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Abstract

The gas supply system in Nigeria is today skewed to favour exports over domestic utilization, thus leaving unfulfilled what have always been the twin objectives of Nigeria's gas policies –robust foreign exchange earner and stimulation of the national economy. So far as this review has shown, neither of these objectives has been achieved – yet. FG earnings from export oriented NLNG at \$43Billion in the last twenty years is about the same quantum that is on average distributed annually to the states via the Federal Allocation Accounts Committee (FAAC). While domestic gas supply is sufficient to generate only 16W of power per Capita – the lowest in a peer comparison of select African countries.

However, it has not always been the case that gas enjoyed a prime focus in the energy policy framework of Nigeria as it does today. Gas is receiving increasingly more attention as noted by deliberate policy actions taken at various times – the enactment of the NLNG fiscal act in 1989, introduction of the Associated Gas Framework Agreement (AGFA) provision in the PPTA in 1998, the incentives for gas utilization projects in the Corporate Income Tax Act (CITA) introduced in 1998 and 1999, Gas Pricing policy of 2008, the National Gas Policy framework of 2016 and more recently the Flare Gas Regulations of 2018 – all targeted at the different components of the gas value chain – upstream production, market sector development, pricing, off-take, and related downstream utilization.

Global increase in natural gas utilization rides on the back of geopolitical dynamics such as climate change action, growth in emerging economies, and increased US shale gas production. Contextualizing Nigeria's gas polices against the wider canvass of geopolitical concerns which include the interplay with Nigeria's energy security suggests that Nigeria will have to take deliberate policy steps – from upstream gas fiscal terms reforms, through to pricing reform, project prioritization, strategic gas portfolio allocation to refocus effort on channelling gas to deliver a “harder domestic punch.”

Introduction

According to the June 2019 NNPC Financial and Operations Report, Nigeria produced an average of 7.5BCFD of gas in that month. 40% of this production was utilized in the NLNG, 10% was for Power utilization while 10% was flared – the balance was reinjected for reservoir pressure maintenance. The profile of the gas utilization as revealed indicates that the most of Nigeria’s gas production ends up as export via the NLNG project while a smaller portion of it is used for power generation in-country. The different end uses of the gas production bear different economic impacts to the country – while the NLNG project brings in “Tax and dividend dollars”, the gas – to – power projects deliver a key energy input to the economy which intent is to spur growth and economic activity. Broadly speaking these two economic impacts are reflective of the two objectives pursued by government policy on gas – as a foreign exchange earner and to spur the domestic economy (Salahudeen, 2017; Gas Supply and Pricing Policy, 2008).

However, it has not always been the case that gas enjoyed a prime focus in the energy policy framework of Nigeria. Historically gas production in Nigeria was considered a nuisance as evidenced by the high gas flare ratio only twenty years ago. Add the fact that the 1993 Production Sharing Contract (PSC), which has turned out to be a major successful arrangement in bringing online more than 900,000bpd of deep-water oil– 45% of national daily production, did not actively make provision for the commercial treatment of gas to encourage its development and production. Furthermore, comparing the gas R/P ratio to the oil R/P ratio using data obtained from the NNPC Annual Statistical Bulletin (ASB), it is seen in Figure 1 that in 1992, the expected R/P ratio for gas was ~5 times longer than that of oil. However, the ratio has declined to 1.33 in 2015; indicative that at current gas production rates, the given gas reserves can be sustained 33% longer than the duration for Oil. The trend also implies that although gas production relative to gas reserves is still lower than for oil, it is “catching up” with oil.

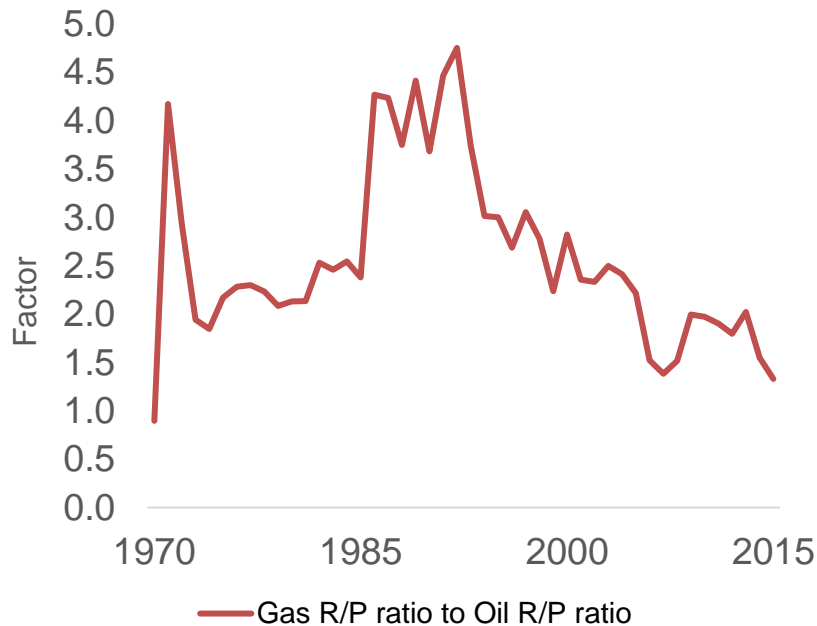


Figure 1: Trend of Ratio of Gas R/P to Oil R/P (Authors’ analysis based on data extracted from NNPC ASB)

This situation is now shifting, with the attendant effect that gas is receiving more attention and has been doing so incrementally, as noted by deliberate policy actions taken at various times –for example, the enactment of the NLNG fiscal act in 1989, introduction of the Associated Gas Framework Agreement (AGFA) provision in the PPTA in 1998, the incentives for gas utilization projects in the Corporate Income Tax Act (CITA) introduced in 1998 and 1999, Gas Pricing policy of 2008, the National Gas Policy framework of 2016 and more recently the Flare Gas Regulations of 2018.

All the gas policies have targeted the different components of the gas value chain – upstream production, market sector development, pricing, off-take, and related downstream utilization. These

policies have sought to fulfil the twin objectives of using gas as a foreign exchange earner and to spur economic growth. The thrust of this paper will therefore be to review key gas related policies and fiscal/contractual provisions, establish their linkage to the broader economy of Nigeria and contextualize the policies against the wider canvass of geopolitical concerns which include the interplay with Nigeria's energy security.

Historical Gas Production and Utilization

Production of Gas has increased from ~11BCF per annum in 1961 (30MMSCFD) to ~3TCF per annum (8.21BCFD) in 2015 as seen in Figure 2 and as at 2019, this was approximately the same production recorded. The percentage of that production which has been utilized at all also increased from 10% in 1968 to 89% in 2014. Notice that even though gas production increased rapidly in the years between 1970 and 1980, the utilization was around 2% for that same period. Utilization increased steeply from 20% in 1994 to 77% in 2010 along with increasing gas production.

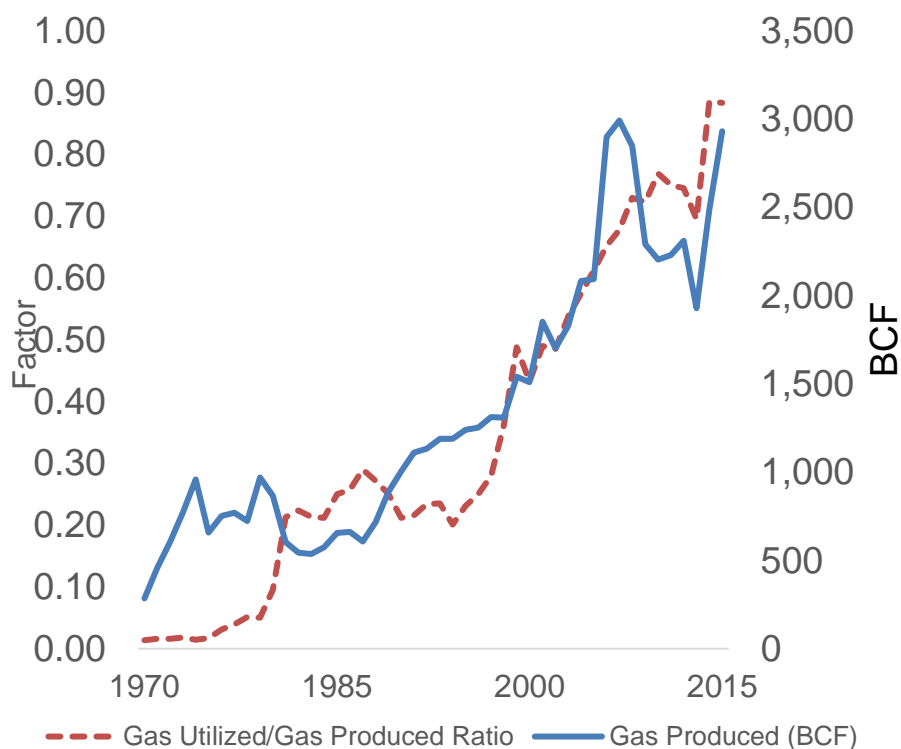


Figure 2: Gas Production and Gas Utilization/Production Ratio (Authors' analysis based on data extracted from NNPC ASB)

A look at the contribution to national gas production in Figure 3 shows that the Shell JV has historically contributed the most gas production. This production from Shell JV has hovered around 30%, however in recent times, gas production from "Others"¹ has increasingly contributed more up to 27% in 2017 from only 4% in 2007. After Shell JV, the Mobil JV contributes the most gas, followed by NAOC JV. Note that Elf (JV) contribution has increased from 3% in 1997 to 9% in 2017 peaking at 16% in 2009. NPDC as at 2017 contributed 8% to national gas production.

¹ "Others" category refers to the grouping of small independent companies and non-JV production

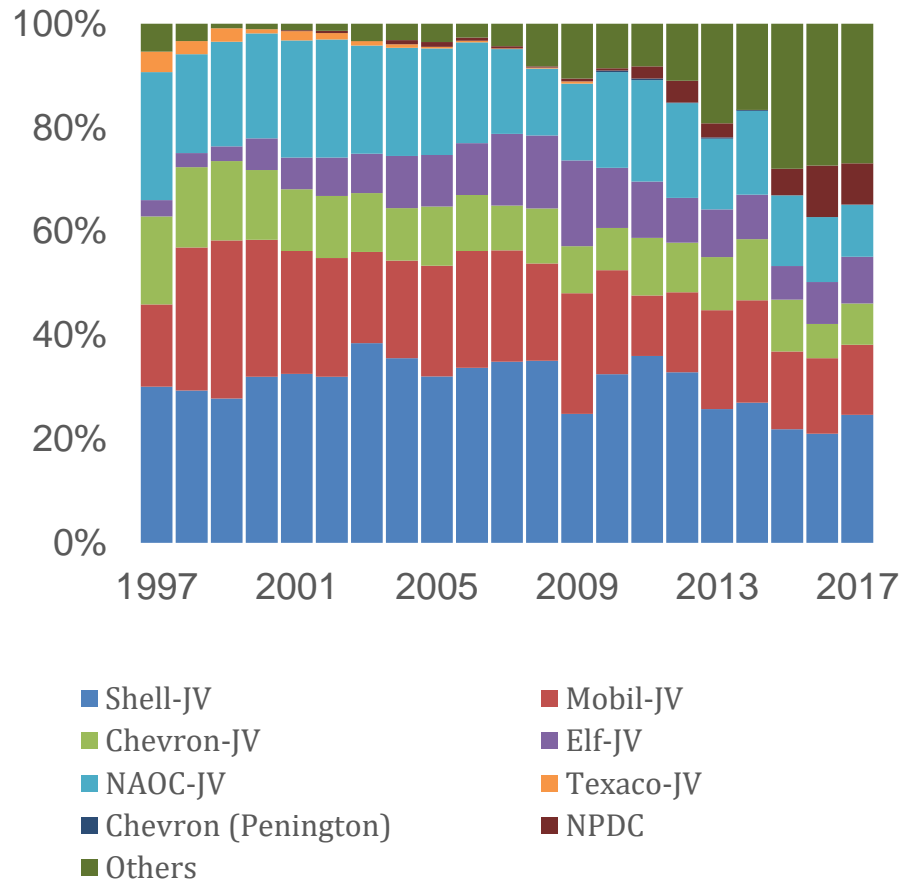


Figure 3: Percentage Contribution to Gas Production by Company (Authors' analysis based on data from NNPC ASB)

For the period 2015-2018, Nigeria produced an average of 7.597BCFD of gas per day whereby about 1.038BCFD or 14% was used in the domestic market; about 656mmscfd or 63% of the total gas to domestic market was consumed by the power sector while the balance was used by the industries (NNPC F&O reports, 2015 – 2018). 3.324BCFD or 44% of produced gas was exported, out of which about 2.946BCFD of the Gas goes to NLNG representing 89% of the export volume. The balance after accounting for export and domestic is as large as 3.236BCFD or 43% of produced gas which is non-commercialized as it is used for fuel, re-injected to produce more oil or are flared. 65% of the non-commercialized gas volume of 3.236BCFD is re-injected while the balance is used as fuel and flare. Average flare gas of 740MMCFD is about 10% of the total gas produced down from 2.500BCFD of gas flared in 2006.

Taking a portfolio view as depicted in Figure 4, gas flared has declined from 2.20BCFD in 1997 to 0.98BCFD in 2017. This represents a 55.45% drop from the 1997 levels. Note that while gas flared has reduced in the IOC JV class, it has increased on the "Others" category. Percentage contribution of the Shell JV to gas flared has declined from a 2001 peak of 35% to 7% in 2017, while Mobil JV contribution has declined from a 2007 peak of 30% to 14% in 2017. Of all the IOC JVs, Shell JV has seen the most aggressive decline in their contribution to the flare volumes. The Elf contribution to gas flared has hardly changed over time from the 4%.

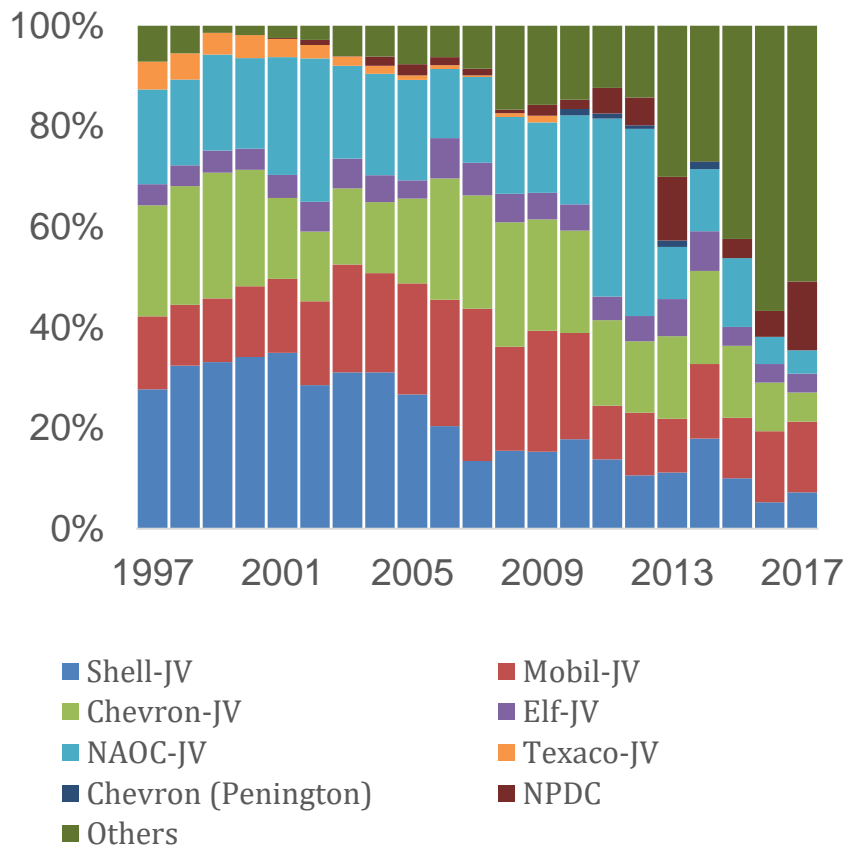


Figure 4: Percentage Contribution to Gas Flared by Company (Authors' analysis based on data obtained from NNPC ASB)

Note that the "Others" category of gas producers is now the worst culprit in their contributions to gas flare – contributing 51% to the gas flared in 2017. Comparatively, Shell JV and Elf JV flare ratio have tracked each other especially in the latter years from 2006. At the start of the series, Elf flare ratio was higher than the Shell JV flare ratio. As at 2017, Shell JV and Elf JV ratio are similar at 4% and 5% respectively.

Gas Related Fiscal Provisions

Figure 5 below shows the timeline for the development of the various gas related fiscal arrangements in Nigeria between 1979 and 2001. What is worthy of note is that in the period between 1979 and 1990, there are not many gas related policies recorded. However, in the decade between 1990 and 2000, there are several gas policies that are instituted by the government and a key one was the NLNG act 1989. A more up-to-date chronology will show the Nigerian Domestic Gas Supply & Pricing Regulations of 2008, which gave rise to the Gas Aggregator Company of Nigeria (GACN), as well as the provision of the Gas Department in the Ministry of Petroleum. In more recent developments, the Flare Gas Regulations of 2018 has been made to create social and economic benefits from gas flare capture, and protection of the environment amongst others (Flare Gas Regulations, 2018)

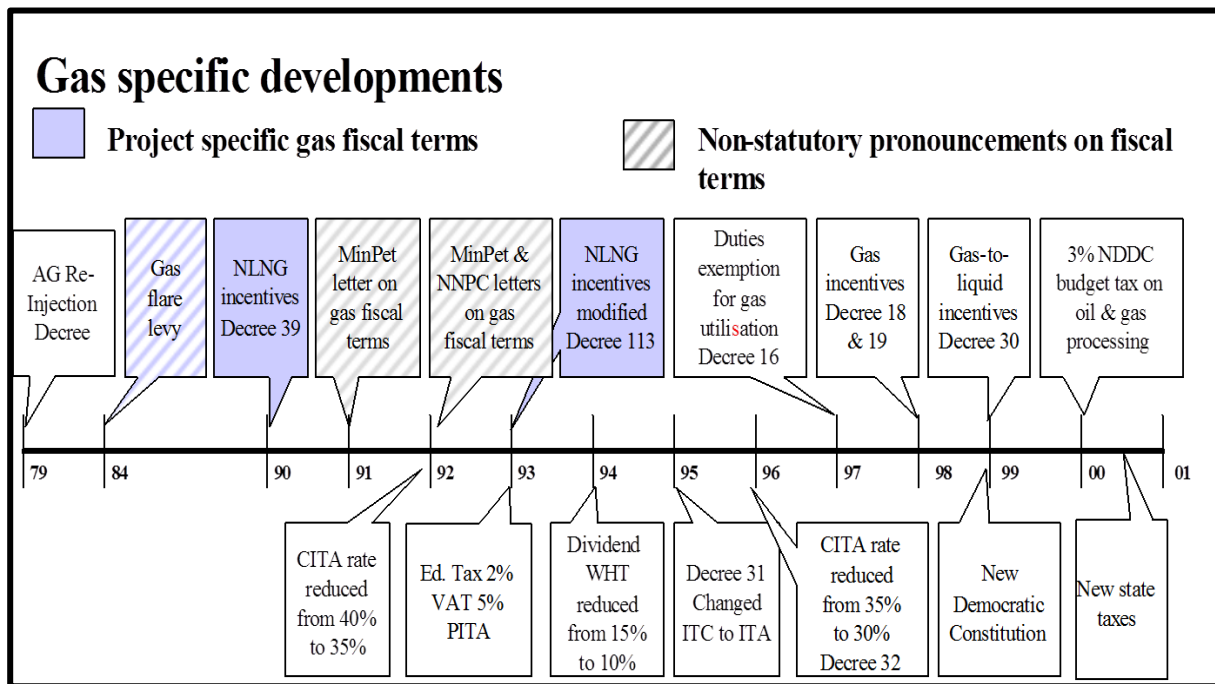


Figure 5: Historical Development of Gas Fiscal Arrangements (Adapted from Nigerian Fiscal Regime & Profitability Analysis)

The full range of fiscal incentives for gas in Nigeria are defined in Sections 11 & 12 of the Petroleum Profit Tax Act (PPTA) (Upstream Gas Terms) and Section 39 of CITA (Mid-stream Gas Terms). Tax consolidation and cost recovery from oil in upstream gas projects for associated and non-associated gas is allowed under the PPT. Section 39 CITA grants a range of fiscal incentives for gas utilization projects which include tax holidays, accelerated capital depreciation, and two options for investment tax allowance which depend on whether a tax holiday is elected or not. The fiscal provision for gas in the upstream depends on revenue inflow from oil against which gas costs can be defrayed (AGFA).

The implication of this for government tax receipts is that the cost of mid-stream projects once recovered against the high tax rate (85%) applicable to upstream oil projects results in the depressed government take in oil projects. Summarily AGFA acts to subsidize the cost of gas projects or put differently, the government bears up to 97% of the cost of gas development projects via tax expense. Furthermore, the AGFA regime unwittingly discriminates against those investors without upstream oil production or tax capacity and prevents such investors from gas-focused developments. Figure 6 plots the trend of quarterly PPT collections compared against Gas Production obtained between 2011 and 2018, and the divergence between the upward gas production trend and the downward trend of PPT collections may be indicative of a signal of the opportunity cost to the government of keeping the AGFA in place.

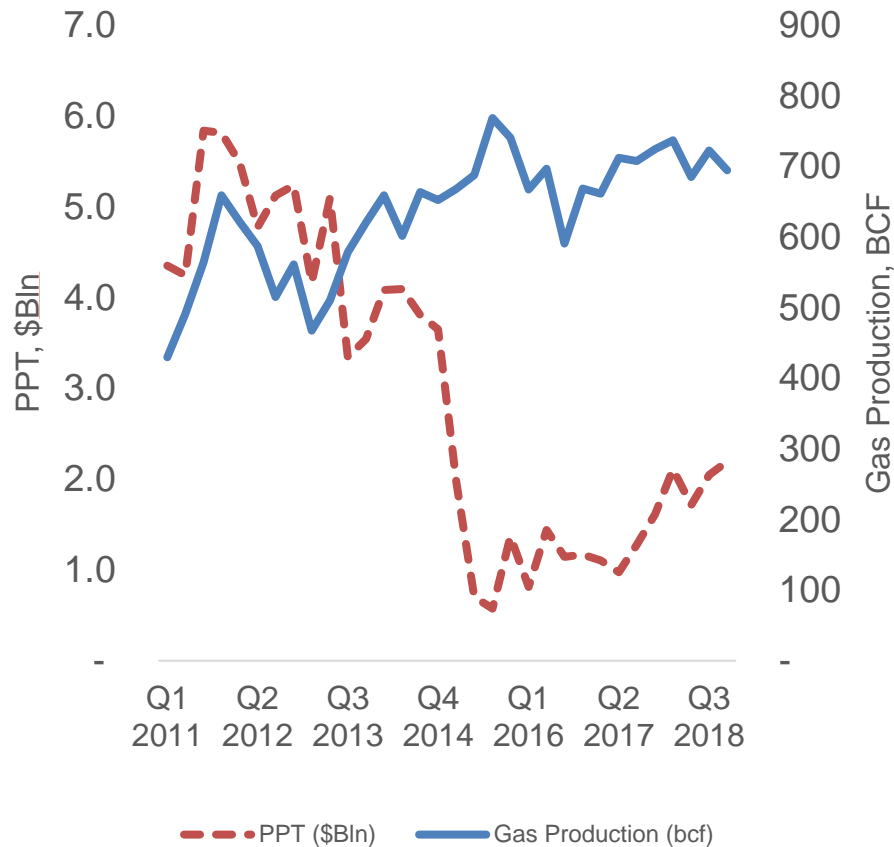


Figure 6: Trend of Gas Production and Quarterly PPT Receipts (Based on data obtained from NNPC ASB and FIRS Tax Statistics)

Further analysis of this trend will show what the government forgoes for every unit of gas produced. The worth of the AGFA provision can thus be established by confirming whether the production of a unit of gas yields an inflow into the economy more than the forgone government revenue over the same period that the unit of gas is produced. A discussion of a selection of key gas related fiscal policies as well as project beneficiaries of the policies will now follow.

PSC Provisions for Gas Development

The Deep Offshore and Inland Basin Production Sharing Contracts Act 1999 as amended is an Act to grant fiscal incentives to the oil and gas companies operating in the Deep Offshore and Inland Basin areas under production sharing contracts with the Nigerian National Petroleum Corporation (NNPC) (Deep Offshore Act, 1999). Furthermore, Section 17 of the Act defines a Production Sharing Contract (PSC) to mean “...any agreement or arrangements made between the Corporation [NNPC] or the holder and any other petroleum exploration and production company or companies for the purpose of exploration and production of *oil* [author’s emphasis] in the Deep Offshore and Inland Basins;”

Based on the above definition, it can be summed up that the Nigerian PSC is an agreement that prioritises the exploration and production of oil over gas. However, the 1993 PSC makes provision for the contractor in the PSC, in the event that a commercially viable quantity of gas is discovered, to *investigate* and *submit proposal* for the *commercial development of the gas* where the cost of such investigative study is included as an Operating Cost to be recovered from allocated Cost Oil (Author’s emphasis). Furthermore, the agreement stipulates that another agreement shall cater to the funding and participation of the contractor in the commercial development of the natural gas and further preserves the right of the contractor to participate in such gas development project. Interestingly, the same PSC allows the contractor to utilize the natural gas at no cost for the enhancement of oil production and in fact quite

categorically states that “...*The objective of maximum technical and economic recovery of Crude Oil shall always be paramount...*” This focused pursuit in oil production is further entrenched where the contractor is required not later than two years from commencement of production to submit to the minister a programme for the utilization [for enhanced oil production] of any natural gas (both Associated and Non-Associated) discovered from the Contract Area.

The following points can thus be drawn from the above:

- i. The PSCs are, by fundamental design, driven to maximize the exploration and production of crude oil.
- ii. Although provision is made for development plan for commercially viable quantities of gas, which will be subject to another agreement, the PSC maintains that the objective of the contract is maximization of oil production.
- iii. Further, the “AGFA principle” is mirrored in the PSC, where the cost of investigating the commercial development of gas is accounted for as Operating Cost to be recovered from Cost Oil.
- iv. Even though there is provision for a gas development plan, to be covered by another agreement, the PSC seems to uphold the view that gas is to be utilized for enhanced oil production.

From the foregoing, it will be considered that gas development from PSC contract area has been subjugated to oil production. This is particularly a problem from a strategic point of view for Nigeria given how prolific the deep–water play has turned out to be. There is an estimate of 30TCF of gas locked away in the deep–water subject to the above restrictions on gas development placed and enshrined in the PSC.

NLNG Fiscal Act

The NLNG plant has the capacity to produce 22mtpa LNG and 5mtpa of NGLs, estimated to have cost \$12Billion to construct, that has capacity to consume 3.5BCFD of gas. The gas supply to the plant comes from over fifty (50) fields (Woodmac). It was first conceived in the 1960s, but its construction commenced in 1990. Production from the plant started in 1999 and since then it has liquified an estimated 17.25TCF of gas and has produced an estimated total of 280Million Mt of LNG and 62Million Mt of Condensate (NLNG Facts and Figures Reports). Given its size driven by steady expansion over the years, it can be argued that NLNG has been instrumental to driving down the gas flare ratio in Nigeria down from 60% at the start of the plant in 1999 to the current level of 10%. This assertion rides on the consideration that NLNG consumes 40% of the gas produced daily in Nigeria today and 89% of the export gas volumes.

The NLNG project is backed by the LNG (Fiscal Incentives, Guarantees and Assurances) Act signed into law in 1989 which confers pioneer status on the Nigeria LNG Limited and exempts it from certain taxes, customs duties, other levies. The Act also exempts the plant from the provisions of the Pre-Shipments Inspection of Imports Act and provides guarantees and assurances by the Federal Government to the company and its shareholders (NLNG Fiscal Act). Key provisions of the Act are described in

Table 1 below.

Table 1: The NLNG Fiscal Act in a Snapshot

S/N	Provision	NLNG Fiscal Section	Description
1	All provisions of Industrial Development (Income Tax Relief) except Sections 2, 3 and 7 apply	Section 1(2)	The exceptions of Section 2, 3, and 7 of the Income Tax Relief Act relate to: <ul style="list-style-type: none"> - procedure for the application for pioneer status and fees payable (Section 2) - the terms of the pioneer certificate. Specifically, Sec.3(6-b) stipulates that the period of tax relief shall not exceed five (5) years (Section 3) - the cancellation of pioneer certificate. The exclusion of the applicability of this section to NLNG is to ensure that its pioneer status cannot be stripped (Section 7).
2	Tax Relief Period	Section 2	For 10years commencing on the Production Day which is the date of the first commercial delivery of LNG produced by the Company to a purchaser of the LNG.
3	Liability to company tax	Section 3	Subject to Companies Income Tax Act (CITA) except otherwise provided for in the NLNG Fiscal
4	Dollar Accounting	Section 4(1)	Books and records of the Company and the accounts shall also be drawn up in US Dollars
5	Interest on Loan	Section 5(1)	Interest accrued on loan shall be deducted in full for tax purposes
6	WHT on Interest	Section 6(1)	Interests on loan or other financial arrangement paid to any company other than a Nigerian company shall be exempt from taxation in Nigeria.
7	Exemption from National Shipping Policy Act	Section 6(10)	The Company, its contractors, sub-contractors, its customers or a shipping company owned by NLNG or its shareholders for LNG transport are exempt from National Shipping Policy Act.
8	Exemption from Customs Duty	Section 7(1), (2)	The Company and its contractors and sub-contractors shall be exempt from the payment of import duties, taxes etc in respect of all necessary imports of plant, machinery, goods and materials for the construction of the plant
		Section 7(7)	LNG and other hydrocarbons produced by the plant is exempt from the imposition of export duties, taxes or other duties, levies, charges or impost of a similar nature.
9	Restriction on set off of capital allowance	Section 8	NLNG is not subject to the “2/3 rd ” rule found in Par. 2(24) of the Second Schedule to the CITA which restricts the off set of accumulated capital allowances from assessable profits.
10	Guarantees	Second Schedule; Section 9	Snapshot of the guarantees include:

S/N	Provision	NLNG Fiscal Section	Description
			<ul style="list-style-type: none"> - Guarantees shall exist as long as the company or successor is in existence liquefying natural gas - Government shall not invalidate unenforceable rights arising under contracts contemplated in the Act so long as they are not illegal or against public policy. - The NLNG venture is subject to the fiscal provisions of the Act which can only be amended by agreement between government, the company and its shareholders. - Company and its shareholders in their capacity as shareholders shall not be subject to new laws which do not apply generally to other companies incorporated in Nigeria - The Government shall not limit the loan or other financing amount which may be provided to the venture

It will be noted that the NLNG fiscal Act as described above, provides several waivers which imply tax costs to the government. In a January 2016 report, the Centre for Research on Multinational Corporations calculated that the lost tax due to government between 2004 and 2013 specifically because of the tax holiday period was \$3.30Billion (Mark, 2016). It is worth noting that the figure computed by the report didn't capture the foregone import duty on the plant equipment imported into Nigeria for the purpose of constructing the facility, the exclusion of the several taxes on earnings from services rendered to NLNG by contractors and sub-contractors, or the exclusion of tax on dividends paid out by the company to its shareholders. Furthermore, the report limited its scope to the mid-stream LNG plant, while it didn't count the cost to the Government of the subsidy provided by AGFA that enables the development and production of the required upstream gas volumes to feed the plant.

Table 2 compares the provisions of the Industrial (Income Tax relief) Development Act with the NLNG Act. The NLNG Act adopts and expands upon the Income Tax which forms the basis of the pioneer status.

Table 2: Comparison of Income Tax Relief and NLNG Act (Adapted from Mark, 2016)

Provisions	Industrial Development Act 1971	Nigeria LNG Act 1989
Exemption from CIT (Corporate Income Tax)	YES for 3 to 5 years – Sec. 10(1)	YES for 10 years – Sec. 2
Capital allowances carried forward	YES – Sec. 10(2), Sec. 14(2)	YES – Sec. 8
Interest on loans deductible		YES – Sec. 5(1)
No tax on cross-border interest payments by NLNG		YES – Sec. 6(1)
No tax on dividends paid	YES – Sec. 17(1), (2), & (3)	YES – Sec. 6(2)

Provisions	Industrial Development Act 1971	Nigeria LNG Act 1989
No tax on payments by NLNG for services provided by non-Nigerian companies or individuals		YES – Sec. 6(5)
No capital gains tax on transfer of shares in company or any other company connected to it		YES – Sec. 6(6)
No tax on profits of shipping companies owned by NLNG		YES – Sec. 6(8)
Exemption from withholding tax on shipping companies		YES – Sec. 6(9)
Exemption from all shipping regulations for shipping companies owned by NLNG		YES – Sec. 6(10)
Exemption from customs duties (import duties, taxes and all other duties, levies and charges) for NLNG or its contractors		YES – Sec. 7(1)
No export duties, taxes or other duties, levies or charges on the export of LNG or other hydrocarbons		YES – Sec. 7(7)
No restriction on set off of capital allowance accumulated during the tax relief period against assessable profits in the period following the end of the relief period		YES – Sec. 8

On the other hand however, NLNG has paid out a total of \$36Billion in dividends, 49% of which has come to the Government as an investor and shareholder, \$9Billion in taxes since the plant commenced the payment of taxes in 2012 and has paid out \$26Billion for gas feedstock, 57% which comes to the Government as an equity supplier of the gas (NLNG Facts and Figures reports).

From the foregoing, the provisions of the NLNG Fiscal Act indicate that the government granted a tax relief period double the maximum of five (5) years allowed by the extant law, suspended key provisions of with respect to tax treatments (import duty, export duty, WHT), currency denomination of Nigerian company, and national policies, and further guaranteed fiscal stabilization for the plant. These provisions went over and beyond what has been provided for in the Companies Income Tax Act, as well as the Income Tax relief Act.

The Escravos Gas To Liquids (EGTL) Project

The EGTL plant, which estimated cost is \$10.30Billion (Oil Industry News, 2016) is designed to convert 325MMSCFD of rich natural gas into 33,000barrels per day of liquid products. The product slate is approximately 22,100bpd of premium quality diesel (<5ppm Sulphur), 10,280bpd of Naphtha, and 920bpd of Liquefied Petroleum Gas (LPG) (Chevron, 2019). The synthetic premium quality diesel was targeted for export to the European market where the Clean Air Act was expected to have come into effect in 2005. Pre-feasibility studies for the plant were concluded in 1998, with start of construction in 2005 (Hydrocarbon Technology, 2015). Production from the plant commenced in 2014 (businessday, 2014).

The EGTL project was fiscally enabled by a combination of provisions contained in Sec. 39 of the CITA as well as Sec. 11 of the PPTA. Specifically, Sec. 11(2-f) of the PPTA is a 1999 amendment to the principal act and stipulates that “*all capital investments relating to the gas – to – liquids facilities shall be treated as chargeable capital allowance and recovered against the crude oil income*”. Furthermore, Sec. 11(2-g) goes on to provide that “*gas transferred from the natural gas liquid facility to the gas – to – liquid facilities shall be at zero percent tax and zero percent royalty*” (Authors’ emphasis). It cannot escape notice that of all the gas utilization project options – such as fertilizer, chemicals etc – it is the Gas – to – Liquids project option that was singled out for its capital cost to be recovered against oil income as in Sec. 11(2-f) and for which its gas supply (from the upstream) will attract zero royalty and tax as noted in Sec. 11(2-g).

Sec. 11(2-f) is especially outstanding when considered against Sec. 11(2-d) of the PPTA which contemplates that “*expenses identified as incurred exclusively in the utilization of associated gas shall be regarded as gas expenses and be allowable against the gas income and profit to be taxed under the Companies Income Tax Act;*” It would therefore appear that expenses identified as incurred exclusively for a gas utilization project would be accounted as gas expense then defrayed against gas income and taxed under CITA *except* “the” GTL project. It is also note worthy to place the foregoing against what is considered a gas utilization project by considering that the CITA defines “gas utilization” to mean “*...the marketing and distribution of natural gas for commercial purposes and includes power plant, liquified natural gas, gas to liquid plant, fertiliser plant, gas transmission and distribution pipelines;*” For the avoidance of doubt therefore, a gas to liquid plant is a gas utilization project.

Turning attention now to the “Incentives to the gas industry” found in Sec. 39 of the CITA, Table 3 summarises the applicable provisions.

Table 3: Summary of the Gas Utilization Incentives Sec. 39 CITA

Provisions of Sec. 39	CITA		Description
	NO	YES	
Tax Holiday	NO	YES	Sec. 39(1-b) Alternative between Tax Holiday or not is provided
Years of Tax Holiday	0	3+2	Sec. 39(1-a) An initial tax - free period of three years may be renewed for an additional period of two years;
Annual Allowance (AA)	90%	90%	Sec. 39(1-c) accelerated capital allowances after the tax-free period; for investment in plant and machinery
Investment Allowance (IA)	35%	15%	Sec. 39(1-b), (1-c). 35% IA applies without Tax Holiday, while 15% with Tax Holiday
Tax Free Dividends			Sec. 39(1-d) Applies during the Tax-free period
Tax deductible Interest			Sec. 39(1-e)

Provisions of Sec. 39	CITA	Description
		Interest on loan obtained with Ministerial approval eligible for tax deduction

From the foregoing, the fiscal provisions in the PPTA was made with a specific interest in GTL projects. Given a project cost of \$10.30Billion for the EGTL project, a quick computation will show that due to Sec. 11(2-f), and a tax rate of 85% on oil in the upstream, the government gave up a tax amount of at least \$9.10Billion – if the Investment Allowance provision of 5% in the upstream is considered. However, note that CITA Sec. 39(1) above allows the EGTL, defined as a gas utilization project, to enjoy an allowance as high as 35%. Consequently, drawing on CITA Sec. 39(1) in combination with PPTA Sec. 11(2-f) will potentially see a tax loss of up to \$11.73Billion. Put differently, the fiscal provision for the EGTL gas project implies that the government would have paid between 88% and 114% of the project cost via tax expenditures – taxes it did not receive.

Gas Supply and Pricing Policy (2008) and National Gas Policy (2016)

The Gas Supply and Pricing policy of 2008 is one component of a tripartite of policies to support the over-arching Gas Master Plan (GMP) (National Gas Policy, 2016). The other two are the “Gas Infrastructure Blueprint” and the “Domestic Supply Obligation.” The purpose of the Pricing policy of 2008 is to define the policy of the FGN with respect to the pricing of gas supplied to customers in the downstream. The policy in its aspiration, contemplates the domestic utilization of gas to mean gas utilized locally within the shores of Nigeria for home, industrial and/or electric power use. To this end, the policy identifies three demand sector groupings which are described in Table 4.

Table 4: Gas Demand Sector Classification and Strategic Intent in Gas Pricing

S/N	Sector	Description	Strategic Intent
1	Strategic Domestic Sector	This refers to a set of sectors that have a significant direct multiplier effect on the economy namely the Power Sector (Residential and light commercial users) or other sector that FGN from time to time consider applicable.	Low cost gas is to be supplied to this demand sector to spur economic growth
2	Strategic Industrial Sector,	This refers to industries that utilize gas as feedstock in the production of value-added products that are primarily for export or which may be consumed locally. E.g. Methanol, GTL, Fertilizer etc.	Feed gas cost is to be affordable and predictable. To help grow the country’s industrial base and provide competitively priced exports
3	Other Commercial Sectors	This sector uses gas as fuel as opposed to feedstock e.g. Cement Industries, Aluminum industries, Refinery and other heavy industrial manufacturers.	This sector is expected to bear high gas prices. This sector is further expected to be a huge direct revenue earner for the country. Its priced as alternative to LPFO

The grouping of the gas demand sectors shown above is for a sector differentiated gas pricing strategy which objective is to drive the industrialization potential of gas to the benefit of Nigeria. Consequently,

the policy sets forth the Gas Pricing Framework, which lays out a transparent structure for determining the floor price for dry gas using three (3) different approaches as follows:

- i. Cost of Supply Basis (Strategic Domestic Sector – Power)
- ii. Product Netback Basis (Strategic Industrial Sector)
- iii. Alternative Fuels Basis (Other sectors)

The 2008 gas policy envisaged a step wise transitional pricing framework that was expected to lead up to a market led regime upon the attainment of gas export saturation. It was anticipated that gas prices will transition from the low price contemplated under the cost of supply basis through the netback pricing and ultimately to the alternative fuels pricing basis – where a willing buyer/willing seller price regime will operate. Each transition point was expected to be marked by the achievement of saturation level – defined as when the gas demand of the said sector was fully matched by supply.

However, this transition did not or has not occurred. Instead, gas price to export based projects – priced based on netback – failed to cap domestic prices which galloped past the price of gas to export based project such as NLNG. The price of gas to power has been kept artificially lower than the cost of supply, in violation to the policy intent, with the result that upstream gas development for supply to power has been stunted. Even as the gas price to power is lower than its cost of supply, it is still higher than the gas price to export. The consequence has been failure to achieve the aspiration of spurring domestic economy in favour of projects that obtain low gas prices for export. Figure 7 shows comparison of gas prices to different projects/sectors in the Nigerian economy.

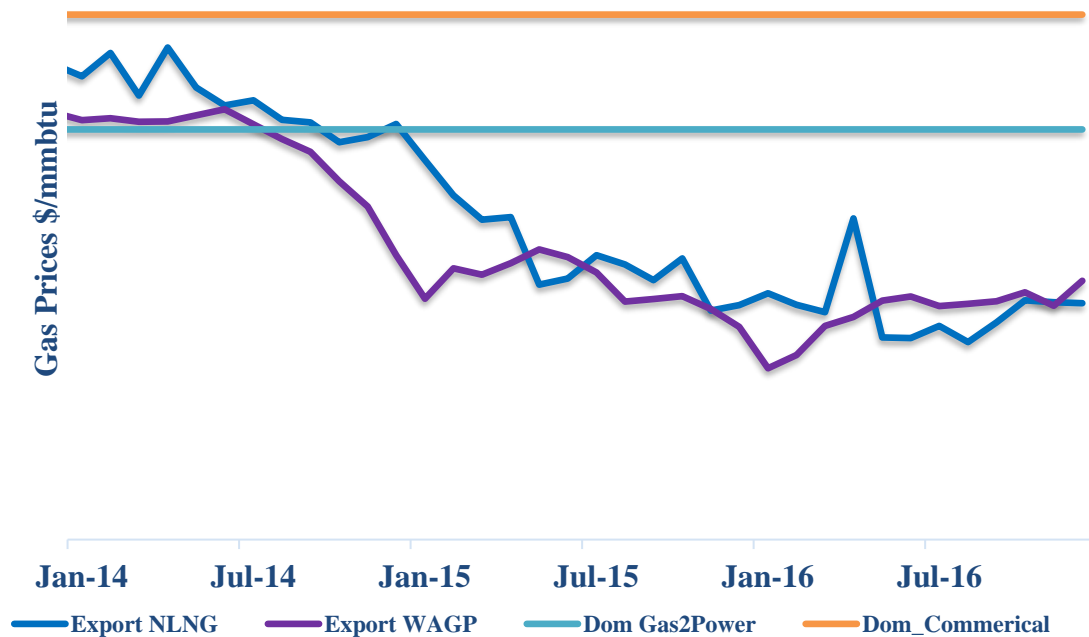


Figure 7: Gas Price to Export vs Domestic (Authors' analysis; Specific Prices on Y-axis omitted to maintain price confidentiality)

It will readily be noted that the price of gas to export projects is at significant discount to the price of gas to domestic projects – a discount as wide as between \$1/mmbtu and \$2/mmbtu. This is at variance with the policy intent of the gas pricing policy of 2008 in which the price of gas to export project would cap the gas price to power.

The 2008 gas policy also brought forth the Domestic Gas Aggregator as well as the Department of Gas. These institutions were conceived to coordinate gas supply to domestic market and allocate supply obligation respectively amongst other functions.

Given the current state of gas play in Nigeria – stunted upstream gas development, slow paced domestic gas projects, security issues, failed differentiated pricing mechanisms, and power sector debt amongst others – significant steps and reforms are required to integrate gas into the National economy. Core at this effort at integration is to get the pricing of gas right, as the entire gas value chain along with the wellbeing of the national economy depends on it.

Gas and its Linkage with the Nigerian Economy

Figure 8 shows a 2018 snapshot of the demand centres of gas produced in Nigeria. The impact of gas on the Nigerian economy can therefore be traced to each of the demand centres. Based on this relationship, the linkage or integration of gas to the national economy will be established as well as an evaluation of the extent to which the twin objectives of gas policy in Nigeria have each been achieved. The 2008 gas policy posits that in addition to natural gas export for the realisation of economic rent (tax and dividend for equity), ensuring increased domestic utilization must be a strategic focus.

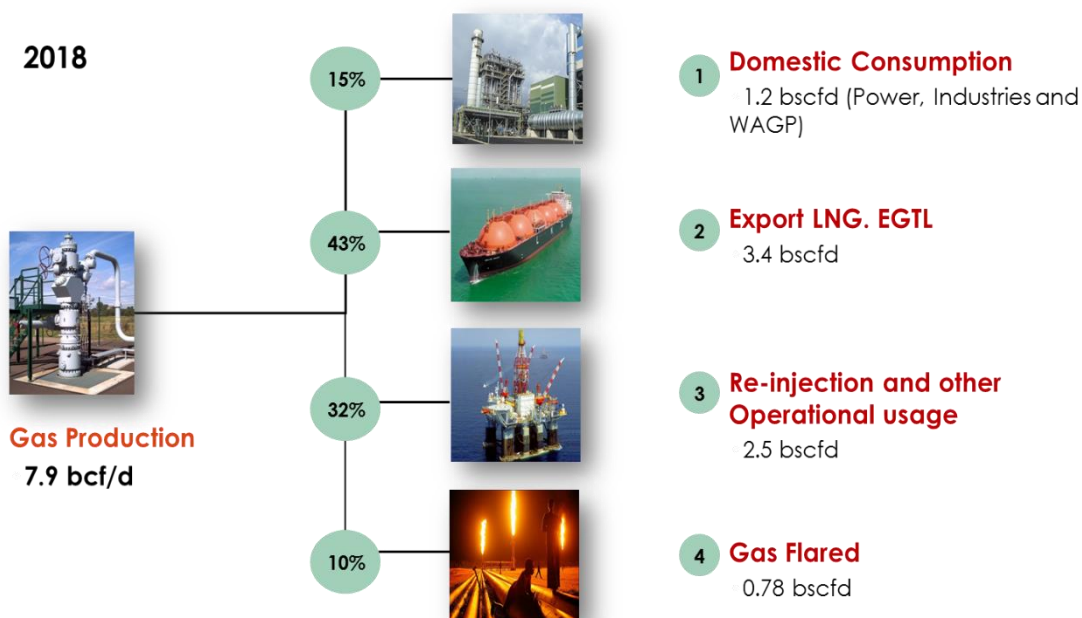


Figure 8: Demand Centres for Produced Gas in Nigeria (2018) (Authors' depiction based on analysis of monthly NNPC F&O report in 2018)

It is seen readily that currently 1.2BCFD of gas, which is 15% of Nigeria's gas production goes to domestic utilization which ends up used mostly for power generation – 63% of the total domestic gas produced between 2015 and 2018 was consumed by the power sector while the balance was used by the industries. However, 43% of the gas production is allocated to export projects – NLNG, EGTL. The bulk of this gas to export is via the NLNG project. 32% and 10% of gas production is to re-injection and flare respectively. It can be argued that since the 32% of gas production, which is 2.53bcfd, is used for pressure maintenance to ensure sustained oil production, that this gas indirectly contributes to the economy as well. Although it becomes debatable how much of that gas for pressure and other operational reasons leads to incremental oil production which would not happen otherwise. It is considered that this debate will lead into the realm of conjecture and speculation without otherwise hard and irrefutable facts. As a result, this paper will posit that only 58% of gas produced in Nigeria translates into the economy of the country.

Consequently, the discussion in this paper on the interlink of gas to the economy along the twin objectives pursued by gas polices, will focus on gas to NLNG and gas to Power. The NLNG plant which consumes circa 40% of the gas produced from Nigeria has delivered a total of \$42.69Billion in Feed Gas

Cost, Taxes and Dividends to the FGN between 1999 and 2018. Figure 9 shows the historical distribution of the government receipts from the NLNG plant.

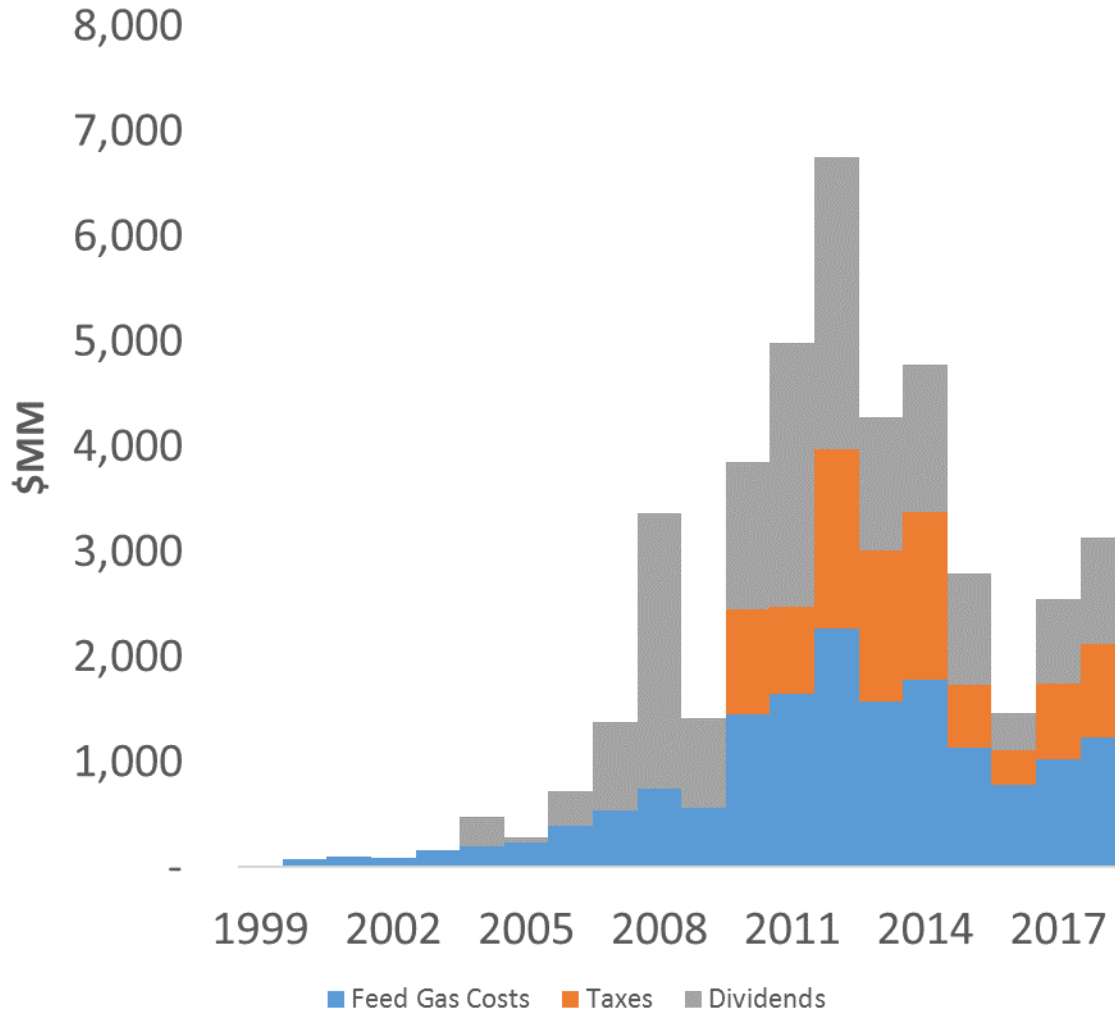


Figure 9: Distribution of Receipts to Gov't from NLNG (1999 - 2018) (Authors' analysis based on NLNG Facts and Figures)

The Bulk of receipts have been due to dividends at \$17.6Billion followed by price paid for gas at \$15.98Billion. Taxes have contributed the least at \$9.1Billion – due to the tax holidays and other fiscal incentives granted to the NLNG project.

As earlier pointed out, an average of 63% of gas to domestic ends up for use as power. This quantum of gas which is an average of 700mmscfd produces 2,800MW of power which is about 75% of the total power consumed in the country. This amount of electricity generated by gas is clearly insufficient to power the needs of a country like Nigeria with a population of 200million. Nigeria's per capita power generation at 16MW per capita is the least amongst a comparison of other African countries shown in Table 5 below:

Table 5: Peer Comparison of Nigeria's per Capita Power Generation

Country	Power Consumed (MW)	Population (Million)	Per Capita Generation (W per Capita)
Nigeria	3,196	200	16
South Africa	29,224	60	487
Egypt	22,831	100	228
Libya	4,047	7	578
Morocco	3,927	36	109

Putting together impacts from two major demand centres of gas production in Nigeria, the FGN has received a total of circa \$43Billion from the NLNG plant which consumes 40% of gas produced. To put this sum in context, consider that this amount realised in two decades from the NLNG plant is the average amount disbursed by the Federal Accounts Allocation Committee (FAAC) annually². Additionally, gas supplied to domestic, the bulk of which goes to power generation, translates to 16W per Capita, the least in a peer comparison.

Global Gas Supply and Upstream Gas Development

It is expected that growth in global LNG trade will continue, with exports of LNG from the US dominating growth and having a competitive price advantage. The export of LNG from the US may exert upward pressure on domestic (U.S.) natural gas prices and thereby expose a hitherto isolated North American market to the full effects of global market dynamics. The increasing LNG exports from the US are affecting global LNG market dynamics. This section will examine how global LNG market dynamics will impact well head cost of gas supply in Nigeria especially against the context of what has been described as Nigeria's twin objectives of her gas policies.

By 2025, LNG imports is anticipated to be 400mtpa, up from around the current 300mtpa. This anticipated increase is expected to be driven by increase electric power demand, use of LNG as bunker fuels to substitute fuel oil post – 2020 IMO standards, economic growth in emerging economies of China, India. For competitively priced LNG supply to be maintained in the face of increased demand, natural gas prices may come under downward pressure. Given Nigeria's position where the bulk of its gas is exported, the question then arises as to whether the anticipated low prices of natural gas required for NLNG supply to remain competitive can be borne by upstream gas development economics.

Table 6 is of indicative upstream economics of a prolific dry gas PSC Asset. The table reveals that the dry gas PSC asset in deep water requires well head gas price >\$7.50/mscf for a 10% IRR to Investor.

² This is based on Average of FAAC disbursements between 2007 and 2017

Table 6: Well Head Gas Prices for Upstream (NA) Gas Supply

Gas Price (\$/mscf)	Investor IRR (%)	Investor NPV (\$MM)
3.75	1%	(2,510.66)
5.63	6%	(1,149.29)
7.50	10%	109.43
9.38	14%	1,327.08

Further economic analysis will be required to delineate the portfolio of Nigeria gas assets by terrain and business arrangement. Such delineation is required for strategic allocation of gas fields to meet different economic and energy security objectives.

Conclusion and Policy Recommendation

The anticipated rise in LNG exports globally will put pressure on gas suppliers to supply on competitive terms which may lead to depressed natural gas prices. This possible dynamic will have an impact on the Nigeria gas supply system if it is not reconfigured to deal with this oncoming possibility. Assessment here shows that deep water NAG requires \$7.50/mscf well head price to return a 10% IRR to an investor – a price well above the current cost of delivered LNG to Europe of around \$5/mscf. The gas supply system in Nigeria is today skewed to favour exports over domestic utilization, thus leaving unfulfilled what have always been the twin objectives of Nigeria’s gas policies –robust foreign exchange earner and stimulation of the national economy. So far as this review has shown, neither of these objectives has been achieved yet. FG earnings from export oriented NLNG in the last twenty years is about the same quantum that is on average distributed annually to the states via FAAC. Gas supply to power is only enough to produce at most 3GW of power thus leaving Nigeria with the least power generated per capita in a peer comparison. On a positive note though, the gas flare ratio has dropped from a high of 60% in 2006 to ~ 10% in 2018, but this is only because in the same period, export gas ratio has risen due to the incremental ramping up of the NLNG plant from 8mtpa to 22mtpa.

A combination of woeful fiscal losses, imposed energy subsidies, and market dislocations have acted to stymie development of upstream gas and gas based industries. As more LNG capacity is built around the world, Nigeria will have to take deliberate policy steps – from upstream gas fiscal terms reforms, through to pricing reform, project prioritization, strategic gas portfolio allocation to refocus effort on channelling gas to deliver a “harder domestic punch.” The following recommendations are offered:

1. Expedite the development of relevant Gas Development Agreement to hasten the exploitation of the gas in the deep-water PSC assets.
2. Abrogate or refocus the upstream gas development subsidy which exists through AGFA (NAGFRA) which has cost the government so much but delivered relatively little benefits.
3. Strategic re-allocation of upstream gas assets development effort to target domestic utilization and export markets.
4. Power sector reform to ensure that electric power is appropriately metred, priced and distributed such that the gas to power value chain is sustained.
5. Development of key gas infrastructure which will enable an active gas market to evolve to include gas supply, market participants, gas utilization, market led pricing.

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