



Gas flaring and its impact on electricity generation in Nigeria



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ABSTRACT

It's quite a challenging period at this crucial stage in Nigeria where there is enormous gap in power supply and demand. This paper examines power generation in Nigeria with a view to X-ray some of the challenges of irregular power supply and its associated implications. Critical assessments and methodological evaluations of the research are based on recent literature and publications from Nigerian National Petroleum Company (NNPC) and Nigeria Gas Company (NGC). The major cause of irregular power supply in Nigeria is believed to be inconsistencies in government policies and shortfall in gas supply to power plants. Nigeria solely depends on Liquefied Natural Gas (LNG) to fire its power plants and gas flaring has continuously hindered its smooth operation. The key objective of the study is to create public awareness on how best to tackle epileptic power supply in Nigeria and also create a mind-set that petroleum industry bill (PIB) is not about increment in petroleum products price as currently perceive by majority of Nigerians but all about sustainable development in the oil and gas industries. The authors believe that with the passage of petroleum industry bill and complete deregulation of power sector, Nigeria is set to join the league of sustained power generation and distribution. Petroleum industry bill (PIB) empowers the gas company to sell gas at competitive price which guarantee return on their investment. The current scenario where gas is delivered to Power Holding Company of Nigeria (PHCN) at virtually free price is not sustainable and further encourages gas flaring at the detriment of infrastructural development.

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1. Introduction

Power generation and distribution have remained epileptic for quite an age in Nigeria despite government efforts to improve the system. Efforts have been intensified by successive governments to develop a broad based plan for power generation and distribution in Nigeria as evidenced in the decentralisation of Nigeria Electric Power Authority (NEPA) and the subsequent emergence of Power Holding Power of Nigeria (PHCN). This bold policy appears to have broken longstanding impediments in energy chains in Nigeria in which government dictates and maintains an inefficient bureaucracy in energy sector. To this end, Ogunlowo et al. (2015) have emphasized the need for Nigerian government to develop a coordinated, legal and regulatory frameworks in energy sector which may ultimately boost the business of power generation in Nigeria. The authors further affirm that energy generation and distribution

in Nigeria need to be overhauled in view of its importance in societal growth. According to Oseni (2011), the relevance of power sector to any industrial growth cannot be overstressed. For any industry to harness its full potential, power sector is pivotal and highly necessary for industrial growth. Power sector has been the foundation and the infrastructure on which sustainable growth is built. It is widely believed that Nigeria is endowed with a vast supply of gas, coal, as well as solar and hydro resources. Currently, power generation is mainly from thermal plants, which contribute to about 60% of total power and hydro power plants which generate about 30% energy input (Tallapragada, 2009). Many literature (Barros et al., 2014; Adaramola et al., 2014; Ikeme and Ebohon, 2005) have reported the need for government to reinforce gas development in view of its relevance to energy growth. Gas supply to thermal plants should be the utmost priority of any government and therefore all relevant laws that may encourage this process need to be enhanced. This study brings to fore fundamental issue that need to be addressed if sustainable progress is to be allowed in this sector. Part of the study of this work is to analyse progress made and the existing shortcoming in energy development in

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Nigeria and proffer a sustainable way of tackling this problem with all seriousness it deserves. As illustrated in Fig. 1, it is clearly seen that energy consumption per capita in Nigeria still have to be improved. South Africa currently generates over 20,000 MW of electricity and Nigeria is predicted to generate equivalent status if government allows competition in this sector. Gas flaring in Nigeria is purely as a result of uncoordinated legal framework. Laws are not harmonised and as a result there is no specific direction to reduce gas flaring (Barros et al., 2014).

Table 1 shows various sources of energy in Nigeria and successive government have only focussed on energy from petroleum reserve. Exploring other sources of energy will further deepen competitiveness in the energy business as more players will be available to be patronized. This low power generation has resulted in frequent electricity “black-outs” as majority of Nigerian populace rely solely on electricity generators. Nwaoha and Wood (2014) have reported that Nigeria is endowed with some 182 trillion cubic feet of proven gas reserves and these reserves need to be proactively developed.

According to Nwaoha and Iyoke (2013), the role of natural gas in the global energy market cannot be overemphasized. Currently, natural gas is the third largest global energy source as reported in notable journals (Gasol et al., 2009; Chow et al., 2003; Umbach, 2010) and its utilisation is expected to increase substantially in coming decades. Investment in natural gas continues to grow due to its availability, versatility and sustainability because it is a cleaner energy source compared to coal and crude oil (Leather et al., 2013). Bourcier et al. (1985) have reported the need for developing countries with gas reserves to strive and curb gas flaring in view of its finite nature. Depleting gas reserves through flaring is a disaster that may likely affect unborn generation. Nigeria is now faced with dwindling crude oil price at the international market and sourcing for resources to develop age long power plant is now a difficult task. The worst vital aspect of gas flaring is the associated risk to the environment and global warming. Table 2 still shows Nigeria as one of the leading gas reserve nation and if the current volume of gas flaring is not reduced, there appears a looming and environmental disaster. The role of Department of Petroleum Resources (DPR) appears not well defined in Petroleum industry in Nigeria. DPR is statutorily and constitutionally saddled with monitoring and imposing sanctions where necessary to erring oil companies. Oil companies continuously defile regulatory agency and there is need for government to take a fundamental approach where interest of all players will be protected.

2. Challenges of natural gas development in Nigeria

Globally, natural gas production has increased from 97 billion cubic feet (BCF) per day in 1970 to 309 BCF per day in 2010 as

Table 1

Natural energy-resources in Nigeria (Ibitoye and Adenikinju, 2007).

Energy Type	Resource Estimate
Crude oil	36 billion barrels
Natural gas	185 trillion cubic feet
Hydro power	14,750 MW
Coal	2.75 billion metric tons
Solar radiation	3.5–7.0 kW h/m ² -day
Wind energy	2.0–4.0 m/s
Biomass	144 million tons/yr
Wave and tidal energy	150,000 TJ/yr

reported in the literature (Towler, 2014; Flores, 2014), which is shown in Fig. 2. Nigeria equally recorded significant improvement in gas development during this time. The annual growth rate was predicted to be steady at 2.75%. The decline in this prediction was highly noticed during the economic recession in 2008. Natural gas is reported to meet 21.4% of the world energy supply, third only to oil and coal. In the United States for instance, it is responsible for 24.3% of the energy supply, second only to oil (Towler, 2014). Natural gas if properly harnessed could be the mainstay of any economy as it is cleaner than crude oil. Russia has consistently dominating gas exploration until the innovation of shale gas in the United States. The resultant effect of greenhouse gasses could be a possible way to curb the continuous release of gasses into the nature. Today, the world is groaning under climate change and global warming there appear no solution in sight for now. Developing gas reserve in Nigeria is faced with enormous challenges and Nigeria appears not ready to tackle the problem head-on. The recent decentralization of Nigerian Electric Power Authority (NEPA) seemed to have been the right step in the right direction but latest development in the sector call for urgent attention. Gas being the engine room for power generation in Nigeria need to be effectively harnessed. Government needs to allow oil companies to sell gas at international price to Power Holding Company of Nigeria (PHCN) and allows market forces to determine gas price in Nigeria. This process encourages gas companies and their interest is further protected when they can recoup cost of production from gas sale. The challenge of gas development is further compounded by communal agitation for resource control and environmental degradation of oil communities. The environmental impact of gas flaring is more pronounced in Niger–Delta (Hassan and Kouhy, 2013) and there is need for government to encourage the supervision and monitoring of gas pipelines by the local youth which invariably gives them a sense of belonging in petroleum industry. Engaging local youth reduces pipeline vandalism and sustain gas flow into power plants. This practice is recommended as a short term measure and the long term plan is the passage of Petroleum

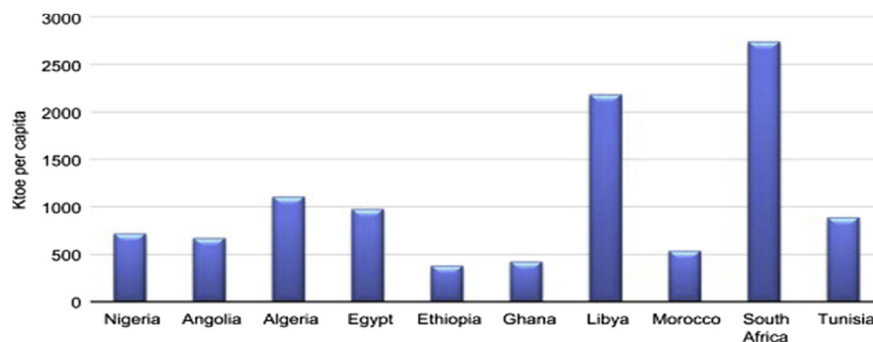


Fig. 1. Energy consumption per capita in African countries as at 2002 (Emodi and Boo, 2015).

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