The Transformation from Fossil Fuel to Green Energy

Sustainable resource management and the need for revenue transparency, subsidy reform and deregulation

by *Ms. Lois Laraba Machunga-Disu and Miss Zumunta Machunga-Disu*

introduction

A central plank of a green deal for Nigeria is the transition to the sustainable management of Nigeria's oil and gas resources. There is a need for a paradigm shift, diversifying the economic base towards sustainable renewable sources. But the Nigerian economy and the oil and gas sector are in a dialectic state:

- Nigeria has large reserves and high production but no clear conservation policy that considers inter-generational equity;
- Nigeria has large gas reserves but gas contributes little to domestic electricity generation. Quite the contrary, Nigeria is the second largest venter of gas in the world, after Russia;
- The oil and gas sector is Nigeria's prime revenue source but generates little employment;
- Relatively robust upstream sector income is used to cross-subsidise at a high level some 112 million low income people (70% of a population of 160 million) to ameliorate their hardships;
- Despite sufficient domestic refining capacity of 445,000 bpsd (barrels per stream day) current refining output is on average 30%. This near collapse of the downstream sector has tied down capital and pushed domestic petroleum imports to over 90%;
- A large pool of skilled indigenous petroleum experts exist, but over 98% of petroleum sector operations-management is dominated by foreign players. About 95% of materials and equipment used in the sector is imported;
- Nigeria has many environmental laws and institutions but poor operational practices in the oil and gas industry result in a lot of environmental malpractice and degradation. We witness constant oil spills, gas flares and community unrest;
- Nigeria currently enjoys the benefits of high crude oil prices spurred by emerging markets demand. Her manufacturing output remains below 8% of GDP. The country seems unaware of the emerging price threats from the increase in unconventional energy production.

All this is exacerbated by poor petroleum revenue management due to weak institutions both in terms of structures and human capacity and by poorly written fiscal policies. The focus of this chapter is, therefore, to make concrete recommendations for change in the sector after first elucidating the historically poor resource management and the lost opportunities from waste, loss of revenues, poor governance structures, poor conservation planning, damage caused by oil spills, gas flaring.

This chapter charts a 'petroleum exit strategy' for Nigeria by proposing structural changes in the oil sector to reduce corruption, spread the oil wealth more evenly among Nigerian citizens and make resources available to kick start a more sustainable, greener energy economy that replaces depleted natural resources. Especially as energy generated from fossil fuels results in climate change. As shown in this report, climate change needs to urgently be addressed through adaptation and mitigating strategies aligned with the transition to a green economy. Concrete alternatives to oil are discussed in the chapters on Clean Energy and Agriculture.

background

The ownership and control of all mineral rights in Nigeria is vested in the state. The state reserves the right to participate in any project and determines the type of contractual arrangements between partners in allotted blocks or licenses. Nigeria holds significant reserves in natural resources (solid and hydrocarbon). Nigeria has large bitumen (tar sand) deposits, which at an estimated 42 billion barrels exceed petroleum reserves, and a further almost 600 billion tons of low sulfur coal reserves. According to the International Energy Agency (IEA, 2011), Nigeria has proven reserves of 37 billion barrels of crude oil and 187 trillion cubic feet (TCF) of gas, both of which are a depleting resource. Nigeria's geology identifies seven basins. The Niger Delta basin has seen aggressive exploration and production, with the first oil being taken in 1958. Production here is said to have reached maturity, though deep water blocks and deeper plays may hold additional reserve prospects. Oil substantially declines. Data published in 2008 indicated Nigeria's reserves-to-production (R/P) ratio of 45.6 years for crude oil, 236 years for natural gas using the above mentioned proven crude oil and gas reserves. Known recovery factors using current technology, probably puts R/P at the next 15 years for crude oil and 74 years for natural gas.

Tar sands in Ondo State (*photo: Victor Okhai*)

> *"If Petroleum in Nigeria dries up that will make Nigerians sit up, it will make us to diversify to other things that will help in us in the economy of this country."*
>
> *ABC1, 20 – 25, Male, Enugu*[i]

There is an over-reliance on the export of oil and gas to serve the government's immediate budgetary needs. Revenue needs trump domestic energy and economic development needs. Out of an annual average production of 2.2 million barrels per day (mbd) over 80% is exported. Nigeria is ranked number 8 among the world's Top 20 crude oil producers. It is also the 9th largest gas producer in the world and has the potential to be a major gas supplier. A major portion of the gas is exported as LNG (liquefied natural gas) and NGL (natural gas liquids) including for gas supply projects in other West African countries. The gas reserves consist for about 50% of associated gas (which is released by oil drilling) and 50% non-associated gas (NAG). In 2010, about one third of the associated gas (536 billion cubic feet) was flared instead of being harnessed for electricity production or other productive uses. This makes Nigeria the world's second largest venter after Russia. According to the Nigerian National Petroleum Corporation (NNPC), gas flaring costs Nigeria US$2.5 billion per year in revenue, not to mention in respect to 'green

deal' sustainable development, the local and climate change consequences. The issue of sustained gas flaring is discussed in more depth below.

Petroleum accounts for over 90 percent of Nigeria's export earnings. According to 2010 OPEC figures, nominal net petroleum export revenue was US$ 65 billion, this is said to be 72 percent of the government's current account receipts. But reports by NNPC contradict this, stating net annual revenue (2006-2010) is about $23 billion, using an average crude oil price of $76 per barrel. Despite this, the oil and gas industry only makes a small contribution to GDP, as it is a technology and capital intensive sector employing few people. There is little domestic manufacturing for the sector, especially of oil equipment used in the upstream sector and manufacturing of oil products from her refineries. Local content makes up about 5% in goods and services, though the Local Content Regulator claims higher rates. According to the Central Bank of Nigeria (CBN), the oil sector had negative growth in the period between 2005 and 2007. The wider impacts of the quantum growth of emerging economies are felt across the region. China, for example, is actively seeking access to natural resources essential to its rapid growth. Nigeria, despite being endowed with ample natural resources, has been unable to translate this advantage into domestic growth of secondary and tertiary sector production.

harmonising energy legislation

The Petroleum Industry Bill (PIB) 2009/2010 has been touted as the panacea for the sector, but the revised PIB is under review and not yet passed into law. The PIB attempts to revise "the legal, fiscal and regulatory framework - the institutions and authorities for the Nigerian petroleum industry, and to establish guidelines for the operation of the upstream, midstream and downstream sectors." Its passage has primarily been delayed by conflicting interests concerning:

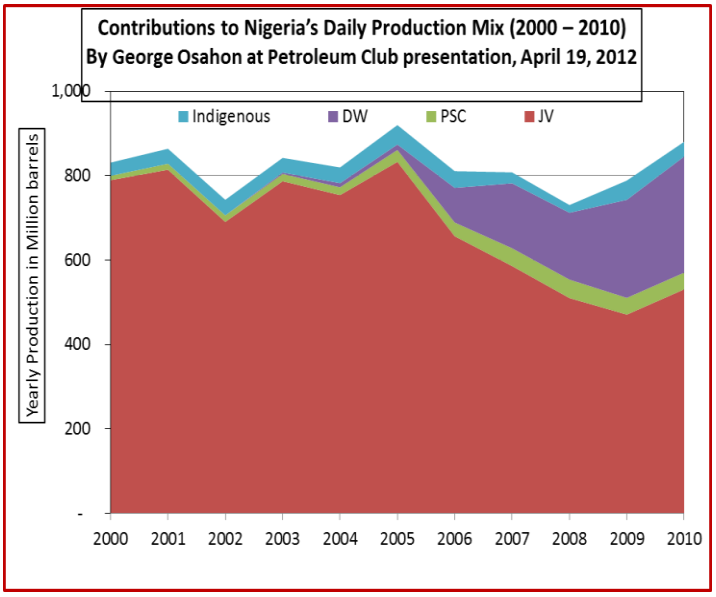
- the re-distribution of economic rent. The oil companies oppose the proposed increase in taxes, whilst the government argues the increase is a proper reflection of the high oil price regime;
- an increase in the community share of income of 10% of profit, in addition to the constitutionally proscribed derivation of 13% and the 3% levy on the oil budget funding the Niger Delta Development Commission (NDDC);
- the expediency of retaining institutions, such as Petroleum Product Price Regulatory Authority (PPPRA) and the Petroleum Equalisation Fund (PEF). In our view, these have no place in a deregulated market-driven downstream industry.

The PIB may not in the end adequately address the severe problems facing the industry, especially in revenue management. Any reform of the PIB requires appropriate amendments to the 1958 Petroleum Profit Tax Act (PPTA) and the Petroleum Act of 1969. The latter covers the devolution of powers and duties of the Petroleum Minister to institutions like the Inspectorate-DPR, PEF, PPRA, the NOC and PAMCO (Petroleum Asset Management Company). The PPTA needs further reform to strengthen the administrative control of tax management. Bureaucrats need specialised training to better understand technical cost structures, crude oil prices and yields for different Nigerian crude streams. Tax management is a treasury function housed in the Federal Inland Revenue Services (FIRS) and falls under the purview of the Federal Ministry of Finance (FMF). It is rather far removed from the petroleum industry and at present appears to lack skills and capacity. Shockingly, it has hitherto been common for tax rules to be written by the industry! This is one important reason for decades of intransparent revenue management. We note the Nigerian Extractive Industry Transparency Initiative (NEITI) has called on the government not to pass the PIB in its current form as it will result in millions of dollars in reduced revenue.

the government as "investor" or "regulator"

It is the role of government to regulate and create a suitable investment climate in the country. At the moment, the government acts both as regulator and investor in the oil and gas sector. It makes so called "cash calls" to fund joint ventures (JV) upstream and provides the NNPC with funds for capital investment and major operating expenses ("priority projects"). This has fostered inefficiency, corruption and mismanagement of financial resources. The cash flow of the NNPC, the government's direct injection and upstream joint ventures often cannot be segregated. Clearly, an investor cannot regulate itself! The following complex has resulted in a negative sector outlook:

- The government is unable to effectively supervise and audit the sector;
- The sector uses poor financial policy systems;
- The majority of cash calls are paid in US dollars which violates the national accounting policy. This practice dates back to 1985 following a simple instruction by the Federal Ministry of Finance (FMF);
- Since 1993, contractors are paid in both foreign and local currency (a decision made in a simple letter by the Petroleum Ministry). This saps foreign currency reserves and creates a sub–currency market putting pressure on the Naira;
- Weak government control over resource management emanates through Work Programmes, Budgeting and Performance set by Joint Operating Agreements (JOA) and Production Sharing Contract (PSC) management committee procedures. This results in a focus on export rather than domestic markets;
- Political and partisan interests dictate the choice of key management furthering poor governance.



the role of government in upstream licensing & indigenous capacity development

Oil block licenses are almost exclusively in foreign hands. 98% of production, operations and management of joint ventures and production sharing contracts (PSCs) are run by international oil companies (IOCs). The government holds in aggregate, as non-operator status, a 57% interest share of joint ventures and a 20%-30% "profit oil" share in the PSCs. Clearly, the sector could contribute much more to the economy through domestic players. Locally-owned assets represent less than 7% of the total output. Major portions of these assets have, in fact, been ceded to foreign technical partners, due to a lack of access to finance. Furthermore, even though Nigeria has enormous gas reserves the focus has been on oil production.

"We cannot do without the Government because when there is no head there's no tail. Without the Government we can't exist, it's not realistic and possible."

C2DE, 20 – 25, Female, Lagos Semi Urban

natural gas & unabated gas flaring

It is the law to stop gas flaring. In 1985, when crude sold at US$ 27 per barrel, the penalty was first set at two Nigerian kobo per thousand standard cubic feet (2k / US$ 0.04 MSCF). It was last increased in 1998 to 10 Naira / US$ 0.46 MSCF. The penalty applies equally to those operations where the government is partner and has thus indirectly contributed to the flaring. Our key concerns with regards to gas flaring are:

- The approval of Field Development Plans (FDP) by the Department of Petroleum Resources (DPR) is not contingent/mandatory on the associated gas (AG) either being shipped to a gas utilisation plant or it being re-injected;
- Nigeria lacks in domestic pipeline infrastructure and pipelines are not open to access by 3rd parties;
- The focus of producers / operators is on gas export;
- A lack of access by 3rd parties to equity gas reserves held by the government and joint ventures;
- Artificially low domestic gas purchase prices and lack of payment discipline for gas already supplied;
- The current low penalty of N10 / $0.064 per MSCF, when the price of oil is over US$ 100 / barrel.

The domestic gas price structure needs to be changed as current prices are kept artificially low. Hence, without intervention, the IOCs will flare gas at little cost or export captured gas to distant markets at the detriment of domestic energy supply. They will also keep undeveloped reserves inaccessible for 3rd parties. A Gas Master Plan (GMP) intended to address these problems, based on the 'false' premise that 3rd parties could obtain gas from upstream suppliers. Hence, President Goodluck Jonathan in 2011 launched the 'Gas Revolution'. The plan was to promote industrialisation by attracting US$ 25 billion in investments that would create 500,000 jobs through public-private partnerships. Investors from Saudi Arabia, India, Italy and the USA, as well as Nigeria, signed on to the plan. The plan went beyond existing gas-to-power initiatives by establishing a central processing facility in Oviakwu, Rivers State, a large petrochemical plant and two fertilizer plants in Lagos and Delta States. Taken together, the demand for gas generated would support the elimination of all flaring in Nigeria.

gas pricing

A new gas pricing framework was developed in 2009 to encourage in particular domestic electricity projects. Despite the introduction of fiscal incentives, the domestic price of gas remains extremely low by international standards. This drives the export of gas as no investor can make a reasonable return on domestic investment. As a result domestic power supply is affected. The former Minister of Power, Prof. Barth Nnaji, was quoted on 3 January 2012 as saying that despite a capacity of 5,100 MW Nigeria was generating only 4,300 MW of electricity due to a lack of gas supply.

Prices in the electricity sector are US$ 0.30 / MMBTU[ii] (USA: US$ 7 / MMBTU). The Power Holding Company of Nigeria currently only pays US$ 0.12 / MMBTU or about US$ 0.70 / boe.[iii] This is a case of 'buy cheap and sell high'! Gas for export by Nigeria Liquefied Natural Gas (NLNG) is bought at US$ 0.5/MMBTU, which equals about US$ 3.00 / boe!

the downstream sector - oil products, the need for deregulation and subsidy reform

The so called downstream sector processes crude oil and natural gas. It produces oil, petro-chemical products and chemicals, as well as gas products like methane for electricity production, NGL and LPG.

oil products downstream deregulation and subsidy removal

The much debated decision to fully remove the consumer subsidy for petrol at the start of 2012 initially saw the price rise from N 65 (US$ 0.42) to N 141 (US$ 0.90) per liter. Under pressure from a sustained strike led by labour unions, the government adjusted the price to N 97 (US$ 0.62) per liter. The intent of the subsidy removal was to create a 'self-regulating' petrol market that would not suffer from large-scale corruption as described in, for example, the May 2012 National Assembly report. The social toll of a N 141 petrol price apparently was acceptable to the executive, but it clearly was not acceptable to the millions of people who saw their monthly income swallowed up by an increase in the cost of transport and food. If government wanted to right a wrong, people were asking, why should poor citizens suffer?

To mitigate the removal of the fuel subsidy the government had on 20 December 2010 presented the unions with a Subsidy Reinvestment and Empowerment Programme (SURE-P). Among the projects cited were the construction or completion of eight major roads and two bridges, provision of healthcare to 3 million pregnant women, six railway projects, youth employment, mass transit, 19 irrigation projects and rural and urban water supply projects. But SURE-P appeared to restate promises by the Babangida, Abacha and Obasanjo administrations - promises that had not been kept. A delay in paying civil servants their recently agreed minimum wage of N 18,000 (US$ 115) per month added to the distrust of government.

The Federal Ministry of Finance estimated that the cost of bridging the price gap would for 2012 amount to N 1.2 trillion (US$ 8 billion). This amounts to one third of the annual national budget provision. The National Assembly probe, led by Farouk Lawal, chairman of the ad hoc committee on subsidy, further revealed that in 2011 alone Nigeria spent N 2.587 trillion, rather than the budgeted N 240 billion! The numbers are still being critically examined at the time of writing this report.

Fact is that the 2011 petrol price of N 65 was the lowest in West Africa. Some comparative prices for petrol in 2008 are given in the table below. The large differential led to significant illegal cross-border trade. The Nigerian media reported that the International Monetary Fund (IMF) was pushing various governments in the region to remove fuel subsidies, arguing the subsidies are not aiding the poorest but rather a source of corruption and smuggling. It is noteworthy that in 2011, the governments of Nigeria, Ghana, Guinea, Cameroon and Chad all moved to cut subsidies.

Comparative petrol prices (2008; US$ per liter)

Chad	1.25
Cameroon	1.13
Niger	1.12
Benin	0.93
Nigeria	0.44
U.K.	1.76
USA	1.77

Sources: Federal Ministry of Finance, OPEC

The benefits of subsidy removal and further deregulation are:

- More investment in infrastructure like depots and refineries, thus improving supply;
- Adequate supply leading companies to compete on service and value-added products;
- Increased competition among marketers may result in lower prices for customers;
- Capital recovery by investors and investors making a reasonable profit;
- The government receives taxes.

Refining crude oil with a fuel catalytic cracker (FCC) unit produces some 45% petrol, the balance is made up of kerosene, low-fuel oil, diesel and LPG. By 2007, all prices except for the price of petrol had been deregulated. Since 2003, the NNPC pays international market prices for crude oil, but the income from the domestic sale of crude oil is insufficient to meet the import cost of petroleum products. A Petroleum Support Fund (PSF) was created from which the differential is paid based on information provided by the NNPC and PPPRA. This is where corruption has arisen. According to a government committee, in 2007 the Nigerian Custom Services showed about 700 cargoes docking, yet the NNPC submitted 1,200 cargoes for subsidy payments. No punitive measures were taken. The recent subsidy investigations showed this practice continues unabated.

the wider problems of fuel subsidies: policy choices and the need for deregulation

The problems facing the downstream segment of the oil and gas sector extend beyond the subsidy issue:

- massive imports – over 90% of petrol is imported. This implies that the US$ 8 billion / yr in fuel subsidy only account for primary costs;
- low refining capacity – local refineries operate at less than 30-40% capacity;
- poor maintenance culture – biannual mandatory Turn-Around Maintenance (TAM) schedules are not kept;
- limited authority to incur expenditure by NNPC lead to frequent shut downs;
- decision making on refinery maintenance contracts takes at least 1-2 years-long contracting cycles;
- substandard products from unlicensed crude processors entering the market;
- cost structure of the import logistic chain & unused capital tie-down – in 2008, limited offloading capacity led to N 113 billion (US$ 900 million) in demurrage;
- low or zero margins for independent investors in the sector (without the PPRA prescribed margin);
- over-pricing – some sellers pay Rotterdam prices but by discharging and reloading, in e.g. Cote d'Ivoire, they obtain a new bill of lading and certificate of origin reflecting the higher price at the second port;
- the PPRA “guaranteed margin” of 19% for importing traders bears no direct relationship to market forces;
- inability to re-invest in and expand the downstream sector – no refinery has been built since 1986;
- mismanagement and corruption – as early as 2005, NNPC discovered N 17 billion in revenue got lost by selling oil to four companies at domestic prices. This has been followed by scandals involving the PPPRA and the Petroleum Equalisation Fund (PEF);

- non-competitive market structures – with few dominant traders there have been few new serious entrants into this market for 10 years, apart from a proliferation of brief-case entrepreneurs (importers) in the downstream;
- impact on other dependent economic sectors (agriculture etc) from the lack of fuel;
- fixed prices are a disincentive to investment and inhibit market entry;
- the rise in vandalism – NNPC reports an increase from less than 1,000 incidents in 2003 to over 3,000 in 2006. Petrol is stolen and sold on the black market.

subsidies in the upstream sector

funding gas development

As long as the government remains the main investor in the sector there will, in our view, be limited gas development. A radical change is needed, starting with the withdrawal of the government as investor and capitalisation of the new National Oil Company (NOC) prior to opening the market as proposed in the PIB.

the role of subsidies

To improve efficiency and reduce environmental damage, removal of these subsidies needs to be evaluated:

- low penalties sustain gas flaring – it is cheaper to flare than to invest in gas utilisation. The end of gas flaring would trigger investment and provide more than US$ 2.5 billion in gas revenue annually;
- discretionary gas pricing – there is no clear basis for setting tariffs and wholesale prices. The price paid by PHCN amounts to a US$ 50 - 90 million annual subsidy and is a disincentive to investment;
- non-payment of bills for supplied gas or electricity consumed – by public sector institutions to PHCN and by PHCN to NNPC;
- fiscal structure – the gas supply pricing structure and downstream gas utilisation tax policies represent subsidies. Upstream operators charge development cost to oil revenues, reducing Petroleum Profit Tax payable. The government in the end pays for gas projects through this 'tax shadow system';
- Petroleum Profit Taxes earned are not reflecting the recent price increases for crude, especially under the PSC contract, which is worsened by 50% tax allowance (a form of subsidy);
- subsidy removal reduces corruption and brings about re-alignment of market forces. Subsidy removal encourages competition and investment in the sector and reduces the government deficit.

alleviating the impact of subsidy removal while sustaining the pricing of oil products

Government and civil society must in our view unite in managing the removal of the fuel subsidy. The government must recognise the impact of the continued depreciation of the Naira vis-à-vis the rising price of oil. Prior to 1986 the exchange rate was stable, but a failed Structural Adjustment Programme

(SAP), which officially 'devalued' the Naira by lowering the value of a country's currency within a fixed exchange rate system in respect to other foreign reference currency and since then the Naira continues to depreciate under various macro policies added by the recent crisis have seen the Naira depreciate to N156 / US$. The high real price of petrol against the domestic peg at N 65/liter adds weight to calls for a correction. A transparent index pricing mechanism should be used to avoid constant wrangling over the pricing of oil products. Furthermore, pressure on the Naira can be reduced by cutting wasteful government expenditure.

tackling & punishing corruption

The government needs to regain credibility by tackling corruption through:

- **liberalising import and trade** of petroleum products by breaking up the oligopoly of "specially selected traders," with a strengthening of oversight by the DPR, the Ministry of Environment and the testing agencies employed for certification of standards;
- easing market entry for **new investors** – an open-access policy and ownership-sharing of refineries, depots, pipelines, jetties can be implemented promptly;
- expanding **public transport** systems by an incentive system for states and local governments;
- establishing fuel dumps for public transport to be supplied on a priority basis with compressed natural gas (CNG) for **city transport**;
- providing macro-economic & fiscal stability through a **price index system** – interest and foreign currency exchange rates significantly impact on the petroleum price. There is a need for an indexing system that links the domestic price of petroleum, utilities services and salaries;
- **restructuring the downstream sector** – the PPPRA and PEF exist because of the politically stated aim of uniform petrol prices across the country. Unfortunately, the proposed Petroleum Industry Bill (PIB) entrenches this regime. A deregulated downstream sector would allow market parties to incorporate distribution costs. Price controls would be made redundant and competition would reduce the currently wide margins. In line with international best practice, the recently established Commodity Price Control Board and a Federal Energy Commission (which we recommend to be established, see below) can oversee this change;
- **restructuring NNPC** trading – a commercial NNPC should have a full-fledged trading operation similar to Kuwait, Petrobras and Statoil, that can participate directly in the market place. Currently, NNPC only has a limited global trading operation through Nigermed, Napoil and Hyson, relying on brokers to handle their crude oil trade and appointed third parties to import products;
- **capitalise or privatise NNPC** – the NNPC or the proposed new National Oil Company (NOC), needs to urgently be capitalised and given control of its downstream cash flow and capital investments. NNPC operating at arm's length from government, or as a privately-held company, should sell crude and downstream products at market prices. This has three benefits. Firstly, an instant price drop will occur, similar to what was seen when price controls of 'essential commodities' were lifted in the 1990s. Secondly, a reduction in corruption by eliminating middlemen is anticipated. Thirdly, NNPC can focus on refining since it can market what it produces at market prices and import any differential in competition with importers and other refiners;
- NNPC to reduce its **credit grace period** and demurrage – the current 60 and 90 day credit grace

periods for domestic and crude oil traders unduly benefit the traders;

- eliminate term contracts for crude exports – the money thus raised should be invested in domestic processing capacity. **Less crude oil and natural gas exports** add value and employ more people in petro-chemical manufacturing plants. In the past, little consideration was given to the cost of importing heavy crude. Twenty refinery licenses were granted in 2000 without an analysis of the crude streams and reserves to be dedicated to them.

In the long term, the following restructuring is needed to move away from a single commodity economy:

- investment in **alternative energy** – to encourage diversification of energy as discussed in this report;
- an integrated energy planning system for upstream and downstream – without domestic **research and development** (R&D), studies and feasibility projects, Nigeria will lack the information necessary for effective resource deployment and utilization;
- establish a **commodity market** for crude and petroleum products at the Nigerian Stock Exchange: to promote market transparency, we recommend the government proceeds with the planned launch of a commodity exchange in Abuja. Similarly, we see merit in the creation of such an exchange for ECOWAS;
- create a strong statistical data & reporting basis – a good example is the US Energy Information Administration (EIA). A **Nigerian EIA** can align information and projections and will require access to information on all activities of the industry;
- full **deregulation of the downstream sector**: the government should end its role as investor in the downstream sector and limit its role to that of regulator. A first step would be the strengthening of oversight and regulatory bodies;
- **industrialisation** and development of a petroleum-allied industry (backward integration): Nigeria needs industrial capacity in allied industries such as construction, maintenance, transportation and marketing to support the oil and gas sector. Developing this allied industry will create jobs and provide, for example, for a faster turn-around in maintenance.

revenue management

In economic theory, natural resource use should be taxed fairly and efficiently. Resource rents should be distributed between investors and government so as not to discourage investment in or between economic sectors. In reality, Nigeria has a highly differentiated structure of royalties, taxes and levies across the upstream and downstream sectors. The intransparent revenue and accounting system has led to huge economic losses and bred large-scale corruption. Specifically, though the nominal rate of the petroleum profit tax is 85%, the effective rate is dramatically lower. Though industry complains of high taxes, the effective tax rate lies in the range of 40-70%, which is very low by international standards. Saudi Arabia and Angola, for example, charge 90% or more. The exact rate depends on the cost structure of the project and company, which is insufficiently supervised, the international market price and special permissible deductions for, e.g., NGL and NLNG projects. The existence of Production Sharing Contracts and Joint Operating and Participating Interest Agreements for projects with direct government participation complicates the picture further. The lack of transparency from non-commercial structures, obsolete regulations and the limited capacity of regulators, combined with the market power of the oil companies, breed corruption and, for example, lead to understatement of taxes. Tax returns prepared by oil companies are blindly relied upon by the Federal Inland Revenue Service (FIRS). Its staff is poorly

remunerated and lacks the know-how to e.g., assess technical cost or track crude prices.

A further source of corruption is the licensing process, which is easily manipulated, and a signature bonus payments system that lacks transparency.

Basic industry data remain hidden in a fog: There is no independent evaluation of "proven reserves" and production or independent reservoir management. When in 2004 Shell discounted its reserves after the US SEC set new compliance standards, neither the DPR nor the NNPC or FIRS were able to confirm or challenge the data. Daily crude oil and natural gas production data cannot be reconciled as there is no system that provides 'real-time' reporting from well-heads, which is internationally common practice. Attempts to install those systems were thwarted by operators and NNPC officials. As royalty payments are made on a gross production basis these are likely understated. Gross Production in the calculation of Petroleum Profit Tax (PPT) returns suffer from the same problem. NEITI has reported that crude production figures for 2006-2008 are still disputed between the Department of Petroleum Resources (DPR), companies including NNPC and the international terminal operators.

Finally, widespread oil theft aka 'bunkering', is alleged to be over 100,000 barrels per day, constituting about 5% of the country's production.

This situation has led to the creation of the Nigerian Extractive Industries Transparency Initiative (NEITI), which builds on an international EITI network. Nigeria enacted the EITI principles into law in 2007. NEITI has commissioned financial, physical and process audits for the period post-1999 - the first comprehensive audit since Nigeria struck oil in 1956. NEITI recently commissioned the 2009-2010 audit, but it unfortunately has limited capacity. Clearly, NEITI's work is a major force in the anti-corruption drive. It must be noted that legislative changes in the USA (Dodd-Frank) and Europe (pending), strongly opposed by IOCs, will force all publicly-traded companies to provide transparent project-by-project accounts of payments, including to Nigerian partners.

Removing incentives for fraud begins with a simplified tax system, the revocation of MoUs with international oil companies and an urgent review of the PSC terms. The myriad of complicated formulas, multiple deductions and multiplicity of taxes for each investor confuses the administration of taxation. The *Oil & Gas Technical Background Paper* to this chapter provides further details of the problems and potential technical and legal solutions on the revenue management of the sector.[iv]

recommendations on revenue management

- The practice of IOCs advancing tax policies or changes in fiscal terms behind closed doors without due process needs to end. A protocol setting out how and when fiscal terms can be amended needs to be put in place.
- The tax proposals contained in the revised PIB should for the sake of audit continuity be transferred and adopted as amendments to the existing Petroleum Profit Tax Act.
- The National Assembly should obtain independent technical and economic advice. Removing deductions (in our estimate an unwarranted 40%) can be accompanied by a transparent single tax rate for each sub-sector.
- The cap placed on investment by NNPC needs to be removed as it has created an umbilical cord between the government and NNPC, i.e NNPC should be fully commercialised (privatised). This will also enable assessment of the full value of Nigeria's equity holdings through joint operating agreements and production sharing contract terms in the NNPC.

- Capacity needs to be strengthened and remuneration increased in the tax office. Corrupt officials need to be punished.

environmental and social impacts

Oil exploration and production has a large social and environmental footprint. In Nigeria, the suffering of the people of the Niger Delta in particular is well documented. Exploration opens up remote pockets of forest and swamps and is accompanied by seismic work. Production brings oil spills, well blow-outs, ballast discharges and the disposal of drilling mud. The resulting damage to fauna and flora leads to delays in biota succession, ecosystem changes and a decrease in resources, such as fisheries. The environment loses in aesthetic and cultural value. Ultimately, the burning of oil and gas is a major contributor to dangerous climate change.

Economic development in the producing regions has not been socially inclusive. Many people of the Delta are impoverished. Women as purveyors of water, fuel wood for food, health care, sanitation and child bearing, are most impacted by deforestation, oil spills, soil erosion, gas flaring and ultimately, by climate change impacts such as floods and droughts. Panos photographer George Osodi captured these impacts in his book, "*Delta Nigeria: The Rape of Paradise.*" The resource scramble has negatively impacted on local culture and moral ethos.


Oil spill (photo: Fidelis Mbah)

prevention of oil spills & an end to gas flaring

Oil spills and gas flares cause severe damage, yet they can be avoided. They arise from poor operation practices, wanton vandalisation or are policy-induced. Some examples of major spills are:

- Two consecutive spills in 2008, caused by faults in a pipeline in Bodo and Ogoniland;
- Shell in early 2012 shut its 200,000 bpd Bonga facility, about 120 km off-shore, after the biggest leak in Nigeria for more than 13 years. The oil washed ashore the densely populated region.

A 2011 UNEP report on the environmental damage in Ogoniland estimated the clean-up cost for this area of the Niger Delta to amount to US$ 1 billion. The problem is serious, but it appears the number of spills peaked in 1999, when over 100 wells were shut-in producing 0.5 million bpd.

creating accountability for restoration

Royal Dutch Shell Nigeria has been sued after frequent oil spills and pervasive air pollution in Ogoniland. Amnesty International and the Centre for Environment, Human Rights and Development (CEHRD) charge Shell must pay an initial sum of US$ 1 billion.

mitigating community unrest & containing the rising cost of militancy

The repeated oil spills have deteriorated the relationship between IOCs and communities. Barricading of offices and drilling locations, as well as cat strikes, are common place. The blockades are not about compensation, but about the degradation of the environment**.** While not unique to the Delta, the region lacks basic social and economic infrastructure. Hostage taking and piracy remains common. Though after the 2009 amnesty many militants put down arms, the Joint Military Task Force issued a further ultimatum in 2011. As recently as February 2012 attacks were launched against Agip facilities. Militancy

comes at a rising cost to the government. In addition to direct security costs, a “Transitional Safety Allowance” for former militants is paid on top of a N 65,000 monthly amnesty allowance. The region receives millions for the Indicative Niger Delta Management Plan (INDMP) through the Ministry of Niger Delta, in addition to the oil producing companies' contribution of 3% of their annual budgets to the Niger Delta Development Commission (NDDC), a share of the Federation budget for oil producing states and the 13% derivation from oil revenues enshrined in the 1999 constitution. Development agencies further contribute: the EU, for example, announced in 2011 € 200 million in projects for Nigeria, most of them in the Niger Delta.

The cost of oil has proven to be extremely high in environmental but also in social, political and economic terms. This has inspired a broad-based movement in the Delta region (and beyond) calling for the remaining oil to be left in the soil and for environmental and social restoration.

environmental law and implementation

Nigeria has a plethora of environmental regulations,[v] spelled out in detail in the *Oil & Gas Technical Background Paper*.[vi] Notwithstanding their comprehensiveness compliance is seriously lacking. In our view, there are too many regulators and conflicting competencies between e.g. DPR, NOSDRA, NESREA and the Ministry of Environment. Penalties for violations are extremely low and the chance of penalties being levied is low. The example of gas flaring has been detailed above. Failure to submit an EIA or comply with it costs from N 50,000 (US$ 320) to N 1 million (US$ 6,400). Critically, Nigeria has no environmental right-to-know legislation and data on oil spills held by DPR and NOSDRA are confidential. This makes pursuing complaints against companies more difficult. The lack of funding and low capacity of the agencies further reduces effectiveness.

the link to renewable energy development

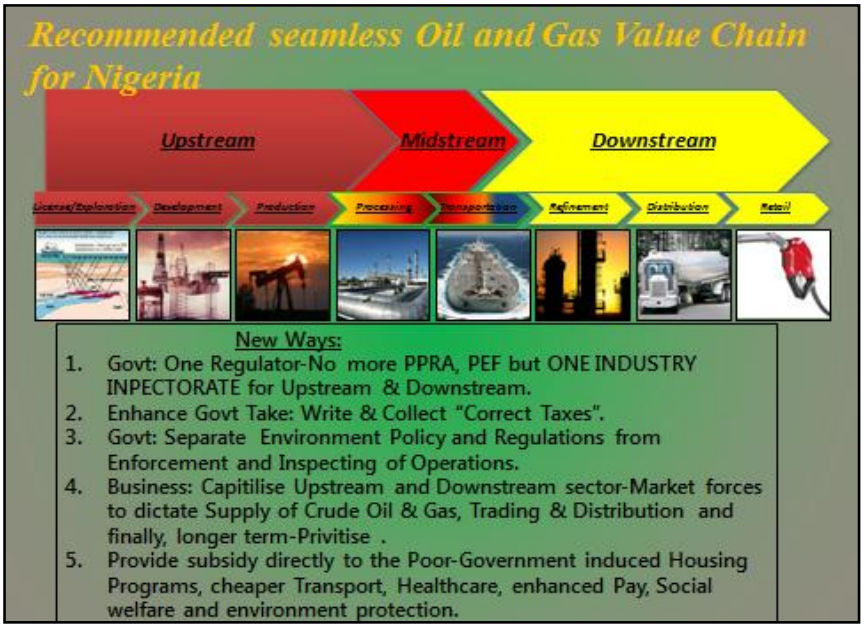
Because of acute electricity shortages the potential of bio-energy is being explored. There is, however, no debate in Nigeria on the conflict between large-scale biomass production and the drive to increase food security. Can Nigeria really afford to significantly shift production of priority food crops for bio-energy use?

The importation of ethanol has been approved until the domestic capacity exists to meet demand, estimated at 5.14 billion liters per year. Since 2001, investors have invested US$ 3.86 billion in 19 ethanol bio-refineries and 10,000 mini-refineries and feedstock plantations, to produce 2.66 billion liters / year of ethanol. A further 14 projects are in the offing. It must, however, be noted that of the 20 pioneer projects, 4 are in the conception phase, 8 in the planning phase, and 7 under construction with only 1 is operational.

conclusions and recommendations

A transition to a green economy and the efficient management of the energy sector is achievable. Building on our analysis and an extensive review of global best practice, the high-level recommendations below could:

- Accelerate the development of the domestic energy market;
- Provide for the effective integration of energy supplies;
- Significantly scale up renewable energy for electricity both on-grid and off-grid;
- End gas flaring by harmonising gas management and electricity sector development;
- Guide the transformation away from oil & gas dependence towards renewable energy supplies;
- Streamline governance and increase support from the Nigerian people.

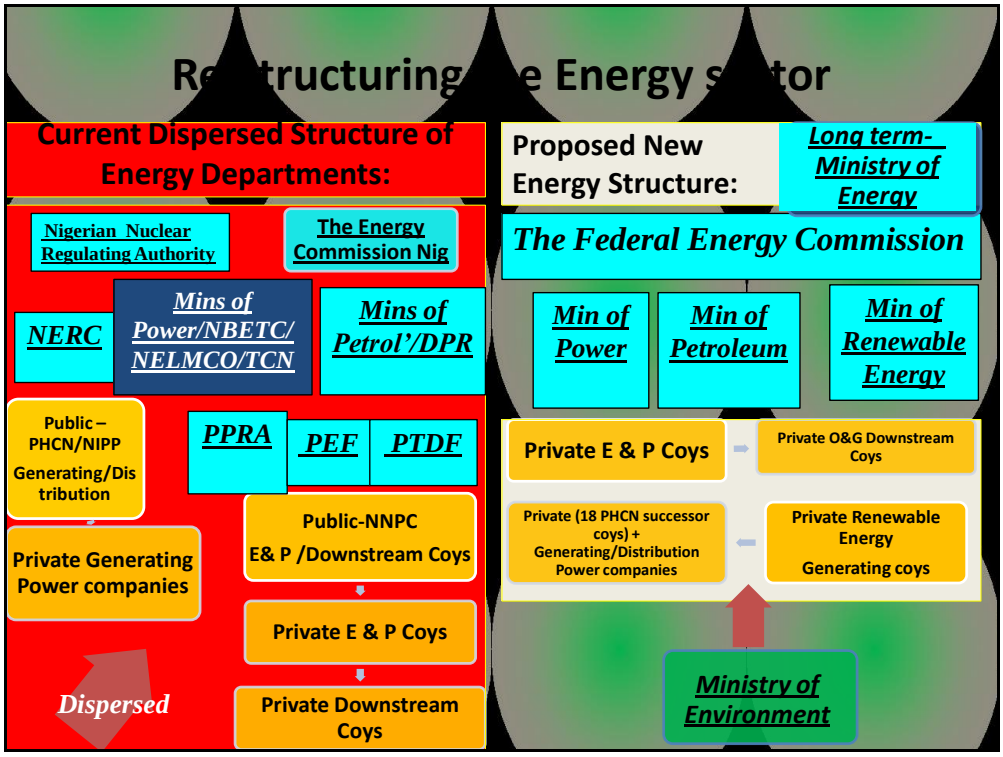


review the structure & management of the energy sector

Nigeria urgently needs a single energy regulator, as well as a realignment and harmonisation of existing policies, legislation, structures and organisations. A comprehensive long-range energy supply & demand policy and plan should be drawn up to inform the harmonisation. In the absence of a single energy regulator, the Presidency has become the *de facto* coordinator. Notwithstanding its importance to the nation's economy and security, this is not a sustainable way to govern the sector. The new regulator can assess infrastructure needs for industrial development and coordinate the planning of sources of energy supply and for managing demand, from the current dispersed supervisory authorities. We recommend the establishment of a Federal Energy Commission (see chart below).

create an effective management structure

Energy sector management is currently dispersed. We propose the following structure to meet future challenges that is capable of both planning and implementation of the new vision:



conduct long-term sustainable energy planning

The future energy system providing access to sustainable energy to all Nigerians requires integrated long-term planning and policies. The aim cannot be achieved through the envisaged grid expansion. It is key to provide renewable energy to meet demand while considering the potential of energy efficiency in reducing this demand. Energy planning should reflect factors like population growth, the functioning of energy markets, the renewables potential, estimated demand, prices and futures and issues concerning "market power". Integrated "sustainable" energy planning systems incorporate concerns over the environmental impacts of energy consumption and production, including climate change. Stricter regulation of the energy sector has in many countries led to the setting of (performance) standards and emissions reduction targets for CO2 and other greenhouse gases. Crucially, the future of Nigeria's oil and gas production, which may have peaked already, in light of the tremendous problems summarised in this chapter, will need to be reflected in the plan.

better governance - the government as regulator

Nigeria's public institutions are weak and lack in capacity. In the energy sector, this has sadly enabled rent seeking through bribes and contract inflation. Petro-dollars have also infected the political system and accusations of vote buying and influence peddling are common. Those exceptional civil servants who do not engage in this business are few and far between. The 2012 National Assembly probe unearthed large scale fraud. In 2011, over N 2 trillion (US$ 12.6 billion) was paid to fuel importers to cover the difference between market costs and state-regulated prices, representing almost one third of a N 4.5 trillion (US $28 billion) government budget. For this reason we support the gradual removal of the subsidy, assuming mitigating measures are put in place to protect citizens from undue effects of anti-corruption efforts. Nigeria's international reputation has been tarnished and economic development hampered. Transparency International ranks Nigeria as one of the world's worst countries to do business in.

increasing the peoples' stake in natural resources

Illegal blue sapphire mining, Taraba State (photo: hbs Nigeria)

Though some take the position that mineral resources should be vested in the communities, it is our view that resources should remain vested in the federal government. A substantial share of the economic rent derived shall, however, be allocated to host communities through a transparent allocation system, using the global accepted practice of royalty rent. The principle behind a royalty payment, usually on a gross income basis, is that it represents compensation for the destruction and depletion of the value of the endowed land (akin to a ground rent payment for landed properties). Royalty is bestowed onto the "landowner." This implies that the Nigerian Land Use Act requires amendment since in Nigeria all land belongs to the government[vii]. We recommend this structure to compensate communities-states of the Federal Republic of Nigeria, for those affected by mineral (solid & hydrocarbon) exploration and exploitation on land and in adjacent offshore waters. This current royalty rates for land and swamp terrain in the petroleum sector is in the range of 18%-20% of gross revenue production per barrel (though tax deductible).

It is recommended that the system of royalty payments would replace the current system of payments, which include 13% Derivation, the 3% sum of the annual budget of oil producing companies that fund the NDDC, and the proposed PIB 10% Community Fund. Government should continue to tax profits from operations, which constitute the greatest share of economic rent. This policy should also be applied to other (solid) mineral resources. This system is more transparent and auditable by all stakeholders and it meets global standards.

the need for privatisation

The dual role of the government as investor and regulator is detrimental to good governance and economic development. With some caveats we support the gradual, transparent and structured privatisation of government holdings in the sector. The government currently pays its 57% equity share of joint venture budgets of between US$ 4 and $5 billion annually. In addition, it covers NNPC's capital and major operational costs. The combined total of US$6 to $8 billion is covered by current revenue, with limited debt or multilateral projects financing. Such direct competition for money can hamper sector investment and investment in other sectors. Hence, the need to privatise the petroleum sector. This will hopefully also lead to more transparency and fiscal discipline, as well as improve tax collection. The pitfalls of privatisation are well known in Nigeria. Some privatised companies have been surrounded by controversy and the exercises conducted by the Bureau for Public Enterprises (BPE) and the authority of the National Council on Privatisation have been questioned. As a result some of the sales have been revoked. The requirement of core investors having technical, financial and managerial acumen needs to be strictly met. Corruption and partisan interests are indeed a problem, but the system has some way of correcting itself as the successes in telecommunication and aviation show.

funding renewable energy development

Nigeria needs a Renewable Energy Development Fund to replace the recently created Subsidy Reinvestment and Empowerment Programme (SURE-P). The federal share of the subsidy partially removed in January 2012 is reported to be about N 15 billion, which is 47% of the 3-tier distribution for which SURE-P is responsible. Unfortunately, SURE-P appears to duplicate the functions of existing public

institutions. The fund could instead focus on providing renewable energy access, thus complementing the national grid and delivering on government's promise to provide power to all Nigerians. In addition, the CBN should create a Renewable Energy Intervention Fund. If combined with fiscal incentives for renewable energy development, this would adequately deepen funding for the development of the sector. Finally, the potential of the Future Generations Fund, part of Nigeria's Sovereign Wealth Fund, in support of this transition should be further explored.

transition from a fossil dependent to a green economy

In order to show the immediate, short-term to long-term steps that need to be taken to achieve this transition, we have developed a transition plan for the sector, annexed to this chapter. While not fool-proof it shows simple steps that can be taken, starting today. It shows how the transition to a green economy can be accelerated following international 'best practice' in energy and renewable energy legislation and organisation, fiscal policies, technology, and financing. Under this scenario the national grid with a capacity of about 6,000 MW can be scaled-up to 200,000 MW by 2030. The grid in 2030 can be for at least 60% served by renewable sources, natural gas will provide up to 30%-40% of capacity. Taking into account population growth and the need for greater deployment of renewable energy in rural areas, large parts of the population not served by the grid will be supplied with off-grid renewable energy solutions.

*Please consult the **Oil & Gas Technical Background Paper** which contains more background, facts and figures supporting the proposals made in this chapter. It is available on www.ng.boell.org under Green Deal Nigeria.*

Footnotes

i. 2*020 - Young Nigeria's Perceptions*, research commissioned by hbs, May 2012

ii. MMBTU = Million Metric British Thermal Unit

iii. Boe = barrel of oil equivalent

iv. The background paper is available on www.ng.boell.org under Green Deal Nigeria

v. These include the Minerals Oil (Safety) Regulations 1963, The Petroleum (drilling and production) Regulations 1969 as amended (1993, 1979, 1995 and 1996), Associated Gas Re-injection Act 1979, as amended (1985); and others on Environment Impact Assessment Act 1992 (EIA), former Federal Environmental Protection Agency 1988 (FEPA), the Federal Ministry of Environment 1999 (FME), National Oil Spills Detection and Response Act 2006 (NOSDRA), The National Environmental Regulation for the Construction Sector of 2011 (NESREA)

vi. The background paper is available on www.ng.boell.org under Green Deal Nigeria

vii. In the USA, for example, landowners earn royalty on mineral resources. In turn, they pay taxes on royalties to the federal government. Furthermore, States like Alabama, Alaska, California, Florida, Louisiana, Mississippi and Texas, that are contiguous to the continental shelf have negotiated royalty rent sharing with the federal government (1986/7) within 3 miles of the seaward boundary of the coast

Lois Laraba Machunga-Disu, author, is the founder and Chief Executive of JALZ Energy Limited, providing energy services in strategy consulting, technical services and oil & gas operations, a company that has interest and is involved in Licencing Rounds (2002 and 2005), an initiative by the Nigerian government aimed at expanding indigenous E & P capacity building in Nigeria. Lois has spent more than 20 years with the Nigerian National Petroleum Corporation (NNPC), occupying various staff functions including HR; engineering controls functions in project management- planning & cost controls; Investment Analysis; Technical Assistant to the CEO, Joint Interest E & P Operations and Manager, Planning & Business Development in NNPC-NAPIMS. She has worked in various international offices in Japan with JGC, Yokoma, on the new Port Harcourt Refinery Project and in the USA on major E & P development projects such as Shell's Gas Gathering Project Houston; Mobil's 6-Wellhead Platform Projects with Petro-Marine Engineering, Houston; Chevron's Escravos Gas Projects with Chevron Overseas, Houston; Mobil's Ubit Expansion Project with Waldarmar S. Nelson, New Orleans, LA. She continues to support development agencies in Nigeria like the UK's Department for International Development DFID, the Heinrich Böll Foundation hbs and as consultant to the Oil & Gas Policy Commission of the Nigeria Economic Summit Group (NESG, since 2006), as well as often advises the Nigerian government, for example as a member of the Presidential Standing Committee on Resource Mobilisation for National Economic Empowerment Development Strategy (NEEDS, 2004), Presidential Sub-Committee on Restructuring, Constitution and Capitalization of the new National Oil Company (NAPCON) and its subsidiaries, which produced the Petroleum Industry Bill (PIB, 2009); and she is currently a member of the Taskforce on the Governance and Control to review the PIB, 2012. Lois is a member of the Institute of Petroleum, UK, Publicity Secretary (founding member), Nigerian Gas Association, 1999, Member of Chamber of Shippers and the International Association for Energy Economics (IAEE), amongst others.

The author can be contacted at info@jalzenergy.com

Zumunta Machunga-Disu, co-author, is charged with strategic business development for JALZ Energy Limited. She specializes in strategic planning and organization development and is coming on board after success as a Strategic Development Analyst and Quality Assurance Manager for the Philadelphia Fortune 500 Company, ARAMARK. She aims to grow the company into an international diversified company championing sustainable and renewable energy projects. As an advocate for minority and women-owned SMEs, she believes entrepreneurship and social enterprises are critical to human and socio-economic development in modern day Africa. Prior employment at Shell Nigeria Corporation Pension Fund Administration (SNCPFA) in Lagos, Nigeria and Banister International in Philadelphia, PA, USA provided a unique global perspective critical to the growth and success of the company.

The author can be contacted at zumunta@jalzenergy.com

annex – **transition steps for Nigeria from fossil fuel to green energy economy**

Recommended Actions

Step 1 - immediate to short term:

- Create the Federal Energy Commission (FEC), by appointment of an independent body of commissioners; out of existing regulators and experienced energy experts;
- Establish integrated energy planning for demand and supplies; R&D centers;
- Federal Ministry of Environment (FME) or a suitable agency like the Climate Change Commission to establish standards of measuring and reporting GHG emissions, to set emission targets (including targets for each sector). Climate Change Commission/FME to utilise existing donor technical support from international agencies such as EU's Global Climate Change Alliance, DFID, hbs etc. to design and implement policies;
- Roll-out of integrated energy policies, fiscal policies and incentives for renewable energy for Nigeria in tandem with oil and gas;
- Conclude privatisation plans of key sectors of energy, power & petroleum;
- Embark on mass education of public/civil society on climate change, deforestation, flooding;
- Implement adaptation programs at national, state and local levels as well as at regional level as recommended by National Adaptation Strategy and Plan for Action, NASPA;
- Implement/support regional strategies on climate observation, climate change measurement, impact, vulnerability and adaptation strategies;
- Embark on energy efficiency plans and programmes at all levels; introduce intelligent electricity grid with control systems that monitor peak demand and which controls various sources of power feeding into the grid; reassess building codes;
- Introduce climate related quality controls through the Standard Organisation of Nigeria;
- Develop skills base for renewable energy development in R&D and RE technology by re-assessing Petroleum Trust Fund programmes and Ministry of Education curriculum.

Step 2 - short to medium term:

- Accelerate the gas flare reduction plans, develop the gas corridor grid and put in place a major gas pipeline network across the county or as conceived in the Gas Master Plan (GMP), similar to WAPCO;
- With or without PIB, implement immediately the policy of open access to gas ownership, pipeline transmission and distribution;
- Subsidy on petrol and gas should be tied to the power MYTO system in an integrated approach;
- Revise the weak elements in existing contracts and Joint Operating Agreements and Production Sharing Contracts with IOCs in the light of new energy sector management;
- Strengthen national R & D studies in RE and oil and gas reservoir management and planning (currently under the control of IOCs for their export use);
- Manage waste from landfills and incineration; waste transport efficiencies; waste prevention;
- Implement new housing policy & design to target solar use.

Step 3 – medium to long term:

- Increase spread & intensity of RE energy technologies by having access to intellectual property and own R & D;
- Create a Green Fund and create a domestic carbon market.

Footnotes

i 2*020 - Young Nigeria's Perceptions*, research commissioned by hbs, May 2012

ii MMBTU = Million Metric British Thermal Unit

iii Boe = barrel of oil equivalent

iv The background paper is available on www.ng.boell.org under Green Deal Nigeria

v These include the Minerals Oil (Safety) Regulations 1963, The Petroleum (drilling and production) Regulations 1969 as amended (1993, 1979, 1995 and 1996), Associated Gas Re-injection Act 1979, as amended (1985); and others on Environment Impact Assessment Act 1992 (EIA), former Federal Environmental Protection Agency 1988 (FEPA), the Federal Ministry of Environment 1999 (FME), National Oil Spills Detection and Response Act 2006 (NOSDRA), The National Environmental Regulation for the Construction Sector of 2011 (NESREA)

vi The background paper is available on www.ng.boell.org under Green Deal Nigeria

vii In the USA, for example, landowners earn royalty on mineral resources. In turn, they pay taxes on royalties to the federal government. Furthermore, States like Alabama, Alaska, California, Florida, Louisiana, Mississippi and Texas, that are contiguous to the continental shelf have negotiated royalty rent sharing with the federal government (1986/7) within 3 miles of the seaward boundary of the coast