

NIGERIA OIL & GAS GUIDE

VOLUME 2, 2018 EDITION



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1. EXECUTIVE SUMMARY

In this edition of DETAIL's Oil and Gas Guide, we undertake a cursory review of the petroleum industry in Nigeria with focus on recent activities within the industry, recent government policies and its potential impact on the industry. We have also provided an informed periscopic view of the key activities which may change the landscape of the sector. The following are the topics covered in this guide:

(a) **INDUSTRY UPDATE:** We have provided an update on the key activities within the Oil and Gas Sector. These include a review of Nigeria's crude and gas production showing some historical trends, crude and gas production outlook, crude price outlook, the contribution of the sector to Nigeria's GDP, and potential changes to the fiscal regime of the industry as proposed by the draft National Petroleum Fiscal Policy.

(b) **LOCAL REFINING:** a review of Nigeria's refining capacity, output and capacity utilisation rates. A case is made for development of local refining capacity and a review of government's policy objectives towards development of local refining capacity including the move towards Modular Refineries as a preferred business model for refineries in Nigeria.



Source: www.venturesafrica.com/africas-richest-man-gets-997m-us-grant-for-dangote-oil-refinery/

(c) **MARGINAL FIELDS:** following the announcement of government's intention to conduct a new Marginal Field bid round, Marginal Fields became a topical issue once again. We have provided an update on the Marginal Fields awarded so far, some tips in structuring bids for Marginal Fields and highlighted some critical success factors for developing a Marginal Field Project.

(d) **GAS UTILIZATION/MONETIZATION:** given the changing landscape of global energy mix, there is renewed focus on gas as a source of energy. We have highlighted the vast potential for gas development and monetization in Nigeria, and reviewed government's policy objectives for the gas sector as enunciated in the National Gas Policy. We have also considered some monetization options and gas project essentials.

2. INDUSTRY UPDATE

This section provides a highlight of recent activities within the Oil and Gas sector: an update on Nigeria's crude production and outlook; gas production and outlook; recent activities in the global crude market; its impact on crude prices; expert predictions on crude prices; contribution of the Oil and Gas sector to Nigeria's GDP; and proposed changes to the regulatory and fiscal framework.

2.1 CRUDE PRODUCTION UPDATE

Nigeria's crude production has continued its steady increase and reached a 12-month high in March 2018 with an average daily production of 1.686 million Barrels per day (Bp/d) according to OPEC figures,¹ which represent an increase of 39% year-on-year when compared to the 1.210 million barrels per day recorded in March 2017. The March figure represents an increase of 2.7%

and 3.1% when compared to the average daily production for January 2018 and February 2018 respectively. For the first quarter of 2018, Nigeria's average daily crude production was 1.655 million bp/d which is higher than figures recorded in the four preceding quarters (see Figure 1 for a breakdown of Nigeria's average daily crude production from Q1 2017 to Q1 2018 and Figure 2 for five-year trend).

Figure 1 - Quarterly Production figures for Q1 2017 to Q1 2018 (OPEC FIGURES)

Period	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018
Average Daily Production ,000	1,388	1,485	1,592	1,572	1,655

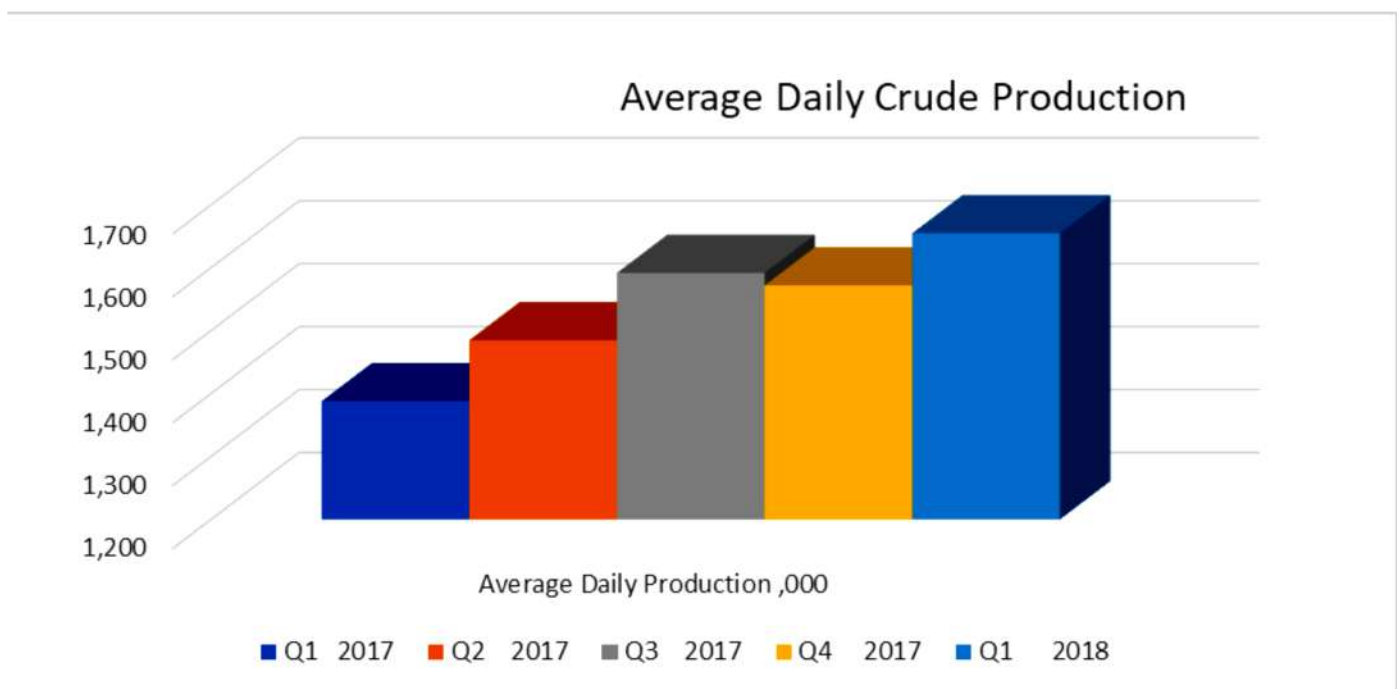
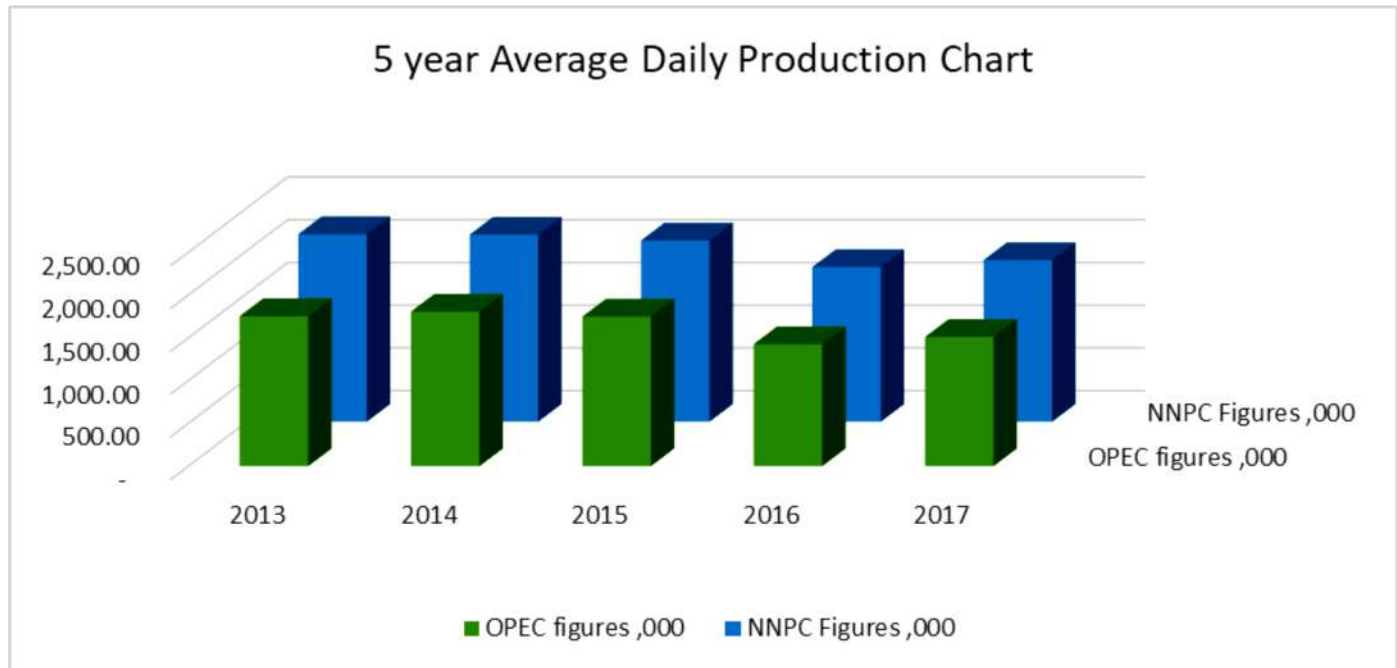


Figure 2 - Average Daily Production Table (Five-year Trend: OPEC and NNPC figures)

Period	2013	2014	2015	2016	2017
OPEC ² figures ,000	1,754	1,807	1,748	1,427	1,510
NNPC Figures ³ ,000	2,193	2,187	2,119	1,808 ⁴	1,890



2.2 CRUDE PRODUCTION OUTLOOK

In view of Nigeria's exemption from production cuts agreed between OPEC members and some key non-OPEC oil producers under the Declaration of Cooperation, and resolution of the security problems in the Niger Delta, Nigeria's oil production is expected to continue its steady increase in the foreseeable future. Other factors which support our predictions of continuous increase in production includes:

- (a) **Reduction in production costs:** Nigeria's crude production cost has fallen significantly from \$70 in 2014 to \$20 per barrel as of March 2018⁵ according to the NNPC. The NNPC has also set a target to reduce this further to about \$15 in the near future. The renegotiation of rig rates for deep offshore activities from \$580,000 to \$164,000 per day last year is a further indication of NNPC's drive to reduce cost of production.
- (b) **New Project development:** According to NNPC's Monthly Financial and Operations reports, the NNPC recently signed two alternative financing agreements with NNPC/Chevron Nigeria Limited JV and NNPC/Shell Petroleum Development Company (SPDC) JV on Joint Venture projects to grow reserves and production. The projects are expected to deliver combined incremental reserves of 413.9 million barrels of crude. Furthermore, the Group Managing Director of the NNPC, Dr. Maikanti Baru stated that the NNPC will launch the following projects this year: Bonga South-West Aparo (BSWAP) located in OML 118 and Zaba-zaba sited in OPL 245.⁶ These projects, as well as other incremental production projects being undertaken across the upstream oil and gas sector will substantially increase Nigeria's daily crude production.
- (c) **Award of Marginal Fields:** The Minister of State for Petroleum Resources announced the Federal Government's plans to award Marginal Fields to indigenous companies in 2017 in order to grow Nigeria's oil reserves and generate revenues for the government whilst increasing participation of indigenous companies in the sector. Although, the bid round did not take place in 2017, this is expected to take place sometime in 2018 or 2019.

The following are factors that may hinder the projected increase in production:

- (a) **OPEC Production cut:** In 2017, Nigeria was excluded from production cuts agreed to by OPEC members and some key non-OPEC oil producers ("Declaration of Cooperation"). The initial agreement which took effect on 1st January 2017 was for a period of 6 months but was extended in May 2017 till March 2018. However, in November 2017, the production cut was further extended till the end of 2018.⁷ More importantly, Nigeria is currently exempted from the production. However, Nigeria may not be exempted from any further extension of the production cuts if crude production continues to rise. This may potentially hinder the projected production increase.
- (b) **Regulatory uncertainties:** the non-passage of the Petroleum Industry Bill creates a regulatory uncertainty and a "Change in Law" risk which cannot adequately be assessed in terms of likelihood of occurrence and its potential impact. Although, the bill has been broken down into five different bills, none have been signed into law as at April 2018. The first of the five bills, Petroleum Industry Governance Bill (PIGB) was passed by the National Assembly in March 2018 while three other bills (Petroleum Host Community Bill, Petroleum Industry Fiscal Bill, and Petroleum Industry Administrative bill) passed second reading at the Senate in July 2017⁸ and have been referred to the Petroleum Upstream, Downstream and Gas committees of the Senate.⁹ The Federal Government also released a proposed draft of the National Petroleum Fiscal Policy in February 2017 which sets out government's proposed changes to the current fiscal regime. Although, the breaking down of the PIB into smaller bills is a welcome development, from investors/Financiers' standpoint, it creates an uncertainty as to what will be its final content and its potential impact on the industry. This may therefore delay final investment decisions for key projects until the bills are passed into law.
- (c) **Security challenges:** The security situation in the Niger Delta area has improved significantly since 2017, however, pipeline vandalism and oil theft continue to be a problem. A total of 1,120 pipeline vandalized points was recorded by NNPC between January to December 2017¹⁰. Although, this is an improvement from the preceding 12 months (i.e. 2016) where a total 2,560 vandalized points were recorded¹¹ pipeline vandalism continues to be a major deterrent to the development of critical infrastructure that will enhance increase in crude production.

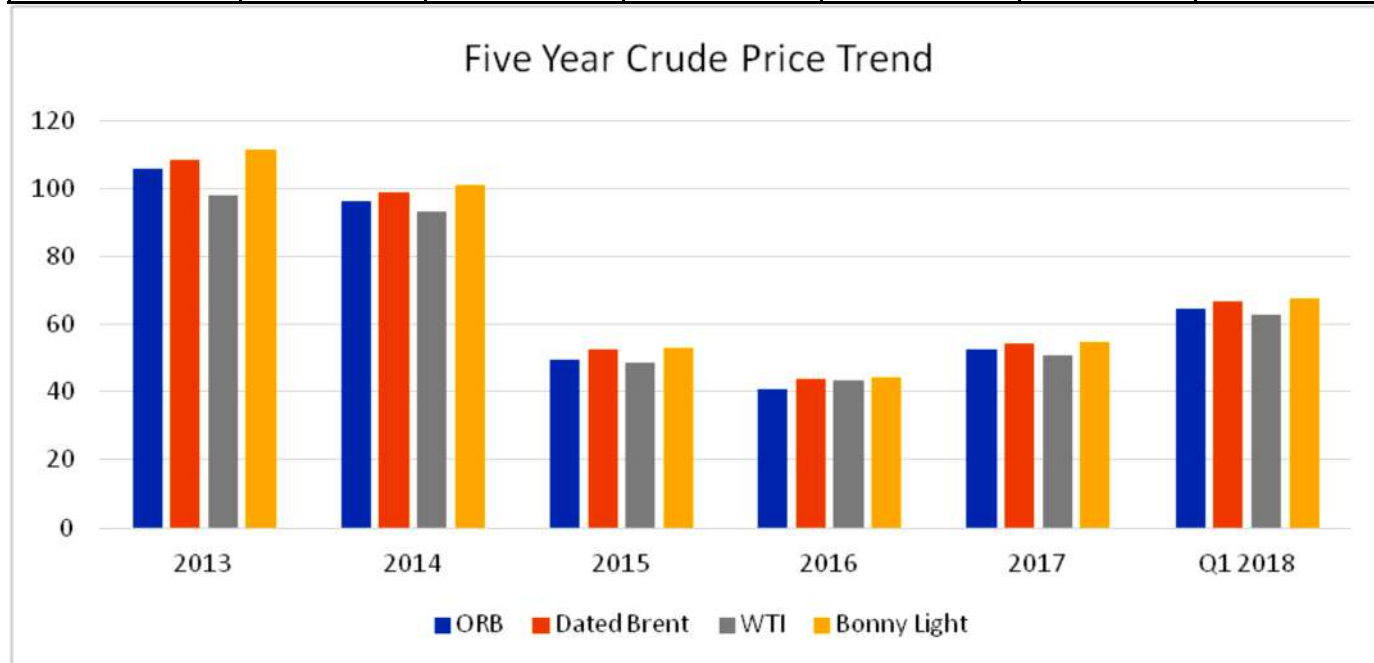
2.3 CRUDE PRICES

Crude oil prices reached their lowest levels for over 10 years in the first quarter of 2016 but have rebounded, and as at end of March 2018, major benchmarks such as Brent Crude and West Texan Intermediate (WTI) averaged \$66.79 and \$62.90 year-to-date respectively. While Nigeria's major crude grade Bonny Light Crude averaged \$67.72 which represents a year-on-year increase of 20% when compared with the average price for the same period in 2017 (which was \$53.96).¹² According to OPEC, the OPEC Reference Basket Price

(ORB) in February ended lower for the first time in six months, tumbling 5% month on month, but remained well above \$60/b, a high level not seen in more than two years. For year-to-date, the ORB averaged 64.75 as at end of March 2018 which is 24.6% higher when compared with the average price for the same period in 2017 (which was \$51.95), and as at Thursday 17th May 2018, the ORB stood at \$76.75 per barrel. Figure 3 sets out oil price movements of major crude benchmarks over the last four years and Q1 2018.

Figure 3 – Oil Price Data – Yearly Average (US\$ per barrel)

	2013	2014	2015	2016	2017 ¹³	Q1 2018
ORB	105.87	96.29	49.49	40.76	52.43	64.75
Dated Brent	108.62	99.08	52.41	43.76	54.17	66.79
WTI	97.96	93.26	48.73	43.27	50.82	62.90
Bonny Light	111.36	100.85	52.95	44.02	54.55	67.72



* The chart above indicates a steady upward trend in crude prices after hitting their lows in 2016. It also indicates that in Q1 2018, crude prices averaged their highest in over 3 years but are yet to achieve the 2013 and 2014 figures.

2.4 CRUDE PRICE OUTLOOK

According to OPEC, crude price rose steeply in September 2017 and has continued a steady upward trend as a result of oil market rebalancing following OPEC and key non-OPEC oil producers' success in draining the oil market of excess barrels, and the achievement of 100% conformity level so far with their voluntary production adjustments under the Declaration of Cooperation. OPEC is bullish on the potential of oil prices rising following extension of production adjustments to the end of 2018.

The US Energy Information Administration (EIA) in its Short-Term Energy Outlook released in April 2018 predicts that Brent Crude prices will average \$63 in 2018 and 2019 while WTI prices will average \$4 per barrel lower than Brent.¹⁴ While the World Bank forecasts that oil prices will average \$65 per barrel in 2018 and 2019, as a result of accelerating global growth and rising demand.¹⁵

Major Investment Banks have also made upward revisions to their oil price forecasts. Goldman Sachs forecasts Brent Crude averaging \$75 a barrel over the next three months, \$82.50 over the next 6 months and

\$75 over the next 12 months (i.e. for 2018), citing steady demand growth and continuing compliance with OPEC-led production adjustments.¹⁶ However, it also expects the price of Crude Oil to dip again as U.S Shale producers increase their supply and more importantly, the end of the OPEC led production cuts. As such, it predicts Brent Crude to fall to \$60 by 2020.¹⁷ Standard Chartered raised its crude price forecasts by \$10 to \$71 and \$68 for Brent and WTI respectively, stating that the OPEC and non-OPEC production adjustments are now receiving greater acknowledgement for market discipline and demand pessimism is significantly reduced.¹⁸

Citigroup analysts are of the view that oil prices will likely trade at an average of \$65 per barrel in 2018 and \$55 per barrel in 2019 due to rising demand and potential supply losses from Venezuela and Iran. However, they expect more supply in the market in 2019 hence the forecast of \$55.¹⁹

A summation of analysts' views is that oil prices increase or decrease will largely depend on crude production levels and market demand for the crude produced.



Source: <https://guardian.ng/news/nigeria-lng-exports-reach-85-billion-in-15-years/>

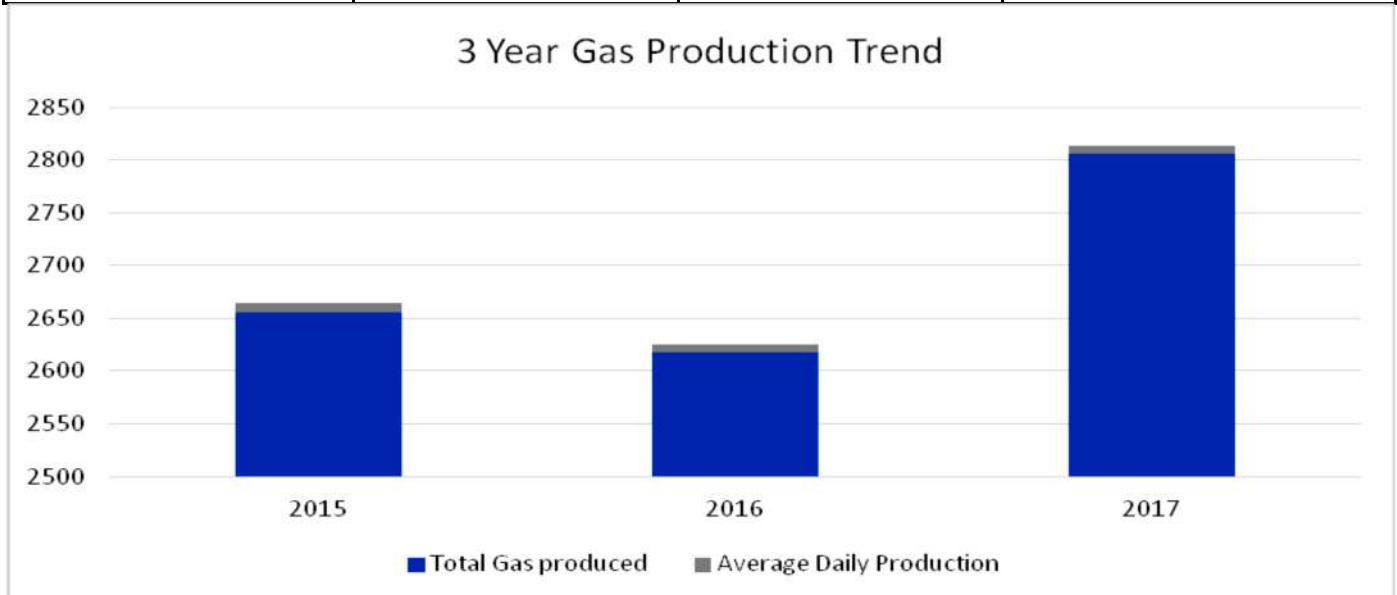
2.5 GAS PRODUCTION UPDATE

According to NNPC reports, Nigeria produced a total of 2805.56 Billion Cubic Feet (BCF) between January and December 2017 representing an average daily production of 7,683.63mmscfd. This represents a year-on-year increase of 7% when compared to the same period in

2016 where a total of 2617.67 BCF was produced representing a daily average production of 7,155.54mmscfd. Figure 4 provides a breakdown of Nigeria's gas production for the last three years.

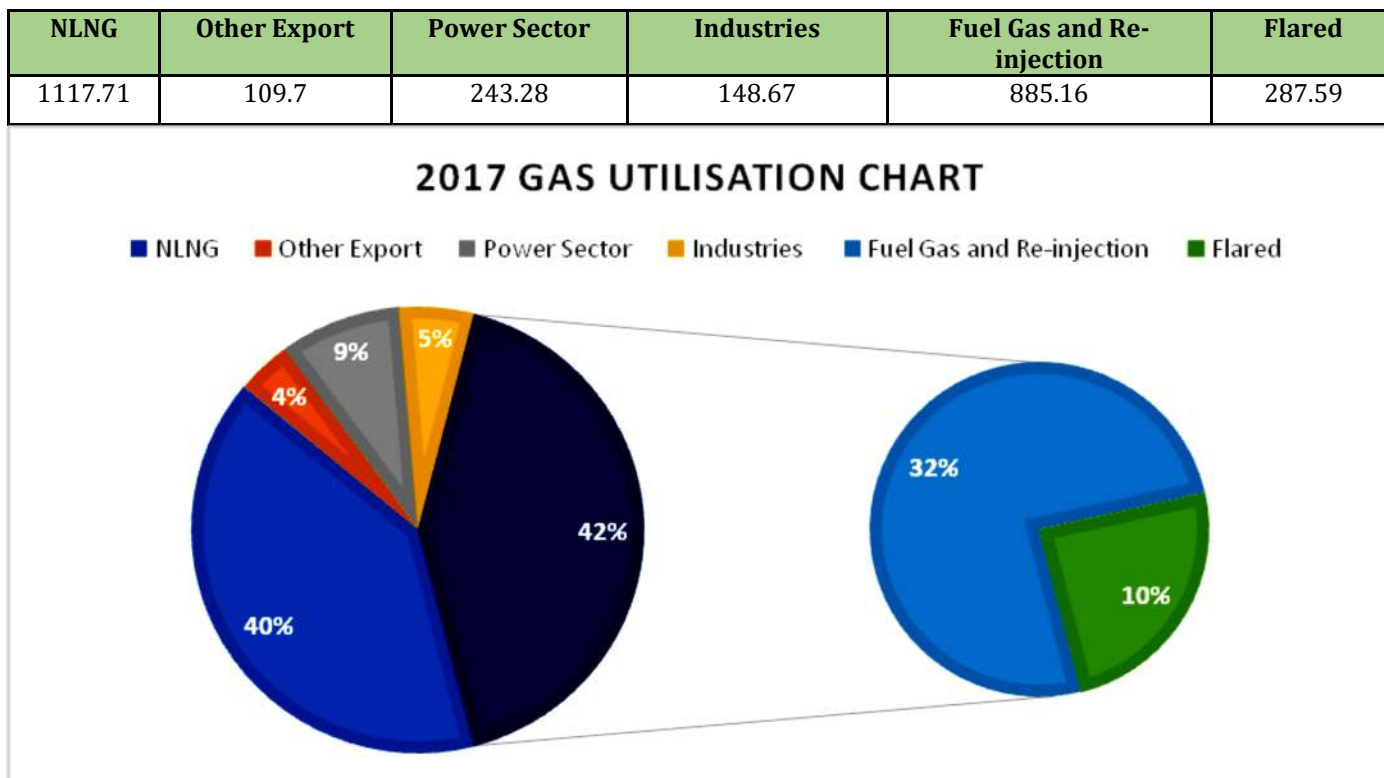
Figure 4 – Monthly Gas Production for 2017

Year	2015	2016	2017
Total Gas produced (BCF)	2656	2617.67	2805.56
Average Daily Production (MMSCFD)	7,951.42	7,155.54	7,683.63



Out of the 2,805.56 BCF of gas produced from January to December 2017, a total of 2,792.11 BCF was supplied, out of which 1619.36 BCF representing 58% was commercialized while the remaining 42% was either used as fuel gas, re-injection or flared. Within the same period, a total of 287.59 BCF representing 10% of the total supplied was flared. Out of the 1619.36BCF commercialized, 1227.41BCF (or 76%) was exported while 391.95BCF (24%) was supplied to the domestic market. 91% (1,117.71) of the gas exported during the period were supplied to Nigeria LNG (NLNG) while 62% (243.28 BCF) of the gas supplied to the domestic market was supplied to the Power Sector. Figure 5 below provides a percentage breakdown of gas utilisation for 2017.

Figure 5 – Gas Utilization Chart (January to December 2017)



2.6 GAS PRODUCTION OUTLOOK

Nigeria's gas potential has never been in doubt given its proven natural gas reserves which is estimated at 180 Trillion Cubic Feet, making it the ninth largest in the world according to the EIA international energy statistics. However, gas production and utilization has been hindered by several challenges ranging from lack of adequate infrastructure to effectively monetize the abundant gas resources, uncertain regulatory framework, and weak domestic gas market largely due to illiquidity of the Power Sector.

However, despite the challenges, gas production is expected to increase steadily as local demand for gas continues to increase, and in view of the government's plans to move Nigeria from a crude oil export-based economy to an attractive oil and gas-based industrial economy giving primary attention to meeting local gas demand requirements. Government's plans in this regard

are set out in the National Gas Policy approved by the Federal Executive Council in June 2017.

Further, there are several gas projects coming on stream in the next few years to meet the growing local demand for gas. These include the 7 Critical Gas Development Projects earmarked by NNPC and its partners (7 other Oil and Gas Companies) to fast-track their plan to increase gas supply for domestic consumption by 285% by 2020.²⁰ Also, the NNPC recently approved contracts for the construction of the Ajaokuta-Abuja-Kaduna-Kano Pipeline project, a critical infrastructure that will increase domestic supply of gas.

However, factors such as the liquidity issues within the Power Sector (being the offtaker of 62% of gas supplied to the domestic market) and availability of critical infrastructure needs to be resolved; and stakeholders will need to explore other efficient gas monetization options for Nigeria to achieve its gas production potential.

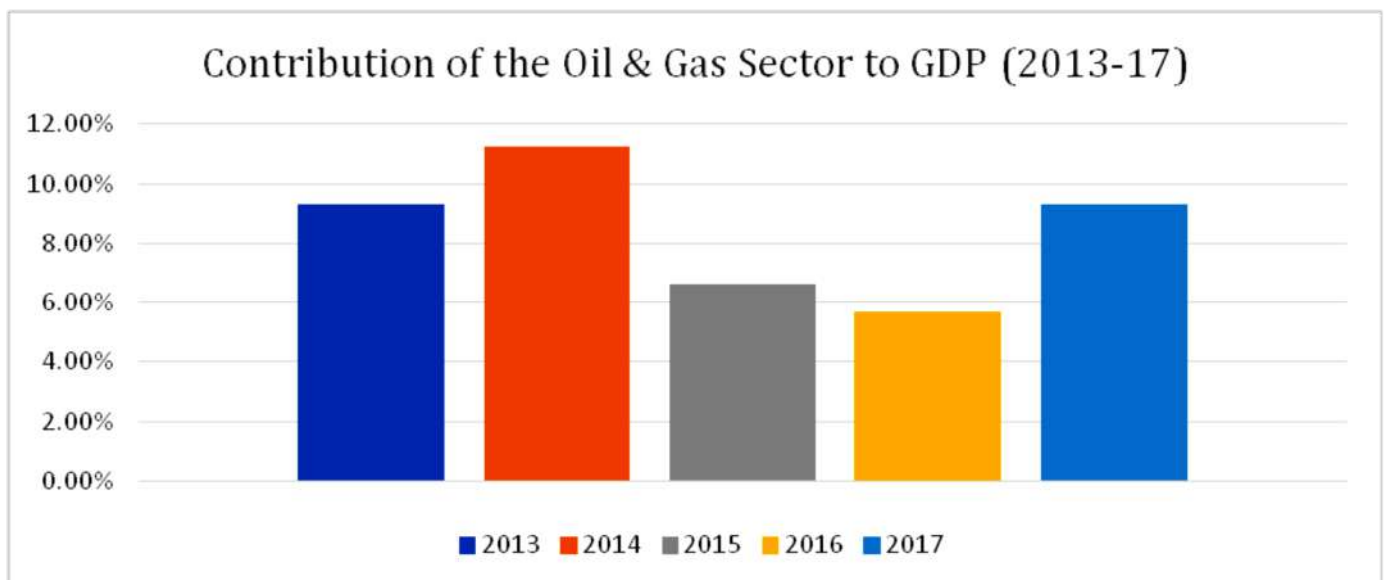
2.7 CONTRIBUTION OF THE OIL AND GAS SECTOR TO NIGERIA'S GDP

The Oil and Gas Sector (including Oil refining) contributed 8.68% to Nigeria's GDP in 2017 which represents an increase of 53% from the 5.66% contributed in 2016.

Figure 6 below shows a five-year trend in the contribution of the Oil Sector to Nigeria's GDP.

Figure 6 – Contribution of Oil and Gas Sector to Nigeria's GDP

YEAR	TOTAL GDP (₦) Million	CONTRIBUTION TO GDP (₦) Million	% CONTRIBUTION TO GDP
2013	80,092,563.38	7,449,994.13	9.30
2014	89,043,615.26	10,002,304.630	11.23
2015	94,144,960.45	6,238,437.12	6.62
2016	101,489,492.20	5,752,904.6	5.66
2017	113,719,048.23	10,575,199.97	9.30



2.7.1 DEDUCTIONS FROM FIGURE 6

- Contribution to GDP was highest in 2014 and lowest in 2016 which is connected to the fall in oil prices and drop in crude production in 2016 as a result of the security issues in Niger-Delta.
- There is a congruence between global oil prices and the contribution of the sector to the GDP; in 2014 global oil prices were above a \$100 per barrel while prices averaged \$44.02²¹ in 2016.
- The increase in contribution to the GDP in 2017 from the preceding quarter can be partly attributed to the positive economic growth in 2017; the economy grew by 0.83%.

2.8 PROPOSED CHANGES TO THE FISCAL REGIME OF THE OIL AND GAS SECTOR

Figure 7 below highlights the proposed changes to the current fiscal framework of the Nigerian Oil and Gas Sector as outlined in the Draft National Petroleum Fiscal Policy ("Policy") released by the Ministry of Petroleum Resources ("MPR") in February 2017.

Figure 7 – Highlights of Proposed Changes to Fiscal Framework

S/N	Current Fiscal Framework	Draft National Petroleum Fiscal Policy
Taxes		
1.	<ul style="list-style-type: none"> Companies operating in the Upstream Oil sector are subject to Petroleum Profit Tax (PPT) at the rate of 85% in accordance with the Petroleum Profit Tax Act (PPTA). Upstream Companies with Production Sharing Contracts (PSCs) operating in deep offshore (over 200 metres) are subject to 50% PPT in accordance with the Deep Offshore and Inland Basin Production Sharing Contract Act. Companies operating in the downstream oil sector are subject to Companies Income Tax at the rate of 30% in accordance with the Companies Income Tax Act (CITA). 	<p>All companies operating in the Upstream Oil sector will be subject to:</p> <ul style="list-style-type: none"> Companies Income Tax of 30% in accordance with CITA; and National Hydrocarbon Tax (NHT) at the following rates: <ul style="list-style-type: none"> 40% for onshore operations; 30% for shallow water operations; and 20% for deep water operations.
Royalties		
2.	<ul style="list-style-type: none"> Royalty payments are currently based on water depth in accordance with the Petroleum (Drilling and Production) Regulations, and the Deep Offshore and Inland Basin Production Sharing Contract Act (in respect of Deep Offshore PSCs). For instance, the royalty rate for companies in areas with water depth of over 1000 meters is 0%. 	<p>Royalty payments will now be based on oil production volume and price of crude oil, at the following rates:</p> <p>Volume based Royalty rates</p> <ul style="list-style-type: none"> 5% minimum royalty for Oil and Gas production depending on production rates; 20% maximum royalty for production above 50,000 bpd, accounting for terrain; 5% royalty for frontier areas for both oil and gas; 10% maximum royalty for production above 1000mmscf, accounting for terrain. <p>Additional Royalty based on crude price</p> <ul style="list-style-type: none"> 0% royalty for crude oil price below \$50 per barrel; 0.2% increase for every \$1 crude oil price increase above \$50 per barrel; and 25% maximum royalty rate for prices above \$170 per barrel. No price based royalty for Gas.
Tax Deductions and Reliefs		
3.	Section 10 of the PPTA permits deduction of interest expense when computing profit assessable for tax.	Seeks to limit the pool of tax deductible items. Specific details have however not been provided.
4.	Acquisition cost is deductible as qualifying capital expenditure under section 10 of the PPTA.	Acquisition cost will no longer be deductible as qualifying capital expenditure.

S/N	Current Fiscal Framework	Draft National Petroleum Fiscal Policy
Tax Incentives		
5.	Under the PPTA, companies involved in Upstream operations are entitled to certain allowances including Petroleum Investment allowance for any qualifying capital expenditure incurred for the purposes of petroleum operations, which ranges from 5-20% depending on the terrain. ²²	The policy seeks to remove all Investment tax allowances (ITA) and Investment tax credits (ITC) currently enjoyed by Upstream companies.
6.	Sections 11 and 12 of PPTA permits, as part of the incentives for utilization of gas, the treatment of investments for gas utilization and facilities as part of oil field development/capital investment for oil development, making it tax deductible.	Investments in gas facilities, gas capital and operating expenses will no longer be deductible from, or cross-subsidized by, oil income. As such, sections 11 and 12 of the PPTA will be amended or repealed.
7.	Section 39 of CITA provides for an initial tax-free period of 3 years which may be extended for a further period of 2 years for gas utilisation downstream projects. These include: <ul style="list-style-type: none"> Marketing and Distribution of Natural Gas for commercial purposes including Power Plants; Liquified natural gas; Gas to Liquid plant, Fertilizer plant; and Gas Transmission and Distribution Pipelines. 	Tax incentives under section 39 of the Companies Income Tax Act ("CITA") will now be applicable to mid-stream projects such as crude oil product transportation systems and refineries; and LPG projects and infrastructure.
8.	N/A	The Policy introduces new incentives for small fields. These include: <ul style="list-style-type: none"> A 5% royalty on small fields based on average daily production for the month; and Allowances under the NHT that will reduce tax rate to 0% particularly in relation to small gas fields. <p>Note that "Small Field" is not defined in the Policy.</p>
Capital Gains Tax		
9.	Capital Gains Tax (CGT) for disposal of assets is currently 10% in accordance with the Capital Gains Tax Act.	This will be increased to 30% for Oil and Gas Transactions and the government seeks to amend the CGT Act to give effect to this proposal.



Source: <https://guardian.ng/news/modular-refineries-and-quest-for-local-refining-capacity/>

3. DEVELOPMENT OF LOCAL REFINING CAPACITY

The Short and Medium-Term Priorities to Grow Nigeria's Oil and Gas Industry (2015 - 2019)²³ (the "7 Big Wins") identified the Growth of Refineries and Local Production Capacity as a focus area, with the objective of transforming Nigeria from being an import dependent nation into a net exporter of refined petroleum products. To achieve the objective, implementing a new business model for refineries was stated as one of the action plans, as well as increasing private sector participation through co-location and joint venture arrangements.²⁴

This section considers Nigeria's refining capacity and output, makes a case for increase in local refining output and analyses recent government's initiatives towards achieving local refining policy objectives.

3.1 CURRENT LOCAL REFINING CAPACITY

Nigeria currently has four major government-owned refineries with a combined refining capacity of 445,000 barrels of crude per day (bpd) according to the NNPC. The two Port Harcourt Refineries (PHRC) have a combined installed capacity of 210,000 bpd while the Kaduna (KRPC) and Warri (WRPC) have a capacity of 110,000 bpd and 125,000 bpd respectively.

Although the combined capacity of the five refineries is theoretically capable of meeting Nigeria's domestic demand for refined petroleum products, the capacity utilisation rates of the refineries are quite low as a result of the current state of the Refineries. Figure 8 below provides a breakdown of the capacity utilisation rates of each refinery in 2017 whilst Figure 9 shows the capacity utilisation of four (4) NNPC refineries between 2014 – 2017.

Figure 8 – Capacity Utilisation Rates of Local Refineries in 2017²⁵

Month	PHRC %	KRPC %	WRPC %	Combined Utilisation %
January	38.51	26.72	42.56	36.73
February	40.73	34.45	4.7	29.06
March	12.94	29.73	0.00	13.46
April	29.81	31.30	9.92	24.5
May	34.29	27.95	0.00	23.0
June	26.98	0.00	0.00	12.73
July	24.18	0.00	1.87	11.94
August	0.00	0.00	33.08	9.50
September	13.4	0.00	0.00	6.34
October	31.04	0.00	10.01	17.63
November	0.00	0.00	20.07	5.81
December	41.07	29.6	0.00	26.99

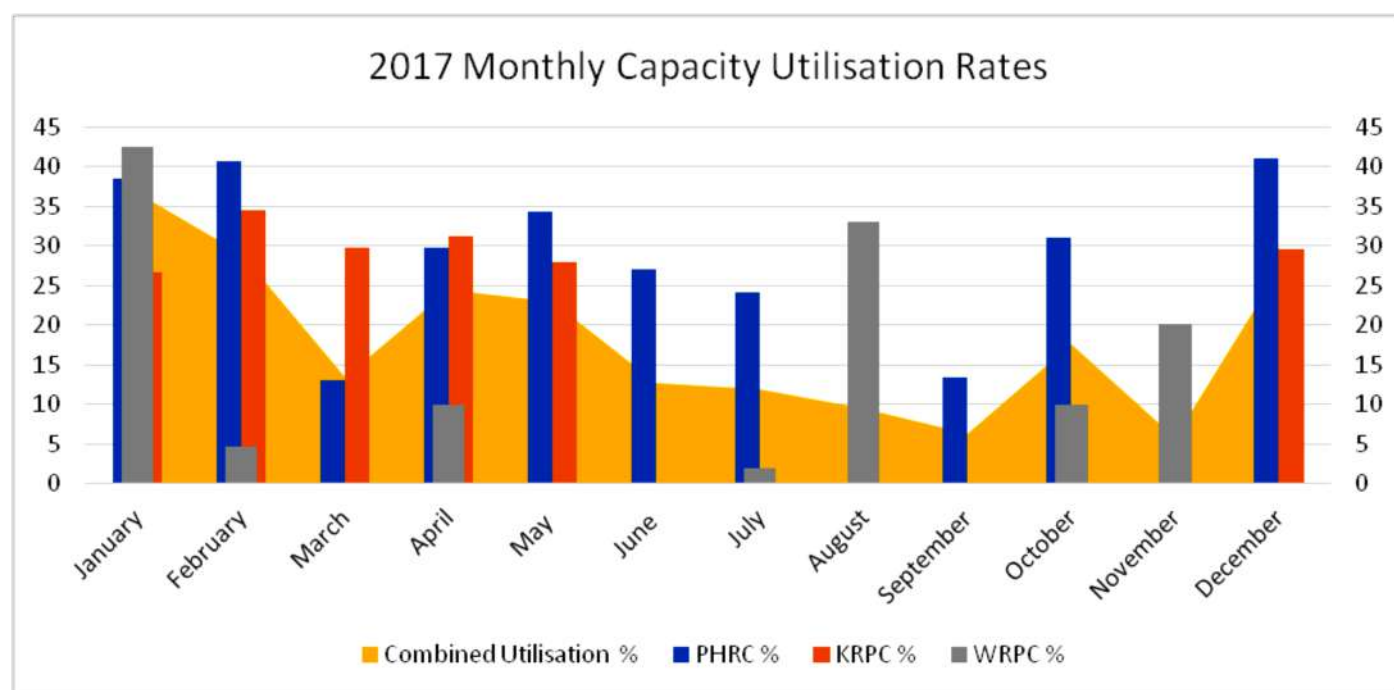
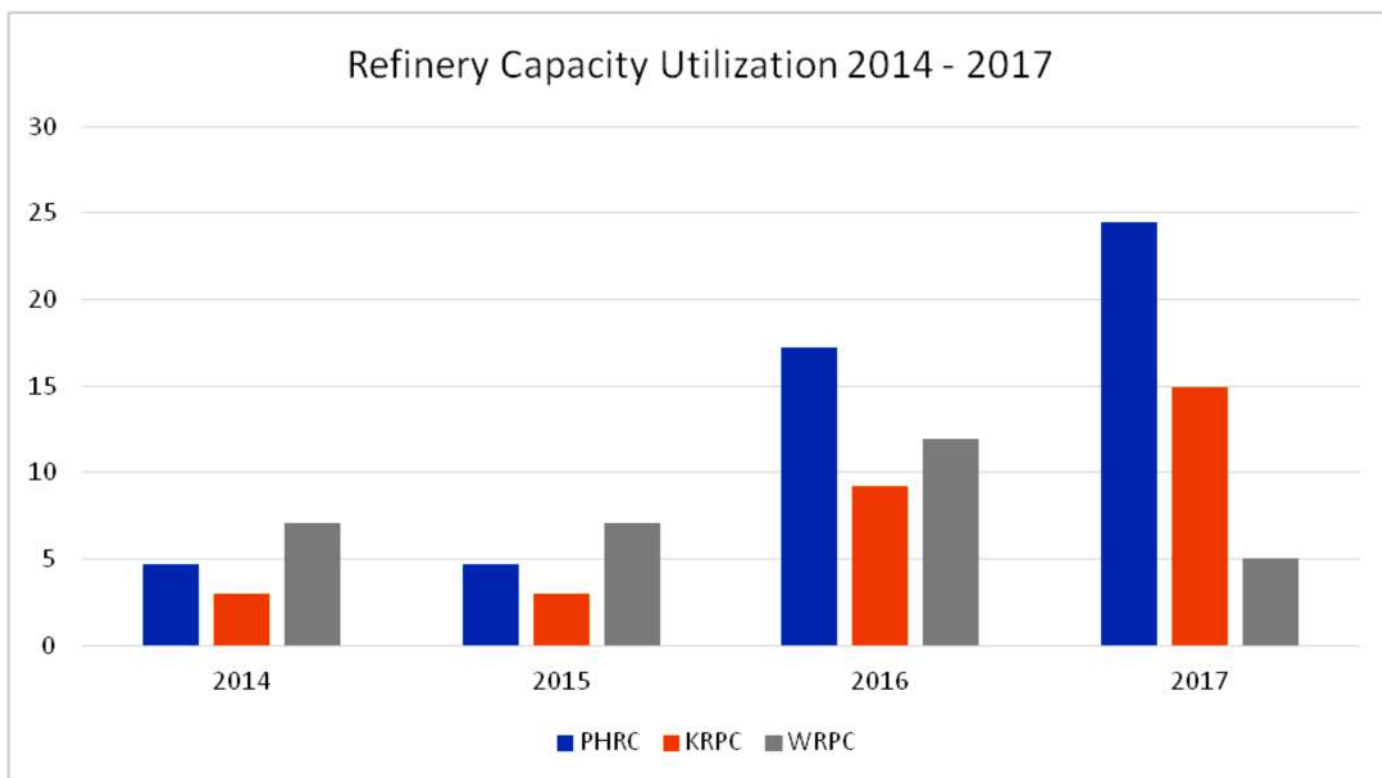


Figure 9 – Refining Capacity Utilisation for the last four years

	2014	2015	2016	2017
PHRC	4.66%	4.66%	17.23%	24.44%
KRPC	2.98%	2.98%	9.17%	14.90%
WRPC	7.07%	7.07%	11.92%	10.38%



According to the National Petroleum Policy, the reasons for the underperformance over the years of the NNPC refineries include (among other factors):

- Lack of investment from NNPC;
- Irregular maintenance;
- Inconsistent power supply;
- Lack of modern management practices;
- Irregular payment of invoices by offtakers (PPMC); and
- Inconsistent crude oil supply, due to vandalism and operational shutdown of pipelines.

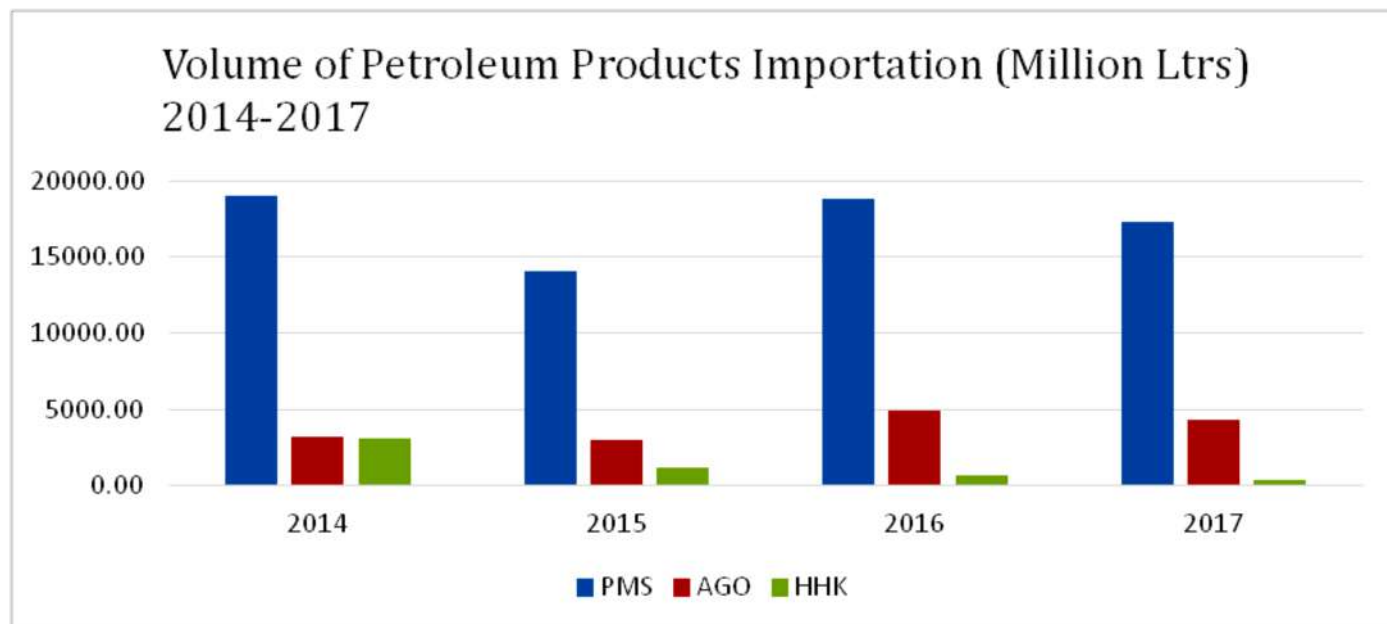
3.2 THE CASE FOR INCREASE IN LOCAL REFINING OUTPUT

The following are some rationale for the need to develop Nigeria's local refinery business/potential:

- High existing crude reserves:** Nigeria is estimated to have 37.1 billion barrels of crude reserves²⁶ and produces an average of 1.89 million²⁷ barrels per day. Despite this production level, the petroleum products imports statistics for 2017²⁸ reflects that 17.313bn litres of premium motor spirits (PMS), 4.277 billion litres of automotive gas oil (AGO) and 340 million litres of household kerosene (HHK), were imported into the country to augment the production from local refineries. Improvement in local refining output will significantly reduce Nigeria's import bill in this regard. Figure 10 below gives a breakdown of petroleum products imported between 2014 and 2017.

Figure 10 – Breakdown of Petroleum Products imported (2014-2017)

YEAR	PMS (Million Litres)	AGO (Million Litres)	HHK (Million Litres)
2014	18,991	3,183	3,059
2015	14,058	2,962	1,162
2016	18,812	4,898	713
2017	17,313	4,277	340



B. **Potential Effect on FX:** The FX demand for importation of refined petroleum creates a strain on Nigeria's foreign exchange earnings. It accounted for 30% of Nigeria's total forex earnings in 2016 according to the Minister for Finance²⁹ and the Minister of State for Petroleum Resources³⁰ has also stated that Nigeria allocates an average of \$28 billion to import about 92% of the petroleum products consumed locally.³¹ Increasing Nigeria's refining output by the upgrade of existing local refineries and development of new refineries will reduce the pressure on Nigeria's foreign exchange demand.

C. **Creation of Jobs:** Development of the local refining sector (either by increasing capacity utilisation of existing refineries or developing new ones) will

necessarily increase economic activity within the sector. This will consequently lead to the creation of new jobs (directly and indirectly) and potentially enhance the standards of living and the country's GDP.

D. **Contribution of the Oil Refining Sub-sector to GDP:** the contribution of the Oil Refining sub-sector to GDP is quite low and has been less than 1% for quite some time (at least 5 years) according to National Bureau of Statistics. Figure 11 below outlines the percentage contribution of the sub-sector to the Nigeria's GDP over the last four years and draws comparison with the Contribution of Crude Petroleum and Natural Gas Exploration and Production.

Figure 11 – Percentage Contribution of the Sub-Sector to Nigeria's GDP

YEAR	Exploration and Production (Crude Petroleum and Natural Gas) (%)	Oil Refining (%)
2014	10.80	0.43
2015	6.36	0.26
2016	5.29	0.27
2017	9.11	0.19

To achieve the objectives of the Petroleum Policy and increase its potential contribution to GDP, it is evident that the oil refining sector needs to be significantly revamped.

3.3 GOVERNMENT PLANS FOR THE REFINING SECTOR - A REVIEW OF THE NATIONAL PETROLEUM POLICY

The FGN has set out (under the ERGP) the broad goals of (i) boosting local refining for self-sufficiency of the Nigerian economy; (ii) reducing petroleum products importation by 60% by 2018; (iii) becoming a net exporter by 2020; (iv) save foreign exchange and prevent reversion of the fuel subsidy regime; and (v) developing the domestic oil refining industry to meet internal demand and export refined products instead of crude oil.³² Figure 12 below provides an update on the key activities identified for the achievement of the broad objectives.

Figure 12 – Update on Key Activities for Achievement of Broad Objectives.

Activity	Update
Reduction of Governments stake	The Government has not taken steps to divest its interest in the NNPC refineries and other downstream subsidiaries. The passage of the Petroleum Industry Governance Bill (PIGB) will however ensure the divestment of government interest in the NNPC. ³³
Downstream liberalisation	The Government has commenced the liberalization of the downstream sector to allow for the free importation of petroleum products and its sale in a competition driven market. In furtherance of this objective, PMS prices were increased to N145 with a view to gradually phase out the fuel subsidy regime and deregulate the prices.
New business models for refineries	This is currently being undertaken with the push for the adoption of the Modular Refinery model. In furtherance of the policy direction of the FGN, the Department of Petroleum Resources (the DPR) in May 2017 released the General Requirements and Guidance Information for the Establishment of Modular Refineries in Nigeria (discussed in more detail in 3.5 below).
Revamp refineries to increase capacity utilisation	The Government has hinted that it will carry out steps to revamp the local refineries to boost the local refining capacity and meet the 2019 deadline to achieve local refining sufficiency. ^{34 & 35}
Encourage private-sector participation through co-location and JV arrangements	The Government has taken steps to utilize co-location arrangements to boost local refining capacity. The Government has concluded agreement with two private sector investors under co-location arrangement for the establishment of refineries in Kaduna and Warri. ³⁶
Work with the National Assembly to ensure passage of the PIB	The PIB has now been divided into five different bills for ease of legislative action. The first of the five bills, Petroleum Industry Governance Bill (PIGB) was passed by the National Assembly in March 2018 and is awaiting presidential assent while three other bills (Petroleum Host Community Bill, Fiscal Framework Bill, and Administrative Framework Bill) passed second reading at the Senate in July 2017. ³⁷

3.4 CONCEPTS IDENTIFIED FOR IMPROVING THE REFINING LANDSCAPE

The Petroleum Policy further recognises that a strong refining sector is a key requirement to achieving economic success and some of the concepts identified for improving the refining landscape are:

A. Existing NNPC Refineries to become commercially independent

The NNPC refineries will need to be independent, profit centred with responsibility for their own

commercial operations. As part of the proposed plan, each of the refineries will be independently responsible for procurement of crude oil from any available source. It is also expected that the Nigerian Petroleum Marketing Company (“NPMC”) will no longer be the sole offtaker for the refineries thereby moving to a demand-based model that encourages productivity in the existing refineries.

B. Divestment of Non-Performing Government Owned Refineries

The aim is to make the NNPC refineries successful, high volume, commercially viable enterprises. They will be encouraged to become so and will be supported as much as it is within the government's ability to do so. Each refinery will be given a transition period to become independent and commercially viable. Where any of the refineries fails to become commercially viable after the transition period, the Petroleum Policy provides that government intends to divest (sell off), grant a concession or if necessary, shutdown such refinery, and handing over the site to a qualified private sector investor for construction of new refinery.

C. Return of Storage Depot Assets to the Refineries

The storage depots currently operated by the NNPC will be returned to the refineries. This will effectively create a separate income stream for the

refineries and other intended refineries may have access to the use of this storage facilities for their operations.

D. Asset sharing with Strategic Partnerships

The Petroleum Policy also suggests that new licensees may consider locating such new refineries within the precincts of the existing refineries to leverage on some of the infrastructure currently in place.

E. Private Refineries will be Encouraged

The government will also encourage a market driven refinery operation in which NNPC refineries will have to compete in an open market along with any other entrant. The DPR annual Oil and Gas Report 2016, identifies a total of 25 licensed refining (as at 2015) companies who are expected to contribute a total of 1, 352,000 Bpd upon completion. Figure 13 below highlights the companies with the highest projected capacity:

Figure 13 – Projected Capacity of Oil Refinery Companies

S/N	Company	Capacity (BPSD)
1.	Dangote Oil & Refinery Company	500,000
2.	Epic Refinery & Petrochemical industries limited	107,000
3.	Petrolex Oil & Gas Ltd	100,000
4.	Aiteo Energy Resources Limited	100,000
5.	Capital Oil & Gas Industries limited	100,000

3.5 MODULAR REFINERIES: THE PREFERRED BUSINESS MODEL FOR REFINERIES

The Federal Government of Nigeria (FGN), has taken some steps to foster the development of modular refineries, as an integral part of the economic model to achieve sufficient local refining capacity. To entrench the model, the DPR has issued licenses to at least twenty-five (25) modular refinery project sponsors, with cumulative potentials to boost the domestic refinery capacity by more than 671,000BPSD,³⁸ and there have been reports that additional ten (10) licenses have been issued by DPR.³⁹

In furtherance of the policy direction of the FGN, the Department of Petroleum Resources (the DPR) in May 2017 released the General Requirements and Guidance Information for the Establishment of Modular Refineries in Nigeria (the General Requirements Guide) to promote the establishment of third party financed greenfield and modular refineries, to achieve in-country petroleum products sufficiency, and to stimulate export capacity.⁴⁰



Source: <https://guardian.ng/energy/modular-refineries-and-nigerias-economy/>

3.5.1 ADVANTAGES OF MODULAR REFINING MODEL OVER ESTABLISHMENT OF CONVENTIONAL PLANTS

The push for the establishment of modular refineries could prove successful in the short term given that modular plants have been known to have certain advantages over conventional refineries. Some of the advantages of modular plants which makes it competitive in the short term above conventional plants are considered below:

- A. **Cost:** the cost of establishing modular refineries is significantly lower than conventional refineries. In comparison to capital requirement of about Five Billion Dollars to Fifteen Billion Dollars (USD 5, 000, 000, 000 – USD 15, 000, 000, 000) required to establish a conventional refinery, modular refineries require investments in the range of One Hundred Million to Two Hundred and Fifty Million Dollars (USD 100, 000, 000 - USD 250, 000, 000), and can be lower or higher depending on capacity and configuration.
- B. **Construction Timeline:** given the current abysmal state of refining in Nigeria, the adoption of modular refineries offers the fastest route to ramp up refining capacity as the construction time is compressed.⁴¹ Whilst construction of conventional refineries may take several years (estimated 3 to 8 years), modular refineries can be constructed and deployed within a much shorter period (about 24 months). It is constructed in a controlled environment and properly tested before being shipped out. It is relatively easier to fabricate and erect.⁴²
- C. **Flexibility:** another advantage of modular refineries is the flexibility in construction, siting and operations it offers over conventional plants. The production capacity can be increased to meet new demands with the addition of new modules.⁴³ An initial 30,000 bpd capacity refinery can be upgraded to double or triple the capacity with ease and speed. Also, when an area becomes unsuitable for business, it can be disassembled and reassembled in a more suitable environment.
- D. **Maintenance:** large scale refineries are not easy to maintain and require a stringent quality control and jurisdictional system to ensure longevity. The lack of required maintenance has therefore been a challenge to refineries operating in Nigeria and is one of the primary reasons for the low utilisation rates of Nigeria's four government owned refineries (see Figure 9 above refinery utilisation rates.). Modular refineries therefore offer an advantage as the maintenance cost is low; routine turn around maintenance and on-stream inspections would require less personnel and down time. Modular plants are also easier to secure because of the reduced surface area and perimeter and internal monitoring of equipment and external acts of sabotage can be better policed.⁴⁴

E. Return on Investments: according to PWC's analysis, the projected payback period for an investment in modular refinery is shorter (2.6 to 8 years) depending on capacity and configuration, while the projected payback period for a conventional refinery is estimated to be 18 years (using 200,000 bpd capacity assumption).⁴⁵

F. Multiplicity of Sources: the reliance on few conventional refineries to fulfil the country's demand of refined products poses an economic risk, as the effects of the breakdown or collapse of one or some of the plants is pronounced. The adoption of a supply model that utilizes numerous small-scale plants ensures that the economic impact of a breakdown is significantly reduced.⁴⁶

3.5.2 POLICY INITIATIVES TO FOSTER DEVELOPMENT OF MODULAR REFINERIES

The most significant policy initiative of the FGN in respect of modular refineries is the release of the General Requirements Guide to promote the establishment of scalable modular refineries located within refinery clusters. Outlined below are some of the major propositions of the FGN in respect of modular refineries, as stated in the General Requirements Guide:

A. Adoption of Private Sector Led Model for the Establishment of Modular Refineries: The General Requirements Guide propagates an all-inclusive private-sector led model for the establishment of modular refineries. It encourages credible private investors to have majority equity in joint venture projects, with equity participation (In the form of land-for-equity and or paid off shares) from the state governments or its agencies (the SGNs), local government authorities (the LGAs), registered local cooperative societies and regional refinery stakeholders⁴⁷.

B. Categorization of Investors: Whilst the General Requirements Guide provides that the size of the investment structure will determine the investor categorization and selection process, it broadly recognizes the following classes of investors and investments:

- i. private investors with financial and technical capacity, preferably with established Nigerian presence or partnership;
- ii. public-private partnership with credible participation from relevant stakeholders such as foreign technical partners, SGNs and LGAs, Ministries, De-

partments, and Agencies (MDAs), organized private organizations, cooperative societies, and community equity contribution; and

- iii. regional refinery stakeholders involved in artisanal activities with focus on converting the vocationally acquired skills to cognitive technical skills who will be considered for equity partnership with technical and financial partners.⁴⁸

Though FGN is not identified as an investor under the General Requirements Guide, it will aid the establishment of modular refineries by facilitating crude commercial agreements from marginal and other oil fields, and to facilitate ownership joint venture investment vehicles with organized host communities and SGNs.

C. Integration of Community Stakeholders into the Midstream Sector: in addition to recognizing regional community stakeholders as potential investors under the broad categorization of investors, the General Requirements Guide aims to further integrate community interests by encouraging relevant SGNs to use local structures to:

- a. screen and capture the data of indigenes interested in gainful employment in the refineries and small medium enterprise activities; and
- b. focus on formally converting community stakeholders who have acquired vocational skills to cognitive technical skills.⁴⁹

3.5.3 POTENTIAL DRAWBACKS TO THE SUCCESSFUL IMPLEMENTATION OF THE MODULAR REFINING MODEL

The FGN anticipates that the modular refinery model will promote increased availability of petroleum products for domestic use; conserve foreign exchange utilized in the importation of petroleum products; promote socio economic development in order to curb restiveness, criminal and illegal refining in the Niger Delta Region; empower the nation to become a net exporter of petroleum products as opposed to being an importer; and mitigate environmental degradation associated with illegal refinery activities, crude oil theft and pipelines

vandalism⁵⁰.

Whilst a significant number of investors have obtained the requisite licence to establish modular plants,⁵¹ across the country, there are reports that only two modular refineries are currently operational in Nigeria.⁵² The slow progression in the implementation of the modular refining model across the country can be attributed to a number of challenges, some of which include:

- I. **Access to adequate financing:** Although modular refineries are much easier to construct and implement in comparison with conventional refineries in terms of costing, access to adequate financing is a major challenge that has bedeviled attempts to foster the establishment of modular refineries across Nigeria. Project Sponsors are unable to raise finance to undertake development of modular plants projects especially from the commercial banks, who currently have low appetite for oil and gas projects, high interest rates, rigid security requirements. In this regard, there is an urgent need for the Government, key stakeholders in the oil and gas industry, and financial services sector to collaborate in order to work out effective financing options for the successful implementation of the modular refining model across the country.
- II. **Bankability Considerations:** the inability of indigenous investors and local stakeholders to raise financing, is premised upon the concerns by foreign investors and financial institutions that the establishment of modular refinery projects in Nigeria may not be bankable. This assumption is largely dependent on certain factors such as inadequate supply infrastructure, security challenges, and the likelihood of frequent disruption to access feedstock which may result to failure in meeting production targets.
- III. **Licensing Costs:** the cost of procuring the requisite licence required to operate modular refineries in Nigeria is considerably high, which inherently discourages participation especially as the modular refining model is aimed at encouraging participation by small scale domestic investors, and local stakeholders who are already confronted with the issue of limited funding. As it currently stands, the application fee for the establishment of a modular refinery in Nigeria is \$50,000 with a DPR service charge of N500,000⁵³ amidst other related costs.
- IV. **Subsidy regime and market forces:** the current subsidy regime on petroleum product has the potential of making the modular refining model unattractive to investors. The absence of which, has the potential to make the model more attractive, as profit margins will increase due to increased competition premised on the market forces of demand and supply which will drive petroleum prices. Although, the Federal Government now plans to gradually phase out the subsidy regime and fully deregulate prices of petroleum products.

3.5.4 REGULATORY FRAMEWORK AND LICENSING PROCEDURE FOR MODULAR REFINERIES

A. Legislative Framework

In addition to the recently released General Requirements Guide the provisions of which is extensively considered in this Guide, the legislative framework governing the operation of modular refineries in Nigeria is summarily considered below:

- I. **The Petroleum Act (1969)** confers the Minister of Petroleum Resources with the powers to grant licences for the construction of refineries in Nigeria⁵⁴, and powers to impose an application fee for licences. The Minister is further empowered to make regulations concerning refineries and refining operations in Nigeria; specify the proportion or quantity of crude oil to be supplied to refineries, the share of each refinery in the total market and the price of refinery products.⁵⁵
- II. **The Hydrocarbon Oil Refineries Act (1965)** prohibits the refining of any hydrocarbon oils without a licence⁵⁶ (Refiner's Licence) granted by the Nigerian Customs Service Board in respect of the premises to be used for the refinery.⁵⁷
- III. **The Department of Petroleum Resources (DPR) Guidelines for the Establishment of Hydrocarbon Processing Plant 2007 ("DPR Refinery Guideline")** describes the approval process for the issuance of licences to construct and operate refineries in Nigeria.

B. Licensing Process for Modular Refineries

The General Requirements Guide summarizes the application process and fees for a license to construct and operate modular refineries in line with the licensing processes prescribed in the DPR Refinery Guidelines. In accordance with the DPR Refinery Guidelines, an applicant will be required to go through the three (3) stages of licensing before operations, by obtaining (a) License to Establish (LTE), (b) Authority to Construct (ATC) and (c) License to Operate (LTO).

The Guidelines further enumerates a timeline of key activities to enable smooth and speedy completion of the process for selection and licensing, which defines a timeframe for the workshop, submission of applications, technical evaluation and publication of report of successful companies.

C. General Licensing Criteria for Modular Refineries

Though the specific provisions of the DPR Refinery Guideline must still be complied with by investors, the General Requirements Guide outlines general criteria for the establishment of modular refineries, which are:

- I. **Design Capacity of Modular Refinery:** modular refinery plants should have design capacity not exceeding thirty thousand barrels per day (30,000BPD). Any plant with capacity exceeding 30,000BPD will be upgraded to a full conventional refinery.
- II. **Siting of Modular Refinery:** the location of a modular refinery should be strategic and influenced by proximity to the source of crude oil, producing Marginal Fields and tie-in to supply infrastructure or clusters. Further, establishment of modular refineries will be based on the acceptable carrying capacity indices of each state which will be determined by the production capacity, access to infrastructure and limit of the environmental degradation.
- III. **Particulars of Investment Vehicle:** evidence of registration for both Nigerian and foreign companies must be provided by investors, alongside constitutive documents. In respect of consortiums, companies must present legal documents of partnership, including evidence of joint venture or partnership agreement, company profile as well as constitutive documents.
- IV. **Evidence of Financial Standing:** investors are required to show financial capability and compliance with fiscal regulations by providing three (3) years audited account, financial report, tax certificate, evidence of paid up share capital, detailed financial plan with proof and source of funding, and letter of authority allowing verification of all claims.
- V. **Compliance with Community Affairs, Safety, Health, Environment and Security (CASHES):** investors are also required to submit Health, Safety and Environment (HSE) Plans, Quality Management System, Security Plans, Management of Change Procedure, Community Affairs and Corporate Social Responsibility Plans.
- VI. **Utilization of Nigerian Content:** applicants must maximize the utilization of local human and material resources in line with Nigerian local content requirement laws.
- VII. **Adherence with Technical Specification:** investors are required to comply with the provisions of the DPR Refinery Guideline and the Supplementary Guidelines for the Design, Construction, and Operation of Modular Refinery Plants to be issued by DPR.
- VIII. **Age of Modular Refinery to be relocated:** relocation of a modular refinery will only be allowed for a refinery that has been in operation for less than ten (10) years from its date of establishment. For refineries that have not been in operation since establishment, this should not be older than fifteen (15) years from the date of establishment.

3.5.5 FISCAL INCENTIVES FOR MODULAR REFINERIES

The General Requirements Guide provides that modular refineries shall qualify for all the tax incentives enumerated under section 39 CITA. These are:⁵⁸

- I. an initial tax-free period of three years which may be renewed for an additional period of two years;
- II. as an alternative to the initial tax-free period in (I) above, an additional investment allowance of thirty-five (35) per cent, which shall not reduce the value of the asset;
- III. accelerated capital allowances after the tax-free period, as follows:
 - a. an annual allowance of 90 percent with 10 percent retention, for investment in plant and machinery; and
 - b. an additional investment allowance of 15 percent which shall not reduce the value of the asset.
- IV. tax-free dividend during the tax-free period where the investment for the business was in foreign currency or where the introduction of imported plant and machinery during the period was not less than 30 percent of the equity share capital of the company;
- V. interest payable on any loan obtained with the prior approval of Minister of Petroleum Resources for a gas project shall be tax deductible; and
- VI. the General Requirements Guide further notes that the tax-free period of a company shall start on the day the company commences production as certified by the Ministry.

3.5.6 OUTLOOK ON POTENTIAL CONTRIBUTION OF MODULAR REFINERIES TO LOCAL REFINING CAPACITY

There is a huge potential in the modular refinery model being propagated by the FGN, with the possibility of it ramping up the local refining capacity, incorporating stakeholders into the oil and gas sector, and ultimately leading to foreign exchange savings. The proposed establishment of modular refineries in refinery clusters, if pursued to fruition, can meet a significant portion of the local demand for refined products, leaving unmet and export volumes to be catered for by the conventional refineries being established and revamped.

However, it is unlikely that the current policy moves will drive investors to fund modular refinery projects on the scale projected by the FGN unless steps are taken to address the challenges that have prevented the successful establishment of projects previously licensed by the DPR. The major challenge to be countered is that of

financing, and it is unlikely that the introduction of tax incentives alone will spur investment interests. The FGN therefore might be required to do more to boost investor confidence in the model proposed by the General Requirements Guide, especially by tackling the challenges associated with sourcing feedstock and product delivery which typically discourages financiers.

Though we project that more modular refineries will be established in the coming years in response to government actions; it is very unlikely that up to half the number of current licensees will go on to complete the construction of their projects, due to inability to meet funding requirements. In summary, the contribution of modular refineries to local refining capacity will improve in the short term, but not on a scale to tilt the balance significantly.



Source: <https://guardian.ng/news/niger-delta-indigenes-give-terms-for-modular-refineries-takeoff/>

4. MARGINAL FIELDS: KEY SUCCESS FACTORS

Marginal oil fields became a topical issue following the announcement by the Minister of State for Petroleum Resources (“**Minister**”) in May 2017⁵⁹ of the government’s intention to undertake a Marginal Field bid round in 2017. This announcement came on the back of the government’s strategic plans to conduct new licensing rounds⁶⁰ and grow Nigeria’s oil production sources⁶¹ through the award of Marginal Fields to indigenous oil companies. This plan was enumerated in the Short and Medium-Term Priorities to grow Nigeria’s Oil and Gas Industry 2015 – 2019 (7 Big Wins), and the National Petroleum Policy⁶².

This section, considers some of the critical success factors in acquiring, procuring, financing, and developing a Marginal Field in Nigeria. In consideration of the above, we have drawn from some of the challenges faced by past successful bidders and have also provided some tips for structuring a technical and financial proposal in contemplation of the upcoming bid round. For an analysis of key issues relating to Marginal Fields including an outline of the award procedure based on the existing guideline issued in 2013, see the previous edition of DETAIL’s Oil and Gas Guide using the following link http://www.detailsolicitors.com/media/archive2/oil_and_gas_guide/OilandGasGuide2014V1.pdf

4.1 MARGINAL FIELDS UPDATE

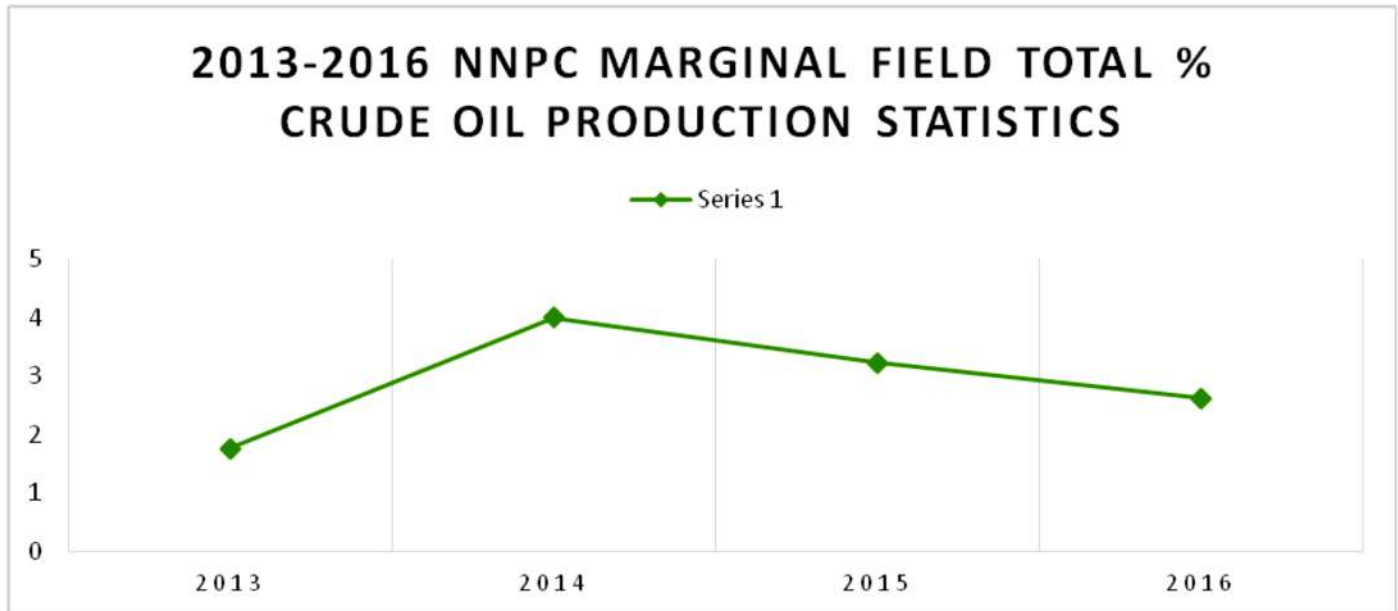
The Federal Government of Nigeria (“**FGN**”) has so far awarded thirty (30) Marginal Fields since the first field was farmed out in 1997 following the passing of the Petroleum (Amendment) Act⁶³ in 1996 which set out the procedure for farming out Marginal Fields. Out of the 30 Marginal Fields awarded, fourteen (14) have started production. Figure 14 provides a list of the producing fields.

Figure 14 – List of Producing Marginal Fields in Nigeria

S/N	Field	Company	OML	Year of Production
1.	Egbaoma	Platform Petroleum Limited ⁶⁴ Newcross Petroleum Limited ⁶⁵	38	2009 ⁶⁶
2.	Ibigwe	Waltersmith Petroman Oil Ltd ⁶⁷ Moris Petroleum Ltd	16	2008 ⁶⁸
3.	Uquo	Frontier Oil Ltd ⁶⁹ Seven Energy Ltd	13	2015 ⁷⁰
4.	Ajapa	Brittania-U Nigeria Ltd ⁷¹	90	2010 ⁷²
5.	Umusadege	Midwestern Oil and Gas Ltd ⁷³ Suntrust Oil Ltd	56	2008 ⁷⁴
6.	Umusati	Pillar Oil Limited ⁷⁵	56	2012 ⁷⁶
7.	Ebendo	Energia Limited ⁷⁷ Oando Production and Development Company (OPDC)	56	2009 ⁷⁸
8.	Ebok	Oriental Energy Ltd ⁷⁹ Afren Resources Ltd	67	2011 ⁸⁰
9.	Ogbelle	Niger Delta Petroleum Ltd ⁸¹	54	2005 ⁸²
10.	Otaipko	Green Energy International Lekoil Ltd ⁸³	11	2017 ⁸⁴
11.	Asamaratoro ⁸⁵	Prime E & P Ltd ⁸⁶ Suffolk Petroleum Services Ltd	11	2014 ⁸⁷
12.	Obodugwa 3 ⁸⁸	Pillar Oil Ltd	56	2009 ⁸⁹
13.	Stubb Creek ⁹⁰	Universal Energy Resources Ltd Sinopec	14	2015 ⁹¹
14.	Eremor ⁹²	Excel E & P Ltd	46	2017 ⁹³

According to the Africa Oil and Gas Report,⁹⁴ the following two other fields are expected to start producing in the nearest future.

S/N	FIELD	COMPANY	OML
1.	Oza Field	Millennium Oil and Gas Limited Emerald Energy Resources Limited Hardy Oil and Gas Plc	11
2.	Atala Field	Bayelsa Oil and Gas Limited	46



According to NNPC statistics above, Marginal Fields contributed an average of 1.76% in 2013, 4% in 2014, 3.22% in 2015 and 2.62% in 2016 to Nigeria's total crude production.⁹⁵ Although, Marginal Field production is expected to increase significantly as more fields start producing, the percentage contribution may not increase significantly as other major oil companies continue to ramp up their production.

In respect of the timeline for the proposed bid round, there were several alluding statements in the press late last year (2017) with regard to the timelines for the bid round, which indicated a potential start in 2018. However, as at April 2018, there have been no formal pronouncements by the FGN or the DPR.

4.2 WHAT TO EXPECT IN THE NEXT MARGINAL FIELD GUIDELINES

According to reports by THISDAY,⁹⁶ the FGN through the DPR has concluded the next Guideline (which is expected to be 2018 Guideline) which will be issued to regulate the upcoming bid round when formal announcements are made. The Guideline will set out the bid process including the award and post-award stage, application process for interested applicants, requirements, prequalification criteria and the rights and obligation of farmees.

The 2018 Guideline is alleged to contain a novel requirement from the DPR which requires interested applicants to pay a fee of \$50,000 for a Competent Persons Report (CPR) in addition to other fees prescribed by the DPR including the Data Mining Fees, Data Prying fees, Premium and other associated development fees. Several reports have further indicated the government's intention to set an acquisition fee, this is in view of the government's aim to generate between \$200 to \$300 million dollars from the upcoming bid round.⁹⁷

4.3 TIPS ON STRUCTURING BIDS

Based on the provisions of the 2013 guideline, DPR is required to issue the requirements for technical and commercial proposals to pre-qualified bidders. Whilst we expect the 2018 Guideline to contain similar requirements, there are no indications on what the requirements will be. We have however set out below a few tips for interested applicants to note when preparing their technical and commercial proposals. It is fundamental that potential bidders provide complete, comprehensive, and accurate information in their proposals to improve their prospect of being awarded a field.

- 1) The proposal must demonstrate the bidder's technical and managerial capability for development of a Marginal Field. This should include evidence of track record of upstream petroleum operations. Note that this was a pre-qualification requirement under the 2013 Guideline.
- 2) Key project personnel must be identified along with their experience in field development, field management and operations. This is to demonstrate that the key personnel have the requisite technical expertise to operate a Marginal Field as one of the major challenges experienced by previous marginal awardees was lack of technical expertise.
- 3) The proposal should contain a detailed field development plan and technology to be applied, as development of Marginal Field may sometimes require unconventional expertise and the use of enhanced oil recovery schemes.
- 4) The proposal should also set out a detailed financing plan and demonstrate the bidder's capability to raise the financing required from acquisition, field development up to production.
- 5) The proposal must clearly demonstrate the bidder's knowledge of best industry practice and intention to abide by it in the development and operation of the oilfield.
- 6) The proposal should set out the bidder's plans for compliance with environmental laws and standards, local content plan and plans for engaging or dealing with host community issues.
- 7) The proposal should demonstrate the bidder's ability to obtain relevant machinery and equipment required to undertake the field development and operation of the field.



Source: <https://www.manufacturing.net/news/2016/09/shell-says-fire-forces-closure-key-oil-pipeline-nigeria>

4.4 CRITICAL SUCCESS FACTORS TO ENHANCE COMMERCIAL VIABILITY OF THE ACQUISITION

There is considerable potential in the development of a marginal oil field in Nigeria. However, many operators have failed to utilize their fields due to several issues relating to lack of access to funding, wrong technical and financial partnerships etc. This section highlights some critical success factors which are catalytic to the successful acquisition and development of a Marginal Field.

A. Field Identification

Apart from the obvious economic considerations in choosing a field to bid for, environmental and social considerations, which are often overlooked at the bid stage, and other field properties should be taken into consideration. These include:

- i. **Communities:** Marginal fields are generally located in rural areas and require a major level of community involvement (consent and support of community leaders, and participation). In light of this, prospective bidders will need to consider the number of communities connected to the field and its evacuation facilities (i.e. pipelines). The more communities involved, the more engagement that will be required and such engagements may have financial implications which may not be quantifiable at the bid stage. An adequate community engagement plan will be required including the possibility of employing members to provide services within their skill set.
- ii. **Accessibility of the Field:** Prospective bidders will need to consider the location of the field and proximity of evacuation facilities (pipeline, terminal, gas processing facility etc.) to the field.
- iii. **Field Properties:** Bidders will need to carry out independent assessment of the field's reserve portfolio, field properties (including sub-surface properties) to determine if unconventional drilling methods or other enhanced oil recovery oil recovery methods will be required, as this will have an impact on the field development cost.

B. Project Sponsors Equity

Acquisition and development of a Marginal Oil field is a capital-intensive venture which will require patient sources of financing. It is therefore crucial for the Project Sponsors to have some equity. The timeline for undertaking field development (which could be up to or more than 36 months) makes it particularly unattractive for

commercial bank financing in Nigeria unless the Project Sponsors can provide alternative repayment source. Therefore, substantial part of the cost will have to be funded by equity either from the Project Sponsors or a technical/financial partner, and any debt obtained will be to supplement the equity.

Further, having equity gives the Project Sponsors more leverage in negotiations with counterparties. It also provides optimum return on investment, and generally makes the acquisition more commercially viable as financier/investors take cognisance of the Project Sponsors equity contribution.

C. Technical & Managerial Capability

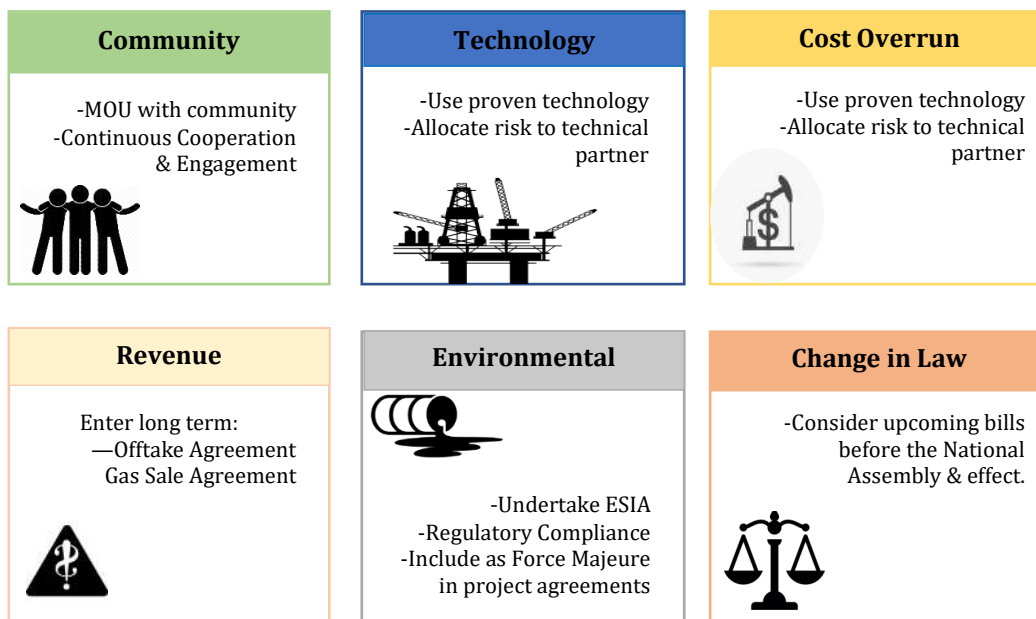
Requisite Technical and Managerial capability is central to the success of any project, and even more important when it relates to oil field projects which demand a high level of specific technical and managerial capability.

One of the challenges faced by Marginal field awardees in previous licensing round is the lack of technical expertise and entry into the wrong technical and financial partnerships. Therefore, to avoid a repeat of the mistakes of previous awardees, prospective bidders who lack the requisite expertise should partner with technical experts well versed in oil field operations, and if the bidder also lacks the financial capability, then such partnerships should be formed with a technical partner with the financial capability or demonstrable ability to raise the required financing.

To avoid entry into wrong partnerships, prospective bidders are advised to undertake adequate due diligence on their prospective Technical and Financial Partners prior to execution of any binding agreements and ensure that the partners have the requisite experience in oil field development and operation and demonstrate the ability to raise the required financing for development up to production stage.

D. Project Risk and Mitigation Strategies

The operation of a marginal oil field in Nigeria is associated with various risks. A detailed risk analysis must be undertaken at an early stage and all potential risks must be identified and appropriate mitigation plans must be put in place. Furthermore, there needs to be a proper inter-play of project documents to ensure risks are sufficiently allocated and mitigated back to back. The following are some risks that should be taken into consideration:



E. Sound Operational Plan

The commercial viability of any oil field project (including Marginal Fields) is largely dependent on the actual cost of operations in relation to its projected revenues. Project costs are likely to be higher than projected if unplanned technical difficulties occur or there is an unplanned extension of the project timeline. Therefore, a sound operational plan is required for efficiency and to mitigate against potential difficulties and cost overruns. The operational plan should be detailed and cover every activity to be undertaken, plan for shared facilities, evacuation plan, offtake, procurement of equipment etc.

F. Contractual Structure of Project Documents

The contractual structure of project documents is very key as it provides the legal basis and defines the obligations of parties involved including contractors. Given the likeliness of executing several contracts with different parties providing various services required for field operations, there is a need to ensure that there are no gaps in obligations. Further, there needs to be a proper

interplay of project documents to ensure risks are sufficiently allocated and mitigated back to back.

A simpler but usually more expensive approach is to have a primary contractor who will be the point of interface with the field operator. Such contractor will then sub-contract all other services. If this approach is taken, then there is a need to ensure that obligations under the sub-contracts align with the primary contractor's obligations under the main contract, and that the risks assumed by the primary contractor under the main contract are reflected in the sub-contracts.

G. Procurement of Guaranteed Offtaker

Procurement of guaranteed offtake is critical to the success of any project as it guarantees a revenue stream once the field starts producing. It is therefore crucial to procure credible offtaker(s) for crude and gas produced from the field. The term of such offtake agreement should be long enough to cover the tenor of any financing obtained for field development and operations, or the projected recovery period for development costs.

4.5 CONCLUSION AND RECOMMENDATIONS

Acquisition of Oil assets (including Marginal Oil Fields) can be a very lucrative venture but at a huge frontloaded cost particularly the cost of field development. It is therefore a high-risk, high reward venture particularly in Nigeria. Therefore, the importance of technical and financial capability of project sponsors, as well as other critical success factors highlighted above cannot be overemphasized.

It is also very important for project sponsors to have a robust financing plan for raising required equity, and partnership with the right technical and financial partner. As earlier stated, the nature of field development project makes it commercially unviable for traditional commercial bank lending in Nigeria therefore foreign funding sources and other creative financing options will need to be considered.

5. RENEWED FOCUS ON GAS UTILIZATION & MONETIZATION

5.1 ENERGY DEMAND OUTLOOK AND EXPERT PREDICTIONS

Summarized below are some expert predictions on Global Energy trends and outlook for gas demand in the Global energy mix with a view to highlight the potential for gas as a source of energy, and to make a case for renewed focus on gas production and development in Nigeria.

- i) The largest contribution to future energy demand is projected to come from natural gas with its share in global energy mix expected to increase by a significant 3.6 percentage points between now and 2040.⁹⁸
- ii) Oil and coal are expected to grow at much lower rates of 0.6% and 0.4% per annum respectively.
- iii) The share of gas in the global energy mix is expected to increase over the next 20 years and surpass coal as a second highest energy source by 2035. Although oil is expected to retain the largest share in global energy mix, however oil's share is expected to decline while gas is expected to increase.⁹⁹
- iv) The gradual transition in the global energy mix is set to continue with renewables together with nuclear and hydroelectric power, expected to account for half of the growth in energy supplies over the next 20 years.¹⁰⁰ However, given that the current base of renewables in the global energy demand mix is low, at about 1.4%, the share of renewables is anticipated to be below 5.5% by 2040 despite its impressive growth.¹⁰¹
- v) LNG is expected to grow seven times faster than pipeline gas trade, such that by 2035 it accounts for around half of all globally traded gas - up from 32% now, with Asia being the largest destination for LNG.
- vi) The share of imported gas in total consumption in Europe is expected to rise from around 50% in 2015 to nearly 80% by 2035, and LNG imports are expected to supply around two-thirds of the increase in imports.¹⁰²
- vii) A faster mobility revolution could disrupt oil demand. It is projected that the number electric cars are expected to rise from 1.2 million in 2015 to around 100 million by 2035.¹⁰³ It should be noted that Cars currently account for a fifth of global fuel demand. A shift to electric vehicles will necessarily reduce demand for oil but contribute to the demand for gas (which is the main source of fuel for power generation).
- viii) Global policy trends towards lower carbon emissions and cleaner energy would also have an impact on reduction in demand for oil and increase in demand for gas. For instance, the UK and France have announced plans to ban the sale of new petrol or diesel cars by 2040¹⁰⁴, and China (world biggest car maker) is said to be considering a similar measure.¹⁰⁵ The US on the other hand requires car manufacturers to achieve average fleet-wide fuel efficiency of more than 50 miles per gallon for 2022-2025 model year vehicles¹⁰⁶, compared to less than 30 miles per gallon in 2015.¹⁰⁷

5.2 NIGERIA'S GAS POTENTIAL

Nigeria is endowed with abundant natural gas resources, which in energy terms, is more than the Nation's proven crude oil reserve. According to the Oil and Gas Journal, at the end of 2015, the Nation had an estimated 180 trillion cubic feet (Tcf)¹⁰⁸ (5475.2 Billion standard cubic meters)¹⁰⁹ of proven natural gas reserves, making Nigeria the ninth-largest natural gas reserve holder in the world and

the largest in Africa. However, despite the country's surplus natural gas resources, only a small fraction of this quantity is currently being utilized. This reserve estimate indicates an inherent possibility of exploiting Nigeria's gas reserves for many more years to come.

Figure 15 compares Nigeria's gas marketed production with other countries with similar or less reserves.¹¹⁰

Figure 15 – Comparative Analysis of Nigeria's Gas Production

Reserves Position	Country	Reserves as at 2016 (billion s cu m)	Marketed Production (million scu m) 2014	Marketed Production (million scu m) 2015	Marketed Production (million scu m) 2016
7 th	United Arab Emirates	6091.0	54,244.6	60,181.0	61,083.7
8 th	Venezuela	5,739.7	21,878.0	26,004.4	27,718.0
9 th	Nigeria	5,475.2	43,841.6	45,148.1	42,562.4
10 th	Algeria	4,504.0	83,295.6	83,040.7	93,152.0
11 th	Iraq	3,819.9	7,927.2	7,685.4	10,416.4
12 th	China	3,610.7	128,481.0	133,279.0	136,628.0
13 th	Australia	3,205.0	53,771.0	53,125.0	56,293.0
14 th	Indonesia	2,775.1	70,891.0	70,274.0	74,026.0
15 th	Malaysia	2,740.0	65,421.0	63,433.0	64,428.0

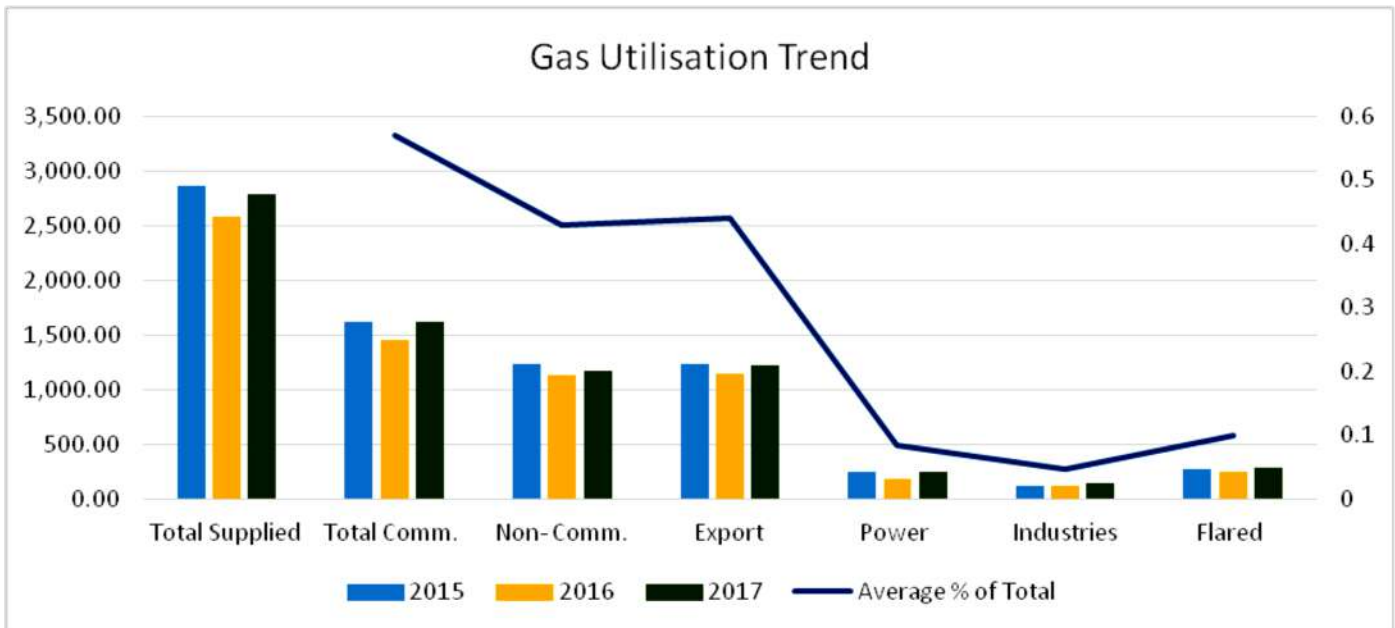
The table above indicates that, apart from Venezuela and Iraq, other countries with comparable gas reserves produce more gas than Nigeria. For instance, Algeria (the country with the second largest reserve in Africa produces twice as much gas as Nigeria while China with significantly less reserves produces three (3) times Nigeria's gas production. This lends credence to the fact that Nigeria is producing significantly less than its potential.

5.3 NIGERIA GAS COMMERCIALIZATION/UTILISATION TREND

A review of the gas utilisation trend in Nigeria over the last three (3) years (2015, 2016, and 2017) indicates that an average of 57% of gas produced in Nigeria is commercialized while the remaining 43% is utilized for either fuel, re-injection or flared. The figures also reveal that an average of 44% of total production is exported while an average of 13% is supplied to the domestic market with the Power Sector utilizing an average of 8.35% over the same period while industries utilized 4.77%. Figure 16 below provides a breakdown Nigeria's gas production and utilisation trend over the period.

Figure 16: Gas Utilization Trend

Year	Total Supplied	Total Comm. BCF	Non- Comm. BCF	Export BCF	Power BCF	Industries BCF	Flared BCF
2015	2,858.36	1,622.01	1,236.35	1,241.56	254.44	126.01	271.38
2016	2,581.42	1,448.91	1,132.52	1,141.75	189.42	117.74	244.84
2017	2792.11	1619.36	1172.75	1227.41	243.28	148.67	287.59
Total	8,231.89	4,690.28	3,541.62	3,610.72	687.14	392.42	803.81
Average %	N/A	57%	43.0%	44%	8.35%	4.77%	10%



In total, an average of 90% of gas produced in Nigeria over the period was utilized while 10% was flared.¹¹¹ While this may appear fine on the face of it, the total amount of flared gas is higher than the quantity of gas supplied to the Power Sector over the same period and more than double the quantity of gas supplied to industries. Therefore, the starting point for achieving increase in gas monetization and supply to the domestic market is to reduce or eliminate gas flaring.

5.4 FACTORS LIMITING NIGERIA'S GAS POTENTIAL

The following are some of the factors limiting Nigeria's gas potential:

1. Commerciality of supply to the Local market

The commerciality of supply can be looked at from two standpoints, first being the local pricing regime and second being the inability of local off-takers to meet payment demand. The price of gas in Nigeria was kept artificially low for a long period of time which made it uneconomical for international oil companies (IOCs) (who owned majority of Upstream Assets) to develop the required infrastructure for gas utilisation.

Though the provisions for domestic gas supply obligation in the National Gas Master Plan is aimed at obliging gas producers to supply gas to local off-takers (especially the power generating companies and strategic industrial sectors), the indigenous offtake market is not commercially viable due to the enforced pricing and inability of buyers (particularly power sector off-takers) to fulfil their financial obligations.

2. Illiquidity of the Power Sector

The Power Sector is the single largest domestic off-taker utilizing about 63% of gas supplied to the domestic market. However, the Power Sector has been plagued by liquidity issues across the value chain even after privatization. Coincidentally, the

Power Sector also has the most potential for utilization of gas supply to the domestic market. Nigeria currently has installed capacity of 12,522 MW¹¹² but generates slightly over 4,000MW out of which an average of 3,393 MW is generated by gas fired power plants.

This fact coupled with other power generation projects in the pipeline makes the Power Sector a ready market for increased domestic utilisation of gas. Therefore, the need to promptly resolve the liquidity issues within the power sector is critical to the rapid development of the domestic gas sector, and a strong catalyst for economic growth.

3. Infrastructure Deficiency

Natural gas production is constrained by the lack of infrastructure which permeates the entire gas sector value chain. This is due to several factors such as uncertainty of regulatory regime, unviability of the sector due to pricing regulations and security challenges, and lack of adequate funding on the Government's side of its commitments under Joint Venture agreements with IOCs. Although there have been increased efforts by the IOC's towards funding Infrastructure in the gas sector, there is still a need for increased Government and private sector investments in infrastructural development in the Gas sector.

4. Insecurity of Supply Channels

The insecurity of supply infrastructure continues to be a major deterrent for development of new infrastructure and investment in the gas sector. The production to end-user cycle for gas in Nigeria suffers from frequent outages due to vandalization of the transportation lines. The frequent outages in supply erodes confidence and reliability in gas supply for gas-based industries, such as cement factories, fertilizer plants etc. For instance, a total of 1,174 pipeline vandalized points was recorded by NNPC between August 2016 and August 2017.

5. Lack of enforcement of Gas Flaring Prohibition Legislations

The inability of the Federal Government to enforce provisions on gas flare penalties cost the country \$14.298 billion between April 2008 and October 2016.¹¹³ According to NEITI audit, some of the issues with assessment and collection of gas flare penalties include:

- a) Inadequate measurement infrastructure to determine quantity of gas flared resulting in underassessment of gas flared penalties;
- b) Non-compliance with the 2008 Gas flaring penalty rates and lack of political will to implement the new rate. The new rate imposed by the 2008 regulation is \$3.50 for every 1000 standard cubic feet (as against the old rate of N10 which still

applies); and

- c) Lack of an enabling legal and regulatory environment to encourage development of gas infrastructure.¹¹⁴

It should however be noted that a new gas flaring bill, the Gas Flaring (Prohibition and Punishment) Bill 2017 is pending before the National Assembly. If enacted, it provides more stringent regulation for gas flaring and may be a catalyst to achieving the 2020 gas flare out deadline set by the DPR.

- 6. **Uncertainty of Regulatory Regime and Administrative Bottlenecks:** There is a regulatory deficiency attributable to the multiplicity of regulatory policies. In addition, the continuous participation of the government in the sector in different capacities such as policy-maker, planner, investor, and regulator of the sector creates conflict of interests and inhibits steps to achieve full privatization of the sector.

- 7. **Oligopoly of Gas Facilities:** Majority of gas transmission pipelines, processing facilities and other associated infrastructure are currently owned and operated by government agencies and/or IOCs. This subsisting market structure creates an oligopoly which poses significant barriers to entry for 3rd parties to participate in the gas market.

5.5 GOVERNMENT POLICIES: RENEWED FOCUS ON GAS

In recognition of the potential role of gas in acceleration of Nigeria's industrial development and economic recovery, and in view of its connection to the Power, Industrial, and Agricultural sectors, the government has set out, as part of the objectives of the 7 Big Wins¹¹⁶, to remedy the challenges in the gas sector through robust policies and laws to drive efficiency, encourage investments and improve local participation in the sector. The implementation strategy to achieve these objectives include:

- a. Creation of a Governance framework (legal/regulatory, institutional, commercial, fiscal) that addresses and situates Gas as a "standalone commodity;"
- b. Development of an industry structure that clearly

defines the roles of all stakeholders and shows a clear market structure identifying investment opportunities along the value chain;

- c. Promoting investment in gas development, identifying key infrastructure projects and opening the mid-stream to private investments;
- d. Building gas markets by tapping into the existing demand pool and creating new demand areas;
- e. Building technical competency within the industry; and
- f. Providing policy framework to support gas exploration as a quick win mechanism to facilitate growth of national gas reserves.

In furtherance of this objective, the Federal Government released a National Gas Policy (approved by the Federal Executive Council) in June 2017. Below is an analysis of the some of the main aspects of the Gas Policy:

S/N	Key Provisions/Objectives	Comments/Analysis
1.	<p>Governance (Legislation and Regulation).</p> <p>The government seeks to establish a new regulatory structure for gas by:</p> <p>a) Passage of new gas legislation which will, amongst other things:</p> <ul style="list-style-type: none"> • separate upstream from midstream; • emphasize gas as a fuel in its own right; • separate gas infrastructure ownership and operations from gas trading; and • set out a new fiscal regime. <p>b) Establishment of a single independent petroleum regulatory authority for the whole petroleum sector.</p>	<p>The following are some of the actions taken so far to achieve these objectives:</p> <p>i. The Petroleum Fiscal Policy which sets out the new fiscal regime, seeks to disallow the treatment of investments for gas utilisation as part of oil field development thereby preventing the tax deductibility of gas investments from oil income. The rationale being to create a level playing field for new entrant with no oil assets. It is however our view that the illiquidity of the domestic market should be fully resolved prior to implementation of this provision in order not to discourage investments by upstream companies with assets.</p> <p>ii. The government has taken the lead in separation of gas infrastructure ownership from trading by breaking up the Nigerian Gas Company (NGC) into two entities.¹¹⁷</p> <p>iii. The Petroleum Industry Governance Bill makes provisions for the establishment of single independent petroleum regulator.</p>
2.	<p>A new Industry Structure which entails:</p> <p>a) A clear separation of roles between the government and the private sector;</p> <p>b) Streamlining the role of government agencies;</p> <p>c) A move towards wholesale markets;</p> <p>d) Strict compliance with domestic supply obligations;</p> <p>e) Review of the Gas Aggregation Policy and determination of most efficient role for GACN¹¹⁸</p>	<p>The policy proposes to limit the role of government to policy setting, legislation, encouraging payment discipline etc. while the private sector will be responsible for creating the markets.</p> <p>It should be noted that this proposed clear division of roles will take considerable time to achieve as the government continues to be a key player in the market (as marketer, transporter, investor etc.).</p>
3.	<p>Developing Gas Resources which entails:</p> <p>a) Diversification of Supply Sources;</p> <p>b) Identification of Low Cost Gas Resources;</p> <p>c) Clarifying Gas Terms for PSCs;</p> <p>d) Gas Flare-out through gas utilisation projects, and review of gas flare penalties;</p> <p>e) Requirement of gas field development plans for all field developments;</p> <p>f) Development of a Gas Resources Management Plan.</p>	<p>i. The government seeks to diversify gas sources from Niger Delta and have identified other potential sources for gas including the Benue Trough and other sedimentary basins. However, the strategy for implementation was not articulated in the Policy.</p> <p>ii. For PSCs, the government is seeking to develop a model Gas Development Agreement containing terms for the development of gas resources in PSC concessions. Nigerian PSCs currently do not contain any commercial terms for development of gas discovered.</p> <p>iii. The purpose of the Gas Development Management Plan is to:</p> <ul style="list-style-type: none"> • identify gas resources in different geological areas; • identify current and potential gas markets; • identify infrastructure needs; and • analyse how best to access low cost gas for delivery to domestic gas markets.

S/N	Key Provisions/Objectives	Comments/Analysis
4.	<p>Infrastructure Development. This entails:</p> <ol style="list-style-type: none"> Identification of critical gas infrastructure projects; Upgrade of existing NGPTC pipeline network; Development of alternative gas transport options (CNG by road, rail, barge; LNG by road, rail, barge, and other virtual pipeline options); Liberalization of entry into mid-stream and incentivise private investors to develop infrastructure for processing, transportation, and storage of gas. 	<p>Some of the key projects identified include:</p> <ul style="list-style-type: none"> • Aba-Owerri-Nnewi-Onitsha Pipeline Project; • Calabar-Ajaokuta Pipeline (CAP) Project; • Ajaokuta-Kaduna-Kano (AKK) Pipeline Project; • ELP-Ibadan-Jebba Pipeline Project; • Obiafu-Obrikom-Oben (OB3) Pipeline Project; • Expansion of ELP Phase 2 Project; • Oso Platform to QIT Pipeline Project; • Erha / Bosi Pipeline Project; and • Trans-Sahara Gas Pipeline Project.
5.	<p>Building Gas Markets by:</p> <ol style="list-style-type: none"> Identifying and developing clusters and industrial parks; Implementing Project based approach to development of gas projects; Exploring alternative markets and uses for Gas including Liquefied Petroleum Gas (LPG), Natural Gas Vehicles (NGVs), LNG Vehicles, LNG for agriculture and agro-allied industries, Compressed Natural Gas etc.; Development of OK and Brass LNG projects and other LNG projects; Improvement of supplies through the West African Gas Pipeline and development of the Trans-Saharan Gas pipeline; and Development of a model for domestic LPG market. 	<ol style="list-style-type: none"> For identification of project clusters, studies are to be carried out to identify areas that could form anchor loads for a gas project. The government's intention is to facilitate the development of the gas projects while the private sector develops the projects. Targeted projects include Petrochemical Plants, Fertilizer Plants, Embedder Power Plants, CNG plants etc. The Policy proposes a move towards a project-based and market opportunity-led approach, rather than a centrally planned national gas market development. This is a welcome development if followed through as it will ensure projects are implemented on sound economic principles. To support the goal of improving the development of LPG infrastructure, such as cylinder manufacturing plants, mini-gas plants, gas plants and trucks, an LPG Availability Gas Intervention Fund of Sixty Billion Naira (N60,000,000,000) is to be established by the Government.

5.6 GAS MONETIZATION OPTIONS AND PROJECT ESSENTIALS

5.6.1 Liquefied Natural Gas (LNG)

LNG is formed through a liquefaction process whereby natural gas is cooled to approximately -162°C (-260°F), and transforms into a clear, colourless, non-toxic liquid that is around 1/600th of the original volume of natural gas. This reduction in volume enables LNG to be transported economically over long distances.

The foremost LNG company in Nigeria is the Nigeria LNG Limited (NLNG) which was incorporated as a limited liability company on May 17, 1989 to harness Nigeria's vast natural gas resources and produce Liquefied Natural Gas (LNG) and Natural Gas Liquids (NGLs) for export. The LNG plant located in Bonny Island Rivers State currently has 6 trains in operation and capable of producing 22 million tonnes per annum of LNG and 5 million tonnes per annum of NGL from 3.5 billion (standard) cubic feet per day of natural gas intake.¹¹⁹ The

government is seeking to increase its LNG exports with 2 additional LNG projects, namely the Brass LNG¹²⁰ and Olokola LNG,¹²¹ as well as increasing the capacity of NLNG by building train 7 that will lift the total production capacity to 30 million tonnes per annum of LNG.¹²²

The following factors indicate the opportunities for LNG as a gas monetization option:

- OPEC has predicted that the demand for gas as an energy source is expected to grow annually between now and 2040 and its share in the global energy mix is expected to increase significantly within the same period;¹²³
- LNG imports are expected to supply a significant proportion of the demand growth. For instance, it is estimated that LNG will supply 50% of China's natural gas imports, and two-third of Europe's 80% gas consumption by 2035;¹²⁴

- iii) Though Nigeria's LNG is focused towards exports, LNG can also be supplied to domestic markets, as it can be transported through alternative means such as LNG Trucks by road or vessels by inland waters; and
- iv) With the problem of pipeline vandalism, LNG provides a suitable and cheaper alternative means of transporting gas in large volumes.

5.6.1.1 Key Considerations in Developing an LNG Project

The key considerations in developing an LNG project will vary depending on the LNG project structure involved. LNG projects can be categorized into the following three broad categories:

- i) **Fully integrated project structure:** LNG projects developed by upstream gas producers or E & P companies as part of upstream operations;
- ii) **LNG Project Company structure:** LNG projects developed by a company with no upstream gas asset. The company may however be owned by upstream companies who have set it up as a separate entity to undertake the project, or by project sponsors with no upstream assets; and
- iii) **LNG Tolling Structure:** LNG projects set up to provide liquefaction services to gas producers or gas owners who pay a tolling fee for the service.

The following are some key considerations in developing an LNG project:

- a. **Contractual Structure:** developing LNG projects entail the entry into several agreements which includes, agreements in respect of purchase of natural gas (for Project Company Structure); construction, financing, and operation of the LNG Plant; LNG processing agreements (for Tolling Structure); and transportation and sales of the LNG produced. These agreements must align for successful development of the project.
- b. **Target Market and Offtake:** it is important to establish a target market for the LNG project and execute offtake agreements for the sale of the LNG produced. Modalities relating to transportation of the LNG should also be considered particularly for supply to the domestic market.
- c. **Bankability Considerations:** development of liquefaction plant is the most complex and capital-intensive aspect of the LNG value chain. Therefore,

the project must be commercially viable based on its economics and must be capable of attracting external financing. From a financier/lender standpoint, the following factors are considered critical for bankability of an LNG project:

- i) For integrated LNG projects, the primary concern will be the security package in view of the restrictions¹²⁵ in taking security interest over oil and gas assets. Otherwise, integrated projects are deemed bankable as it combines both upstream and midstream aspects of the value chain, and the credit worthiness of the project sponsors (upstream companies) are taken into consideration;
- ii) For LNG project Company Structure, lenders will typically consider the overall economics of the project, risk profile, project-on-project risks which must be adequately mitigated. Consideration will also be given to the terms and conditions, and obligations under the key contracts. For instance, obligations of an LNG project company under its LNG offtake contracts must be covered by the terms of its gas supply agreements; and
- iii) For tolling structure: the key focus will be on the tolling fee, payment terms and projected usage rate of the LNG facility. Consideration will also be given to credit worthiness of LNG company's counterparties.
- d. **Other project essentials:** these include (but not limited to):
 - i) Location of the Plant: the plant must be located in close proximity to gas fields in order to mitigate against supply disruption due to pipeline vandalism. The Plant must also be located in close proximity to the chosen mode of transportation of the LNG produced. If the chosen mode of transportation is by water, then the plant should be reasonably close to a terminal or jetty, and if by road, the location of the plant must be accessible to LNG Trucks.
 - ii) Regasification facilities: the availability of regasification facility to the target market should be considered if the LNG is to be supplied to the domestic market. Depending on the contractual structure of the offtake agreements, the LNG company may be required to procure the regasification for supply to its offtakers at a cost.



Source: <http://www.lngworldnews.com/u-s-lng-exports-hit-record-high-in-january/>

5.6.2 Natural Gas to Power

As earlier stated, the Power Sector provides the best opportunity for utilization of gas, as the current level of power generation about 4,660MW (average peak generation for April 2018) is significantly lower than Nigeria's current installed capacity of 12,522MW¹²⁷ and national peak demand forecast of 19,100MW. The Energy Commission of Nigeria estimates that the electricity demand would hit 250,000MW by 2030.¹²⁸ The following factors create opportunities for gas to power projects:

- a) Gas is the dominant feedstock for power generation in Nigeria. Over 85% of the current power generation is generated by thermal plants¹²⁹ and majority of the unused installed capacity are thermal plants;
- b) Nigeria's current generation output is vastly insufficient to meet the current demand for power which as at 2015, was estimated to be about 31,240 MW;¹³⁰
- c) There is a recent deliberate move towards off-grid power generation solutions to augment the shortfall from the national grid. To this end, NERC has encouraged Power Distribution Companies (Discos) to procure embedded generation solutions from 3rd party power developers to meet the power supply shortfall from the national grid; and

- d) Recently NERC published Eligible Customer Regulation which provides guidelines pursuant to which a power generator with uncontracted capacity can supply directly to Eligible Customers (i.e. unserved or underserved customers who meets the eligibility criteria under the regulation).

However, supply of gas power is not without its challenges which includes illiquidity of the power sector (particular in respect of grid supplied power) and gas pricing regulation for gas supplied to the power sector. The opportunity therefore lies in off-grid power projects where the gas supplier can obtain an enforceable payment security and improved tariff.

The following are some key considerations in developing natural Gas to Power Project:

- a) Licensing and Regulatory Approvals: certain licenses and approvals will be required to undertake a gas to power project and this depends on the focus of the project sponsor. For regulatory approvals or licenses relating to gas processing and sales, the appropriate authority is the DPR, while for electricity generation, the applicable regulatory agency is NERC. Interface with other regulatory agencies (including Ministry of Environment etc.) will be required depending on the nature of the Project.

- b) **Guaranteed Offtake/Supply:** To guarantee the success of any gas to power project, it is essential to procure a credible offtaker and credible gas supplier, with obligations secured by an irrevocable payment security and take or pay obligations.
- c) **Project Documentation:** The bankability of the project documentation will determine if a gas to power project can attract external financing. The key documents in gas to power projects would be the Gas Sale and Purchase Agreement (GSPA) and the Power Purchase Agreement. Both Agreements would have to be aligned in terms of risk in order to reduce the exposure of the Project Sponsor. The following are some key elements which must be addressed in the PPA:
 - i) The counterparty must be credible, and its obligations backed by payment security;
 - ii) The tariff under the PPA must be such that it would be sufficient for the gas to power developer to make payments to its gas supplier;
 - iii) All payments by the off-takers should be without withholding, deduction, set-off or counterclaim;
 - iv) The governing law and dispute resolution

mechanics must be acceptable to the financiers; and

- v) The PPA must place a firm obligation on the Off-takers and guarantee a minimum offtake per relevant period (e.g. monthly or quarterly).

5.6.3 Liquified Petroleum Gas (LPG)

LPG is composed of propane and butane (generally approximately 50% each) and is produced as a by-product from refining crude oil or processing natural gas. LPG is usually stored and pressurized as liquid in cylinders or tanks. Production of LPG in Nigeria is currently approximately 4 metric tonnes per annum, largely for exports. Presently, the major supply source of LPG in the country is from the gas processing facilities especially the Nigerian LNG (NLNG) company.¹³¹

Nigeria's LPG consumption is about 320,000MT as at 2015,¹³² with NLNG supplying about 250,000MT, and the remaining 70,000MT coming from other sources, including the Nigerian National Petroleum Corporation (NNPC) and imports. The proposal to increase the capacity of the NLNG through the construction of 2 additional trains is expected to also boost the production of LPG.



Source: <http://lpgservicesnigeria.com/gallery-projects/lpg-tank-projects/>

The following factors indicate that there is significant opportunity for LPG penetration, as an effective gas monetization option:

- i) LPG only accounts for approximately 5% of household energy mix in Nigeria and is the least utilized of the four major cooking fuels used in Nigeria. According to the National Gas Policy, approximately 30 million households still depend on wood as a source of energy. This means there is significant room for LPG penetration;
- ii) Industrial applications of LPG are also currently low which is largely due to the cost of switching from diesel source to LPG;
- iii) There are opportunities for LPG as a source of fuel for off-grid power generation. However, there are only a few LPG-to-Power applications in Nigeria. According to the National Gas Policy, this is largely due to scarcity of LPG generators, bulk storage tanks, vaporizers etc. Investment in LPG infrastructure will increase its utilization as a fuel source;
- iv) To support the development of LPG infrastructure, the Federal Government is proposing to provide an intervention facility, "LPG Availability Gas Intervention Facility" of Sixty Billion Naira (N60,000,000,000). Provision of this facility will encourage development of LPG infrastructure and

resolve the critical issue of availability of financing.

However, one of the critical challenges to LPG utilisation in Nigeria is the Tax Regime. Currently, VAT is payable on locally produced LPG while imported LPG is not subject to VAT, which essentially discourages local production of LPG. While this problem was noted in the National Gas Policy, there is no clear indication of government's plan to rectify the situation.

5.6.4 Compressed Natural Gas

CNG involves compressing natural gas to less than 1% of its volume at standard atmospheric pressure. It is stored and distributed in hard containers, usually in cylindrical or spherical shapes. CNG can be considered attractive especially in areas where there is no access to a gas pipeline and is also considered as a cheaper alternative to LNG due to high cost associated with LNG liquefaction and regasification facilities, and due to community or safety issues. The use of CNG is still a maturing concept in Nigeria but there are however a few power plants that rely on CNG as the relevant feedstock such as Island Power Plant located in Lagos. Additionally, the Federal Government through the Nigerian Gas Company in collaboration with NIPCO Plc are in the planning phase for a Benin City CNG Project¹³³ which seeks to establish CNG filling stations.

5.7 CONCLUSIONS AND OUTLOOK FOR GAS DEVELOPMENT IN NIGERIA

As previously stated, Nigeria's gas potential is immense but gas as an energy source is under-utilized as a result of the challenges (outlined in 5.4 above) and government focus on Oil. However, with the renewed focus on gas and government objectives to move Nigerian economy from oil to gas (as outlined in the National Gas Policy), Gas production and utilisation is expected to increase steadily over the next few years. However, for Nigeria to achieve its gas potential, the challenges plaguing the sector need to be resolved, starting with the following:

- i. the commerciality of supply to the domestic market needs to be improved. A starting point will be to resolve the liquidity issues plaguing the power sector;
- ii. creation of an enabling environment for investment by creating regulatory certainty. The starting point will be the passage into of all pending laws relating to the Oil and Gas sector; and
- iii. challenges in raising financing from local financial institutions needs to be resolved. A good starting point will be the creation of a single digit intervention facility which will be accessible by project sponsors seeking to undertake gas utilisation projects particularly in the mid-stream and down-stream.

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