have access to energy services.

However, we are an oil-rich country with abundant resources that have, so far, not benefitted the generality of Nigerians. That should make the attainment of sustainable development much easier. The present legal and institutional frameworks have locked in the treasures of petroleum.

Until we rebuild those frameworks, it will continue to benefit an infinitesimal few members of the influential and rentier classes, and to impoverish the average Nigerian. Petroleum industry reform is the key to unlock development for the entire country, because energy access is the most fundamental requirement for the development of Nigeria and Nigerians.

It is hoped that Nigeria will, at last, recognize and wake up to this fact. As a Nigerian proverb says, “it is when you wake up that it is morning”. Surely our morning is overdue. The Nigerian Association of Energy Economics has a very relevant role in ensuring that dawn emerges in the energy sector, presently one of the darkest areas of our economy and one that is impeding our sustainable development.

I pray for successful deliberations and pivotal conclusions that will positively impact on decisions pertaining to Nigeria and the energy sector and that will stimulate sustainable energy for all Nigerians within the decade of SEFA.

Once again, thank you very much for this great honour.

God bless Nigeria

Yinka Omorogbe, a Fellow of the Nigerian Association of Energy Economics (FNAEE), is the Nabo Graham Douglas Distinguished Professor of Law at the Nigerian Institute of Advanced Legal Studies, Abuja.

She holds an LLB from the University of Ife, Ile-Ife, and an LLM from the London School of Economics and is a member of the Chartered Institute of Arbitrators (UK). This article was previously published in the NAEE Forum, April 2015.

It is taken from remarks delivered by the author at the 7th NAEE/IAEE Conference in Abuja, Nigeria.

THE IMPACT OF OIL PRICES AND OTHER GLOBAL DYNAMICS ON THE NIGERIAN OIL AND GAS INDUSTRY

By Alexander Ogbechie, Ernst and Young

"While international oil prices continue to wobble with oil-producing nations lacking definitive solutions to the crisis, I believe Nigeria could leverage the situation to attain unprecedented growth in its economy."

Since mid last year when the price of oil started plummeting, there have been concerns over its implications for the global economy, especially in Nigeria, which is heavily dependent on oil for revenues.

There is widespread fear over how far Nigeria can go if the slump in oil prices continues. The price of a barrel of crude oil has almost halved from $115 (USD) per barrel in June last year to hovering around $65 per barrel as at time of writing (May 2015).

This has led to drastic reduction in Nigeria's revenue and has compelled the federal government to introduce some economic stabilisation measures in order to ensure a more sustainable revenue profile in 2015.

For instance, among other measures, the federal government recently disclosed that all local and foreign private jet owners in the country shall pay an annual surcharge.

In the same vein, owning a yacht in the country now attracts an Import Adjustment Tax, just as champagne and other wines and spirits attract an Import Adjustment Tax of 50%.

However, the economy still has a long way to go. Fiscal and current account balances have worsened significantly over the last few months, reflecting ambitious infrastructure investment agendas financed with shrinking oil revenues.

Amongst other consequences, the reduction in oil prices has meant that the monthly Federal Account Committee Allocation has also plummeted, as a result, most states of the federation have not been able to pay salaries, making strike actions imminent.

Figure 1. NEED TITLE AND SOURCE INFO.

Price Swing Dynamics

As with any other commodity, the price of oil swings. Over the years, there has been evidence that when the price of oil goes up steadily over a long period, the tendency is for a drastic price drop to be expected.

The volatility and politics of oil, which determine the way the price goes, led to the formation of the Organisation of Petroleum Exporting Countries (OPEC) in September1960 to intervene in shoring up prices through production cuts as needed.

Such interventions in the past helped immensely in the rebound of prices. For instance, prices had averaged $18 per barrel from 1990 to the end of 1997. But from December 1997 to July 1999, oil prices fell from $18 per barrel to about $12 per barrel. In December 1998, the price dipped below $10 per barrel, and by April 1999 the price was just over $11 per barrel.

However OPEC intervened by joining forces with non-OPEC producers such as Oman, Russia, Mexico and Norway to cut 2.1 million barrels with effect from April 1, 1999.

By the end of April, the price had rallied, reaching about $16 per barrel, and $18 per barrel by July. It later rose to $20 per barrel. Also between 2007 and 2008, the world witnessed the greatest level of volatility in the oil market, with prices going up from $65 per barrel in 2007, to an all-time high of $147 per barrel in July 2008, and many analysts predicted a rise to $200 per barrel, but by October of the same year, it dropped to $32 per barrel.

Similarly, OPEC intervened and cut production, and the price rallied and rose to $70 per barrel. Very few people predicted that oil prices would rise soon to $100 per barrel, and by the beginning of last year oil prices had gone up, averaging about $110 per barrel before the current slump set in mid last year.

The fear that the current price slump may last longer than expected is hinged on the fact that the leading oil producing members of OPEC, such as Saudi Arabia and Kuwait, have refused to buy in to the proposal by other members to cut production. Besides, the United States, a major global oil producer and consumer, is now accessing its oil reserves apart from the regular production; therefore, it is not buying from external markets.

Also, oil demand by other big buyer countries such as China and India has dropped, following a lull in the economy. Therefore, the glut in supply is expected to continue until all members of OPEC reach a consensus to cut production.

It is believed that the demand-supply dynamics are, however, not the only drivers of the recent price collapse. Some analysts have suggested that power play and global politics are also at work – the Swing Producers' flexing their influence. Saudi Arabia, which is capable of pumping more than12 million barrels per day (b/d) (versus America's 9 million b/d), appears to have started a price war, which many say is designed to punish its major competitor, Russia, who is unable to tolerate an oil price at levels below $75 per barrel.

In October 2014, as oil prices slipped towards $85 per barrel, the Saudis increased their production and offered discounts to major Asian customers, and only a few weeks back, with U.S. prices nearing $80 per barrel, the Saudis again offered discounts to their North American customers in a transparent bid to gain market share.

U.S. oil supply has indisputably contributed to low prices. The question is how soon low oil prices can chase American oil from the market. No doubt an extended period of low prices would delay/halt projects in oil sands, deep-water, and the Arctic, which typically require many years and billions of dollars to develop.

However, the Saudis are also not able to sustain low prices, as their economy is now accustomed to oil above $100 per barrel. It is believed that Saudi Arabia needs the price to be above $90 per barrel to balance the books, but it can live with lower oil price for longer than their competitors.

According to OPEC's latest monthly oil report, Saudi Arabia boosted its oil output to 10.31 million barrels per day in April this year, its highest oil production level in more than three decades. Saudi Arabia has increased production by 700,000 b/d since the fourth quarter of 2014 in an effort maintain market share. The resulting crash in oil prices is forcing some production out of the market, and Saudi Arabia intends for the brunt of that to be borne by others.

The greatest challenge that low crude oil prices pose to Nigeria is the inability of the country to fund the budget for smooth management of the economy and government. As the 2015 budget stands, it is undecided with an oil benchmark of $65 per barrel, while the oil price is hovering just underneath that mark (an average figure of $53 per barrel for the first half of 2015). If there are no budget funds, it means there will be no implementation of capital projects and workers' salaries will be difficult to pay, as is already the case in some states.

Although the government has the option of borrowing to fund the budget, it should know that it has a paucity of infrastructure whereby money could be generated to pay back loans. Besides, foreign exchange reserves have dropped significantly.

Typically when borrowing, countries consider their percentage debt to Gross Domestic Product (GDP). This consideration is critical—countries

with high GDP such as the United States can go as high as 80%, but because Nigeria runs an oil rent-seeking economy (with externally generated revenues), its percentage debt to GDP ideally should not be more than 10% even though the standard acceptable limit is 40%, adding that currently Nigeria's percentage debt to GDP is well over 20%.

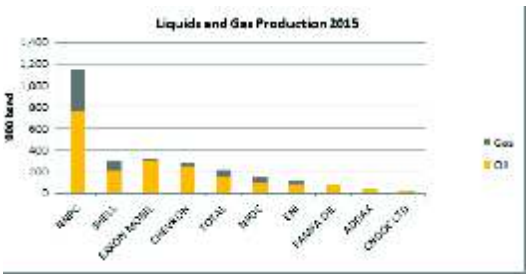
Despite Nigeria's GDP rebasing, which brought it to the 26th largest economy in the world and the largest economy in Africa, the nation's GDP per capita still remains low at $2,688.

This figure leaves Nigeria's ranking at 121st in the world. (South Africa has a much higher per capita GDP of $7,507 and is ranked 69th in the world.)

If the oil price slump persists for so long, many economic activities and projects may be put on hold, and that implies job cuts, retrenchment, and downsizing of the workforce.

Price and Production

There are around 150 companies with upstream interests in Nigeria. The state-owned Nigerian National Petroleum Corporation (NNPC) is the biggest company in Sub-Saharan Africa by production and remaining value due to its non-operated majority share holding in all Joint Ventures (JV).



Source: Wood Mackenzie; EY Analysis

Figure 2: The top oil and gas producing companies in Nigeria

Shell is the most established super major. However, following recent Shell divestments, ExxonMobil is now the largest International Oil Company (IOC) oil producer in Nigeria. Nigeria is Total's second highest value country in its global portfolio and accounts for more than an eighth of its upstream value. Among the majors, Eni is the smallest by production and remaining value.

There are over 100 indigenous oil companies in Nigeria. Since 2010, NPDC, the Exploration and Production (E&P) subsidiary of NNPC, has acquired an increasing share of NNPC's portfolio following the Shell divestments. Others, such as Amni International and Oriental, have teamed up with foreign partners who carry their costs.

More opportunities for indigenous companies are expected. Although Nigeria is the only country in Sub-Saharan Africa with a homegrown E&P industry, and the skills base is generally strong. However, there remains a reliance on the IOCs and western service companies, particularly for deep-water projects. Since 2010, upstream projects in Nigeria require 70% local content by contract value.

Several IOCs are increasingly focusing on expanding their footprint in the offshore areas of the Nigerian oil industry as a result of onshore risks. But with the present scenario of low crude oil prices, the situation has led to the suspension of some of these projects, with three deep-water projects already postponed in Nigeria since the crash.

Experts say a $10 drop in the price of crude oil per barrel will translates to a $1.5 billion reduction in annual profit for exploration companies, so the investing capacity of oil majors would be affected if the prices of oil continue to remain low.

If crude oil prices average $53 per barrel in 2015, compared to $77.5 per barrel in 2014, it is believed that the Federal Government of Nigeria's oil and gas revenue will decline by an equivalent of $10 billion this year, equivalent of 30%.

A Time of Opportunity

While international oil prices continue to wobble with oil-producing nations lacking definitive solutions to the crisis, I believe Nigeria could leverage the situation to attain unprecedented growth in its economy. The current situation is, therefore, an opportunity for us as a nation to cut waste in government expenditure, judiciously use the lean revenue accruing from crude oil sales, put in place private-sector led investment in refineries and petrochemicals, and focus attention on non-

oil sectors of the economy to bolster government revenue.

Malaysia, which is not a member of OPEC, is an example to draw from. That country attained significant growth in its economy by developing the local capability of its people. Malaysia is now one of the largest exporters of skilled engineers and technicians in the oil and gas industry.

Nigeria has not sufficiently invested in functional refineries and petrochemical industries, electricity, and other infrastructure, as well as local capability. The implication is that even the slightest downturn in the international oil market is bound to permeate the entire economy and deplete the government finances.

Continuous increases and declines in oil prices are normal. What matters is the ability to manage the revenues from periods of high price well enough to make up for those of low price. Although Nigeria doesn't have control over the price of oil because it is internationally determined through the forces of demand and supply, it can mitigate the effect.

For the oil and gas industry to unlock its potential and help position Nigeria to be able to attract the required investment, the federal government has to create a conducive business environment by ensuring globally competitive fiscal and economic stabilisation measures, place great emphasis on building local capabilities, and revamp the entire downstream space by building relevant infrastructure such as refineries and electricity.

If all the petroleum products consumed in the country were locally refined, the nation would save huge costs, conserve needed foreign exchange, eliminate the probability of fraud in subsidy payments, and maybe generate additional foreign exchange from the export of refined petroleum products.

Today, Nigeria has reduced the operational costs of its vessels by over 40% because indigenous operators are now playing major roles in the marine sub-sector. The enactment of the Nigerian Oil and Gas Industry Content Development Act is a step in the right direction for Nigeria. The law has created the platform for us as a nation to address the attempts being made in some quarters to prevent Nigerian companies from taking their rightful places in the Nigerian oil and gas sector.

Because of dwindling oil receipts resulting in the decline of government revenue, the Nigerian Government can borrow to fund the budget, but it must try to develop infrastructure that will generate money to pay back the debt. Such infrastructure should be developed under public-private partnership for prudent management and sustainability.

For the private sector to participate in building refineries, the government should encourage investors by giving them robust incentives and removing subsidy. This will engender competition, and investors who feel that importation is cheaper than refining in the country will import, and the price of products will crash.

Currently, the nation runs a rental economy where commodities such as oil, which accounts for 80% – 90% of the nation's revenue, are exported. If we have self-sufficiency, the effect will trickle down to other sectors of the economy. Imagine if Nigeria didn't import products but produced and refined more than it requires locally. In a period of continued drop in prices, the country could export refined products and create jobs and value in-country.

Also if proceeds from oil have been sufficiently invested in making power available to Nigerians, the benefits would be unquantifiable because an uninterrupted power supply would boost industrialisation, manufacturing, and technology development.

Nigeria must also increase its local processing and consumption. This has been the goal of the government for many years. But progress has been impeded by a lack of investment in the downstream petroleum sector as well as a very outdated policy and regulatory environment for the oil and gas sector.

The much anticipated Petroleum Industry Bill (PIB) needs to be passed, as it affects the source of the bulk of national foreign exchange earnings. This is critical to the transformation of the sector and its repositioning to play an effective role in the new economy. The removal of the Petroleum Fuel

Subsidy is also critical because it benefits the more affluent, which is a small minority of the population.

Nigeria's inability to monetise its enormous natural gas resources is another challenge. Gas has great potential to accelerate economic growth. The huge deficit in the nation's energy consumption, especially electricity, which has constrained our economic growth, can be easily eliminated if gas is fully utilized. The key is to adopt a pricing regime for gas that will encourage investment in gas infrastructure.

The hope is that Nigeria can take advantage of the current low oil prices as it presents Nigeria with an excellent opportunity to expand its hydrocarbon output and improve the local processing capacity.

Alex Ogbechie is a manager in the Oil and Gas Advisory Department of EY Business Advisory. He holds a degree in Mechanical Engineering from the University College London (UCL) and an MSc in Petroleum Engineering from Heriot Watt University.

FREQUENTLY ASKED QUESTIONS AND ANSWER AND RECOMMENDATIONS ABOUT THE NIGERIAN POWER SECTOR.

By John Delano,
Akindelano Legal Practitioners

Based on an exchange between Daniel Marks (DM) African Energy Magazine UK and John Delano ALP earlier in the year 2015.

Background

DM- I'm looking into comments by Nigeria's Minister of State for Power Mohammed Wakil for African Energy. He said that, "The government of Nigeria is working out participation of private sector in the transmission sector under a public private partnership.

This has worked so well in other sectors of our economy". I'm not quite sure what to make of this as I wasn't aware of plans for PPPs in transmission in Nigeria and I haven't heard of PPPs being employed for transmission anywhere else in Africa so I have a few questions:

CBI Question

Firstly, were you aware of plans for PPPs in electricity transmission in Nigeria?

On a related story:

- With another MoU being signed for a private sector led 700MW gas power plant, this time with Brazil's Benco Energy, do you think that many of these plants will be built?

Responses from John Delano ALP

1. I made enquiries about this with the Nigerian Electricity Regulatory Commission and they are also reluctant to confirm this as a policy since it isn't backed by any Policy document of TCN or the Federal Ministry of Power or the National Council for Privatisation (NCP) which is tasked with overseeing the privatisation of the Electricity industry.

My conclusion is that although PPP might be under consideration, it is by no means a certainty and that the Hon. Minister's statement is indicative of this administration's recognition of the limitations of the Public sector and the vital role the Public sector must play in the success of Power.

The current position is of the Law (under the EPSR Act 2005) is that the Generation and Distribution of Power have been Privatised. However the Transmission Sector remains in Government hands, under the Federal Ministry of Power which has contracted the task of transforming the sector to a Canadian Firm – Manitoba Hydro. It is a 3 year contractual partnership.

Q2. Do you think there is significant private sector interest in Nigeria's transmission grid?

A2. At this stage in the privatisation exercise, there is little or no interest from Private firms in Transmission probably because the Federal Ministry for Power (under Barth Nnaji) had made it quite clear that Transmission was not earmarked for Privatisation at this stage in the reform exercise.

Indeed at the tender stage there were only three firms involved and one of them, an Indian Company pulled out before the successful bidder was selected.

Q3. Do you think Manitoba Hydro's ongoing travails will put companies off becoming involved in transmission in Nigeria?

A3. Manitoba's Travails are symptomatic of a company doing business in a challenging sector of

the Nigerian landscape; a sector which had been neglected for a long spell and badly in need of investment and reformation. I think the true test (of the difficulty in revamping Nigeria's Transmission technology) would be whether Manitoba itself will stay on beyond the initial 5 year period.

Q4. Do you know of any precedents for PPPs in transmission?

A4. I do not know of any precedents for PPPs in Transmission. PPP itself is a fairly novel concept in Nigerian public life. It is only about 10 years old and cannot be considered as prolific, by any stretch of the imagination. I think you mean cooperations between public and private sector through privatisation which is the kind of initiative deployed in establishing the Azura Project (450 Mw Power Station). An MOU was signed between the Edo State Government and Azura in 2010 based on land granted to Azura by Edo state.

Strict PPPs have not been utilised in the Power industry. However I do think it is more likely that Transmission will eventually be privatised alongside Generation and Distribution.

5. With regard to the signing of a new MOU (with Benco Energy, Brazil). I think that there has never been a more conducive atmosphere for the development of the Power industry in Nigeria. Having said that an MOU is hardly a cast iron agreement in an industry that is just finding its feet after so many years. Having said that Azura Power started out on the same kind of footing and has progressed in leaps and bounds over the years. There's no reason why others similar projects should not follow suit successfully.

Background:
Enquiries by Daniel Marks (DM) of African Energy Magazine published by CBi UK – March 2015

DM – "I see that it is being reported in the Nigerian press that the payment deadline for the ten NDPHC power plants has been put back to 2016. I was hoping you might be able to tell me a bit about the current situation with regards to the privatization."
Q. Can you confirm that the deadline for completing the sales of the NIPP power plants has been extended to January 2016?

A. It is quite clear now that the deadline has been extended to January 2016

Q. Given the endemic problems associated with securing stable gas supply in Nigeria and the lack of activity in the months either side of an election, do you think it is likely that the NIPP power plants will be sufficiently advanced even by January 2016 for the sales to be completed?\

A. I expect the deadline to be shifted once again. I think late 2016 is the earliest date because the market needs momentum, stability and optimism. It also needs a pragmatic resolution of the Gas issue, even if it is a temporary one.

Q. Do you think the privatization of the NDPHC was rushed in taking place before the power plants were operating, given that the sales seem unable to go ahead without this?

A. There is no doubt the attempt to privatize of the NDPHC was overly optimistic. You can even call it rushed. It was rush was as a result of the momentum which the market had garnered and the enthusiasm of the powers-that-be to attain some self-imposed deadlines. However the gap in Gas infrastructure was (and remains) a fundamental problem. It was just a matter of time before it would become an impediment for serious investors.

Q. Looking at the sector more broadly, do you expect that the Nigerian government's policy of signing MoUs with a large number of private firms to develop greenfield power plants will produce results? Is it attracting the necessary calibre of developer?

A. With the advent of private power firms, the Sector has a fresh lease of life. There is no doubt it faces many challenges, but there is sufficient goodwill and interest from within and from overseas investors to ensure that progress continues.

The readiness of the Nigerian government to sign MOUs in respect of greenfield has been hallmark of Jonathan's commitment to the Power sector, which in turn has encouraged a high calibre of foreign investors to give serious considerations to investing in Nigeria.

Once the dust from the election clears and all of the key players have had a chance to assess the dynamics and variables I think the progress will continue.

In my opinion the key elements will be (i) the level of political will (of the Election winner) (ii) the outcome of negotiations with International Oil Companies who have capacity for Gas production; (iii) entry of new investors keen to enter the Gas industry; iv) the new government's approach to the issues in transmission technology.

Q. Are many of the greenfield projects you are involved with or aware of – aside from Azura-Edo – close to signing PPAs with NBET or reaching financial close?

A. There have been a lot of interest but no than two new Greenfield projects to my knowledge. Certainly not of the size of the Azura project. This is not necessarily a bad sign. It's just that many are taking a wait-and-see approach. Besides why commence a new project when there's still a chance to invest in NIPP stations ?

Background: Questions about Renewables December 2015

Exchange with David Slater Senior Project Manager African Energy

Q. With regard to RE, what is the new government's attitude to renewable energy, and what the industry is expecting, or hoping, to see in 2016.

A. There is a policy in place to promote Renewables in Nigeria. It is spear-headed by the Ministry of Power with the Ministry of Environment playing an advisory role and it has been in place since the early 2000s. The government has always emphasized that any additional sources of Energy is fervently welcome and it has declared the sources it considers as viable as the following : Solar, Wind Biomass and Natural Gas .

In line with Government policy the Nigerian Electricity Regulatory Commission (NERC) has granted several licenses to organizations dedicated to bringing Solar to Nigeria. Renewables will fit snuggly into the Rural electrification program of the Federal government, however it is unlikely to feature in the mainstream of Nigeria's power supply for many years to come.

The main reason is that government's resources and attention are currently more focused on more convention energy sources particularly Gas powered turbines and there is at best a very moderate appetite for renewables. Having said that Solar appears to enjoy the most support and is perceived by both NERC and the Ministry of power as the most practical form renewable for Nigeria.

On paper The Renewable Energy Programme (a creation of the ministry of environment) is expected to provide inputs to national sustainable development and agenda to meet the followings targets:-

- National Agenda on Emission reductions
- Millennium Development Goal
- Vision 20:20 Environment sub-sector
- Clean Development Mechanism
- Clean energy rural entrepreneur incubation
- Alternative sources of energy that is clean and sustainable for national energy mix

In recent times the prevalent thinking on the subject was expressed by Engineer Hadiza Abubakar National Coordinator of the Renewable Energy program set up by the Ministry of Environment as follows: Manufacturers and project developers can come into Nigeria on three fronts.

Number one is grid-connected power generation, where you contribute to national development through the grid.

The second part is off-grid and mini-grid [serving institutions and businesses].

[Finally] we have the bottom of the pyramid, where we have stand-alone systems for villages, where we need to replace the [diesel] generators and kerosene lanterns with solar systems on a pay-as-you-go basis, where it is easier for families to afford and install solar lanterns and solar systems into their homes.

Q. NERC yesterday announced that the collection losses of discos could no longer be passed on to consumers. How much of a risk do you think this is, for already struggling discos?

Q. Can this refusal to allow discos to pass on collection losses to consumers really result in a 50% reduction in the tariff or do you think there is a political element, given the upcoming elections?

A. Collection losses by Discos is going to be an issue for a while in this market place and will have to be tackled by NERC over and over again. I don't expect this new policy be remain permanently. I expect that NERC will reconsider its stance in a few months when it becomes apparent just how weak or untenable the Disco's position is. NERC does not exist in a vacuum, like every other institution of government NERC has to tow a self-protective political line.

Q. Finally, is the transitional electricity market now operating in Nigeria?

A. Yes, indeed the Transitional electricity Market is now in operation, however as can be expected it has been a tentative beginning for various reasons- the most significant been that liquidity is still a big issue in this market and will be for some time. Also Gas supply is still a problem for most Gencos.

Compounding these issues are the elections which have slowed things down.

For more information email john.delano@akindelano.com TEM – a crucial test for the Nigerian Power Industry.

John Delano graduated from Hull University with an LLB (honours) decree in 1988 and became a registered lawyer in Nigeria a year later. He practiced as a solicitor with Irving & Bonnar in capital markets transactions and corporate, and company law. He later worked in the field of publishing law in the UK for such companies as Informa and The Independent. He is currently a focusing his practice on strategic planning and arbitration with a keen interest in company law and the energy and the telecom sectors. John is a Partner at ALP.

MY CAREER NARRATIVE : THE PLIGHT OF THE ENGINEERING GRADUATE IN NIGERIA.

By Asuzu John Asika, MSc, MBA

"As a graduate in 2001, I realised that things were a lot harder than I initially believed and soon joined the many engineering graduates seeking opportunities in the then booming financial industry."

I recently attended a conference in Lagos, Nigeria, organised by the Nigerian Chapter of the Energy Institute for its Young Professionals Network and was requested to give an impromptu speech to this group of young and aspiring engineers and professionals.

I was asked to speak about something close to my heart, so I decided to speak about my struggle as a young aspiring professional engineer, detailing my career narrative and all the challenges I faced to get to where I am today.

I am Asuzu John Asika, a Chartered Engineer, a member of the Engineering Council in the United Kingdom, a Chartered Member of the Institution of Chemical Engineers, and an Affiliate of both the Energy Institute and the Association of Project Managers and Practitioners. I currently work as Joint Venture Manager/Developments Coordinator on a $3 billion Green Field Natural Gas development in the Southern North Sea, UK, having held different positions during my sometimes very varied 15-plus year career.

In 2014, I completed an Executive MBA program at the prestigious School of Management, Cranfield University, UK, and have since set up an engineering services and management consultancy company based in the UK and Nigeria called Pulse Integrated Consulting and Engineering Nigeria Ltd.

I achieved all this and more by never letting my present situations define me, but always striving to delineate where I wanted to be and what I wanted to achieve, then working very hard to achieve this.

I started my career narrative at my undergraduate university days. I enrolled to study Chemical Engineering at the University of Lagos in December 1995. In my fourth year, I went on an industrial placement with Chevron Nigeria Limited at the Escravos Offshore Oil and Gas Facility, where I worked in the facilities engineering department as a trainee process engineer.

This was where my ardent interest in pursuing a career in the oil and gas industry started. The scale and diversity of the activities the whole value chain of this industry offered for an engineer outweighed the difficulty and stiff competition to get a job in within it.

As a graduate in 2001, I realised that things were a lot harder than I initially believed and soon joined the many engineering graduates seeking opportunities in the then booming financial industry. I joined the Corporate Banking division at Diamond Bank as an executive trainee (Youth Corper), and after a year I felt that I was missing out on my passion so I left banking to further my education to the master's degree level.

I gained admission to study Gas Engineering and Management at Salford University, Greater Manchester. I worked hard during this course, which was funded initially by my father, who was a lecturer at the time, and from my working part-time most evenings to pay my bills. My hard work paid off as I achieved very good grades and was awarded a bursary by Siemens Metering Limited, a sponsor to the University.

I was tasked with designing a natural gas meter testing facility and later requested to help in the building of this facility. On completing the project, I was headhunted by a lecturer at the University of Manchester to work at his engineering consultancy company called PERDAC and worked as a project engineer, involved in business development. I also organised training courses. Some of the major projects I worked on

included designing a process for spraying the right cocktail and volume of vitamins on cornflakes for Kellogg's Cornflakes as well as designing a wafer coating facility for Glanbia Foods in Ireland. Although I enjoyed my time working at the consultancy, it was not the direction I wanted my career to head in, so I embarked on a self-redefining journey to get my career back in the direction I wanted it to go.

I was in a quagmire at the time because I had a few years of work experience under my belt, all be it not all necessarily in the industry of my preference. I applied for experienced-level jobs within the energy industry and asked each company to apply for a work permit for me as well. After numerous applications (roughly 200 applications) over a one-and-a-half-year period, some interviews and many rejections due to lack of adequate relevant experience, I decided to change my approach.

I started applying for graduate-level jobs at the big energy companies in the UK and Nigeria, and this paid off as I was invited to several assessment centres and got five job offers in the same period. Having the problem of deciding what company to join was a one that made me very happy, considering the effort and time I had put into it.

I accepted the offer from National Grid Plc, working for a subsidiary company, National Grid Gas (Formerly Transco) on their Engineering Leadership Graduate Scheme. I had eaten my proverbial humble pie and gone back to where I was in 2001, but I learnt that sometimes you have to take a step backwards in order to move forward.

Nevertheless, I was determined to make the most of the opportunity I had just been given and prove myself worthy of being promoted quickly to make up for the lost time. My prior work experience came in handy on the graduate scheme as it showed and I was taken off the two-year graduate scheme after one year and made a field process engineer looking first after 30 compressor stations and later on, looking after four of the company's peak shaving LNG facilities.

From this point onwards, my career in the energy industry took off. I progressed steadily, getting promoted almost every other year and being once again headhunted to work as lead process performance engineer at Hydrocarbon Resources Ltd (now Centrica Energy Exploration and Production), a subsidiary of Centrica Plc, the owners of British Gas.

Having worked for a few years in the UK, I applied for chartered engineering status to demonstrate my commitment to the engineering profession and was elected to the Engineering Council and the Institution of Chemical Engineers on my first attempt.

This resulted in a significant increase in salary, further driving home the importance placed by energy companies on competency and the chartered engineer status. I set a new target for myself to gain some business management and commercial experience and set off working towards this. Being well aware of the difficulty with changing careers paths, I prepared myself for all the challenges that I knew lay ahead. I took on managing small brownfield modification projects and the P&L responsibility that came with it and was soon managing bigger projects. I also enrolled on an executive MBA program at Cranfield University much to the disapproval of my manager then, as he wanted me to remain core technical and did not share my aspiration.

Enrolling in the MBA program enabled me to gain attention at the company head office, and I was invited for an interview for a new role to help look after the company's 49% interest in a Non-Operated Joint Venture Green Gas Field development project that was going through the process of final investment decision. I accepted the offer that was made afterwards to become the joint venture manager and non-op developments co-ordinator.

I combined managing a multi-billion dollar project that was in its execute stage with attending a very demanding executive MBA program, burning the candle at both ends to excel in both.

In October 2013, Shell Nigeria, the Nigerian National Petroleum Corporation, the Nigerian Local Content Board, as well as a host of other oil and gas support companies, organised an event in Aberdeen, Scotland. It was aimed at expat Nigerians with the objective of getting these

group of professionals working out of Nigeria to consider bringing their skills back home to serve the booming oil and gas industry in Nigeria.

They showcased the opportunities and the support the government was offering in the form of the Local Content initiative and set up support.

This struck a chord in me, and a group of us working in different fields within the energy industry in Aberdeen and Nigeria came together and formed Pulse Integrated Consulting and Engineering Nigeria Ltd.

I shared my career narrative and my struggles with this group of young professionals not to discourage them from following their dreams and aspirations, but to make them well aware of the challenges that professional engineers face in the energy industry. The media carry the idea that there is a massive shortage of skilled professional to service the vast energy industry, and yet we have millions of engineers graduating every year who could fill this gap but no concrete effective system in place to bridge the skill gap that fresh graduates have.

I faced this during my time, with the added challenge of trying to achieve this in a foreign country against the local skill set and preconception of foreigners taking jobs at the expense of the indigenous workforce.

I did this because my chances in Nigeria at the time were even more limited, and it was the situation of being stuck between the devil and the deep blue sea. Today, things are different, as the Nigerian government has identified this issue and has put things in place to try and address it. Although it is still a work in progress, the light at the end of the tunnel is very visible.

The challenge now is for the private-sector and indigenous companies in the energy industry of Nigeria to do their own part in building a formidable industry serviced mainly by an indigenous workforce, capable of meeting the needs of not only the energy industry in Nigeria, but also Africa and the rest of the world.

Asuzu John Asika is a Chartered Engineer, a member of the Engineering Council in the United Kingdom, and a Chartered Member of the Institution of Chemical Engineers. He holds a BSc in Chemical Engineering from the University of Lagos, an MSc in Gas Engineering & Management from the University of Salford, and an MBA from Cranfield University.

GAS –TO – POWER AND THE ROLE OF GAS COMPRESSION IN THE NIGERIAN ENERGY INDUSTRY:

Current challenges, strategies and solutions for sustainable development

By Lucky Enajite Edjenekpo, CCP, PMP

"Nigeria's natural gas sector is restricted by the lack of infrastructure to monetise gas that is currently flared."

Abstract

Every industry in every country of the world is dependent on electricity to remain operational; therefore it is no surprise that the frequent power cuts are having devastating effects on Nigeria's industrial sector.

The electricity shortage in Nigeria is undeniably related to many of the key issues occurring in Nigeria today. The underlying causes of power shortages and regular interruptions – blackouts and brownouts – vary, from failures to bring on new capacity to coincide with the demands of economic growth, low investment, and structural issues.

This article presents current challenges facing the gas compression industry in Nigeria. Challenges include security concerns, supply-chain issues, "big crew change", corruption, business environment and infrastructural issues, poorly managed construction contracts, pipeline vandalism, gas supply disruption, the absence of institutional framework, and in recent times oil price volatility.

Dealing with these issues will involve the provision of basic amenities in the oil and gas communities, competency development, and improvement of supply-chain and construction contractors personnel, training and technology conferences to address the big crew change, pragmatic enforcement of the law against corruption, appropriate monetary and fiscal terms to attract foreign direct investment, involvement of indigenous oil and gas companies, revival of moral awareness of the populace, formation of regional gas companies, development of fallow wells, adequate risk assessment by operators and service providers, quick passage of the Petroleum Industry Bill (PIB), and an enduringly strong political will on the part of the government.

Introduction

Nigeria has an abundance of natural resources, especially hydrocarbons. Nigeria has the world's 9th largest proven natural gas reserves at 182 trillion cubic feet (Tcf) as of January 2013. The country produced about 1.2 Tcf in 2012, ranking it as the world's 25th largest gas producer. (EIA, 2013)

It is projected that there will be 300 million new urban residents in Africa by 2030. This will generate a massive need for more services, housing, security, schools, medical facilities, and transportation, which, in essence, all require electricity. (Mubila, 2012:7) These concerns are even more particular to Nigeria considering the vast potential the country is endowed with.

The lack of electricity is a major constraint in continuing business, maintaining standards of living, and increasing economic development in Nigeria. Most economic activity is not possible without energy, and no country in modern times has substantially reduced poverty without massively increasing its use of energy.

Background

The petroleum industry is usually divided into three major components: upstream, midstream and downstream. Midstream operations are usually included in the downstream category. The upstream oil sector is a term commonly used to refer to the search for and the recovery and production of crude oil and natural gas.

The upstream oil sector is also known as the exploration and production (E&P) sector. The upstream sector includes the search for potential underground or underwater oil and gas fields,

drilling of exploratory wells, and subsequently operating the wells that recover and bring the crude oil and/or raw natural gas to the surface.

The downstream oil sector is a term commonly used to refer to the refining of crude oil and the selling and distribution of natural gas and products derived from crude oil. Such products include liquefied petroleum gas (LPG), gasoline or petrol, jet fuel, diesel oil, other fuel oils, asphalt and petroleum coke.

The downstream sector includes oil refineries, petrochemical plants, petroleum product distribution, retail outlets and natural gas distribution companies. The downstream industry touches consumers through thousands of products, such as gasoline, diesel, jet fuel, heating oil, asphalt, lubricants, synthetic rubber, plastics, fertilizers, antifreeze, pesticides, pharmaceuticals, natural gas, and propane. (Wikipedia)

Most midstream and essentially all downstream compression equipment are part of large industrial facilities, owned and maintained by major operators. In recent years, a few more midstream – mostly gas processing – plant operators have tended towards contract compression equipment than in the past. Nonetheless upstream, at or near the wellhead, in today's market, reveal more compression equipment being leased than owned by operators.

Historical estimates indicate that contract/rental compression equipment account for about a third of the total gas compression horsepower used in the gas industry from upstream to downstream. High-speed (<700rpm) natural gas engine or electric motor-driven reciprocating compressors predominate upstream and most midstream natural gas compression applications.

High-speed compressor packages are usually provided by a packager. The packager purchases the compressor, driver, and other major components from individual manufacturers and incorporates them on fabricated I-beam skids. (COMPRESSORtech^2, 2014)

Many Nigerians know only too well that the deregulation and privatization of the upstream and downstream oil and gas industry will bring much needed sustainable industrial development in the country. (Noruwa & Christopher, 2012:16)

Gas Compressors

Compressors are manufactured as positive-displacement, dynamic, or thermal type depending on application. Positive types fall in two basic categories: reciprocating and rotary. Reciprocating compressors consist of one or more cylinders, each with a piston or plunger that moves back and forth, displacing a positive volume with each stroke.

The compressor is the most essential constituent of any natural gas application. Compressors of various designs and manufacturers are used in many operations throughout the oil and gas industry. Compressors are used in some drilling operations, in many production operations, and they are extensively used in surface transportation of gas via pipelines. The gas compressor is a mover of compressed fluids, unlike pumps, which are movers of basically incompressible fluids (or liquids).

The positive displacement class of compressors is an intermittent-flow device that is usually a reciprocating piston compressor or a rotary compressor (e.g., sliding vane, screws, etc.). The dynamic class of compressor is a continuous-flow device that is usually an axial flow or centrifugal compressor (or mix of the flow). Each of the two general classes of compressors and their subclass types have certain advantages and disadvantages regarding their respective volumetric-flow capabilities and the pressure ratios they can attain.

In general, positive displacement compressors are best suited for handling high-pressure ratios (about 200), but with only moderate volumetric-flow rates (up to about 10^3 actual cfm).

Dynamic compressors are best suited for handling large volumetric-flow rates (up to 10^6 actual cfm), but with only moderate pressure ratios (about 20). (Lyons, 1996) Additionally, positive displacement compressors, particularly the multistage reciprocating compressors, are very insensitive to pressure-ratio changes. These

compressors will produce their rated volumetric-flow rates even when the pressure ratio approaches the design limit of the machine. The dynamic compressors, however, are quite sensitive to pressure-ratio changes.

The volumetric rate of flow will change drastically with changes in the pressure ratio around the pressure ratio the machine has been designed. Thus, positive displacement compressors are normally applied to industrial operations where the volumetric-flow rate is critical and the pressure ratio is variable.

The dynamic compressors are generally applied to industrial operations where both the volumetric-flow rate and pressure-ratio requirements are relatively constant. In general, only the reciprocating compressor allows for reliable flexibility in applying variable volumetric-flow rate and variable-pressure ratio in an operation. The rotary compressor does not allow for variation in either.

The dynamic compressors are designed for specific volumetric-flow rates and pressure ratios and are not very useful when these design limits are altered.

Gas Compression

Gas from a pure natural gas wellhead might have sufficient pressure to feed directly into a pipeline transport system. Gas from separators has generally lost so much pressure that it must be recompressed to be transported. Whatever the source of the natural gas, once separated from crude oil, if present, it commonly exists in mixtures with other hydrocarbons, principally ethane, propane, butane, and pentanes.

Natural gas processing consists of separating all of the various hydrocarbons and fluids from the pure natural gas to produce what is known as “pipeline quality” dry natural gas. Thus, before the natural gas can be transported it must be purified. (Lyons, 1996)

Nigerian Electricity Market

The demand for electricity in Nigeria far exceeds supply. This widely known fact informed the drive for major expansion of generation facilities by the Nigerian government. To this end, the Niger Delta Power Holding Company Limited (NDPHC) was established to implement the speedy execution of the National Integrated Power Project (NIPP).

The NIPP, a public-sector funded initiative, is the principal tool being used to combat power shortages in the country. This project is expected to deliver significant new generation capacity to the electricity supply system including transmission and distribution and natural gas infrastructure throughout Nigeria. (NIPP, online).

Challenges

Nigeria's gas-to-power sector is a very critical part of her ongoing power-sector reform, which appears to be totally overwhelmed by various forms of challenges that experts in the country's energy sector consider too significant to be ignored by the federal government.

Several challenges confront the gas compression industry in Nigeria. These include:

Security

Host communities' problems and their effects on the cost of doing business constantly stare at the face of operators and their service providers thereby slowing down development of oil and gas infrastructures. Local groups seeking a share of the wealth often attack the oil infrastructure forcing companies to declare force majeure on production.

The perceived lack of transparency of oil revenues, tensions over revenue distribution, environmental damages from oil spills, and local ethnic and religious tensions continue to create a fragile situation in the oil rich Niger Delta. Rising unemployment due to lack of progress in job creation and economic development in the Niger Delta also contributes to the insecurity experienced by the operators.

Supply Chain

Unpredictable import-duty processing times resulting from intricate and cumbersome procedures that must be followed to get original equipment manufacturer (OEM) equipment into the country is an issue operators and service providers battle with constantly in the industry.

Product quality issues, inadequacy, and sometimes outright unavailability of needed replacement parts are other concerns related to supply chain facing business leaders in the industry.

Big Crew Change

In parts of the country affected by the ongoing Integrated Power Project (IPP) development, the demand for experienced compressor hands has reached critical proportions. The problem has been exacerbated by retirements in the current workforce, leaving many companies with a serious shortage of experienced workers, forcing companies to recruit from each other and their service providers or to reach outside the industry.

Corruption

Corruption in the oil and gas industry is rampant and widespread. It is not restricted to the contractors alone but also thrives within the workforce. There are reported instances of delay in the process of awarding contracts attributable to unscrupulous demand for upfront gratification in cash or kind.

The disturbing aspect of it all is when such behaviors are seen among the rank and file of those with oversight functions both in government and corporate organizations. (Okereke, 2013; Olugbenga et al, 2013:38) A recent scandal affecting an anti-corruption agency further highlights limited government progress in tackling graft. (Ibeh, 2014)

Business Environment and Infrastructural Issues

Nigeria's natural gas sector is restricted by the lack of infrastructure to monetise gas that is currently flared. Incessant oil theft known as “bunkering” often lead to pipeline damage that results in production losses, forcing companies to shut down production.

Equally worrisome is the situation that all the existing mining leases for the hydrocarbon industry in Nigeria did not define gas but oil mining, which reveals a lack of political will on the part of the federal government. The trend towards progressively tight enactment of Nigerian content requirements has implications across a range of issues – the ability to deliver projects on time and labor costs present risk.

Sadly, though underscoring the strategic importance of pipeline infrastructure and associated facilities, such as gas-compression facilities, the country's Bureau of Public Enterprises (BPE) recently lamented the delay in the sale of 10 gas-fired power plants due to concerns over the availability of fuel gas. (Gas to Power Journal, 2014A)

Construction Contractors

Poor management of fixed-price contracts make it easy to operate over budget with bloated variation orders along with cash-flow issues. At the root of it all is the not-too-thorough planning embarked upon by the project team. The usual practice is the late involvement of the project manager from the early stages of the project – compounded by the in-house jostle for the role by eligible professionals.

The impact of all of these is the drag in implementation of projects, which oftentimes means hurried project deliverables that are not quite fit for purpose – not maintenance friendly and involving incomplete work, repeat work, and so on.

Pipeline Vandalism

Attack on oil infrastructure and pipelines force international oil companies (IOCs) to shut in their wells, and sometimes IOCs are forced to declare force majeure, which results in huge losses in revenue and the attendant repair cost utilising funds that could have been channeled to beneficial developmental projects for society at large. Sadly, the presence of wireless-sensor networks would not deter vandalism of oil and gas pipelines and facilities in the Niger Delta. (Obadoeze et al, 2012:65)

Pipeline vandalism is a recurring phenomenon. 1000 MW was lost to pipeline attack just recently, as announced by the minister of power. (Gas to Power Journal, 2014A)

Supply Disruption

One critical challenge is low gas supply – the gap between gas requirement and gas availability – to

power plants resulting from an absence of appropriate structures, including regulations and laws guiding the mining of gas resources – associated and non-associated gas inclusive.

Aging infrastructures and poor maintenance that result in all-too-frequent outages are a common phenomenon in the industry. These disruptions mostly stem from pipeline damage associated with oil theft resulting in shut down of trunk lines.

Failure of power plant owners to pay their bills to the gas companies also contributes to supply shortages. Nigeria currently loses 1,476 MW to gas shortage. (Gas to Power Journal, 2014B)

Natural Gas Wastage

Aside from the well known and documented wastage associated with gas flaring – Nigeria flares the 2nd largest amount of gas globally – a less well known phenomenon is the wastage at power-generation plants due to inefficient system processes and machinery coupled with behavioral issues of the human interface. (EIA, 2013) A recent study of the Delta Four power plants revealed a huge waste of gas available for power generation. (Oyem, 2013: 434, 443)

Falling Oil Price

The effect of oil-price volatility on the implementation of new gas-prospecting projects is a cause for concern among operators especially those in Joint Venture (JV) arrangements. The common perception is that the Nigerian National Petroleum Company (NNPC) oftentimes would delay in remitting its share – the so called "lack of partner funding" – to the arrangement, bearing in mind that Nigeria's budget is framed on a reference oil price of $77.5 (USD) per barrel. (EIA, 2013; PwC, 2014)

Absence of Institutional Framework

Regulatory uncertainty associated with the delay in the passage of the PIB is resulting in less investment in the development of new natural gas projects. The absence in all the mining leases for the hydrocarbon industry of the definition for gas mining exposes the industry to unguided players predisposed to corruption.

Recommended Remedies

The following strategies are worthy of consideration by the Nigerian government, business leaders, and practitioners in the Nigerian energy industry as they brace up to tackle the challenges.

Security

Provide basic amenities: For sustainable gas supply, oil and gas producing communities should be provided with basic amenities like pipe-borne water, good roads, schools and hospitals and electricity as well from the gas mined in the area. Above all, there should be a concerted effort to eliminate environmental pollution in these communities.

These recommendations also apply to communities with crisscrossing oil and gas pipelines. Transparency of purpose and will is key in all of these recommendations. The government alone cannot meet these needs. Corporate consciousness dictates that corporate organisations should participate in the venture for societal good, which they stand to benefit from in the long term.

Supply Chain

Competency development: The growing pace of change sweeping across Nigerian Customs requires that supply-chain practitioners stay abreast of requirements in addition to bringing innovative solutions to internal and external processes to improve on the delivery times of OEM parts and equipment.

Big Crew Change

Training: Around the world, the compression industry is continuing to expand its capacity to satisfy demand for gas compression and processing equipment. Along with the continuing strong demand for compressors comes the need for more trained and experienced engineers, operators, and maintenance technicians. Recruitment and training should be urgent

ongoing priorities for the development of the necessary workforce. Many upstream and midstream companies have expanded their internal training capabilities, and third-party training providers fill in some of the gaps. Regional colleges should develop entry-level compressor operator and maintenance training programs. Relevant agencies and professional bodies in the country should increase their focus on training for the near term and into the future.

Technology conferences: Development of annual training and technology conferences by relevant professional associations cannot be overemphasized. These events should focus on engine and compressor maintenance with intensive training track programs for compressor operators and maintenance technicians taught by industry experts. The topics covered at such training events should include environmental health and safety and OEM training for gas engines and compressors and turbines.

Corruption

Dealing with the root causes: Development of a strategic plan by government to deal with the root causes of corruption, which include over-centralization of resources and social insecurity. (Chete et al, 2014:30)

Pragmatic Enforcement of the Law

The political will by the government to invest more resources on the enforcement of and compliance with laws and regulations is mandatory in the fight against corruption. It must be mentioned that it is the enforcement of the laws – existing and new – that should be paramount to all stakeholders. There should be honesty in tackling corruption. A lack of high level political will to fight corruption forcefully and a lack of institutional independence and capacity to effectively investigate and prosecute graft cases will continue to stall progress if not addressed.

Adopting the "Name and Shame" Approach

The time is right for adopting the "name and shame" approach as a tool in dealing with the menace of corruption in Nigeria. Equally important is the need to focus on proper conduct and celebrate it in the public domain. Some may argue that it would not matter a great deal, but keep in mind that someday such records could be useful in determining who qualifies to hold strategic public-office positions in government or public companies in the country.

Adoption of Robust Anti-Corruption Policies

Businesses engaging in regular interactions with public officials are particularly exposed to corrupt demands, which underlines the importance of having robust anti-corruption policies that are properly communicated and implemented, including regular refresher anti-corruption training by in-country staff. The importance of managing integrity risk is further accentuated by the increasingly stringent enforcement of international anti-corruption legislation and capabilities.

Companies Must Speak Up Against Bribes

As noted by Blanding (2014), the "United Nations estimates that roughly a trillion dollars in bribes is paid annually worldwide" increasing the "cost of investment in developing countries by at least 20%. And yet, companies are mostly silent on the subject." According to Paul Healy, quoted in Blanding (2014), both anecdotal and empirical research show that "corruption may not be as necessary as it is perceived to be. In fact, at the end of the day, bribes may hurt a company's bottom line—and not just after being caught." Thus, either way, companies do not benefit in the long run if they continue to aid and abet corruption.

Aside from tightening internal controls regarding payment systems to business partners and reinvigorating the internal anti-bribery culture under compliance oversight, large multinational organizations must break their silence and speak up against corruption. (Blanding, 2014)

Business Environment and Infrastructural issues

Attract foreign direct investment: Relevant government agencies should continue to maintain the momentum to attract foreign direct

investment in gas prospecting by utilising appropriate fiscal measures. A recent press release by Petroleum Africa stated that the multi-stakeholder project driven by U.S. President Barack Obama, christened Power Africa Initiative, aims to add more than 10,000 MW of electricity generating capacity with the ultimate goal of "enhancing energy security, decreasing poverty, and fostering economic growth." The six initial partner countries are Nigeria, Ethiopia, Ghana, Kenya, Liberia, and Tanzania. The lending bank, Standard Bank Group, well acclaimed as Africa's largest lender by assets, has provided funding more than $400 million principally for Nigeria and Kenya. (Petroleum Africa, 2014) The judicious use of such funds will help in addressing the dearth of infrastructure in the energy industry.

Encourage Participation of Indigenous Companies

The Nigerian Content Development Management Board (NCDMB) should take the lead in encouraging indigenous companies in the sphere by following through with its mandate by law.

Already companies are showing interest in the power sector. Oando, a publicly owned company in Nigeria, is planning to build a 400 MW plant that will commence in mid-2015. The company gas and power unit currently operates a 228-km network of natural gas pipelines – with plans to expand to 600-km – supplying power plants and industrial consumers in Lagos and Port Harcourt. (Petroleum Africa, 2014)

Unbundling natural gas transmission networks: Consideration should be given to the unbundling of natural gas transmission networks in future regulatory frameworks in view of its effects on final customer prices. In particular, the government should follow through with the unbundling of the Nigeria Gas Company (NGC) – the transmitter of pipeline gas – to create room for better services and fair competition.

Opportunities in Nigerian content compliance: Seek ways to turn regulatory systems into opportunities for growth rather than an obligation.

Construction Contractors

Competency development: It is highly recommended that construction contractors develop their competencies in all aspects of project management but especially project control and cost management. The difference that exists between the business organisation (the permanent organisation) and programs/projects (the temporary organisation), which is by no means trivial, must be recognized and managed with the foreknowledge it deserves.

Project Financing

Construction Contractors live and die by cash flow. Access to funding should be made relatively easy – for the competent ones with good track records – by the relevant banking institutions. (Oshodi, 2014)

Pipeline Vandalism

Revival of moral awareness: The need to revive a moral awareness among the citizens to protect public property like gas transportation pipelines and associated facilities cannot be stressed enough. Adequate surveillance and arrest and prosecution of those caught vandalising pipelines must be enforced by security agents.

Supply Disruption

Formation of regional gas companies: The formation of a regional gas company in West Africa to help deal with the perennial shortage of the supply of natural gas in the sub region is a welcome development, a decision rising out of the need for the countries in the region to work together to find a lasting solution to gas supply disruption. Nigeria, Cote D'Ivoire, and Equatorial Guinea, with Ghana taking the lead, are all involved in the establishment of the strategic gas company. (Petroluem Africa, 2014)

Natural gas storage infrastructure: The removal of infrastructure bottlenecks must be prioritised in the ongoing reforms in order to secure a sufficient natural gas supply. The idea of building natural gas storage facilities should be considered.

Develop fallow wells: Increasing the supply of gas by developing fallow wells identified in certain parts of the country where there have been proven gas availability is recommended. Noteworthy is the effort of Niger Delta Power Holding Company (NDPHC), the ministry of petroleum, and the private sector. Recently, the federal government earmarked $1bn (USD) to address the challenges of gas supply to power plants to boost electricity supply nationwide. (Gas to Power Journal, 2014D)

Falling Oil Price

Adequate risk assessment: The need for operators and service providers to conduct proper risk assessment cannot be over emphasized considering that the fall in oil prices, the low level export quantity (below benchmark), and low prices (nearing budget benchmark) would definitely result in inadequate revenue to fund the nation's budget. (Udemezue, 2014)

Absence of Institutional Framework

Quick passage of the Petroleum Industry Bill (PIB): The PIB when passed into law is expected to change the organisational structure and fiscal terms used in governing the oil and gas sectors. Some believe, though, that the changed fiscal terms would make deep-water projects that involve large capital expenditure commercially unviable. Negotiation of contracts with IOCs, change in tax and royalty structures, deregulation of the downstream sector, restructuring of Nigerian National Petroleum Company (NNPC), concentration of the oversight function with the Minister of Petroleum Resources, and a mandatory contribution of 10% of monthly net profits by the IOCs to the Petroleum Host Communities Fund are some of the aspects of the PIB considered to be the most touchy. (EIA, 2013)

Political Will

The principal means to meet the challenges can thus be summed up as robust political will, deliberate funding for gas production, and an institutional framework to drive all transactions relating to gas production, separate from oil. The passage of the long awaited Petroleum Industry Bill into law hopefully should address all of these concerns.

Conclusion

Introducing flexible, efficient, and reliable gas compression and transportation and transmission solutions for the energy industry in Nigeria will result in long-lasting development and sustainable benefits and, in turn, economic growth.

References

1. Blanding, M. (2014) "Corrupting Silence: Companies Must Speak Up Against Bribes"http:// hbswk. hbs. edu/ item /7542.html [Online] [Accessed 26 November 2014]
2. Compressortech2 (2014) Compressor Training 18 (6) www.compressortech2.com [Online][Accessed 9 November 2014]
3. Chete, L.N., Adeoti, J. O., Adeyinka, F.M., Ogundele, O. (2014) Industrial development and growth in Nigeria: Lessons and challenges WIDER Working paper, No 2014/019 http://hdl.handle.net/10419/96311 [Online] [Accessed 11November 2014]
4. EIA (2013), Nigeria Report http://www. eia.gov/ countries/cab.cfm?fips=NI [Online][Accessed 9 November 2014]
5. Gas to Power Journal (2014 A) "Nigeria capacity falls by 1000MW on further pipeline attack" http://gastopowerjournal.com/markets/item/4114-nigeria-capacity-falls-by-1000-mw-on-further-pipeline-attacks#axzz3IxewqYZi [Online] [Accessed 13 November 2014]
6. Gas to Power Journal (2014 B) "Nigeria loses 1,476MW to Gas Shortage" http://gastopowerjournal.com/ gtplondon2014/item/4167-nigeria-loses-1476mw-to-gas-shortage#axzz3IvyWL8G1 [Online] [Accessed 13 November 2014]
7. Gas to Power Journal (2014 C) "Nigeria to spend $1 billion to improve Gas Supply" http://gastopowerjournal.com/ markets/item/3791-nigeria-to-spend-$1-billion-to-improve-gas-supply#axzz3IxewqYZi [Online][Accessed 18 August 2014]
8. Gas to Power Journal (2014 D) "Nigeria to spend $1 billion to improve Gas Supply" http:// gastopowerjournal.com /markets/item/3791- nigeria-to-spend-$1-billion toimpr ove-gas-supply#axzz3IxewqYZi [Online] [Accessed 18 August 2014]
9. Ibeh, N. (2014) "Nigeria: Accused of Corruption, Code of Conduct Tribunal Chairman Shuns EFCC" http://allafrica.com/stories/201403312493.html?keepThis=true&TB_iframe=true&height=600&width=850&caption=AllAfrica+News%3A+Nigeria [Online] [Accessed 11 November 2014]

10. Lyons, C. W. (1996) Standard Handbook of Petroleum & Natural Gas Engineering. Houston: Gulf Publishing Company 1 pp 476 – 479
11. Mubila, M., (2012) African Development Bank Group, Briefing Notes for AfDB's Long-Term Strategy, Briefing Note 4: Africa demographic Trends http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/FINAL%20Briefing%20Note%204%20Africas%20Demographic%20Trends.pdf [Online] [Accessed 10 November 2014]
12. NIPP Transactions (2014) "Nigerian Electricity Market" www.nipptransactions.com/background/electricity-market [Online][Accessed 4 November 2014]
13. Noruwa, A. I. & Christopher, C. O. (2012) "Deregulation and privatization of the upstream and downstream oil and gas industry in Nigeria: curse or blessing?" International Journal of Business Administration 3 (1)
14. Oshodi, B. A. (2014), Energy Economics and Project Financing Options in Nigeria (May 7, 2014). Available at SSRN: http://ssrn.com/abstract=2434220
15. Oyem, I. L. (2013) "Analysis of Nigeria power generation sustainability through natural gas supply", Journal of Innovative Research in Engineering and Sciences 4(1) pp. 434 – 443
16. Okereke, C. O., (2013) "Critique of Risk Management Strategy in the Nigerian Electricity Privatisation Programme" PM World Journal II (VIII) http://www.pmworldjournal.net/ [Online][Accessed 9 November 2014]
17. Olugbenga, T. K., Jumah, A. A, & Phillips, D. A. (2013) "The current and future challenges of electricity market in Nigeria in the face of deregulation process", African Journal of Engineering Research 1(2), pp. 33-39
18. Obodoeze, F. C., Inyiama, H. C. & Idigo, V. E., (2012) "Wireless sensor network in Niger Delta oil and gas field monitoring: The security challenges and countermeasures", International Journal of Distributed and Parallel Systems 3 (6)
19. Petroleum Africa (2014) "West Africa to Form Regional Gas Company" http://www.petroleumafrica.com/west-africa-to-form-regional-gas-company/ [Online][Accessed 8 November 2014]
20. Petroleum Africa (2014) "Momentum Gathering Power Africa Initiative Across Africa" http://www.petroleumafrica.com/momentum-gathering-power-africa-initiative-across-africa/ [Online][Accessed 8 November 2014]
21. PwC Nigeria (2014) Nigeria's 2014 budget Tax and Economic Analyses http://pwcnigeria.typepad.com/files/nigerias-2014-budget---tax-and-economic-analyses.pdf [Online] [Accessed 10 November 2014]
22. Udemezue, O (2014) "Nigeria: Falling Oil Prices, Government Responses, and Impending Realities (1)" http://allafrica.com/stories/201411060512.html [Online] [Accessed 10 November 2014]

    Wikiedia, (2014) Upstream, Midstream, Downstream http://en.wikipedia.org/wiki/Upstream_(petroleum_industry) [Online][Accessed 11 November 2014]

Lucky Enajite Edjenekpo is an oil and gas professional with more than 24 years' experience in project management and operations management. He is currently the Support Services/Nigerian Content Manager at Exterran Nigeria Limited, Nigeria. Lucky holds a BEng in Mechanical Engineering and an MSc in Engineering Management from the University of Benin (UNIBEN), Nigeria and an MBA (Leadership and Sustainability) from the University of Cumbria, UK. Lucky is a Certified Cost Professional (CCP) and a certified Project Management Professional (PMP), driven by passion to advance project management practice and maintenance service delivery. He lives in Warri, Nigeria and can be contacted at lucky-edjenekpo@hotmail.com.

Note: The ideas expressed in this paper are those of the author, and in no way, manner, or form should they be construed to represent opinions of the company he works for – past or present.

Fidelity Bank supports the Power Sector Reforms – *in a practical way*

Ughelli Power Plant – 972 MW
(Transcorp Ughelli Power Ltd)
Syndicated Acquisition Finance Facility
Syndication Member

Egbin Power Plant – 1320 MW
(Kepco Energy Resources Ltd)
Syndicated Acquisition Finance Facility
Syndication Member

Kano Electricity Distribution Co.
(Sahelian Power)
Acquisition Financing
Mandated Lead Arranger

Akute Power Ltd. 12.5 MW IPP
(Commissioned in 2010)
Project Finance
Sole Lender

Benin Electricity Distribution Co.
(Vigeo Power Limited)
Syndicated Acquisition Finance Facility
Co-Arranger & Facility Bank

Ikeja Electricity Distribution Co.
(NEDC)
Syndicated Acquisition Finance Facility
Syndication Member

Island Power Limited - 10 MW IPP
(Commissioned in 2010)
Project Finance
Sole Lender

Alausa Power Ltd. 10.4 MW IPP
(Nov. 2013 Commission Date)
Project Finance
Sole Lender

Our commitment to the Power Sector Reforms is reflected in the number of projects we have supported in this area. We have become the bank of choice for Power, Infrastructure and Real Sector Financing in Nigeria.

To know how we can support you in these and other areas, please call: +234 1 773 3199 or visit: www.fidelitybankplc.com

FIDELITY
Fidelity Bank Plc RC 103023
We're Fidelity, we keep our word

www. twitter.com/fidelitybankplc www. facebook.com/fidelitybankplc

AKINDELANO
LEGAL PRACTITIONERS

Akindelano Legal Practitioners (ALP) is a corporate law firm with offices in Lagos Abuja and Ibadan. Founded in 1972, ALP has established itself as one of the leading lawfirms in Nigeria. We have an impressive client-list spanning the public and private sectors and comprising of medium to large Indigenous companies as well as major international corporations.

We have a keen interest in the Energy industry. Our client list includes Oando Plc and Niger Delta E&P Plc. With more than 40 years experience, we draw on a rich heritage of excellence to create a dynamic and successful business firm which sets the highest professional standards. Our clients' progress remain at the core of our practice and our goal is to achieve a good understanding of their business environment thereby ensuring innovative and commercially viable solutions to issues.

We strive to minimize the turn- around time of every transaction and maintain our competitive edge by dealing with our clients legal needs promptly, decisively and efficiently.

Akindelano Legal Practitioners is a member of a number of professional associations including:
The Energy Institute (E.I.)
The International Bar Association (IBA)
The Chartered Institute of Arbitration (CiArb)
The International Project Finance Association (IPFA)
The Nigeria South Africa Chamber of Commerce (NSACC)

ALP SEMINAR SERIES

ALP Seminar Series was conceived as a forum to evoke discourse regarding practical, commercial and legal issues facing executive decision-makers engaged in business in Nigeria. It aims to stimulate innovative strategies and outline pragmatic solutions. We expect the Seminars to strengthen existing synergies and help create new ones. The Seminar series is now a yearly event propelled by an advisory committee of professionals with diverse business expertise.

The Seminar Advisory Committee consists of Mr. Omamofe Boyo (Oando Plc), Boma Ozobia (Sterling Partnership), Ajibola Olomola (KPMG), Kayode Akinkugbe (FBN Capital), John Delano (ALP) and Oluyele Delano (SAN) (ALP).

Please feel free to register your interest in attending by emailing alp@akindelano.com. To access papers presented at previous seminars please visit www.akindelano.com/alpseminars.php

Akindelano Legal Practitioners
21 Military Street, Onikan, Lagos
01-9504742, 08069334178
www.akindelano.com

AKINDELANO

LEGAL PRACTITIONERS

Lagos:
21, Military Street,
Onikan-Lagos
Tel: 01-4605511, 0806-933-4178

Ibadan:
Ile Ori Detu
1, Shell Close
Onireke

Abuja:
Plot 215 Cadastral Zone
Km 10 Ring Road
Airport Road

www.akindelano.com/alpseminars.php