THE NIGERIAN GAS MASTER-PLAN, INVESTMENT OPPORTUNITIES, CHALLENGES, ISSUES AFFECTING POWER SECTOR: AN ANALYSIS

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ABSTRACT, The Nigerian Gas Master-Plan, Investment Opportunities, Challenges, Issues Affecting Power Sector: an Analysis. The objective of this article is to contribute towards understanding of the Nigerian Gas Master Plan (NGMP/Plan) and its bifurcations with key socio-economic development factors. I applied the method of discourse to bring to being some points that have hitherto been unknown about the Master-plan and its inter-relationships and bifurcations. Elaborated here are the spectacular gains that have accrued to the Latin American country, Trinidad and Tobago, from its recent development of natural gas resources. This was considered suitable and significant here for highlighting that if such spectacular achievements could be realized from Trinidad and Tobago's relatively smaller gas deposit (15.3 tcf), probable reserves (8.4 tcf), possible reserves (6.2 tcf) would be by far greater considering Nigeria's larger natural gas reserves (184 tcf) wealth as earlier stated. I show that the Plan is well designed relevant to addressing Nigeria's current development needs generally. It presents potentials for stimulating Nigeria's economic growth by harnessing the country's abundant natural gas reserves. The Plan enumerates/ elaborates huge investment opportunities. Some challenges likely to be faced in the implementation/management of the Plan are already being surmounted as recent reports show that some of its key investments have been realized and the required infrastructure are being provided. Regarding the issues in the Master-plan that are likely to affect and are affecting Nigeria's power sector development, I reckon that they are mostly positive factors due to the way the plan promises to stimulate electricity generation in our country.

Keywords: Master-plan, Nigeria, power, challenges, investment opportunities, power.

1. INTRODUCTION

1.1. The spurt in gas consumption in Nigeria and matters arising

The trend in energy consumption in Nigeria since 1975 has been characterized by increasing demand for natural gas. In 1975, gas demand experienced a surge while by 2005 an explosion in gas demand occurred and has experienced increases thereafter.

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Forecast show that the extent of global gas demand level was going to exceed 20bcf/day by 2011, exceed 25,000 MMS of gas volume utilized by 2015 (Yar'Adua, 2007). The foregoing explosion in gas demand led to the conception of the Nigerian Gas Master-plan. Those who view the Nigerian Gas Master Plan (hereafter NGMP) describing the documents that have launched by NNPC (Ige, 2008, Yar'Adua, 2007) for promoting the country's natural gas development and myriad related follow-up activities afterwards as well as activities undertaken and ongoing concerning management including implementation) represents the "renaissance" for Nigeria's socio-economic and environmental resuscitation. Although, dedicated exploration for gas is yet to be done as systematical mapping and purposeful way rather than estimated through exploration activities aimed at discovering petroleum oil, Nigeria's natural gas reserve has been acknowledged to be very large (Ige, 2008). With proved reserves of 182 trillion cubic feet (tcf), Nigeria has been ranked at the seventh position of the world largest. Nigeria's natural gas wealth is not only so adjudged in terms of the large quantity, its zero per cent sulphur content and richness in natural gas liquids makes it to be reputed to be of the highest quality that is fondly described as "sweet".

Therefore, the above assertion that the Nigerian Gas Master-Plan represents a renaissance for socio-economic and environmental development arises from an informed study and understanding of the Master plan's mission, vision, and commitment of its engineers and architects. The visionary and promising contents of the NGMP are exactly what Nigeria has required and ought to have undertaken many years previously to replicate "the Gas Revolution" that started bearing fruits in the USA, among others are accomplishing through application of new technologies (hydraulic fracturing or "fracking") for transforming their economies/societies. The latter involves strategic energy sector planning and management that have facilitated accomplishments or caused turns-around involving dynamisms in institution, processes, structures, and attitudes, acceleration of economic growth, reduction of poverty (Kolb, 2014; Todaro, Smith, 2005) among other achievements that persuade concerned scholars to described the foregoing changes as "the Gas Revolution" in other economies that have undertaken to manage natural gas resources by utilizing strategies capable of harnessing natural gas resources to achieve socio-economic-environmental development goals and objectives thereby raising living standards considerably (Kolb, 2014). Rather than undertaking energy revolution, Nigeria's energy landscape has for too long been kept to either stagnate, decline or "submerge in a quagmire" that has trapped or captured attempts and opportunities for achieving economic growth and socio-economic development to the extent that it could be tolerated if someone say that any attempt at change is permissible. However, attempts at changing Nigeria's energy landscape have been few. If any, they have either been scams or belonged to categories of the mediocre: not effective.

1.2. Objectives

The general objective of this article is to contribute towards understanding of the Nigerian Gas Master Plan (NGMP) and its bifurcations with key socio-economic development factors. THE NIGERIAN GAS MASTER-PLAN, INVESTMENT OPPORTUNITIES, CHALLENGES, ISSUES AFFECTING ...

1.3. Organization

In the rest of this article, I present (in appropriate section, as labeled) materials relevant for achieving the following specific objectives drawn from the title of this study/article. I begin by elaborating a theoretical-conceptual framework of innovative (economic development) planning/management as befitting the natural gas revolution and in fact any comparable innovative large-scale undertaking. I follow on by showing the huge gains that have accrued to the Latin American country, Trinidad and Tobago, from its recent development of natural gas resources. This is significant for many reasons including highlighting that the spectacular achievements realized from Trinidad and Tobago's relatively smaller gas deposit (15.3 tcf), probable reserves (8.4 tcf), possible reserves (6.2 tcf) would be by far greater considering Nigeria's larger natural gas reserves (184 tcf) wealth as earlier stated.

Then, I relate the latter to the former i.e. the natural gas revolution to innovative planning/management by elaborating the latter almost immediately after the former. However, I present the method adopted for implementing this study before the natural gas revolution. I follow on by examining investment opportunities capable of being spurned by the NGMP (as has been known/experienced by other economies that planned-managed-implemented large-scale gas revolutions). I examine challenges: those generally associated with the NGMP and more specific challenges in the nexus of Nigeria's embattled electricity/power sector. Afterwards, I conclude the paper by summarizing its key points and recommending strategies for enhancing the NGMP management such that the expected benefits to the power sector are realized for the facilitation of national economic growth.

2. THEORETICALLY AND CONCEPTUALLY FRAMING THE NIGERIAN GAS MASTER-PLAN ON NEO-LIBERALISM

This study presents features that make it amenable to elucidation by drawing from the perspectives offered by the doctrine of neo-liberalism. However, considering the need to avoid repeating my earlier espousals of the violent character of this doctrine, (neoliberalism) (e.g. Ingwe, Ukwayi, 2014, among others), I adopt only two of its multiple perspectives here. Of the four major understandings/interpretations of neoliberalism recently clarified, the following are brief elaborations of the two selected versions.

2.1. Ideological hegemonic project perspective

Neo-liberalism in this sense denotes organized class-based alliances whereby the elite who apply their dominance (influence) to contrive programmes that are usually designed to foist on the weaker majority images of the world preferred by them (elite). Some people of central interest under this neoliberalist conception include: those who willingly consent to domineering influences; people who conceive neo-liberalism and the specific ideas they create; and people who lead in consenting to or adopting the ideas and actions foisted by dominant groups (Springer 2012, p. 136 citing Cox 2002; Dumẽnil and Lẽvy 2004; Harvey 2005; Peet 2002; Plehwe et al., 2006).

2.2. Policy and programme

This dimension of neo-liberalism connotes systematic reworking of certain specific categories including ownership and management of economic activities and production systems by either the State (or public sector) and/or private (businesses) in such a way that the latter –who are most related to or are themselves business owners – make themselves heirs "qualified" to take over the wealth, corporations and establishments hitherto owned and controlled by the public/State. The motives usually employed in the systematic reworking of socio-economic and political re-configuration of societies include: privatisation, liberalisation, deregulation, depoliticisation, and monetarism (Springer 2012: 136 citing Brenner and Theodore 2002; Klepeis and Vance 2003; Martinez and Garcia 2007; Ingwe, Ukwayi, 2014).

3. SOCIO-ECONOMIC CONTEXT FOR UNDERSTANDING URGENT NEED FOR SOCIAL DEVELOPMENT POLICY MAKING IN NIGERIA

Nigeria's population projected at 169 million has been nearly 20 percent of sub-Saharan Africa (SSA)'s total population (732.5 million, 2005) (Nigeria, 2007, 2007b. WRI, UNDP, UNEP, World Bank, 2005, p. 177). Nigeria has been better known for oil than gas for many reasons. First, emphases on exploration for oil has led to discoveries of large proven oil deposits (4,635 million metric tones of oil equivalent (mtoe) of oil and 4497 mtoe of natural gas (WRI et al, 2005: 201). Second, Nigeria's has occupied enviable positions of being one of the world's leading oil producers/exporters. Third, oil export has earned for Nigeria an average of between US\$15-US\$20 billion annually since the 1970s to the present (Adams, 1991). Unfortunately, a disproportionately large part of these earnings have been stolen by the elite (who constitute less than one percent of the total population). It is reported that Nigeria's US\$1 billion was stolen in 1978 by military dictators who were in power between 1976 and 1979. Between US\$50- US\$ 210 billion was reportedly stolen by the Sani Abacha dictatorship between 1993 and 1997 (Ingwe, 2014, Lombardi 1986 cited in Adams, 1991, Omojola, 2007: 20-35, Ribadu, 2009). The consequence of this high level of corruption on the health sector is gross under-funding and mass poverty. About 70.2 and 90.8 percent of the nation's population lived on less than US\$1/day and US\$2/day respectively in 1997 (WRI et al, 2005, Ingwe, 2009). Nigeria's ranking on the human development index (where the most developed country was represented as "1") was only 0.47.

Electric-power production and supply oscillated between 2,000MW to 5,000MW daily for distribution to the nation's population projected at about 161 million (Ingwe, Anwunah, Ojeigbu, Martins, 2014, Business Day, 2011, p. 21, Sambo, Garba, Zarma, and Gaji, (no year)). At this moment of expectation (Nigeria's gas sector is being constructed and yet to realize its full potentialities, we can only project the gas sector's job creation potentials by drawing from its track records in nations that are reaping from the ongoing "...Gas Revolution" (Kolb, 2014). Following brief reports of direct and indirect jobs created by gas in the US were: 37,000 new direct jobs (2011); the latter direct jobs in the United States' oil and natural gas extraction activities were responsible

for creating (or drove) the creation of another 111,000 U.S. jobs related to industries that supply the energy industry with goods and services. That is, "for every one new job in the U.S. oil and gas industry, three more new U.S. jobs were created elsewhere" (ExxonMobil Perspectives, 2012).

4. COMPARING WITH TRINIDAD AND TOBAGO'S NATURAL GAS SECTOR

This Latin American country provides a lesson for understanding the potential of Nigeria's Gas Master Plan to fuel economic transformation. A 2014 update of this economy's characteristics revealed that oil and gas contributed about 40% to the GDP and 80% of exports while employment got only 5%. Over the last decade, the country's economic planning has focused much more of its efforts on natural gas sub-sector development implying decline of its oil production. However, the decline in oil subsector contribution or share is attributed to declining reserves, itself resulting from reduced (or lack of) government investment in the sub-sector, and the changing global gas market (provoked by the unconventional gas growth in the USA and spreading elsewhere) –issues that are have raised (are raising) concerns for the long-term growth of the country's gas (and other general energy) (sub)sector.

The country's non-associated natural gas reserves were reported by Ryder Scott (as at 2009, 1st January) to possess the following: Proved reserves (15.3 tcf); Probable reserves (8.4 tcf); possible reserves (6.2 tcf). Additionally, "exploratory resources" were reportedly (29.6 tcf). Trinidad & Tobago's natural gas derived from its fields is primarily classified as "sweet" gas -comprising 0.1% - 0.35% carbon dioxide and negligible sulphur compounds (Hamel-Smith & Co, 2013). Some important achievements of Trinidad and Tobago's gas sub-sector deserve mention here. First, Trinidad and Tobago's population have been enjoying cheap electricity, which is derived from its natural gas applications in the context of the country's increasing renewable energy sector's recent garnering of momentum for growth thereby strengthening the overall energy sector. Second, many products derived from natural gas constitute major exports of the economy. The include petroleum oil and natural gas-based industrial products such as liquefied natural gas (LNG), methanol, ammonia, urea, that add to other export products (steel, beverages, processed food, cement, cotton textiles). Third, the economy's gas sub-sector contributes towards the low unemployment rate (5.6% 2012 estimate) in comparison to the higher rate for the world (56) 5.5% (2011 est.) as well as a good scenario of population living below poverty line (17%, 2007 estimate. Fourth, that this economy receives one of the highest rates of investment globally, exhibits one of the highest levels of per capita incomes in Latin America has much owed to the gas (and oil) economies (Theodora.com, 2014). Fifth, I present in the following the approximate gas use by sector in the country of Trinidad & Tobago: Petrochemicals 27%, Power Generation 7%, Iron & Steel 3%, LNG 60%, Own use (Field) 1%, Gas Processing 1%, and Light industrial and others 1% (Hamel-Smith & Co. 2013). We realize from the foregoing uses how gas has been applied in manifold sectors of the economy. It is apposite to examine the objectives of the Nigerian Gas Master-Plan with a view to noting how it addresses or how it promises to address the foregoing problematic scenarios.

5. THE NIGERIAN GAS MASTER-PLAN

I now turn towards analyzing the Nigerian Gas Master-plan.

5.1. Objectives of the Nigerian Gas Master-Plan

The general objective of the Nigerian Gas Master-Plan is to stimulate the country's economic growth through natural gas sub-sector development. This strategy was decided on following the economic histories (studies) of similar strategies and success stories of gas development in other countries (see, lessons from Trinidad and Tobago, in this article). Following are specific objectives of the Nigerian Gas Master-Plan. To maximize the multiplier effect of gas in the Nigerian economy, some key strategies would (are being undertaken). Some of those include using gas to facilitate the performance of electric-power generation (this aspect shall be elaborated in one of this paper's sections later). Up-scaling of domestic LPG and public transportation based on compressed natural gas, and stimulation of wide-ranging industrial development using natural gas products such methanol, ammonia, urea, chemical fertilizers, among other products that can both be consumed locally and exported to obtain foreign exchange.

To optimize Nigeria's share and competitiveness in high value export markets, some more specific thoughts/plans were considered. These include discriminatory participation in high value markets and strategic positioning of relevant aspects of these economies/products in the market as a means of achieving economic growth.

To achieve the third specific objective (of guaranteeing long term gas-security in Nigeria), a sustainable development approach involving consideration of ensuring transgenerational needs are met through the application of ecological principles of gas (resource) management (Yar'Adua, 2007).

5.2. Investment opportunities in Nigeria's gas Master-plan

Manifold and massive investment opportunities are both presented and promised by Nigeria's larger and growing natural gas sub-sector of the energy sector. Detailed data and information gathered from the Nigerian Gas Master-Plans road-shows in multiple locations (London, Singapore and Abuja, between 15th May to 23 May 2008) reveal distinct categories of investment opportunities in Nigeria's rapidly evolving gas market that have been identified. The natural gas infrastructure blueprint comprises two key investment categories. They include: gas gathering and processing facilities, CPF, and gas pipeline transmission systems (plus compressor stations). The strategy for the latter deserves brief statement.

Strategies for gas infrastructure development

Since there are two key investment categories of the gas infrastructure (gas gathering and processing facilities, CPF, and gas pipeline transmission systems (plus compressor stations), these briefs on the strategies shall cover both as follows.

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Strategy for development of gas gathering and processing facilities, CPF

This involves developing dedicated to gas gathering and processing to form three gas hubs in Nigeria. Their labels/designations and locations are: West Delta (Warri and Forcados environs); Obiafu (West Port Harcourt); and Akwa Ibom and Calabar axis. The plan is to constitute these into centres for treating wet gas, extracting LPG/NGLs, exporting lean gas into transmission systems. The organization of investment is based on plants' ownership and operation as tolling facilities serving the needs of third party gas actors. Third party gas can also be purchased and accessed.

Strategies for development of gas pipeline transmission systems (plus compressor stations)

This involves developing infrastructure dedicated to gas pipeline transmission systems (plus compressor stations) to distribute gas areas of need e.g. Nigeria. Two major features of this infrastructure category are: development of three gas transmission systems based on independent operation; and, management of an inter-connected gas transmission system.

5.3. Challenges in Nigeria's Gas Master-plan

The major challenge of Nigeria's gas master-plan is supply. This problem that is viewed as particularly relevant to the domestic market is underlain by five factors. They include: availability, affordability and commerciality of supply, deliverability and its cost-effectiveness, legal and regulatory framework, and funding. Some expatiation of the foregoing specific challenges would enhance clarity. The challenge of supply availability pertains to three aspects. First, export orientation of the gas sub-sector since inception (the NLNG establishment mindset as was foisted on dictators by some IOCs or "Seven/ Eight sisters", which own the NLNG company. Others concern the proven reserves of rather short-term and medium term; and development of gas reserves. Regarding the affordability and commerciality of supply challenges, three concerns are also highlighted. The latter pertain to: pricing of gas (products); securitization of revenue; and, inadequacy of bankable gas business agreements. Concerning the challenges in the nexus of deliverability and its cost-effectiveness, their two dimensions are: adequacy of gas infrastructure and costs and flexibility of infrastructure. Legal and regulatory framework poses challenges in terms of gas legislation. Funding challenge relates to guaranteeing gas infrastructure and developments. The strategic solution of the Nigeria's gas master-plan to this challenge is the decision to address them in a holistic way.

5.4. How Nigeria's Gas Master-plan affects Nigeria's power sector development

For the avoidance of doubt, Nigeria's ongoing power sector resuscitation is anchored on gas supply as capital for powering independent power producing plants (IPPs) that are expected to cause substantial increases in the amount of electricity. How the Nigerian Gas Master-Plan affects the country's electricity sector could be comprehended through the related and the specific gas development programme known as the Nigerian

Electricity and Gas Improvement Project, NEGIP, or "Gas-to-Power" and the gas supply and aggregation involving IOCs (SPDC, Chevron, and others), the Nigerian Government electric-power company, Power Holding Company of Nigeria, PHCN. The latter is financed by a World Bank credit of US\$400 million for the purpose of providing a series of partial risk guarantees. It is a component of Nigeria's Government Power Sector Reforms and CPS that was inaugurated in 2005 and has run through 2009 up to the present. The CPS advocated development of key infrastructure including power, gas, and transport (World Bank, 2009). The Master-plan's launching was in conformity and bodes well with Nigeria's electric power policy (inaugurated in 2001), Nigeria's Electric Power Sector Reform Act (EPSRA) enacted in 2005 that outlined clear power reform objectives and launch of the electricity sector reform road-map in August 2010.

The conformity is specifically marked by the Gas Master-plan's design to stimulate and offer enormous investment opportunities that could be complemented by those investments from the power sector undergoing reforms. The gas-to-power component of the Nigeria's Gas Master-plan is guaranteed through the provision of private risk guarantee (PRG) valued at US\$ 1.2 billion by the World Bank and additional US\$ 184.2 million by the African Development Bank. Additionally, the gas-to-power is also guaranteed or assured by the legal mechanisms of "pay-or-take" obligation, among other risk aversion schemes (Ayoola-Daniels, 2014).

6. CONCLUSION

This study has analyzed –after examining three issues categories in the nexus of the Nigerian Gas Master-Plan: the investment opportunities contained in it, the challenges it faces, and issues in the Master-plan that are affecting and would affect Nigeria's power sector development. I conclude as follows: the Nigerian Gas Master-plan is a well designed document that is relevant to Nigeria's development generally. Specifically, it presents potentials for stimulating Nigeria's economic growth by harnessing the country's abundant natural gas reserves. It offers huge investment opportunities as enumerated above and elaborated in the document. Although, some challenges are likely to be faced in its implementation and general plan management, there are problems that are being surmounted as recent reports show that some of its key investments have been realized and the required infrastructure are being provided. Regarding the issues in the Master-plan that are likely to affect and are affecting Nigeria's power sector development, I reckon that they are mostly positive factors due to the way the plan promises to stimulate electricity generation in our country. The implication of the plan for policy is that its objectives and goals are sufficiently laudable making it to deserve to be implemented to its logical conclusion such that all of its purposes are achieved.

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