



FEDERAL REPUBLIC OF NIGERIA

Ministry of Petroleum Resources



National Gas Policy

Nigerian Government Policy and Actions

2016

THE GOVERNMENT OF THE FEDERAL REPUBLIC OF NIGERIA

NATIONAL GAS POLICY

The purpose of this document is to define the policy of the Federal Government in respect of Nigeria's natural gas endowment, establish its medium to long-term targets for gas reserves growth, utilisation and record strategies to be pursued to ensure the successful implementation of the policy in accordance with Nigeria's national socio-economic development priorities.

DRAFT FOR CONSULTATION

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ABBREVIATIONS

AfDB	African Development Bank
AG	Associated Gas
AGFA	Associated Gas Framework Agreement
BoI	Bank of Industry (Nigeria)
BPE	Bureau for Public Enterprise
Btoe	Billion tons oil equivalent
CBN	Central Bank of Nigeria
CO ₂	Carbon Dioxide
CCGT	Combined Cycle Gas Turbine
CDM	Clean Development Mechanism
CNG	Compressed Natural Gas
CPF	Central Processing Facility
CSR	Corporate Social Responsibility
DG	Distributed Generation
DISCO / Disco	Electricity distribution company in Nigeria
DPK	Dual Purpose Kerosene
DPR	Department of Petroleum Resources
DSO/DGSO	Domestic Gas Supply Obligation
ECN	Energy Commission of Nigeria
EIA	Environmental Impact Assessment
EITI	Extractive Industries Transparency Initiative
ELPS	Escravos Lagos Pipeline System
EPP	Export Parity Price, a netback gas price from export price
ESIA	Environmental and Social Impact Assessment
ESMAP	Energy Sector Management Assistance Program
EU	European Union
EUD	European Union Delegation
FGN	Federal Government of Nigeria
LPG	Liquefied Petroleum Gas
NALPGAM	Nigerian Association of Liquefied Petroleum Gas Marketers
FME _{env}	Federal Ministry of Environment
FID	Final Investment Decision
FMITI	Federal Ministry of Industry Trade and Investment
FMP	Federal Ministry of Power
(F)MPR	Federal Ministry of Petroleum Resources
FEED	Front End Engineering and Design
FRGA	Fiscal Rules of General Application
GACN	Gas Aggregation Company of Nigeria

Genco	Generation company
GGFR	Global Gas Flaring Reduction
GMP	Gas Master Plan
GSA	Gas Sales Agreement
GSAA	Gas Sales and Aggregation Agreement
GT	Gas Turbine
GTA	Gas Transport Agreement
GTLs	Gas to Liquids
GTS	Gas Transmission System
IEA	International Energy Agency, Paris
IFC	International Finance Corporation
IFI	International Financial Institution
IMF	International Monetary Fund
IPP	Independent Power Producer
ISO	International Standards Organisation
	Independent System Operator
JV	Joint Venture
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LRMC	Long Run Marginal Cost
MOU	Memorandum of Understanding
MW / MWh	Mega Watts / Mega Watt hours
MT	Metric Tonnes
MYTO	Multi-Year Tariff Order
NAG	Non-Associated Gas
NAPIMS	National Petroleum Investment Management Services
NBET	Nigerian Bulk Electricity Trading Plc
NBP	National Balancing Point
NCDMB	Nigeria Content Development Management Board
NERC	Nigerian Electricity Regulatory Commission
NG	Natural Gas
NGMC	Nigerian Gas Marketing Company
NGPTC	Nigerian Gas Processing and Transportation Company
NGCC	Nigerian Gas Cylinder Manufacturing Company
NNPC	Nigerian National Petroleum Corporation
NGL	Natural Gas Liquid
NGMC	Nigeria Gas Management Company
NGO	Non-Government Organisation
NGV	Natural Gas Vehicles
NIS	Nigeria Industrial Standards
NLNG	Nigeria Liquefied Natural Gas
NLPGA	Nigeria Liquefied Petroleum Gas Association

NNPC	Nigerian National Petroleum Company
NOC	National Oil and Gas Company
NPC	Nigerian Planning Commission
NPDC	Nigerian Petroleum Development Company Limited
NPMC	Nigeria Petroleum Marketing Company (formerly PPMC)
OB3	Obiafu-Obrikom-Oben gas pipeline
OCGT	Open Cycle Gas Turbine
OGGS	Offshore Gas Gathering System
OK LNG	Olakola Liquefied Natural Gas Project
OPEC	Organisation of Petroleum Exporting Countries
PIB	Petroleum Industry Bill
PPA	Purchase Power Agreement
PPMC	Petroleum Products Marketing Company (now NPMC)
PPP	Public Private Partnership
PPRA	Petroleum Products Pricing Regulatory Authority
PRG	Partial Risk Guarantee
PSC	Production Sharing Contract
PTDF	Petroleum Technology Development Fund
PTFP	Presidential Task Force on Power
PTI	Petroleum Training Institute
RE	Renewable Energy
SCADA	Systematic Control And Data Acquisition
scf	standard cubic feet
SON	Standards Organisation of Nigeria
SPDC	Shell Petroleum Development Company
TCN	Transmission Company of Nigeria
TVET	Technical & Vocational and Educational & Training
US / USA	United States of America
VAT	Value Added Tax
WAGP	West African Gas Pipeline
WAGPA	West African Gas Pipeline Authority
WB	World Bank
WLPGA	World Liquefied Gas Association

Units

B / Bn	billion
bcf / bcf/d / bcf/a	billion cubic feet / billion cubic feet per day / bcf per year
bcm	billion cubic metres
bcma	billion cubic metres per year
bbl	barrel
GW	Giga Watts
kg	kilogram
m	million
M	thousand
MW / MW/h	Mega Watts / Mega Watts hours
MM	million
MMbtu	million British thermal units
MMscf	million standard cubic feet
MMscf/d	million standard cubic feet per day
Mscf	thousand standard cubic feet
mt	million metric tonnes
mtpa	million metric tonnes per year
scf	standard cubic feet
t	metric tonne

Currencies

N / NGN	Naira
£	Pounds Sterling
€	Euro
\$ / US\$ / USD	United States Dollar
¥	Yuan

1. EXECUTIVE SUMMARY

Statement of Gas Policy

This Policy articulates the vision of the Federal Government of Nigeria, sets goals, strategies and an implementation plan for the introduction of an appropriate institutional, legal, regulatory and commercial framework for the gas sector. It is intended to remove the barriers affecting investment and development of the sector. The policy will be reviewed and updated periodically to ensure consistency in Government policy objectives at all times.

Government shall abide by the provisions of this policy unless and until reviewed or replaced by a formal restatement of policy duly gazetted by the Government.

Background – A Much More Constrained International Business Environment

For approximately the ten years until around 2014, Nigeria was exposed to a very benign international environment, with high gas prices, strong global demand for gas and LNG, and large flows of investment looking for opportunities in emerging markets for gas based industrialisation (such as petrochemicals, methanol, fertilisers).

Those benign times have now passed and the international business environment is now much tougher. International gas prices have fallen, huge new volumes of gas and LNG supplies are coming on stream globally, against reduced forecasts of market demand growth. Meanwhile, global investment flows are leaving emerging markets. Even within Africa, Nigeria is competing for investment with Southern and Eastern Africa.

Background – Gas Master Plan

This gas policy is based on a fundamental review of the policy positions of the Government over the last ten years in respect of Nigeria's gas resources.

The previous policy positions emanated from the Gas Master Plan, which was designed to ensure the development of a full blown domestic market by 2015. However, with minimal investments made in the gas sector over the period, the Plan has not delivered on all its set targets. For example, Nigeria still lacks critical gas infrastructure and continues to fall short of Domestic Gas Supply Obligations.

Nigeria is experiencing a full-blown energy crisis in spite of its abundant gas resources. A new gas policy that is more effective and adjusted for the much harsher international gas business environment is required to drive the institutional reforms and regulatory changes necessary to attract investment into the sector.

Vision: *“To be an attractive gas-based industrial nation, giving primary attention to meeting local gas demand requirements, and developing a significant presence in international markets”.*

Mission: *“To move Nigeria from a crude oil export-based economy to an attractive gas-based industrial economy”.*

The gas policy intends to move Nigeria from an oil-based to a gas-based industrial economy. This gas-based industrialisation will be driven by some **CORE PRINCIPLES**:

- Separate activities between the government and private sector;
- Establish a single petroleum regulatory authority;
- Implement full legal separation of the upstream from the midstream;
- Implement full legal separation of gas infrastructure ownership and operations from gas marketing;
- Realise more of the LNG international downstream value, through retaining ownership of molecules and through direct international gas marketing;
- Pursue a project-based rather than centrally-planned domestic gas development approach;
- Make a strong maintenance and safety culture a priority;
- Implement international best practice for environmental protection;
- Establish strong linkages with electric power, agriculture and the real sectors;
- Establish payment discipline throughout the energy chain;
- Honour stability of contract terms;
- Protect security of assets;
- Ensure compliance with the Nigerian Content Act.

The main aspects of the gas policy now cover:

1. Governance (Legislation and Regulation):

- a. Single independent petroleum regulatory authority;
- b. Emphasis on onshore domestic petroleum safety compliance;
- c. Full legal separation of the upstream from the midstream;
- d. Full legal separation of gas infrastructure ownership and operations from gas trading;
- e. Introduction of a relevant gas network code;
- f. Pricing:
 - i. Upstream gas price set by netback from export parity price during transitional period;
 - ii. Market-led wholesale gas pricing after the transitional period;
 - iii. Triggers for announcement of competitive wholesale market;
 - iv. LNG export tolling price;
 - v. Cost benchmarking for infrastructure facilities;
- g. Fiscal framework which recognises gas as a stand-alone commodity and industry separate from oil.

2. Industry Structure:

- a. Mixed public-private participation, with a clear separation of roles between government and the private sector;
- b. Restructuring of NGC into separate transport and gas marketing companies;
- c. Strategic partnerships to support operations, in particular for NGC;
- d. Greater involvement in marketing Government-owned equity gas in international markets;
- e. Move towards wholesale market competition;
- f. Implementation of Domestic Gas Supply Obligations;

- g. A review of gas aggregation policy and the future role of the Gas Aggregation Company of Nigeria.

3. Developing Gas Resources:

- a. Enable an environment that encourages exploration specifically targeting gas;
- b. Encourage exploration and development of new gas supply sources from the inland and offshore basins;
- c. Develop portfolio management methodologies to prioritise low-cost gas development;
- d. Clarify gas terms for PSCs;
- e. Achieve gas flare-out through gas utilisation projects utilising mature flare reduction technologies;
- f. Produce a Gas Resource Management Plan.

4. Infrastructure:

- a. Identify and proceed with key gas infrastructure;
- b. Liberalise access to offshore and onshore gas transmission infrastructure and gas processing.

5. Building Gas Markets:

- a. Continue gas exports consistent with domestic gas market development;
- b. Identify and promote domestic gas market development projects;
- c. Gain more value from international downstream LNG markets;
- d. Pursue a project-based and market-opportunity approach, rather than centrally-planned national model;
- e. Identify and develop clusters for gas resource, infrastructure and gas-based industrialisation;
- f. Develop and implement a gas-for-development programme, encouraging gas for smaller-scale projects;
- g. Take steps to ensure rapid growth of the LPG market, including reviewing effectiveness of PPMC as a market leader/maker;
- h. Investigate, develop and gain access to regional African gas markets;
- i. Set a suitable environment for financing of gas projects.

6. Developing National Human Resources:

- a. Develop Nigerian content and implement Nigerian Content Act;
- b. Build institutional capacity;
- c. Introduce a maintenance and safety culture.

7. Communications: Internal and external communications strategy;

8. Roadmap and Action Plan:

- a. Action plan for short term (months);
- b. Implementation Plan for medium term (1-2 years);
- c. Implementation Plan for long term (over two years).

2. INTRODUCTION

2.1. Statement of the Gas Policy

This Policy articulates the vision of the Federal Government of Nigeria, sets goals, strategies and proposes an implementation plan for the introduction of an appropriate institutional, legal, regulatory and commercial framework for the gas sector. It is intended to remove the barriers affecting investment and development in the sector. The policy will be reviewed and updated periodically to ensure consistency in Government policy objectives at all times.

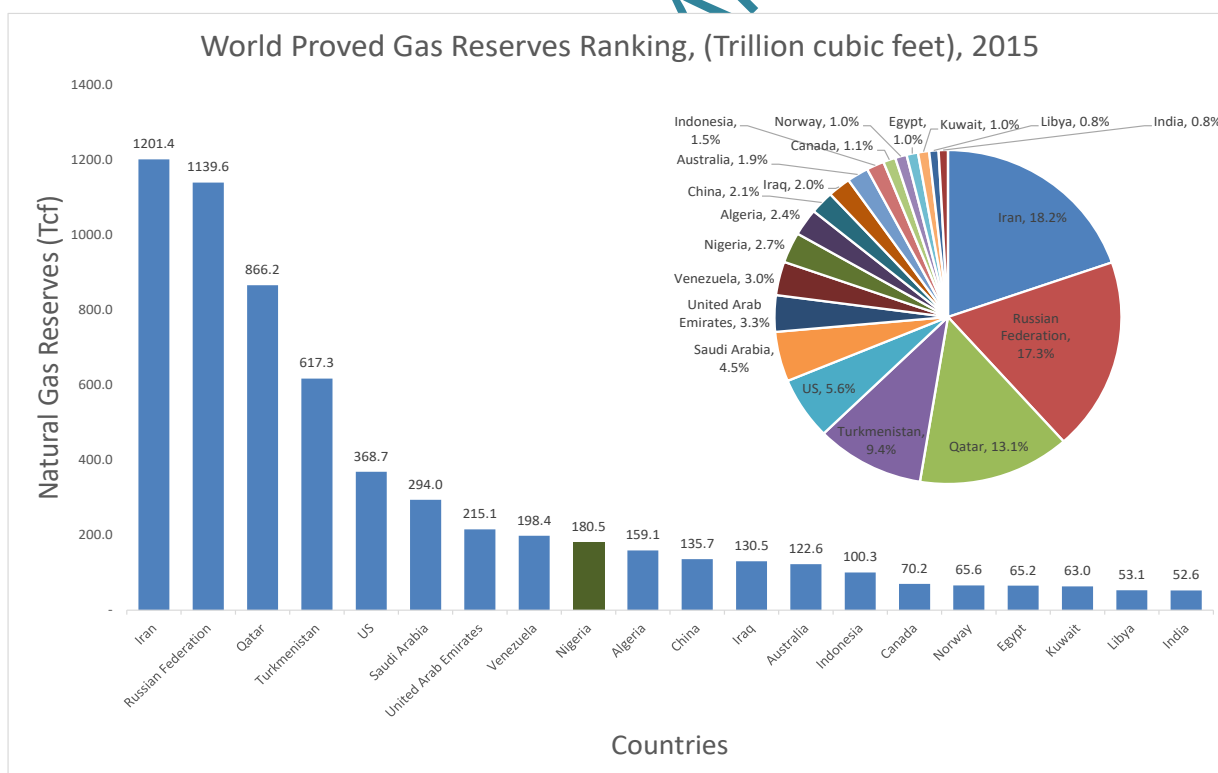
Government shall abide by the provisions of this policy unless and until reviewed or replaced by a formal restatement of policy duly gazetted by the Government.

2.2. Background

2.2.1. Nigeria – A Gas Play and not an Oil Play

The most dominant natural resource in Nigeria is natural gas. With proven gas reserves of 188 trillion cubic feet (tcf) of gas and the 9th largest gas reserves in the world, Nigeria has more gas reserves than oil.

Figure 1: World Proved Gas Reserves Ranking (2015)



Source: BP Statistical Review of World Energy, 2016

Though Nigeria can be regarded as a gas province with some oil in it, little effort has been made to undertake exploration for gas. As a result, a significant proportion of Nigeria's gas was discovered incidentally during exploration for oil.

In 2015, gas production was just 29% of oil production and reserves production ratios were 46 years for oil against 102 years for gas (reserves production ratio is a measure of how strenuously reserves are being exploited).

Table 1: Nigerian Gas Production and Utilisation (2006-2015)

Year	Gas Production (bscf)	Domestic Gas Sales (bscf)	Sales to NLNG (bscf)	Others (bscf)	Total Gas Utilisation (bscf)	Total Gas Flared (bscf)
2006	2,290	326	558	585	1,469	820
2007	2,607	280	844	667	1,790	817
2008	2,580	232	969	709	1,910	671
2009	2,228	237	641	815	1,692	536
2010	2,820	286	992	997	2,275	545
2011	2,967	345	1,115	1,003	2,463	504
2012	2,996	372	1,131	1,028	2,531	465
2013	2,812	391	965	1,027	2,384	428
2014	3,049	425	1,124	1,107	2,669	379
2015	3,003	445	1,161	1,066	2,672	331

*Source: DPR, Annual Oil & Gas Report 2014; Analysis: MPR Gas Policy Team 2016
Others: Fuel, Gas lift, Reinjection, NGLs; Note: Gas Production is total production*

Prior to 2014 and barring 2009, Nigeria was exposed to a very benign international environment, with high gas prices, strong global demand for gas and LNG, and large flows of investment looking for opportunities in emerging markets for gas-based industrialisation (such as petrochemicals, methanol, fertilisers).

Those benign times have now passed and the international business environment is now much tougher. International gas prices have fallen, and huge new volumes of gas and LNG supplies are coming on-stream globally against reduced forecasts of market demand growth.

Nigeria will struggle to compete with the large gas supply volumes about to enter the East Asian markets. North America is closed as a gas importer. European gas demand is depressed and may remain so in the future as the continent increasingly turns to renewable energy. South American gas markets are growing but are relatively small and LNG supplies are currently dominated by Trinidad & Tobago.

Meanwhile, global investment flows have moved away from emerging markets and back to developed economies. Even within Africa, Nigeria is competing for investment with Southern and Eastern Africa.

Nigeria now needs to work hard to survive in the constrained economic environment the country now finds itself in.

From 2008 to 2015 the policy of the Government was to harness Nigeria's vast gas resources based on the Gas Master Plan which outlined the objectives and aspirations

of the Nation with respect to its gas resources. However, with minimal investments made in the gas sector over the period, the Plan has not delivered on all its set targets. For example, Nigeria still lacks critical gas infrastructure and continues to fall short of domestic gas supply obligations.

2.2.2. Objectives of Government

The Federal Government has historically invested more in and derived greater revenue from oil rather than gas. It is however recognised that the natural linkages of the gas sector to the electricity, industrial and agricultural sectors present the single most important opportunity for rapidly accelerating the nation's industrial development and economic recovery.

Government will leverage its large gas portfolio to ensure that gas development is undertaken in accordance with Nigeria's national socio-economic development priorities.

Gas Legislation

The existing petroleum legislation (Petroleum Act 1969) was enacted more for oil with inadequate provisions for gas as a hydrocarbon and an industry in its own right. It also does not provide for the development of a midstream and downstream gas industry.

A Downstream Gas Bill was drafted in 2005 but was subsequently incorporated into a draft Petroleum Industry Bill (PIB). The main thrust of the Downstream Gas Bill and the gas provisions of the draft PIB was to develop a regulatory and commercial framework to support the growth of a downstream domestic gas market.

Gas Master Plan

In 2008 the Federal Government of Nigeria approved the implementation of the Gas Master Plan (GMP). The GMP acknowledged that there was a strategic window of opportunity for Nigeria to establish itself as a major LNG exporting nation and for gas-based industrialisation. The GMP emphasised the following:

I. The infrastructure blueprint

This was the heart of the GMP. It maps out the planned infrastructure needed, including connecting the gas networks in the western and eastern parts of the country, building new transport pipelines from the south to Ajaokuta Steel, on to Abuja and then to the northernmost reaches of the country. The first part of the infrastructure required the construction of Central Processing Facilities (CPFs) in the Niger Delta region to process wet gas for supply to onshore gas transportation networks and industrial plants.

Despite the expectations from the GMP infrastructure blue print, no infrastructure has yet been completed. The projects for the expansion of the Escravos Lagos Pipeline System (ELPS 2) and the critically important Obiafu-Obrikom-Oben (OB3) link pipeline were constituent projects within the GMP and remain under construction.

II. Domestic Gas Supply Obligation (DSO)

A Domestic Gas Supply Obligation (DSO) was introduced to address challenges in gas supply into the domestic market and provide a pricing path for wholesale gas supply to downstream off takers. The DSO was to be broken down to an annual delivery obligation (i.e. delivery to the nearest gas transmission infrastructure) on all gas producers, with the sum of all obligations equalling the planned domestic requirement for gas.

III. Commercial Framework (Pricing Policy)

The National Domestic Gas Supply & Pricing Regulations was issued in 2008, proposing different prices for different consumer groups. All suppliers were to be paid an Aggregate Domestic Gas Price. A Strategic Aggregator (Gas Aggregation Company of Nigeria, GACN) was then established to manage the implementation of the DSO and the aggregate price.

2.2.3. Domestic Gas Market Forecasts

Forecast gas demand is shown in the following table and chart.

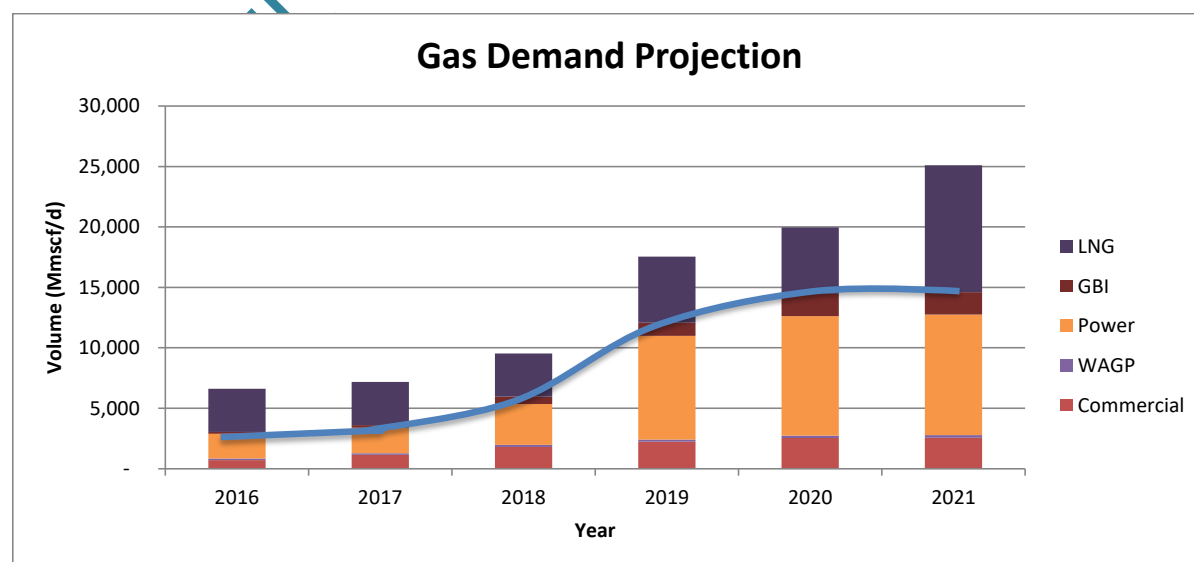
Table 2: Gas Demand Projections

Demand Projections for Existing, Firm and Probable Customers, 2016-2021 (MMscf/d)							
Years	Commercial	Power	GBI	Total Domestic	WAGP	LNG	Grand Total
2016	705	2,038	154	2,897	133	3,580	6,610
2017	1,139	2,107	208	3,454	146	3,580	7,180
2018	1,806	3,385	597	5,788	161	3,580	9,529
2019	2,236	8,581	1,073	11,890	177	5,479	17,546
2020	2,542	9,885	1,858	14,285	195	5,479	19,959
2021	2,567	9,985	1,858	14,410	200	10,483	25,093

Source: NGC 2015

WAGP = West African Gas Pipeline; GBI = Gas Based Industries

Figure 2: Gas Demand Projections



Source: NGC 2015; Analysis: MPR Gas Policy Team 2016

WAGP = West African Gas Pipeline; GBI = Gas-Based Industries

2.2.4. Results from the Previous Policy

While the gas market has grown over the last ten years, it has been very slow, at 3.1% a year, only just keeping up with national population growth (2.8% according to World Bank). In other words, gas supply per head has barely changed over ten years and has not met economic growth needs.

Nigeria is now experiencing a full-blown energy crisis in spite of its abundant gas resources. A new gas policy that is more effective and adjusted for the much harsher international gas business environment is now required to drive the institutional reforms and regulatory changes necessary to attract investment into the sector.

2.2.5. International Perspectives

Oil and Gas Price Movements

There are two key messages:

i. Period of High Prices Now Over

Global Oil and Gas prices for 10 years preceding 2016 have been the highest they have ever been since the modern petroleum industry first started around the 1860s. Price levels have now fallen substantially from those levels and there is a possibility that they may not reach those levels again.

As oil supply reduces there may be a window of oil prices of around \$85/bbl in the period 2020-2030. Prices are forecast to fall again after that window and then stay low. At the same time, while oil supply increases dramatically as US shale oil comes back onstream, demand growth will markedly soften, except for the petrochemicals sector which is likely to be the main market for oil. These oil price movements will affect gas prices as well.

The clear message for Nigeria is that it has to broaden the economy beyond oil.

ii. Recent Extreme Price Volatility

There has also been extreme volatility of oil and gas prices since around 2005, at levels not seen since the 1860s.

Meanwhile Japanese prices were affected by two factors: 1) the linkage to oil prices led gas prices to rise as oil prices rose; and 2) the closure of Japanese nuclear plants following Fukushima led to increased Japanese demand for gas.

But as oil prices fell, the opposite effect happened. Japanese gas prices came close to parity with European gas prices (UK National Balancing Point, NBP and German import prices) in May 2015, and on a couple of occasions actually fell below the

European levels. Price differentials between Japanese and European gas prices have now reverted to their traditional approximately one third premium.

Table 3: Monthly Gas Price Movements at Major Pricing Points (2015-2016)
(January 2015 – September 2016)

Dates	Henry Hub Natural Gas Spot Price (\$/MMbtu)	Japan LNG CIF Price (\$/MMbtu)	Europe Gas Import Border Price (\$/MMbtu)	German Natural Gas Spot Price (\$/MMbtu)
Jan-2015	2.97	15.12	9.25	9.5
Feb-2015	2.85	13.37	8.27	9.29
Mar-2015	2.80	14.28	8.27	9.29
Apr-2015	2.58	10.22	7.42	7.39
May-2015	2.84	8.72	7.27	7.37
Jun-2015	2.77	8.59	7.29	7.3
Jul-2015	2.83	8.87	6.93	6.68
Aug-2015	2.76	9.18	6.95	6.66
Sep-2015	2.65	9.64	6.71	6.49
Oct-2015	2.32	9.44	6.43	6.01
Nov-2015	2.08	8.89	6.24	5.87
Dec-2015	1.92	8.50	6.10	5.81
Jan-2016	2.27	7.85	5.35	5.09
Feb-2016	1.96	8.01	4.90	4.79
Mar-2016	1.70	7.28	4.26	4.09
Apr-2016	1.90	6.38	4.13	4.02
May-2016	1.92	5.86	4.04	3.99
Jun-2016	2.57	5.99	4.13	
Jul-2016	2.79	6.32	4.51	
Aug-2016	2.79	6.60	4.47	
Sep-2016	2.97	6.60	4.21	

Source: US EIA 2016; IMF 2016; World Bank Commodity Markets Review Report 2016;
Analysis: MPR Gas Policy Team 2016

Price Risk of China Shale Gas

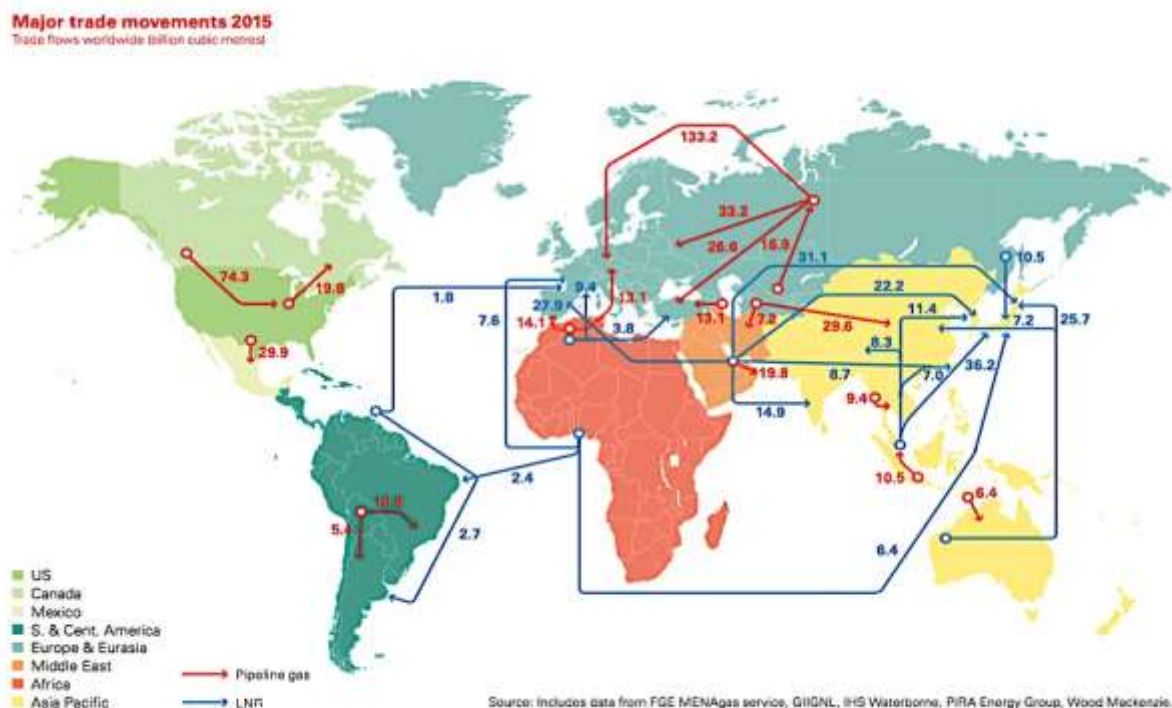
A major threat and perhaps the biggest price risk to LNG and international gas prices over the long run could be if shale gas is developed in China. There are significant shale gas reserves in the Tarim basin in western China that have not yet been developed. As China has been a major LNG importer, the possibility of China ceasing to become a gas importer at the same time as massive new supplies of LNG in the Pacific basin come on line (within the next five to ten years) would probably lead to dramatic falls in LNG prices across the world, with prices staying low for a very long time (probably decades).

Source: MPR Gas Policy Team 2016

2.2.6. LNG Trade Flows

This chart shows global LNG and pipeline gas flows.

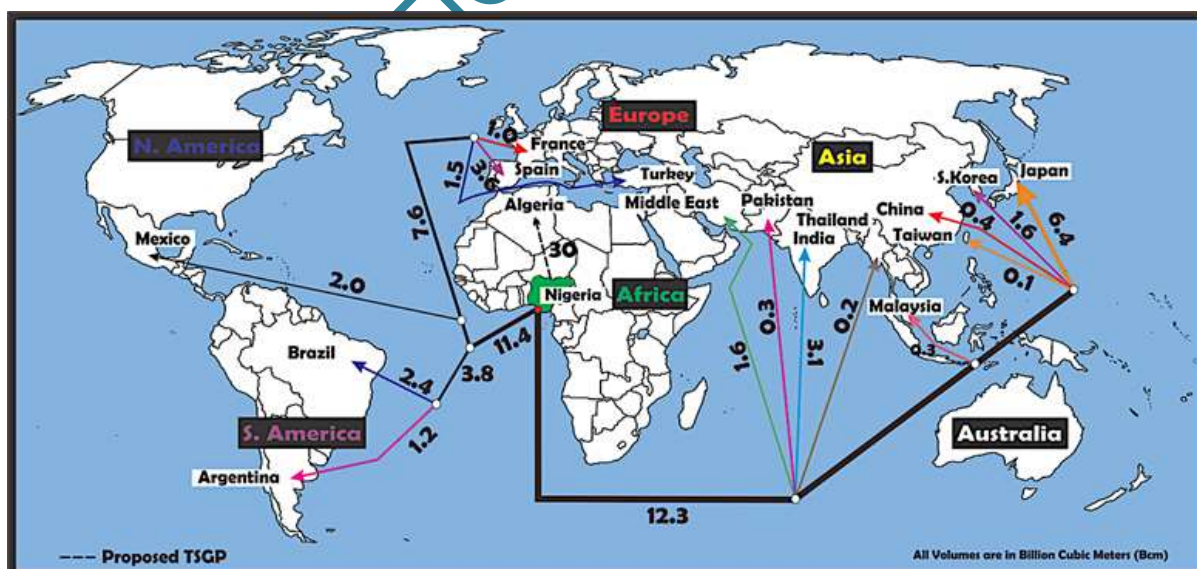
Figure 3: Major Global LNG and Pipeline Gas Flows, 2015



Source: BP Statistical Review of World Energy, 2016

The following chart shows Nigerian LNG trade flows.

Figure 4: Nigerian LNG Trade Flows, 2015



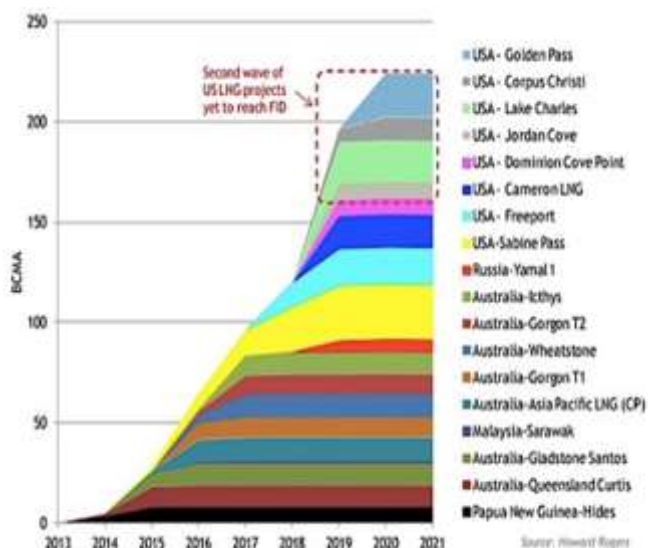
Source: Data: BP Statistical Review of World Energy 2016; Analysis: MPR Gas Policy Team 2016

Atlantic and Pacific Basins

In LNG terms, the world is basically in two basins, Atlantic and Pacific, with Africa dividing the two. The two basins operate differently, with different suppliers and markets, and different contractual terms. Because of LNG boil off over time and because of the freight and insurance costs, LNG from one basin generally is uncompetitive in the other because of the expense of moving it.

Asia Pacific was the major market for Nigeria LNG in 2015. But with two major current exporters (Qatar and Australia) and the huge new volumes about to supply the same region, Nigerian LNG will probably struggle for market penetration in the future.

Figure 5: A Mountain of New Supplies over the Next 5 years



Nigeria is naturally an Atlantic basin supplier. There certainly have been and will continue to be Nigerian LNG deliveries to Pacific basin markets but they are unlikely to be major markets for Nigeria, as there are actual and potential major LNG producers geographically closer to East Asian markets (including Qatar, Abu Dhabi, Tanzania, Mozambique, Indonesia, Malaysia, Australia and so on).

Source: Howard Rogers, 2015

Pacific Basin

Australia: Australia currently is the second largest exporter of LNG and it is expected that Australia will overtake Qatar as the world's largest exporter when LNG projects currently under construction are commissioned between 2016 and 2017. Seven projects, totalling **57.6 mtpa**, are under construction. These volumes of LNG are more than twice the total volume of Nigeria's LNG export or liquefaction capacity. They are expected to enter the Asia Pacific market, which Australia is much nearer to than Nigeria and which currently takes all of Australia's LNG exports.

Mozambique: Mozambique has emerged as the second largest gas reserves holder in Africa following offshore discoveries made since 2009. Mozambique is aggressively developing plans to commercialise its gas resource. Development of four LNG trains is ongoing with future plans for up to ten trains. Again, this supply source would be strong competition to Nigerian LNG for Asian markets.

Tanzania: Tanzania has also made some considerable offshore gas discoveries, with contingent resources estimated at **29 tcf** and possible resources up to **50 tcf**. In the medium term, BG and Statoil are developing two LNG trains, with plans to increase to four trains in the long term.

Mozambique and Tanzania are both developing the same Rovuma basin which crosses the border between the two countries. Mozambique and Tanzania each pose considerable competition for Nigerian LNG for Asian markets (East Asia, South Asia and Middle East), even more so when both schemes are considered together.

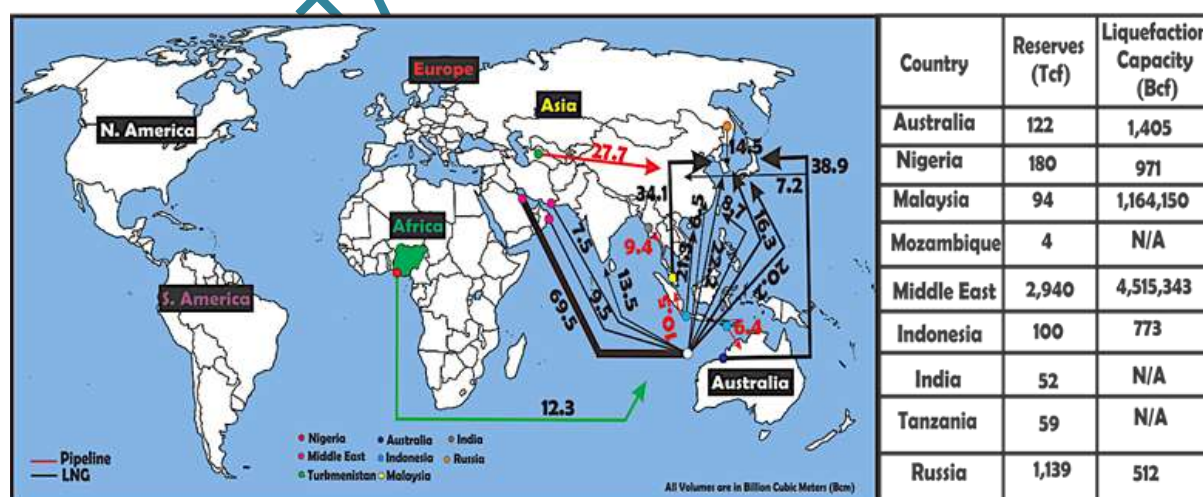
Papua New Guinea: Papua New Guinea joined the league of LNG exporting countries by bringing in LNG supply from Yemen (another LNG exporting nation). The Papua New Guinea LNG project under development has the capacity to produce an estimated **6.9 mtpa** and more than **9 tcf** of gas over its lifetime.

Indonesia: In addition there are existing LNG and pipeline gas exports from Malaysia and Indonesia. Indonesia is cutting down on its gas export obligations as a result of attempts to meet domestic energy demand. SKK Migas, the country's upstream oil and gas regulator, has said that domestic commitments and consumption will continue to grow, which means an increasing gas allocation for domestic use and reducing volumes of gas available for export.

Malaysia: While Indonesia is cutting down on LNG exports, Malaysia is still aggressively committed to increasing its LNG supplies for domestic markets (coastal regions and islands) and exports. Malaysia is the fourth largest natural gas reserves holder in the Asia-Pacific region, and accounts for 10% of total world LNG exports.

Japan Methane Hydrates: The Japanese government has succeeded in extracting samples of a next-generation resource, methane hydrate, from the bottom of the Sea of Japan. It is estimated that there is enough methane hydrate beneath coastal waters to meet the nation's natural gas needs for 100 years. This is a long-term prospect, however, as the technology to extract methane hydrate is far from commercialisation. There are also concerns about environmental damage linked to extraction, partially because methane is a powerful greenhouse gas.

Figure 6: LNG and Gas Flows to Asia, 2015



Source: Data: BP Statistical Review of World Energy 2016; Analysis: MPR Gas Policy Team 2016

With such huge streams of LNG and pipeline gas coming into the market over the next few years to the Asian region, the oversupply will continue to bring pressures on LNG and gas prices, and suppliers will have to settle for buyers' conditions in changing

contract agreements (with probably a continuing move towards ever shorter contract terms). In addition, a buyers' cartel may build up among Asian LNG buyers, further complicated by the emergence of Singapore as an LNG hub.

Because of its distance from the market, Nigerian LNG will struggle to be competitive in Asian LNG markets in the future.

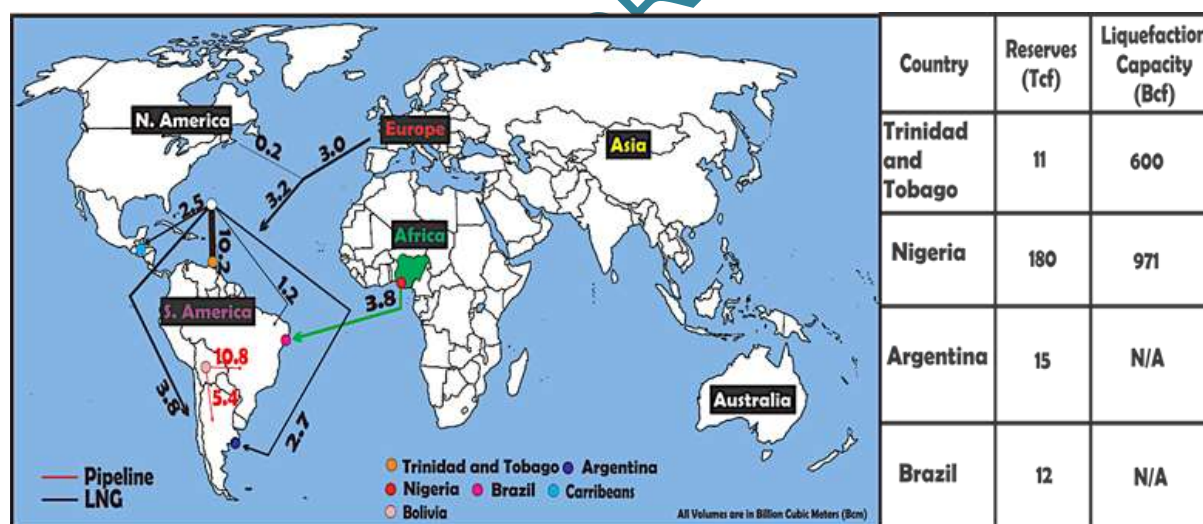
Atlantic Basin

Nigerian LNG markets realistically lie in the Atlantic basin, to North America, South America and Europe. All of these however present challenges to Nigeria.

North America: Since the shale gas revolution, North America is no longer a market for LNG, as it has become self-sufficient in gas, and has become an LNG exporter.

South America: South America has growing gas markets and can be a market for Nigerian LNG, particularly to Brazil and Argentina. Supplies from Nigeria are at a similar distance from Atlantic Coast and South American markets as are supplies from Trinidad & Tobago. Trinidad & Tobago however has cornered the market, and currently provides most of the LNG supply to South America. Nigeria would have to play catch-up to be able to access those markets. While South American LNG markets are growing, they are still probably not large enough to be able to accommodate significant LNG supplies from both Nigeria and Trinidad & Tobago.

Figure 7: LNG and Gas Flows to South America, 2015



Source: Data: BP Statistical Review of World Energy 2016; Analysis: MPR Gas Policy Team 2016

Europe

Gas demand in Europe remains lower than forecast when NLNG Trains 1-6 were commissioned. There are several factors supporting the view that European gas demand may stay low for the foreseeable future.

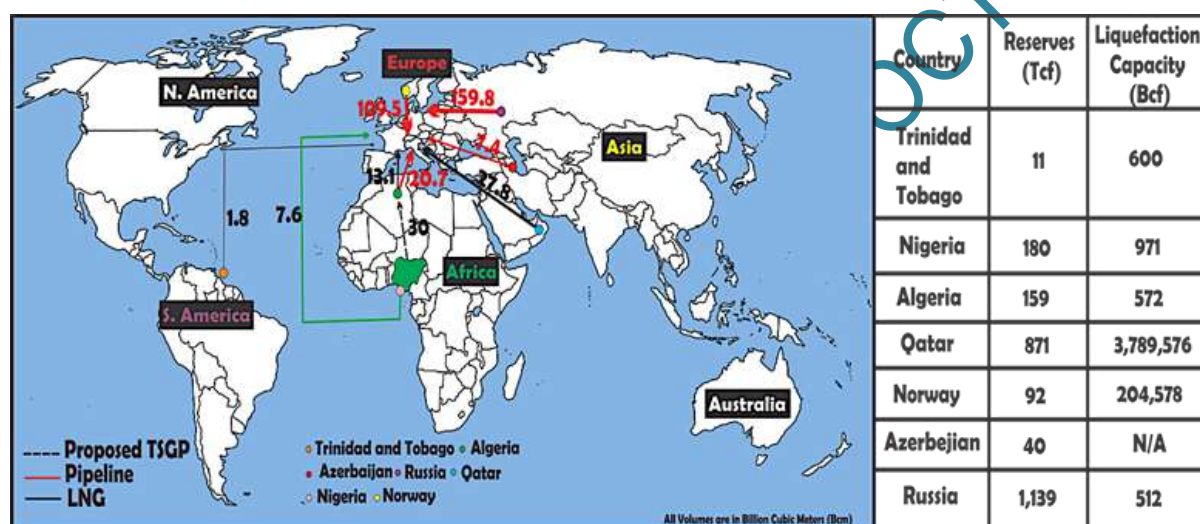
One is the state of the Eurozone economies. Eight years after the financial crisis, southern European economic growth remains low (while northern European economies are growing strongly). Europe (southern Europe at least) may be entering a period similar to what was called "the lost decade" in Japan, where despite many

government fiscal stimuli, the economy remained stagnant. The short and possibly medium term uncertainty surrounding Brexit will only exacerbate European economic growth concerns.

Northern European economies, which are growing well, have abundant gas supplies. Even though the UK has turned from being a net gas exporter to now being a (small) net gas importer, there are abundant gas supplies in Norway, with pipeline supplies across the North Sea, and indeed Norwegian LNG exports (in particular the Snøvit field LNG liquefaction offshore northern Norway); and nearby in Russia (with Shtockman LNG in the Barents Sea off northern Russia).

There are other LNG markets in the periphery of Europe, such as Turkey, which has received some Nigerian LNG supplies, or Egypt, which has also turned from being a gas exporter to a gas importer.

Figure 8: LNG and Gas Flows to Europe, 2015



Source: Data: BP Statistical Review of World Energy 2016; Analysis: MPR Gas Policy Team 2016

Power Generation in Europe

Another threat potentially reducing LNG demand in Europe is the drive towards renewable energy. Europe has turned a corner where renewable energy has now become mainstream across Europe. Europe is reducing its reliance on thermal energy of all sorts.

The growth in electricity generated from renewable sources during the period 2003 to 2013 largely reflects an expansion wind turbines, solar power and biomass, although hydropower remained the single largest source for renewable electricity generated in the EU-28.

Other Factors Supporting Gas in Europe

Two general trends across Western Europe are the decommissioning of ageing coal plants and the move away from nuclear power. Germany has taken a policy to move away completely from nuclear power. The UK and France are committed to continuing nuclear power generation but both countries are encountering technical and financial problems. The result is that there is likely to be a continuing role for gas for power

generation in Europe, to replace coal generation and to take up the slack that new nuclear power will not be able to meet.

Commoditisation of LNG

Costs of LNG liquefaction, shipping and regasification in particular have been falling steadily over the years. LNG used to be differentiated as a high-priced product in Europe; however, LNG is now rapidly becoming a commodity which can be sold all year round into European markets (provided the price is low enough) but it may be losing its winter pricing premium.

Another important trend is that the long term contract of 20, 30 or even 40 years is giving way to shorter contract periods of five years or less. The commodity nature of LNG will be plain to see if LNG spot trades become common.

Potential African Gas Markets

Perhaps Nigeria could help develop and then supply African gas markets with LNG and pipeline gas. The West African Gas Pipeline (WAGP) could be extended further west to neighbouring countries; gas pipeline connections could perhaps be made to Cameroon (although Cameroon has its own domestic gas reserves which are right next to the main industrial markets); or Nigerian LNG could be taken to other markets along the west African coast. While these developments are all possible, the window of opportunity is limited because:

1. Gas export projects take considerable time to develop;
2. Countries with potential markets such as Cote d'Ivoire are beginning to contract LNG from other supply sources;
3. Africa may decide to skip the fossil fuel stage as Africa develops, and go straight to mass renewable power generation along the lines of Europe.

Investment Flows

Global Investment Flows

From 2008, the developed economies suffered and investments into western markets fell dramatically. After a small initial fall, from 2009, investment flows to emerging markets increased strongly, until around 2013. As developed economies recover, investment flows to emerging markets are now flat or slightly declining, while the major investment flows are returning to developed western economies. The growth period for investments into emerging markets has now ended.

Of emerging markets, most of the investment flows went to Asia and only a small proportion to Africa. Within Africa, investment is now moving away from Nigeria to more attractive opportunities in East Africa (Mozambique, Tanzania and Kenya) and South Africa.

Investment Flows to Nigeria

Investment flows into Nigeria are declining and some existing investments are leaving the country for more favourable investment destinations, such as Mozambique, Tanzania, Kenya, and South Africa.

Nigeria's appeal has faded as the price of oil, the source of 90% of export earnings, has declined. Growth fell to 2.8% last year, the slowest since 1999, and is forecast to slow again, to 2%, in 2016 (source: Morgan Stanley). In US Dollar terms, the economy in 2019 will still be 17% smaller than its 2014 peak of \$542 bn.

In Conclusion: Nigeria has a Challenging Future

In conclusion, Nigeria faces some significant market challenges in the future for its LNG exports. It is likely that Nigerian LNG supplies will be able to find markets, but price discounting will likely become the norm. Nigeria will also have to work much harder in the future to market its LNG.

2.3. Challenges Facing Nigeria Presently

Nigeria is currently facing significant challenges. The easy days of past years, when the country enjoyed a very benign international environment with high prices and growing markets, have passed.

These challenges include:

- **International Environment:**
 - Low and volatile gas price;
 - Low demand for LNG;
 - Increasing competition of supplies into the global market;
 - Commoditisation of LNG;
 - Power shifting from producer to buyer;
 - Tipping point reached for renewable energy.
- **Domestic Environment**
 - ✓ Security of supply risks:
 - Gas supply restrictions for domestic gas projects;
 - Growing gas payment arrears in the power sector;
 - Militancy and insurgency.
 - ✓ Absence of enabling environment to attract foreign direct investment (FDI):
 - Slow progress with Nigerian gas export projects;
 - Slow pace of domestic gas projects;
 - Inadequate gas supply for the domestic market;
 - Re-direction of FDI focus from Nigeria to other regions;
 - Slow implementation of key infrastructure projects envisaged in the Gas Master Plan.

- ✓ Governance:
 - There is a vast gulf of understanding between the private and public sectors (especially between government and the IOCs);
 - Need for increased transparency and adherence to due process in business transactions;
 - Conflicts of interest in Government as policy maker, legislator, regulator and commercial participant;
 - NNPC in transmission and wholesale gas transactions.
- ✓ Legislation:
 - Petroleum law designed for crude oil not for gas;
 - Gas not recognised as a commodity in its own right;
 - Lack of coverage of downstream gas in legislation;
 - Laws scattered, sometimes overlapping and opaque.
- ✓ Regulation:
 - Several regulatory agencies with overlapping roles, while other roles are unregulated;
 - Functionally weak agencies;
 - Long and tortuous regulatory processes;
 - High transaction costs for investors.
- ✓ Sector structure:
 - Natural monopoly elements combined with potentially competitive elements;
 - Potential for competition constrained by existing sector structure;
 - Conflicts of interest at various points.
- ✓ Weaknesses in the wider supply chain and with skills development:
 - Too few people who are sufficiently qualified and also skilled;
 - An inefficient supply value chain driving up costs and inhibiting investment projects.

2.4. The Need for a New Gas Policy

Nigeria needs a new gas policy that fits the severely constrained circumstances in which the nation now finds itself. The gas policy must work for Nigerians and must be faithfully implemented to meet the vision outlined in this document.

Government will leverage its large gas portfolio to ensure that gas development is undertaken in accordance with Nigeria's national socio-economic development priorities.

3. VISION AND OBJECTIVES

3.1. Vision

“To be an attractive gas-based industrial nation, giving primary attention to meeting local gas demand requirements, and developing a significant presence in international markets”.

This Vision for Nigerian gas contains key **aspirations**:

1. Move the economy from oil to gas;
2. Diversify the gas supply options within Nigeria, to ensure security of supply;
3. Extend gas penetration in the domestic market in order to facilitate the growth of the electric power, agricultural, and industrial sectors;
4. Gain a presence for Nigerian gas in international markets;
5. Operate a gas industry with a clear division of roles between private and public sectors:
 - Public sector policy making; implementation and regulation;
 - Private sector investment and operations;
6. End gas flaring and address environmental issues;
7. Provide an enabling environment for increased private sector participation in the gas sector;
8. Clarify the rules guiding investment in the gas sector.

3.2. Mission

“To move Nigeria from a crude oil export-based economy to an attractive gas-based industrial economy”

Realisation of these lofty objectives will depend on the successful implementation of the following:

1. Set clear gas policies;
2. Establish a clear legal and regulatory framework;
3. Communicate the vision to government agencies, the public and international stakeholders;
4. Ensure security of gas supply through:
 - Developing new gas supply resources;
 - Installing an optimal infrastructure network;
5. Provide an attractive climate for investment;
6. Seek value addition in downstream high value international and national markets;
7. Direct low-cost gas for domestic markets;
8. Realign the public sector to provide policy, legal and regulatory support to the industry;
9. Introduce international best practice in operations and in governance;

10. Ensure that operations are conducted in an environmentally clean manner.

3.3. Strategic Objectives of the Gas Policy

In order to meet the Vision and Mission, strategic objectives of the gas policy have been defined as follows:

1. Communicate the vision and the gas policy internally and externally;
2. Identify new gas resources from:
 - Niger Delta;
 - Offshore;
 - Inland basins;
 - Gas flare reduction;
3. Establish a clear policy, institutional, legal and regulatory framework:
 - Gas policy;
 - Gas legislation;
 - Regulatory authority;
 - Secondary legislation (regulation);
4. Enable a conducive environment for investors and for market growth:
 - Clear, consistent and investor friendly legal and regulatory framework;
 - Investment promotion;
 - Support for the development of supporting infrastructure;
 - Fiscal environment that supports investment and domestic growth;
5. Discourage wasteful projects whilst encouraging optimisation amongst resource owners; for example, through joint development of gas discoveries and infrastructure between several licensees if such developments would yield an economic project;
6. Seek value addition in downstream high value export markets;
7. Develop Nigerian human resources in the petroleum sector:
 - International training;
 - Improved national petroleum education;
 - Development of competency through education and practical experience, such as apprenticeship schemes;
 - Graduate training;
 - Technical, Vocational, Educational Training (TVET);
8. Implement international best practice in operations, particularly in maintenance, health and safety;
9. Implement good governance throughout the industry:
 - In the public sector;
 - In the private sector.
 - Cluster development of gas infrastructure.

3.4. Strategic Elements of the Gas Policy

These objectives as described above are now described in detail through the rest of this gas policy document. The objectives are addressed under each of several policy areas or themes:

1. Governance;
2. Industry Structure;
3. Developing Gas Resources;
4. Infrastructure;
5. Building Gas Markets;
6. Developing National Human Resources;
7. Communications;
8. Roadmap and Action Plan.

In order to achieve the successful achievement of the strategic objectives and the elements, the Ministry of Petroleum Resources will work with the National Assembly, States, other Federal MDAs such as the Ministries of Power, Environment, Finance, Budget & National planning, Agriculture, Industry, Trade & Investment, Transportation, and Justice and the CBN.

4. GOVERNANCE

4.1. Legal and Regulatory Framework

The main Petroleum Industry legislation in Nigeria, the Petroleum Act CAP P.10 LFN 2004, did not legislate sufficiently for gas as a hydrocarbon and industry in its own right, nor for a mid and downstream gas industry. This has posed a challenge to the development of the gas sector and the attainment of national aspirations for gas-based industrialisation.

The government will pass a new legislation to address gas issues, remove the anomaly and distinguish between upstream, mid and downstream.

4.1.1. Strategic Objectives

The main aspects to be addressed under a new legislation on gas shall reflect:

- Emphasis on gas as a fuel in its own right, rather than a by-product of oil production;
- Separation of upstream from the midstream;
- Greater focus on the development of the midstream and downstream segments;
- Separation of gas infrastructure ownership and operations from gas trading;
- Pricing;
- Competition regulation;
- Fiscal regime;
- Licensing of different activities in the gas chain:
 - Exploration;
 - Production;
 - Wholesale gas supply;
 - Gas processing;
 - Gas Storage
 - Gas transportation;
 - Gas network operation;
 - Gas distribution;
 - Retail trading of gas.

4.2. Institutional Framework

4.2.1. Background

The thrust of the policy is to introduce institutional reforms capable of translating aspirations into results. Currently, the existing policy and regulatory institutions overseeing the oil and gas industry in Nigeria are:

- Ministry of Petroleum Resources;
- Department of Petroleum Resources (DPR);
- Nigeria Content Development and Monitoring Board (NCDMB);

- Petroleum Products Pricing Regulatory Agency (PPPRA);
- Petroleum Equalisation Fund (PEF).

4.2.2. Institutional Capacity Strengthening

The Federal Government is determined to strengthen the capacity of the Ministry of Petroleum Resources as a policy making institution.

Towards these objectives, the policy making and surveillance capability of the Ministry of Petroleum Resources will be strengthened, new technical resources will be introduced, existing departments will be restructured, and additional mandates would be assigned.

4.2.3. Scope of Regulation

A simplified licensing regime will be introduced for every activity, including but not limited to constructing and operating gas processing plants, liquefaction plants, gas storage facilities, transportation pipelines, transportation network operation, distribution networks, wholesale gas supply and retail trading of gas.

4.2.4. Single Independent Petroleum Regulatory Agency

The government is desirous of reducing the current regulatory overlaps and consolidating the existing regulatory agencies into a single petroleum regulatory agency.

The Federal Government is determined that there should be a new single regulatory agency for the petroleum sector in Nigeria which will replace the existing regulatory agencies.

The new agency will cover the whole petroleum sector, incorporate the activities of the existing petroleum regulatory authorities and also cover some new regulatory activities not currently covered. It will essentially be responsible for the economic and technical regulation of the gas sector and shall have licensing, investigative, monitoring and dispute resolution powers.

The following Divisions, Departments or functions are envisaged to form parts of the new petroleum regulatory agency, among others:

1. Upstream oil and gas regulation;
2. Midstream & Downstream Gas regulation;
3. Midstream & Downstream oil regulation;
4. Health, safety and Environment compliance;
5. Consumer protection;
6. Compliance Monitoring.

The government is aware that while there are many benefits in consolidating into a single petroleum regulatory authority (and reducing the current number of disparate and sometime overlapping regulatory agencies), there are also some challenges. The main challenge is likely to be in transitioning the current agencies into a cohesive new regulatory institution. This will require building institutional capacity and a strong and

effective corporate culture within the new institutions, to ensure effectiveness of the institutional framework and sustainability of the policy.

4.2.5. Petroleum Safety Compliance

The current system in Nigeria regarding maintenance, health, safety and environment in the Petroleum Sector needs to be brought to a higher standard. Major safety incidents go without proper investigation and without responsible parties being held sufficiently accountable.

This policy places emphasis on prevention and conclusive investigation as well as appropriate sanctions.

- Lessons should be learned, changes made and similar incidents avoided in the future;
- If individuals are culpable, the guilty are brought to criminal justice, setting a deterrent to people who consider acting in a similar fashion in the future.

The safety record for gas and LPG in Nigeria is unlikely to significantly improve without establishing and empowering the regulator to carry out forensic investigations and to lay criminal prosecutions where necessary.

Government shall empower the regulator to conduct safety inspections, investigations into incidents and accidents, recommend corrective measures and impose sanctions in collaboration with appropriate security agencies.

The new petroleum legislation shall prescribe stiff penalties for breach of safety regulations and standards for functionaries and corporate organisations.

To insulate the regulator's operations from corruption, human and technical deficiency due to lack of skills and equipment, sustainable sources of funding shall be prescribed.

A key safety regulatory function therefore is the monitoring and inspections regime.

- **Inspections:** Preventive monitoring and inspections to ensure licensees are acting within regulation (before-the-incident prevention, ex-ante);
- **Investigations:** Major incident investigations, where forensic investigations of incidents take place (after-the-incident investigations, ex-post), gathering evidence so that:
 - Lessons can be learned for the future; and
 - Criminal prosecutions can be made, if necessary.

4.2.6. Consumer Protection

A consumer representation and protection body will be established, with the mandate of representing consumers against more powerful corporate or government interests.

It will be expected to deal mainly with residential and small business consumers, such as smaller-scale LPG consumers.

The regulator shall prescribe and communicate a consumer protection standard for the gas sector.

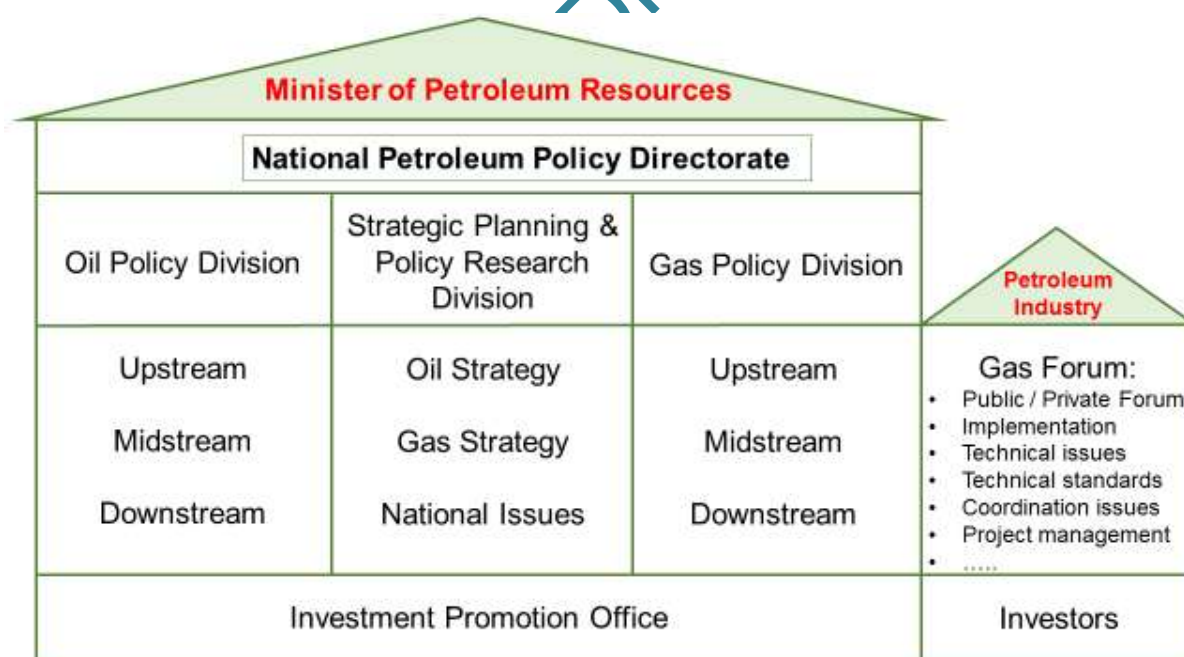
4.2.7. National Petroleum Policy Directorate

For sustainability and effective implementation, specialist centres shall be established within the MPR, in addition to the existing technical departments.

To ensure a more effective role, a **National Petroleum Policy Directorate** which will act as a technical back office of the Minister in his policy making role will be established within the MPR along with the following specialist centres:

1. **Oil Policy Division** with departments for the Upstream, Midstream and Downstream;
2. **Gas Policy Division** with departments for the Upstream, Midstream and Downstream;
3. **Strategic Planning and Policy Research Centre**;
4. **The Investment Promotion Office.**

Figure 9: National Petroleum Policy Directorate



Source: MPR Petroleum Policy Team 2016

4.2.8. Strategic Planning and Policy Research Centre

The Strategic Planning and Policy Research Centre shall keep regular track of local and international developments and keep

Ministry, Regulator and other government institutions updated as necessary.

The Strategic Planning and Policy Research Centre will be a small research centre responsible for tracking developments such as:

- Strategic planning and natural resource management issues;
- Petroleum industry market developments;
- Oil and gas price movements and forecasts;
- Policy initiatives;
- Regulatory initiatives;
- Developments in International energy organisations;
- Key international contacts with whom leaders within the MPR need to keep in contact.

4.2.9. Investment Promotion Office

It will be useful and helpful to investors to have a single point of first contact where they can find out about Nigeria and about the investment opportunities in the petroleum sector. Any potential investor should be given as much information as possible, in as investor friendly a manner as possible, about all the opportunities. While it is not possible to give confidential information about competitors or other companies, the Ministry should be able to produce authoritative estimates of reserves, of markets, of opportunities for investment, of legal and fiscal conditions, and any other information that can be provided.

The Investment Promotion Office will provide:

- Technical support in promoting a project;
- A centre of expertise on upstream and downstream petroleum opportunities within Nigeria which will work with the Nigeria Investment Promotion Council (NIPC);
- A database of projects and investment opportunities;
- An informative website;
- Support with promotions and roadshows;
- Dedicated personnel to help potential investors, so that investors have a single point of contact who will remain with them and guide them through the government process.

The Investment Promotion Office should have a website with as much information as possible on it. In addition, rather than just waiting for potential investors to approach it, the Investment Promotion Office could also actively promote the opportunities in Nigeria and prospective projects to potential developers through promotions, presentations, road shows and direct negotiations with potential developers.

4.2.10. National Gas Focal Point

The National Gas Focal Point shall be a Senior person in the Ministry charged with oversight on the practical implementation of the gas policy, overcoming any obstacles and ensuring consensus and a coordinated development among all the participants.

4.2.11. Dedicated Project Desks

To facilitate institutionalised implementation of the programmes and projects emanating from the policy, the Ministry shall appoint dedicated Project desks within the Policy Departments to serve as Interface between project developers and Government Agencies.

The Project desks will not duplicate the activities of other departments or agencies of the Government or the regulatory agency. Instead, their role essentially will be to lobby and push projects or programmes provided for or relevant to the Gas Policy through Government. Their job will be to engage and fully involve other parts of Government and the private sector to ensure that projects or programmes are implemented.

4.2.12. Joint Forum

In addition to the specialist centres to be established within MPR for the monitoring and implementation of policy, a Joint forum shall be established. The joint forum shall consist of representatives of the main stakeholder groups meeting on a regular basis to address cross-cutting issues on the implementation of the gas policy and/or specific project(s).

- a. The membership of the joint forum shall be drawn from stakeholder groups active in the country:
- b. The forum will relate with the National Gas Focal Point on matters relating to the implementation of the gas policy.
- c. Health and safety will be a major component. Experience from other countries indicates that if consumers gain an impression that gas is dangerous, then market growth will be much slower. Ensuring a safe market development will be vital.

4.2.13. Donor Agencies

The government will work with the donor community to identify aspects of the policy where donor agency support can be secured.

4.2.14. Civil Society and Consumer Groups

The government will work with civil society groups, non-governmental organisations and consumer associations so as to ensure transparency, accountability, sustainability in developing the gas sector.

4.3. Commercial Framework

4.3.1. Background

The commercial framework consists of two key aspects:

- Rules for access to pipelines and gas networks;
- Pricing principles and regulations.

4.3.2. Access to Gas Networks

A full legal separation of gas infrastructure ownership, operations and gas trading is at the core of the policy. Separate companies will carry out these different activities.

Gas transportation companies will not be allowed to engage in the purchase and/or sale of gas, and vice versa for trading companies except through separately managed affiliate entities.

Under the new market structure, a suitable and effective gas network code will be introduced to govern open access to infrastructure facilities and wholesale gas trading.

Pending the completion of the Gas Network Code, effective point-to-point gas transportation agreements, with flexibility for third-party access, shall be the thrust of the policy.

Government and the gas industry will continue to update and implement the gas network code through constant stakeholder engagement to enhance market development.

The policy on gas market development will be more project-led, with the objective of achieving an integrated national network.

4.3.3. Gas Pricing

The existing gas pricing framework assumes that Nigerian gas compositions are typically rich in natural gas liquids, and that many producers can produce low-cost gas at a gas transfer price of less than \$1/MMbtu when adjusted for the natural gas liquids. Thus, the benefits of the natural gas liquids can be used to reduce the price of dry gas sold into the domestic market.

The gas pricing framework will be clarified by a revised National Domestic Gas Supply & Pricing Regulation.

4.3.4. Upstream Gas Price Regulation

Gradual increases in wholesale gas prices over the years have helped to stimulate the supply of gas. However, the current regulated pricing regime is a transitional measure and, with the market now demonstrating a growing appetite for bilateral negotiations of wholesale gas supply transactions, the basis for the transition to market-led pricing is already in place.

The transitional pricing framework will be retained, albeit for a short period, until sufficient gas supply volumes are built up and a sufficient gas market has been established. The policy objective is that wholesale gas pricing will ultimately be market-led, without gas price regulation, except for monopoly infrastructure.

During the transition period, the upstream gas price for the domestic market will remain subject to the **Export Parity Netback Gas Price (EPP)**. The average export market price less the costs of regasification, shipping and liquefaction will be taken as the production price to be applied to the domestic market.

Under this approach, producers should be price indifferent as to whether they deliver gas for the LNG export market or the domestic Nigerian market. Combined with a modest domestic gas supply obligation (discussed further below), producers will have sufficient market incentives to produce for the domestic market.

4.3.5. LNG Export Tolling Price

In order to realise more of the value of the gas product from downstream international LNG export markets, the policy for new LNG liquefaction facilities is that infrastructure owners will be paid a tolling fee by Government for liquefying, shipping and re-gasification of Government's equity gas.

The price and methodology are to be developed in conjunction with the industry but are likely to be based as much as possible on:

- **Liquefaction:** Cost-of-service approach using average cost benchmarks that recognises Nigerian circumstances whilst assuring a rate of return on actual costs;
- **Regasification:** Published or contract regasification prices at the export market facility;
- **Shipping:** Published prices, industry standard freight and insurance costs, or contract prices.

4.3.6. Cost Benchmarking for Infrastructure Facilities

Cost benchmarking is crucial to sector economics and regulatory decision-making.

A cost-of-service approach will be adopted using average, standard or benchmark costs that recognises Nigerian circumstances whilst assuring a rate of return on actual costs.

4.3.7. Price Publication and Monitoring:

While prices are intended to be unregulated, there will nevertheless be a policy of rigorous price monitoring. End user prices will be required to be published and prices will be monitored to ensure there is no pricing abuse,

particularly during the transitional period before the wholesale market is fully established.

4.3.8. Triggers for Wholesale Market Regime

The Minister of Petroleum Resources will declare that a wholesale gas market is in operation when he determines that one or more of the triggers as defined below have been met. Regulated pricing will then end (except for monopoly infrastructure facilities) and wholesale gas contracts will apply based on a willing-seller, willing-buyer basis.

A wholesale market exists where there are 1) pricing reference point(s); 2) large volumes; 3) many buyers; and 4) many sellers. Trigger points indicating a wholesale gas market in operation in Nigeria include:

1. When sufficient parts of the planned national infrastructure are completed, in particular the OB3 pipeline which will act as a connection system between the eastern and western parts of the nation;
2. Sufficient gas volumes passing through the completed OB3, which is a potential physical point gas hub (where gas from the East can be wheeled to the Western or Northern parts of Nigeria). Sufficient volumes are considered to be 2 bcf/d (which is the capacity of the OB3 pipeline);
3. If Oben develops as a physical point gas hub with sufficient volumes, hub pricing can then replace regulated pricing;
4. When domestic gas volumes exceed export gas volumes (export volumes are currently approximately 3.6 bcf/d);
5. When there are sufficient numbers of wholesale traders (sellers) and consumers (buyers).

4.3.9. Infrastructure Tariffs

Regulated tariffs will be introduced for those monopoly infrastructure areas of the gas industry, including LNG liquefaction, gas processing, gas storage, transportation and distribution, in a manner that will provide investors the opportunity to recover all the eligible costs plus an adequate and reasonable return on investment.

4.3.10. Power Sector

The policy drive for gas is to ensure gas supply to the power sector as the country's number one priority.

Significant incremental demand for gas will derive from the power sector, which has been used to low and cross-subsidised gas prices for a long time. The intention is to move to a wholesale market where power generators will take the market negotiated wholesale price.

There are however prevailing risks in the power sector that require the urgent attention of the Government. These include:

- Power sector liquidity and payment assurances to the gas sector;
- Power transmission infrastructure limitations;
- Adequate capitalisation and funding of the bulk electricity trader.

The Government shall imminently address prevailing power sector risks to ensure bankable gas supply arrangements to the power sector.

4.4. Fiscal Framework

4.4.1. Government Fiscal Philosophy

A new fiscal policy and framework is proposed for the Nigerian petroleum sector. This is embedded in a separate and complementary National Petroleum Fiscal Policy document issued by the Government.

The philosophy for the fiscal framework of the gas policy is to set fiscal rules that are clear, transparent, globally competitive and designed to incentivise all participants. The role of the government is seen as not to create economic distortions that confer an advantage on or favour any particular party.

The purpose of the fiscal framework is to make gas standalone, separate from oil. Hence, gas projects will be developed based on their economics and not dependent on or consolidated against oil taxation.

4.4.2. Current Fiscal Structure

Currently, under the Associated Gas Framework Agreement (AGFA) (codified in section 11, Petroleum Profits Tax Act), AG and NAG costs can be recovered from oil income.

This has led to a number of distortions:

1. It discriminates against investors without oil tax capacity (that is, it discriminates against companies who do not have oil operations, and therefore are unable to expense their gas costs against oil operations in the manner that upstream investors in gas projects can);
2. It incentivises oil companies to build gas infrastructure (in some cases unnecessarily oversized gas infrastructure) for fiscal reasons (to include in their cost oil base for offset against their profit oil, which ultimately is paid for by the Nigerian government);
3. It has meant that the only gas infrastructure not built for fiscal purposes has been built by the Nigerian government, via NGC;

4. When the oil price is low (as is the situation now), tax capacity (the ability to collect tax on profit oil) declines.

4.4.3. Fiscal Rules of General Application

Fiscal Rules of General Application (FRGA) is the framework through which the interests of the state and that of the investor are codified. Seven main thematic areas that need to be addressed in the fiscal system for Nigeria are:

1. Governance – the key governing institutions of the oil and gas industry and their role as prescribed by the separation principle, i.e. of policy, regulation and commercial operations;
2. Funding of the institutions and funding of government participation in commercial operations;
3. Fiscal incentives for investments – the balance of risk and reward in a fiscal designed framework;
4. Enabling gas exploitation in Nigeria through policy regulatory and fiscal interventions;
5. The role of the regulator – the principles, powers and economics of regulation;
6. The role of the state in natural resource management – the shareholder responsibilities versus the requirement to meet social needs;
7. Mitigating social consequences of natural resource exploitation – best practice community participation.

An optimum fiscal regime is often a composite of trade-offs across different objectives:

- Early Revenues vs Investment Efficiency;
- Progressivity
- Competitiveness;
- Early fiscal revenues vs tax incentives that drive a critical mass of investments.

Progressive and transparent fiscal regimes are generally considered to be more stable and credible and, depending on the fiscal design, they do not compromise on efficiency.

FRGA are based on clarity and transparency which require that:

- Rules are established by law and contracts are published;
- Laws are consistent with the nation's jurisprudence;
- Laws and contracts minimise discretion;
- Government revenue streams should occur during all production periods but also should increase with a larger share of revenues as profitability increases;
- Progressive fiscal systems that arise from FRGAs should be based on:
 - Royalty (Early Revenues);
 - Regular Corporate Income Tax (CITA);
 - Tax on Rent (Hydrocarbon Tax).

Stable and credible fiscal terms must also demonstrate robustness in the face of volatilities of cost and price. Robustness means that the fiscal system for gas is not subsidised by oil and vice-versa. This can best be achieved through the right pricing of gas and lower royalties and resource tax. Additionally, FRGAs must deter transfer pricing (cost benchmarking) and review international treaties.

4.4.4. Principles of the Fiscal Framework

1. Pricing should not be fixed by the state but there should be an interaction of the market to determine the right price (which is not necessarily a low price);
2. Fiscal policies must enhance investment, be cost efficient and sustainable in the long run;
3. Non-consolidation / non-recovery of gas costs from oil income. The fiscal framework intends to remove the distortions in AGFA from the effective cross-subsidy of oil to the gas sector. The gas policy will therefore ensure that gas project costs are attributed to gas projects, and gas projects are standalone;
4. At the same time, the government intends to have separate fiscal treatment for exploration, production and midstream gas activities, to relax royalty and tax rates for gas, and incentivise entry into the midstream. These are all designed to stimulate investment and ensure that gas projects can be economically viable from a fiscal viewpoint;
5. Upstream incentives to invest in gas-for-development (for example, to promote increased E&P activity in the onshore frontier areas by providing globally competitive incentives) can include the introduction of more favourable upstream terms for gas activities:
 - a. Reduced royalty rates for gas;
 - b. Under production sharing contracts (PSCs), introduction of more favourable production allowances and hydrocarbon tax in the event of gas production;
6. Fiscal policy incentives to attract investment into the midstream.

5. INDUSTRY STRUCTURE

5.1. Background

Solutions to the development of the petroleum sector in Nigeria (as in any market around the world) are in three areas:

- **Areas where Government can have a direct affect:** Government sets the policy, law and the regulatory framework, which directly sets the tone for the whole market.
- **Areas where Government sets the environment:** Government can support the development of the market, such as pushing the implementation of the Gas policy, and by attracting investors to the country. Government implements policy frameworks and regulations effectively and provides market support (such as financial incentives or tax support).
- **Areas where the market acts directly and there is no role for Government:** Government can set the scene but ultimately the private sector builds the gas market.

5.2. Strategic Objectives

The gas policy envisions an industry founded on partnership between the public and private sectors, albeit with a clear separation of roles between the government and the private sector.

The respective roles of the parties envisaged by the Gas Policy are:

- Government:
 - Policy setting;
 - Legislation;
 - Regulation;
 - Putting in place mechanisms to encourage the development of markets;
 - Encouraging payment discipline;
 - Encouraging the development of fair and competitive gas markets.
- Corporate sector:
 - Creating markets;
 - Conducting safe, healthy and environmentally friendly operations;
 - Serving their shareholders, as well as consumers, government and other stakeholders.

This policy recognises that state-owned corporations and private sector companies will have the same responsibilities and opportunities in accordance with extant laws. It is the policy, for example, that nobody will be forced to sell gas to a party only because that party is Government - owned.

5.2.1. Roles of Government-Owned Corporations

They are and will be a number of government-owned corporations operating in the Nigerian gas sector. These include:

i. Nigerian National Petroleum Corporation (NNPC)

Nigerian National Petroleum Corporation (NNPC) is the agency of the government responsible for representing the commercial interests of the government in petroleum exploitation and distribution. It is involved in natural gas production on a joint-venture (JV) basis with international oil companies (IOCs) and with international and national independent operators, which act either as the operator of joint venture concessions held under Oil Mining Leases or as contractors under Production Sharing Contracts (PSCs).

NNPC subsidiaries relevant to the gas sector are:

ii. Nigerian Petroleum Development Company Limited (NPDC)

NPDC is a fully-owned subsidiary of NNPC. NPDC is engaged in oil and gas exploration and production activities in the hydrocarbon-rich regions of coastal Nigeria (the Niger Delta), both onshore and offshore, and more recently around Equatorial Guinea. NPDC operates JVs with international and national operators.

iii. Nigerian Petroleum Investment Management Services Limited (NAPIMS)

NNPC's representatives in the Operating Committees of the various joint ventures are seconded from Nigerian Petroleum Investment Management Services Limited (NAPIMS) which is a subsidiary company of NNPC, established to manage NNPC's interests in the various oil concessions. In addition, all project proposals, joint venture budgets and key operating decisions in gas projects are subject to NAPIMS approval.

iv. Nigerian Gas Processing & Transportation Company (NGPTC)

Will own and operate the government - owned gas transmission network and process plants.

v. Nigerian Gas Marketing Company (NGMC)

Will own all the supply contracts and will operate NNPC's gas supply business.

The NGPTC and NGMC were created after the unbundling of the Nigerian Gas Company (NGC), the former NNPC gas transportation and marketing subsidiary which had operated both as a transporter, wholesale supplier of gas and franchisor of gas distribution franchises. That previous role restricted the development of a competitive and growing gas market; hence unbundling is a structural solution that should allow the national oil company to operate more efficiently in the gas business whilst allowing for a more efficient development of the market.

The policy is that every entity in the gas industry will be required to unbundle various activities in the gas sector, in particular gas transportation will be separated from gas supply.

5.2.2. Strategic Partnerships

The government intends to seek strategic partnerships to support operations in parts of the Nigerian gas industry, in particular for NGPTC.

Strategic partners with demonstrable ability to support NGPTC with modern management and technology, and so increase the effectiveness and value of the company, may be offered a sizeable shareholding in the company.

5.2.3. Export Gas Ownership and Tolling

It is the intention of the gas policy for Nigeria to become more involved in marketing gas in international markets.

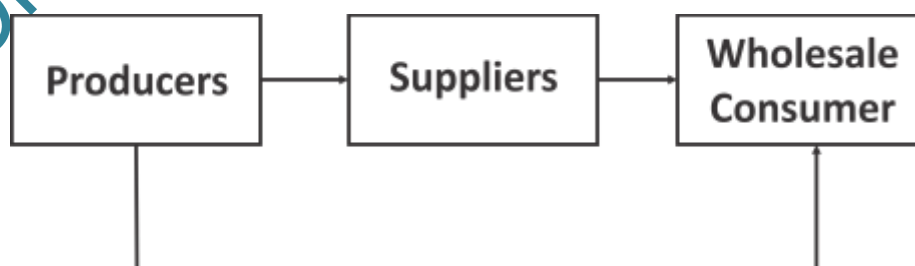
This will initially be through sales to wholesalers at the regasification terminal but over time, Nigeria will become involved in sales to downstream customers within international countries. This will apply particularly in Europe where there is more downstream gas market liberalisation. This envisages that the national oil and gas company will retain ownership of its equity gas which is destined for export markets, until sale to suppliers or the final consumer in international markets.

The gas policy envisages a cost of service tolling structure for future participation of the national oil company in new LNG projects.

5.2.4. Wholesale Domestic Market

The gas policy intends a change in market structure conduct and performance with a move towards wholesale markets.

Producers, their gas marketing affiliates, or independent wholesale traders will be licensed as gas suppliers to make gas available for wholesale delivery within Nigeria. Wholesale consumers (industries and power plants) will buy from suppliers.



5.2.5. Separation of Transport and Trading

For wholesale markets to work, the common practice now across most of the world is for a clear separation of the activities of gas transportation and gas trading. Transporters will not be allowed to trade and traders will not be allowed to transport gas except through separately incorporated and managed entities. This is why NGC or any other entity will be separated into legally separate transport and trading companies.

5.2.6. Domestic Gas Supply Obligation

The Government understands why operators would rather deliver gas to international markets than to the domestic gas market:

- Higher prices can be commanded in export markets;
- Payment discipline is virtually guaranteed in export markets;
- The infrastructure exists so it is much easier to put gas into market.

Nevertheless, it is the desire of the Nigerian government and people to build a domestic gas market in order to ensure national economic development.

The Government shall give priority to the utilisation of Natural Gas for domestic needs. The policy imperative is for gas development for priority domestic utilisation in power generation.

The priority end-use sector for Nigeria is the power sector which is significantly under-developed. However, it is also desired that demand from the industrial, commercial, transportation and industrial sectors, as part of the domestic gas demand mix, should be met.

Domestic gas supply obligations have become a standard regulatory tool amongst producer nations around the world to ensure gas is available for domestic markets.

The government considers it reasonable for there to be a domestic gas supply obligation imposed on producers which is sufficient to kick-start domestic market development but not so high that producers see it as onerous.

The government expects that producers will see the obligations as part of their contributions to national development and doing business in Nigeria.

All producers must make gas available for the domestic market up to the limit of the obligation.

As a matter of policy, the issuance and renewal of upstream licences will be subject to strict compliance by the applicant with its domestic gas supply obligation.

5.2.7. Review the Gas Aggregation Policy

The development of a competitive market for gas supply inevitably means that Nigeria will ultimately move away from the concept of gas aggregation. The Gas Aggregation Company of Nigeria (GACN) was initially licenced as a vehicle for the industry to operate the aggregation process for a transitional period of five years only. In the years since this model was established, GACN has been largely unsuccessful in meeting its objective of growing the domestic gas industry to maturity.

The government will review the licence of GACN and will determine what role it can usefully play in the new industry structure as laid out in this gas policy.

5.3. Gas Market Structure

5.3.1. Philosophy of the Regulatory Structure

There will be a strong independent regulator that will be responsible for the technical and economic regulation of the gas sector. The role includes minimising and, where possible, eliminating market distortions, and implementing licensing, monitoring, investigations, and dispute resolution powers.

The licensing regime will cover every activity including, but not limited to, licences for exploration, production, constructing and operating gas processing plants, liquefaction plants, constructing and operating gas storage facilities, transportation pipelines, distribution networks, undertaking the supply of natural gas including gas trading, and acting as a “supplier of last resort”.

All regulatory and pseudo-regulatory activities will be removed from corporate entities and taken over by the regulator. This includes, for example, distribution licensing and franchising arrangements by any party. In addition, a network code will be introduced to provide conditions for non-discriminatory access for third parties to all infrastructure along the supply chain.

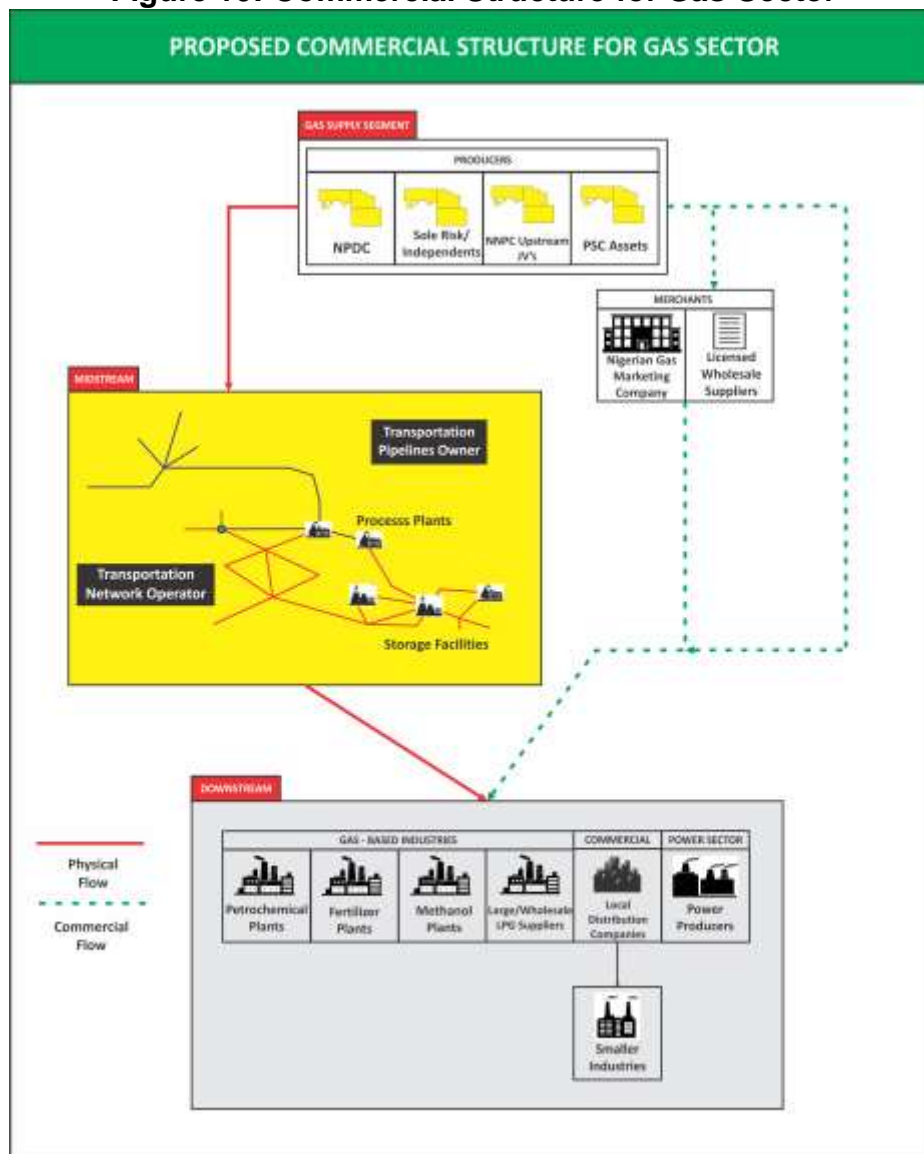
Supply segment: The wholesale gas supply segment will be open under a Supply Licence to any gas producer or gas merchant who meets the regulator’s qualifying criteria as an Eligible Supplier. An Eligible Supplier shall be entitled to purchase gas from a producer or any other Eligible Supplier for on-sale to any off-taker.

The policy seeks to promote more efficient utilisation of capital by encouraging producers to focus their investments and activities more on exploration, development and production of gas, whilst specialised midstream investors can process and transport gas. The regulator’s role is to calibrate the supply segment such that it becomes open to as many players as possible in order to foster competition for the market amongst licensed entities. This competitive pressure ultimately compels innovation and efficiency in gas development because the profit motive provides an incentive to control costs. Gas prices should come down as a long-run effect of increased supply and competition.

Midstream segment: The policy objective for the midstream is to attract as much investment as possible into gas processing, transportation and storage in order to

bridge Nigeria's gas abundance with growing demand.

Figure 10: Commercial Structure for Gas Sector



Source: MPR Gas Policy Team 2016

The gas policy envisages a cost of service tolling structure in the midstream such that producers can focus on exploration and production activities while midstream investors specialise in processing, transportation and storage of gas, or in marketing of gas, for upstream producers.

Given the network-bound and monopoly features of the midstream, the regulatory objective should be utility regulation. The relevant regulatory tools in this regard are:

- Competition regulation;
- Open access rules;
- A Gas Network Code;
- Tariff regulation on a cost of service rate of return basis.

Downstream segment: The downstream segment will be open for wholesale gas supply by Eligible Suppliers to any Eligible Offtaker who may commercially bypass distribution licensees consistent with the open access rules.

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6. DEVELOPING GAS RESOURCES

6.1. Diversification of Supply Sources

Nigeria needs to diversify its gas supply sources from a national and energy security perspective. In order to improve security of gas supply, the gas policy intends to encourage an environment that ensures deliberate gas exploration and production in other regions of Nigeria.

The policy shall promote exploration activities for additional gas resources in other geologically prospective terrains, especially the offshore and inland basins, including the review of the commercial terms upon which titles in these basins are held.

Significant gas reserves have been discovered in some of the inland basins. These reserves have a potential to contribute significantly to the development of distributed power generation assets in Nigeria, and thereby enhance the diversity of gas supply to the power and industrial sectors.

6.1.1. Niger Delta

Gas developments to date have been undertaken largely, almost exclusively, in the Niger Delta. Most of the gas discoveries were by accident, with a company typically exploring for oil and discovering gas. Most of the gas production in the Niger Delta is produced in association with oil production. There are also some dry gas fields, whose output is mostly dedicated to LNG exports.

Table 4: Nigerian Associated and Non-Associated Gas Production (2006-2015)

Year	Associated Gas (AG), bscf	Non-Associated Gas (NAG), bscf	Total Production, bscf
2006	1,542	748	2,290
2007	1,599	1,008	2,607
2008	1,594	987	2,580
2009	1,582	646	2,228
2010	1,865	955	2,820
2011	1,839	1,127	2,967
2012	1,872	1,123	2,996
2013	1,787	1,025	2,812
2014	1,880	1,168	3,049
2015	1,740	1,262	3,003

Source: DPR Annual Report, 2015

Note: Total AG and NAG production

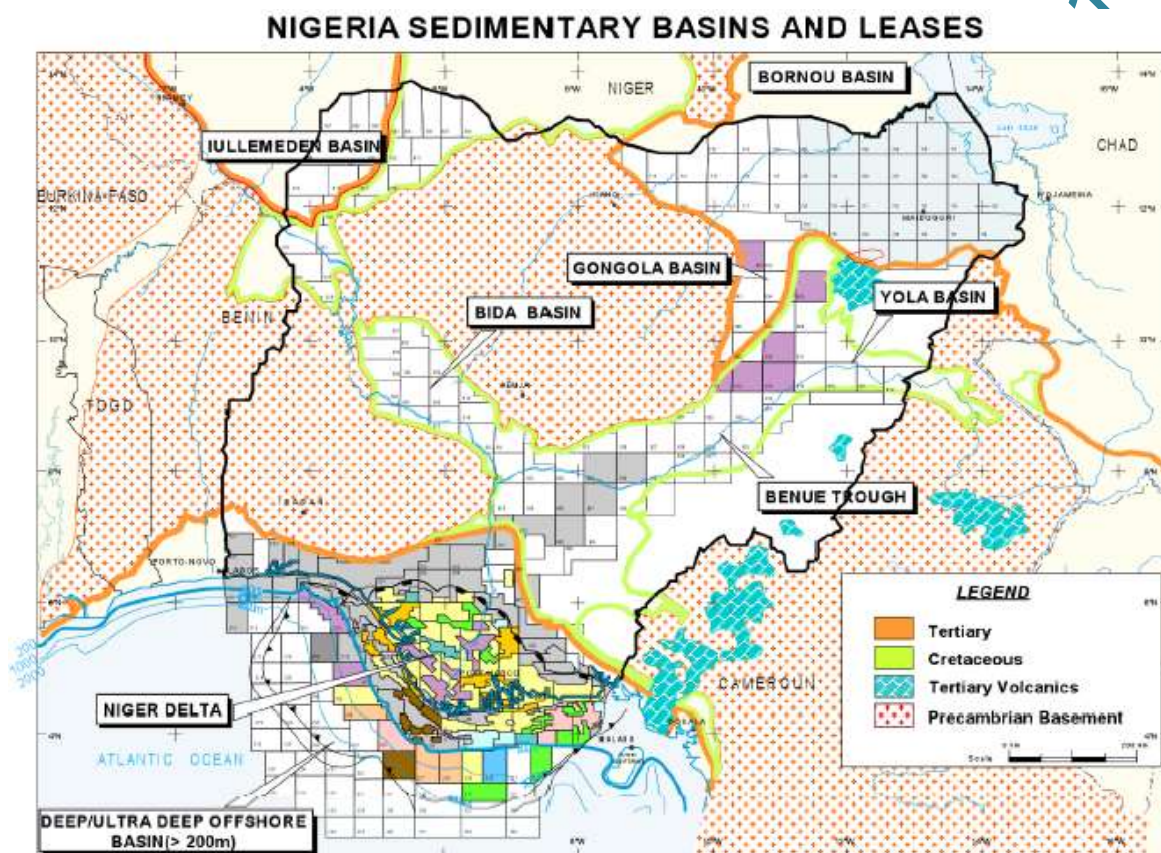
There are security of supply risks with the current situation, emanating from the Niger Delta militancy, and consequent disruptive effects on gas production, the environment and wider economy.

6.1.2. Benue Trough and Sedimentary Basins of Nigeria

As well as the offshore and Niger Delta, many other sedimentary basins have been identified (but not yet developed) in Nigeria, including the Benue Trough, the Anambra Basin, Kerri Basin, Yola Basin, Gongola Basin, Bida Basin, Lullemeden Basin (with Niger) and the Chad Basin (with Chad). A key one is the Anambra Basin. This has been barely explored but it is considered that it will most likely be extensive and rich in natural gas, a dry gas not an oil or associated gas production basin.

Figure 11: Petroleum Basins in Nigeria

Source: NNPC, 2016



6.2. Identifying Low Cost Gas Resources

Except for gas which is held by Government through NNPC in joint venture with third parties or on a sole risk basis by independents, the Nigerian government has ownership rights over virtually all the gas resources in the country. Within this overall portfolio are several low cost wet gas resources, where the inherent value of the natural gas liquids could be leveraged to yield an affordable gas price for the domestic market.

To achieve gas based industrialisation low-cost gas resources will be identified and dedicated to the Nigerian domestic market.

Portfolio management methodologies will be utilised to prioritise the development of low cost gas to be identified, with the subsequent intention to have a proportion of that dedicated to domestic markets.

Table 5: Proved Reserves and Resources in Place across Ownership Types

2P GAS RESERVES / RESOURCES IN PLACE AS AT 1 JANUARY 2016							
S/N	Ownership Type of Gas	Gas Reserves (TCF)					
		AG		NAG		TOTAL	
		Proved (2P)	Resources in Place	Proved (2P)	Resources in Place	Proved (2P)	Resources in Place
1	NPDC	0.33	1.13	1.64	2.60	1.98	3.73
2	NPDC JV	8.12	22.82	5.67	10.80	13.80	33.62
3	NNPC JV	74.44	187.87	60.43	100.41	134.87	288.29
4	PSC	13.01	43.71	17.03	14.60	30.04	58.32
5	Sole Risk/ Independents	1.41	3.88	9.89	8.46	11.30	12.34
TOTAL		97.31	97.31	259.41	94.67	136.88	191.98

Source: DPR 2016

6.3. Clarifying Gas Terms for PSCs

Nigerian PSCs are structured more for crude oil exploration and development. The PSCs have incorporated gas utilisation clauses but they do not contain commercial terms between NNPC and the contractor for development of gas discovered within the concession. The PSC merely provides that in the event of the discovery of a viable quantity of natural gas, the contractor shall investigate the discovery and submit proposals to NNPC for the development of the gas, and a separate agreement is then negotiated between NNPC and the contractor for a gas development.

The absence of clarity regarding terms for gas commercialisation means that significant discovered gas resources remain undeveloped in Nigeria's PSC blocks, especially in offshore basins. Urgent attention to this issue is now required.

The government will develop a model Gas Development Agreement containing its terms for the development of gas resources in PSC concessions.

The policy is that PSC terms will be defined to ensure development of gas resources, for the benefit of the nation.

The government will present the industry with a model Gas Development Agreement containing its terms for the development of gas resources in PSC concessions.

This agreement will address the contractual and fiscal issues relevant to upstream gas production in PSCs while providing some flexibility for adjustment as may be required.

6.4. Gas Flaring

6.4.1. Background

The flaring of natural gas that is produced in association with oil is one of the most egregious environmental and energy waste practices in the Nigerian petroleum industry. While gas flaring levels have declined in recent years, it is still a prevailing practice in the petroleum industry. Billions of cubic meters of natural gas are flared annually at oil production locations resulting in atmospheric pollution severely affecting host communities. Gas flaring affects the environment and human health, produces economic loss, deprives the government of tax revenues and trade opportunities, and deprives consumers of a clean and cheaper energy source.

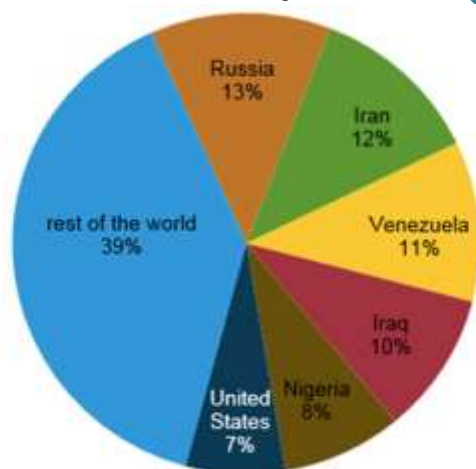
6.4.2. History of Nigerian Gas Flaring Legislation

A whole suite of anti-flaring legislation and initiatives have been introduced over the years to minimise gas flaring in Nigeria. These include measures such as:

- Time limits for cessation of gas flaring;
- Conditions upon which gas flaring may continue;
- Possible revocation of oil mining;
- A regime of penalties for gas flaring.

Figure 12: World's Top 5 Natural Gas Flaring Countries, 2014

Source: US EIA, based on Cedigaz and OPEC Annual Statistical Bulletin, 2015

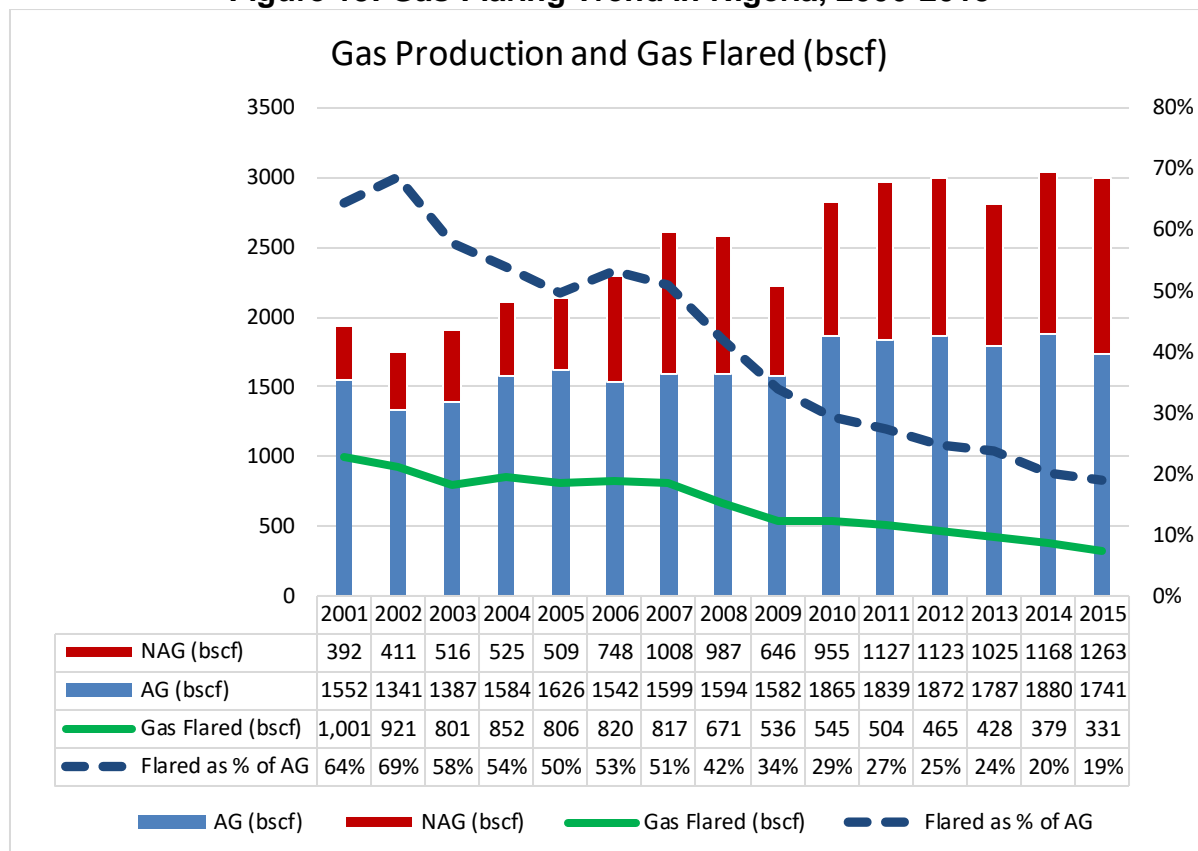


Although Nigeria still flares a significant portion of its gross natural gas production (19% of AG, 331sbcf in 2015), the amount of gas flared has significantly reduced in recent years. Its ranking has dropped from the 2nd to the 5th largest natural gas flaring country in the world (according to Cedigaz and OPEC) or 7th (according to GGFR 2016).



To ensure that flared gas is utilised in markets, the government will take measures to ensure that flare capture and utilisation projects are developed and will work collaboratively with industry, development partners, providers of flare-capture technologies and third-party investors to this end, without prejudice to the enforcement of applicable sanctions.

Figure 13: Gas Flaring Trend in Nigeria, 2006-2015



Source: DPR 2015; Analysis: MPR Gas Policy Team 2016

Note: NAG and AG are total gas produced

6.4.3. Gas Re-Injection

Nigeria is an example of an oil exporting country where the associated gas was mostly flared or re-injected in oil fields during the last decades, in the absence of commercial uses for gas. Historically, there have been no restrictions in Nigeria on any company to re-inject any extra gas. However, the new position is that the government prefers the utilisation of flared gas into markets, utilised by different downstream sectors, rather than flared or re-injected with no valid technical reason.

It is the policy that gas utilisation will be a priority consideration over other considerations for handling of associated gas. In the absence of compelling technical reasons or a viable outlet for the gas, the Government intends to restrict undue re-injection of associated gas.

6.4.4. Policy of Gas Flare-Out through Gas Utilisation Projects

Under the gas policy, the government intends to maximise utilisation of associated gas to be treated for supply to power generation or industry.

Routine gas flaring reduction projects, however, are not to be seen as isolated elements of oil and gas sector operations. Flared gas utilisation is part of the wider

gas policy to develop Nigeria's gas resources and release much more of the value from national gas resources.

6.4.5. New Flare Capture Technologies

Gas flaring reduction technology has the potential to be one of the great energy and environmental success stories. Unlike long-term greenhouse gas solutions such as carbon sequestration or wider deployment of nuclear power, gas flaring can be dealt with today through a variety of existing high-performance technologies. Depending on the region, proven technologies such as distributed power generation, large-scale efficient power generation, gathering and processing, liquefied natural gas (LNG) and micro gas-to-liquids (GTL) are efficient within their respective roles.

New technology solutions for the capture and utilisation of associated gas are encouraged, which could include, for example:

1. Power generation projects designed to utilise flared gas;
2. Replacing diesel fuel with gas for power generation with small gas engines;
3. Combining new processing systems with efficient fuel flexible gas turbines;
4. Small-scale GTL or mini-LNG plants;
5. Gas infrastructure (processing and transportation) solutions;
6. Identifying and designing the full value chain for gas supply, including gas gathering pipelines, to connect different small- and large-size flaring fields.

The commercialisation of flared gas for supply into the domestic market is a high priority strategy for the Government in achieving the national mandate for flare-out by 2020.

To ensure that flared gas is put to use in markets, the government will take measures to ensure that flare capture and utilisation projects are developed and will work collaboratively with industry, development partners, providers of flare-capture technologies and third party investors to this end.

6.4.6. Flare-Out Targets

The Government plans to open an industry consultation mechanism, as an important measure in ensuring flaring targets are feasible and regulations are realistic.

6.4.7. Gas Flaring Penalties

The current gas flare penalty of N10/Mscf (equivalent US \$0.03) of associated gas flared is too low, having been eroded in value over time, and is not acting as intended, as a disincentive. Consequently, the low penalty has made gas flaring a much cheaper option for operators compared to the alternatives of marketing or re-injection.

The intention of Government is to increase the gas flaring penalty to an appropriate level sufficient to de-incentivise the practice of gas flaring whilst introducing other measures to encourage efficient gas utilisation.

6.4.8. New Field Developments

The government intends to develop regulations which will prohibit any greenfield gas project from moving forward until there is a proper integrated plan for the development of the hydrocarbons thereby ensuring that no gas flaring occurs during production of hydrocarbons, except in very special circumstances such as emergencies for operational reasons.

6.4.9. Existing Fields

For existing AG fields, brown field sites, the government will also consider other options to ensure significant gas flare reductions.

1. Operators of existing AG fields need to produce integrated gas flare reduction plans; they will then be expected to implement those plans;
2. The government will consider a new **sliding scale penalty** to be introduced for existing brown field sites, especially for JV and Service contracts which contribute 88% of the total associated gas flared in the country;
3. Existing AG fields need to start planning and investing in the utilisation of the associated gas to be supplied into the market, and to come up with economic plans for their development;
4. The government will consider regulations to allow for open access to gas gathering pipelines, to ensure that flared gas has access to gas gathering systems and gas processing facilities;
5. If the proposed regulations do not prove enough, the government will consider further measures to ensure effective and significant gas flare reductions.

6.4.10. Uneconomic Fields

For those few fields where it is clearly shown to be uneconomic to develop and implement a gas flare reduction plan, the government will consider other options. These could include orders to shut in production at those fields.

6.5. Gas Resource Management Plan

Gas development must be undertaken in accordance with Nigeria's national socio-economic development priorities. Accordingly, the government through the MPR and with support from NNPC and industry will produce a Gas Resource Management Plan. This will:

- Identify gas resources in different geological areas;
- Identify current and potential gas markets;
- Identify infrastructure needs;
- Analyse how best to access low cost gas for delivery to domestic gas markets.

The Gas Resource Management Plan will classify gas resources according to the following categories:

- Low-cost assets dedicated to domestic gas supply (National Preferential Assets);
- Assets dedicated to export;
- National Strategic Gas Reserve (reserved for future development);
- Optional assets (sole risk assets).

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7. INFRASTRUCTURE

7.1. Key Gas Infrastructure Projects

As part of the Gas Resource Management Plan described above, the key gas infrastructure needs will be identified and appropriate recommendations for upgrading the design of the existing National Gas Infrastructure Blueprint will be made to Government.

The gas infrastructure required will be identified under these categories:

1. **Existing Gas Infrastructure:** Review of the existing gas transmission infrastructure in place;
2. **Gas Master Plan Infrastructure Blueprint:**
 - What was planned in the Gas Master Plan;
 - What has actually been achieved;
 - What parts of the Gas Master Plan are still valid now;
3. **New Gas Transportation Links:** New gas transportation needs which are identified;
4. **Upgrading NGC Network:** Upgrades needed to the existing NGC network;
5. **Alternative Gas Transportation Options:**
 - CNG by road or barge;
 - LNG by road or barge;
 - Other virtual pipeline options that may be identified;
6. **Key Anchor Customer Infrastructure:** The investments required at key anchor customer sites, for example at Ajaokuta Steel;
7. **Security of Gas Supply Investment:** The additional infrastructure needed to improve the robustness of the Gas Infrastructure Blueprint and ensure gas supply security.

Critical gas infrastructure includes the following:

- 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;
- Trans-Sahara Gas Pipeline Project.

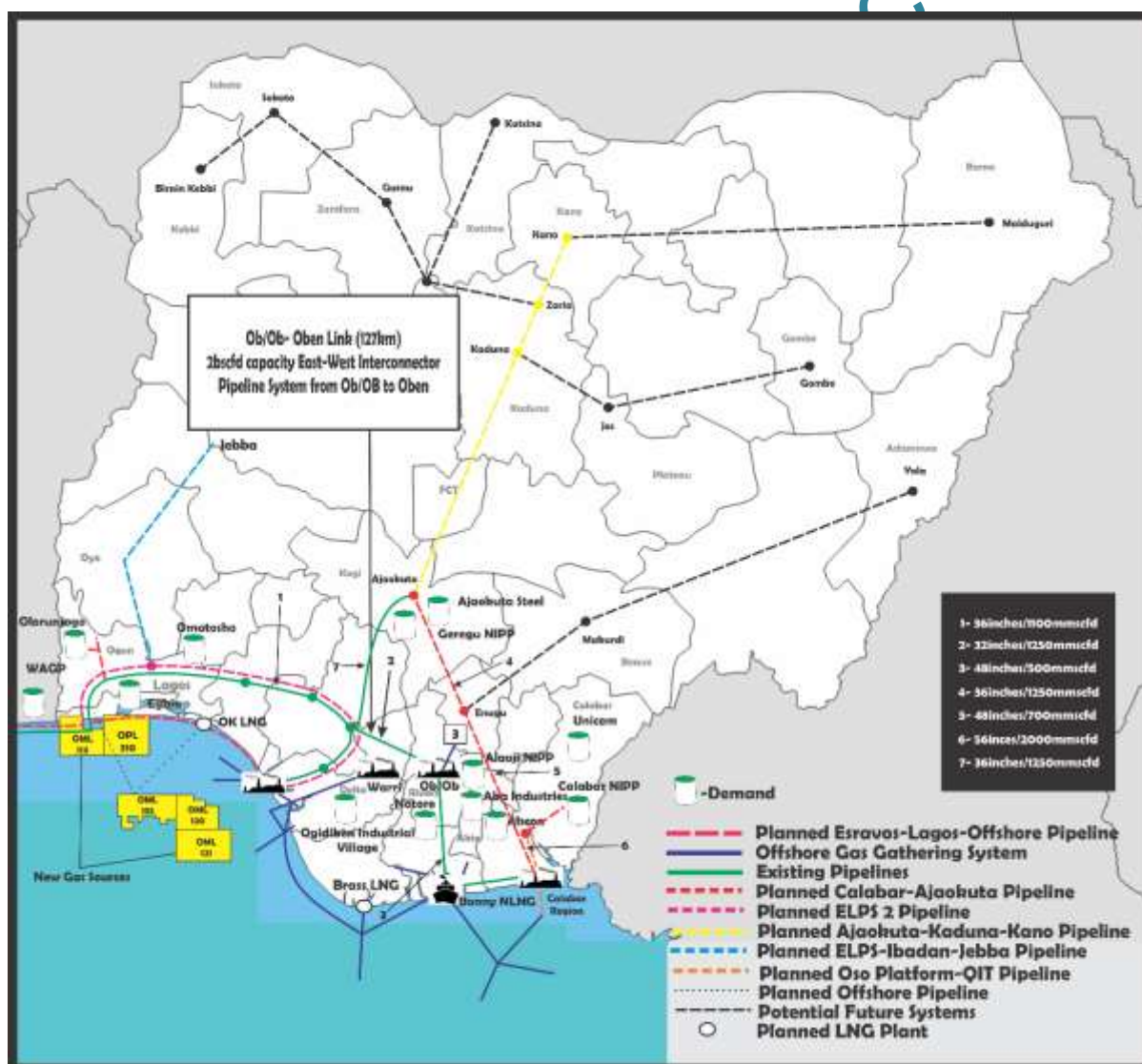
Entry into the midstream will be liberalised and incentivised to allow private sector investors to develop infrastructure to process, transport and store natural gas.

7.2. Need to Improve the Whole Supply Chain

The Nigerian government is aware that there are currently challenges across the whole supply chain. To improve key infrastructure is only part of addressing the problems that exist. Everything cannot be achieved all at once but the government is aware of the challenges across the supply value chain and is determined to improve the following:

- Physical infrastructure, including gas infrastructure, roads, telecommunications and others;
- Business environment;
- Cost optimisation in gas projects;
- Increasing transparency and minimising inefficiencies.

Figure 14: Map of Nigeria showing Gas Demand and Infrastructure



Source: MPR Gas Policy Team, 2016

8. BUILDING GAS MARKETS

8.1. Introduction

A key aspect of the vision of the gas policy is for gas-based industrialisation of Nigeria.

The intention of the Government is that natural gas exports will continue, albeit consistent with Nigeria's aspirations for domestic gas market development.

Renewal of licences and leases will be subject to a commitment by the licensee or lessee to the development of the discovered gas resources within the licence or lease area for domestic or export projects, as applicable, and within a specific timeframe.

Strategic Objective

The vision of the gas policy is for gas-based industrialisation of Nigeria

Means of growing the domestic gas market which have been identified under this gas policy include:

- Identifying and Developing Clusters and industrial parks;
- Market Growth from Anchor Customers;
- Gas Based Industrialisation;
- Gas for Development Programme;
- Alternative Markets and Uses for Gas:
 - Compressed Natural Gas (CNG);
 - Natural Gas Vehicles (NGVs);
 - Liquefied Petroleum Gas (LPG);
 - Liquefied Natural Gas (LNG) vehicles;
 - Liquefied Natural Gas for Agriculture and Agro Allied Industries
- Financing methods;
- Improvements to the supply chain.

Export Projects

The Policy focus is to gain more of the value from downstream export markets.

8.1.1. Liquefied Natural Gas (LNG)

Through the Nigerian LNG Company, Nigeria is one of the world's leading LNG exporter nations. Although Nigerian LNG is sold to Far Eastern markets in the Pacific basin (and were indeed the main set of markets for Nigerian LNG in 2015), Atlantic basin markets historically have been and in the future will be the main markets for Nigerian LNG. This is because of their geographical proximity to Nigeria and the consequent lower transportation costs of LNG.

North America is no longer a market for gas exports within the Atlantic Basin, leaving Europe and South America as the main destinations for Nigerian LNG. Both of these

markets however have challenges for a country like Nigeria that wishes to maximise LNG exports. European economic growth remains below expectations when FID was taken on LNG projects and a European policy drive towards energy savings measures throughout the EU leads to restrained demand for LNG in Europe. Despite lowered expectations, Europe remains a large gas market and will continue to need considerable amounts of imported LNG and pipeline gas.

South America is seeing fast growing markets for LNG but a large proportion of supplies for those markets is currently sourced from Trinidad & Tobago. While Nigeria certainly could sell to South American markets the gas policy realises that some ground has to be made up to become established there.

The gas policy foresees Nigerian gas exports being largely directed to European markets and South America, although there will be some opportunities for exports to Far Eastern markets.

1. Retaining Ownership of LNG

Nigeria will continue to seek opportunities in the global LNG market either through the expansion of the capacity of the Nigerian LNG company or through the development of the OK and Brass LNG or other LNG projects as may be considered appropriate and commercially feasible. The intention, however, is for Nigeria to retain ownership of its natural gas up to the point of delivery into markets. The government therefore intends to move to a tolling arrangement with respect to exports of Government's equity LNG from new projects, whereby the LNG liquefaction facility is paid a fee for liquefying the government share of gas produced from its assets, and LNG shippers are paid a transportation fee for transporting it. Ownership and title to the gas therefore remains with the government entity up to the point where it is regasified at the export market regasification terminal and sold to shippers.

2. Improve LNG Marketing

As Nigerian government entities become more experienced in gas marketing, it is expected that the government entity will be able to retain ownership further downstream, gaining access to transport networks and selling directly to large consumers.

As an example of the concept, Russian Gazprom has an equity shareholding in the UK-Belgium Gas Interconnector. Gazprom subsequently applied for a UK shipper's licence and now operates a gas marketing operation in the UK, selling Russian gas directly to consumers in the UK.

3. Regional and International Pipeline Projects

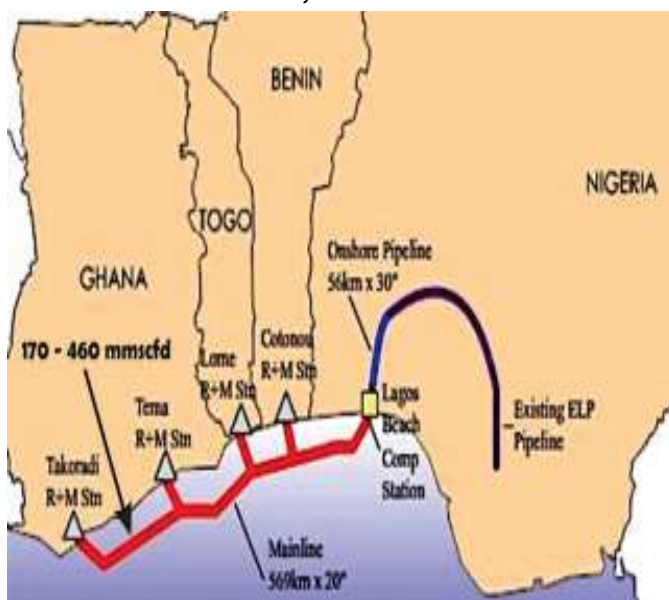
West African Gas Pipeline (WAGP)

The WAGP is the gas export pipeline originating at Lagos as an extension from the ELPS and delivering to consumers in Benin, Togo and Ghana.

There have been numerous problems with this export pipeline project, including:

Figure 20: West African Gas Pipeline, Route

Source: ERERA Forum, 2012



- Vastly over-costed infrastructure;
- Shortage of supplies from the Nigerian side;
- Lack of payments from the national consumers (Ghana, Togo, Benin);
- Pipeline vandalism in Nigeria.

The government is aware of the problems with the WAGP project and shall take appropriate corrective steps to ensure sustained gas supply into the West African region.

For the Country to maintain its position as a leader in the transportation of Gas in the West African sub region, **government shall facilitate the business and regulatory environment for the development of the backbone gas infrastructure and extensions for the Trans-Saharan Gas Pipeline.**

Trans - Saharan Gas Pipeline



Initial feasibility studies have been carried out and MOUs have been signed between the governments of Nigeria, Mali and Algeria.

As a first step towards implementation of the project, the backbone infrastructure of a gas corridor from the south east to the northern most parts of Nigeria will be built, which will allow for subsequent extensions to major population load centres throughout Nigeria

Figure 21: Trans-Saharan Gas Pipeline, Route

Source: NNPC, 2015

8.2. Growing Domestic Gas Markets

8.2.1. Encouraging Gas Projects – Project Based Approach

Supply to the domestic gas market has not grown as expected or forecast. New measures are therefore required to support the growth of domestic gas markets.

Gas development was previously based around export gas projects with some local market development as a secondary objective, which did not deliver. Gas developments will henceforth be on a project-by-project basis but backed by a clear DSO, which means delivery of domestic gas projects will be the primary not secondary objective of project developers. Within this regulatory push (of a DSO), gas development will be essentially market-led rather than centrally planned.

Rather than trying to continue with a centrally planned national market development, the gas policy proposes a project-based and market opportunity-led approach as a more effective way to grow gas markets.

Appropriate frameworks will be developed to support gas-based projects, including gas transport pipelines and associated anchor customers or demand clusters.

Projects will largely be developed by project developers from the private sector. The government will set the environment and support investors in gas-based industrial projects with appropriate interventions to bring their projects to fruition.

8.2.2. Gas-Based Industrialisation

The vision of the gas policy is for gas-based industrialisation of Nigeria.

This means that gas-fired power plants will continue to be targeted but the government will also promote the development of gas for industrial purposes.

The long-term vision for Nigeria is a diverse industrial base that is fired by natural gas.

8.2.3. Market Growth from Anchor Customers

Project based gas industrialisation will mean that gas market development projects will grow around anchor customers. Anchor customers are large consumption centres where the demand is large enough and which are profitable enough, to enable the infrastructure to be built (including gas gathering and processing; gas transportation pipelines; and consumption site facilities).

There are essentially three types of anchor customer that a project-based approach will support:

- Gas fired power generation;

- Large industrial customers, such as Ajaokuta Steel.
- Industrial parks

8.2.4. Identifying and Developing Clusters

A cluster in the Nigerian energy context, is a geographical part of the country where there is a demand centre (large enough and with economically viable consumers), a short transportation system and a source of energy supply. Because there currently remain some problems with Transmission Company of Nigeria (TCN) in terms of the ability to consistently transfer large volumes of stable electricity around the country on a national grid, alternative ways of getting energy to consumers is under consideration by many parties. Gas and LPG can be parts of the solution.

As part of the gas policy, studies will be undertaken to identify where there are clusters which could form anchor loads for a gas project. The government will facilitate the development of these gas projects to clusters but the private sector is expected to develop the projects.

The gas policy also encourages further gas development for other projects, including:

- Petrochemical plants;
- Fertiliser plants;
- Village power plants;
- Embedded power plants;
- Compressed Natural Gas (CNG) plants;
- Natural Gas Vehicles (NGV);
- Liquefied Petroleum Gas (LPG) plants;
- Compressed Natural Gas (CNG):
 - Natural Gas Vehicles (NGV);
 - CNG transport by barge, rail and/or road;
- Liquefied Natural Gas (LNG) for downstream applications, such as:
 - LNG vehicles;
 - LNG to power;
 - LNG to industry;
- Liquefied Petroleum Gas (LPG);
- Domestic LNG;
- LNG to Agriculture.

8.2.5. Alternative Markets / Uses for Gas

Other markets for and uses of gas are also possible and ***the intention of the gas policy is to support project developers and investors seeking to develop alternative gas markets in realising their projects.***

8.2.6. Natural Gas Vehicles (NGV)

Vehicles using CNG may be appropriate for some large Nigerian cities under a single regulatory authority, such as Lagos, Port Harcourt, Abuja, Kano and Kaduna for

example or where there are large vehicle fleets such as large corporate fleets or buses and/or taxis in large urban areas.

NGVs really take off when there is a determined government push behind the initiative. When there is a push which generates a demand, then the markets starts to provide NGV filling stations. NGVs started to take off in London (UK) for example when the Mayor announced that taxis that were not converted to at least dual fuel would not have their licences renewed. NGVs also have a wide use in the West African region outside Nigeria, specifically in Ghana.

The government intends to support CNG penetration, to set the environment, help to develop fleet markets in some large cities and to ensure adequate gas supply but the government does not intend to directly invest or become operationally involved. Having set the framework, the government wishes to encourage private sector investment and operations.

8.2.7. Gas for Rail Electrification

Another important gas market is the provision of gas to power for the provision of electricity for rail electrification across Nigeria. This can include electrification of some of the existing and proposed new railway lines.

8.2.8. CNG Transportation

This does not refer to using CNG as the vehicle fuel, instead it refers to the different ways in which compressed natural gas can be transported around the country. This can provide an alternative to pipeline gas transport for inland destinations.

CNG by Road: As an alternative to building a gas pipeline, CNG can be transported to markets by truck on roads. The advantages are that gas markets can be reached that would otherwise be uneconomic to reach (the average cost is lower), thus opening up new gas markets. The main disadvantage is that this puts further pressure on sub-standard Nigerian roads and on the limited number of and poor quality of trucks (high marginal cost). The risk of accidents and explosions in populated areas is also higher using CNG by road. This could be a viable option for some inland industrial centres, such as Nnewi (Anambra) for example.

CNG by Rail: This option has the same benefits as CNG by road. The risks of accidents are less though, giving further advantages. As the rail network improves this could become a viable option.

CNG by Barge: Another alternative to using pipelines could be the transportation of CNG by boat up the river Niger or along the coast.

8.2.9. LNG Trucks

Vehicles carrying liquefied gas are a new technology and may have advantages over CNG by road because substantially larger volumes of gas can be transported as LNG (LNG carries 600 times the energy content of gaseous gas).

Under the gas policy, the Nigerian government encourages the private sector to take forward proposals and invest in this alternative transportation method.

8.3. Policy for Liquefied Petroleum Gas (LPG)

8.3.1. LPG Production and Consumption

Liquefied Petroleum Gas (LPG) is a mixture of propane and butane (generally approximately 50% each) and is produced as a by-product from refining crude oil or processing natural gas.

LPG presents a window of opportunity to bring about improved quality of life for the populace. A vibrant LPG market in Nigeria will no doubt induce a positive ripple effect that will translate into more jobs for the millions of unemployed Nigerians and business opportunities. For instance, local manufacturing of gas cylinders, Autogas and power generation services would be encouraged as a result of increased demand. Fiscal and environmental benefits in the form of increased tax revenues and carbon credits for government are very crucial even as Nigeria joins the rest of the global community to benefit from the use of clean fuels like LPG.

Production of LPG in Nigeria is currently approximately 4mt per annum of LPG, largely for exports. This is mostly produced from natural gas processing and some smaller production from the NNPC refineries at Warri and Port Harcourt and Kaduna. Presently, the major source of LPG in the country is from the gas processing facilities, especially the Nigerian LNG (NLNG) company.

Nigeria Petroleum Marketing Company (NPMC, formerly Petroleum Products Marketing Company or PPMC), the division of NNPC which acts as its marketing arm within Nigeria, is the main operator in the LPG market and is of a sufficient size and power to affect the performance of the whole LPG industry in Nigeria. It owns and operates nine LPG storage depots around the country. NPMC buys its LPG from the NNPC refineries and provides storage for importers. NPMC sells LPG to export markets, to marketers in bulk and is also allowed to retail directly to end users.

If Nigerian gas production increases to 100 mtoe a year, LPG production could also increase to approximately 10 million tonnes a year. As well as consequences for the domestic natural gas market in Nigeria, there are also consequences and opportunities for domestic LPG markets in Nigeria and the region. LPG is therefore an important gas product in its own right and an important part of a gas policy for Nigeria given its potential to increase natural gas usage.

However, as with natural gas, this resource is largely unused. Most of the production is exported and LPG consumption within Nigeria is recorded at a much lower figure, at around 400,000 tonnes a year as of 2015. The potential demand is much higher, at probably 1-3 mtpa. Nigerian LPG consumption per head is very low relative to other or neighbouring African countries.

As with natural gas, insufficient LPG product is being made available for the domestic market. NLNG is offering 250,000 mtpa to the domestic market but it is not being taken

up, largely because of infrastructure restrictions, namely in passing through the import jetties.

In many emerging markets around the world, LPG has an unofficial, undeclared market that operates outside the official attention of the national regulatory authorities. It is suspected that Nigeria has a similar situation, with undeclared imports coming over the border from Niger or Benin, as well as some undeclared domestic production and diversion of supplies.

Development of LPG market in Nigeria is urgently required in the areas of domestic, power generation, Autogas and industrial purposes.

8.3.2. LPG Infrastructure

The domestic Nigerian LPG market suffers from an inefficient distribution chain and prices that are higher than they would be in an efficient functioning market.

Jetties: The only functioning import jetties currently are at Apapa, Lagos. LPG supplies are restricted to the jetties at Apapa which are all operated by Hyson, a JV of NNPC and VITOL, which brings in VITOL LPG as well as third party LPG. Two new terminals are under construction at Calabar and Port Harcourt.

Depot Storage: There is limited depot storage, 14,500 tonnes of private and 4,000 tonnes PPMC storage, at Apapa (Lagos) and Calabar. Some other limited depot storage facilities around the country owned by PPMC are non-functioning.

Road Transport: There is limited road transport to take LPG from Apapa and Calabar to distribution terminals around the country. There are around 900 functioning (although old) trucks nationwide with a total transport capacity of around 2,000 tonnes.

Distribution Terminals: There are 200 distribution terminals (bottling plants) around the country with in total around 13,000 tonnes capacity.

Cylinders: The most critical infrastructure problem, alongside that of the import jetties, is the state of cylinders in the country. There are around 1.8m cylinders, of which some 10% could be cleared as safe. Unsafe cylinders, owned by the consumers and which are cross-filled, are major safety hazards.

8.3.3. The Scope of the LPG Policy

The scope of the policy for LPG in Nigeria covers its uses in the following areas:

1. **Domestic:** Broader penetration of LPG into homes – low income, rural etc.;
2. **Power Generation:** Encouraging the wider use of LPG in off grid and on grid power generation;
3. **Autogas:** Encouraging the wider use of LPG of autogas in Nigeria;
4. **Industrial:** Expansion of LPG use in industrial applications to include:

- a. **Agriculture:** Dairy production; poultry farming; CO₂ generation for greenhouses etc.;
- b. **Industry** – Steam and direct heat applications, glass production, clean food applications
- c. **Commercial** – hotels, laundries etc.

8.3.4. Domestic Applications

Cooking energy has evolved from the use of fire wood and other biomass sources, to even more inefficient high polluting and health endangering fuels, such as dirty hydrocarbon related energy sources as traditional fuels for domestic cooking/heating activities.

Approximately 30 million households and more than 100 million Nigerians depend on wood as a source of energy for cooking but this has come with collateral damage to human health, environment and economy of the country. According to WHO, smoke from open fire is Nigeria's third biggest killer with over 95,000 deaths annually behind Malaria and HIV/AIDS. Moreover, traditional cooking methods are expensive, burning up to 90% more wood than is necessary and costing poor families money that could be put to better use on education, health and nutrition. The use of firewood also contributes to massive deforestation especially in northern Nigeria while compounding the challenges of climate change. Similarly, the use of kerosene as a cooking energy source also shares most of the challenges of firewood. LPG brings manifold benefits to human health, environment as well as economy of Nigeria. As a domestic cooking fuel LPG therefore presents valuable opportunities to simultaneously combat climate change, reverse deforestation and improve community health and rural economy and livelihood.

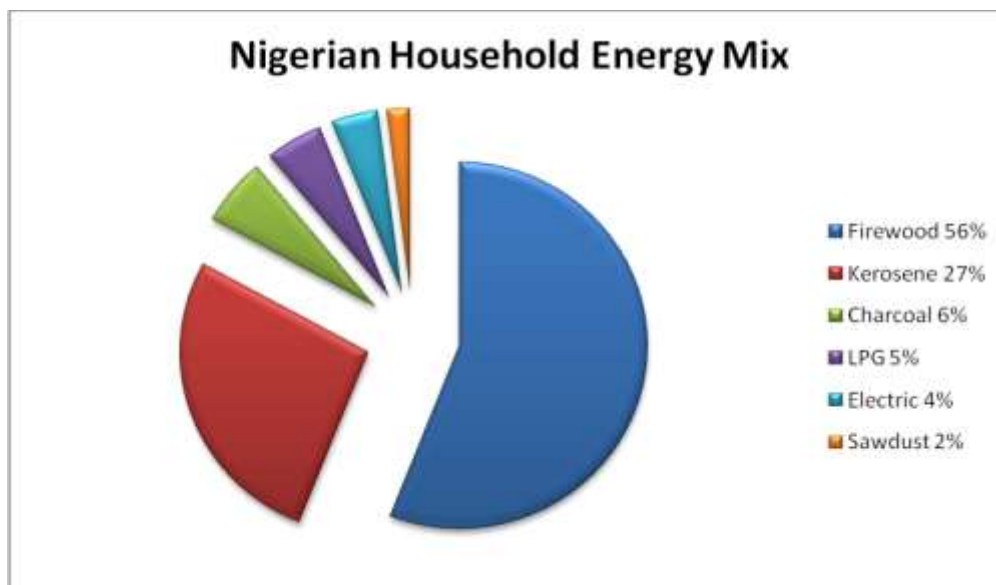
LPG has relatively low emissions when compared to other cooking fuels such as firewood and kerosene. According to the World Liquefied Petroleum Gas Association (WLPGA), LPG delivers far higher calorific value/heat content per unit compared to kerosene or firewood.

In Nigeria, NLPGA research in 2015 shows that the end user pays an average amount of ₦130 for a litre of kerosene. The average cost of 1kg of LPG is ₦240, which means 0.37kg of LPG equates to ₦89. It goes to show that even against subsidised kerosene a consumer of kerosene will spend ₦130 per litre for fuel compared with ₦89 the same consumer will spend on unsubsidized LPG. Furthermore, with increased demand will come greater economies of scale, which will further reduce the price of LPG. This has been one of the main reasons the market has attracted hundreds of millions of dollars of private funding and has grown by over 400% since 2007. It is expected that the current price of LPG will further reduce by the time LPG is accepted as the predominant domestic fuel across the breadth and length of the country.

Despite the huge reserves of natural gas in the country and all the interventions by the FGN, the transformation towards making LPG the primary cooking fuel for Nigerians has not been very successful. Many Nigerians do not have access to cooking gas (LPG) while for those that already use LPG suffer periodic scarcities of LPG.

Domestic LPG production accounts for approximately 5% of household energy mix in Nigeria as shown below:

Figure 15: Nigerian Household Energy Mix



Source: Development Association for Renewable Energy

8.3.5. Industrial Applications

Industrial applications of LPG are extremely susceptible to the cost of switching for the industrial consumer. For example, many industries e.g. textile industries in the north, which currently run on LPFO/diesel are presently dis-incentivized from switching to LPG due to high tariffs and duties on new LPG equipment required for the conversion, as well as vat on LPG as a fuel. Yet, once the switch is achieved, LPG is actually a cheaper and cleaner fuel for those industries. This highlights just one of the issues facing industrial applications of LPG.

In agriculture, several uses of LPG that would stimulate this sector include: pasteurization of dairy products; drying of grain and crop; meat, poultry and fish product sanitization; chick hatching etc.

Table 6: Energy Equivalence of LPG

Energy Equivalence	1kg of LPG
Electricity	10.8 kWh
Firewood	6.5 – 10.8 kg
Charcoal	10.2 – 29.7 kg
Petrol	1.25 litres
Diesel	1.30 litres
Natural Gas	40 – 50 cuft

Source: NLPGA

8.3.6. Electric Power Applications

The NLPGA estimates that between 1.5 and 2 million tonnes per annum of LPG is currently not recovered from flared gas, which is equivalent to over 1,000MW of power generation, or a similar amount of imported liquid fuels (petrol, diesel and/or kerosene) displaced if utilized in Autogas.

Nigeria flares annually 1.5 and 2 million tonnes of LPG in its flared gas volumes. This is more than enough to:

- Generate about 1,000 MW daily of electricity;
- Displace 5.5 to 7.5 million litres of diesel daily;
- Substitute 200-250 MMSCFD of Natural Gas equivalent in industries such as those in Kaduna, Kano etc.; or
- Preserve upwards of 6 – 8 million tonnes of wood **annually in our forests.**

Despite the potential of LPG as a fuel source, there are a few applications of LPG-to-Power in Nigeria. In order to drive this sector, the present dearth of equipment such as LPG generators, bulk storage tanks, vaporisers etc. will need to be addressed, requiring a review of the electric power tariff order to include LPG use and the introduction of appropriate fiscal and other incentives to encourage investors to choose LPG over other forms of fuel for their power plants.

8.3.7. Automotive Application (Autogas)

Vehicles using CNG or autogas may be appropriate for some large Nigerian cities such as Lagos, Port Harcourt, Abuja, Kano and Kaduna for example or where there are large vehicle fleets such as large corporate fleets or buses and/or taxis in large urban areas.

NGVs really take off when there is a determined government push behind the initiative. When there is a push which generates a demand, then the markets start to provide NGV filling stations. NGVs started to take off in London (UK) for example when the Mayor announced that taxis that were not converted to at least dual fuel would not have their licences renewed. NGVs also have a wide use in the West African region outside Nigeria, specifically in Ghana.

8.3.8. Improve Access by the Poorest and Reduce Desertification

The government intends to kick-start the market for LPG among the poorest who are currently using kerosene and firewood, which are dangerous to health and destructive on the environment, contributing to desertification.

The government intends to introduce pilot programmes (at least two, one in the north and one in the south) of free handouts of small LPG cylinders, cooker and basic supply, with consumers expected thereafter to pay themselves for further supplies of the LPG fuel.

8.3.9. Goals & Objectives of the LPG Policy

The government policy for LPG in Nigeria is to ensure the development of a strong and rapidly growing LPG market in Nigeria.

This will include action to ensure that:

1. Infrastructure challenges are addressed;
2. Opening up of the market at import jetties to enable third party access;
3. Port clearance is improved;
4. Entry cost for consumers is minimised;
5. Encourage the entry of more players into the market;
6. Review the effectiveness and operations of PPMC and restructure PPMC;
7. Maintain free unregulated pricing but ensure price publication and price monitoring;
8. Improve the regulatory environment, particularly regarding enforcement of safety regulations and discouraging the practice of shortselling;
9. Improve the fiscal environment, to provide at least equality of treatment for domestic producers;
10. Customer education / awareness programmes are launched;
11. Access by the poorest is improved.

The consumption of LPG in Nigeria is tiny, even by African standards, yet Nigeria is the dominant LPG producer in the region, with potential for significantly more production. The major problems affecting the Nigerian LPG industry that need to be urgently addressed, can be summarised as:

- Inadequate infrastructure, particular at import jetties and with cylinders;
- Insufficient enforcement of regulations, particularly regarding safety;
- Insufficient number of players in the market, which is dominated by PPMC and Hyson;
- Financial disincentives, particularly regarding VAT;
- Unofficial and undeclared production and diversion of supplies.

These problems (there are others but these are the major ones which need immediate attention) exist despite the benefits of LPG as a product. The benefits of LPG for Nigeria include:

- Potential for power generation through LPG, of up to 30 MW, which can allow distributed power and enhanced embedded power within electricity distribution zones;
- For industry, again allowing secure energy to be provided to distributed areas, where it is price competitive against diesel;
- As a vehicle fuel, relieving the pressure on scarce PMS supplies;
- As a route to natural gas markets in the future (a local market can be grown with LPG, which when large and concentrated enough, converts to local pipeline LPG, and which can then be converted to pipeline natural gas);

- For the poorest people, LPG is far safer than firewood or kerosene and the fuel can be price competitive against those two fuels.

The overall goal of the policy on LPG is to promote its wider use in Domestic, Power generation, Autogas and industrial applications towards the attainment of Five Million (5,000,000) MT utilisation in 5 years.

It is estimated that about 10.38 Billion USD could be generated for the economy if 50% of the current kerosene and firewood users switch over to LPG by 2018, creating along with it, over one million skilled jobs in various segments of the LPG supply value chain. In the same vein, the utilisation of LPG can also generate far reaching positive outcomes for our public health and environment as well as saving cost for government at all tiers.

8.3.10. Development Model for Domestic LPG Market

With a view to successfully ensuring the transformation of the LPG sector, a number of strategies, listed below, under four thematic groups namely Availability, Affordability, Accessibility and Acceptability, are considered appropriate. These are:

Availability

As a Medium term strategy, a blend of 40% import content of cylinders and 60% local manufacturing content is expected by the 3rd to 4th year of the policy while a target of 100% manufacturing of local cylinders is expected to be achieved within 5 years.

To support the goal of improving the development of LPG infrastructure such as cylinder manufacturing plants, mini gas plants/skid plants, gas plants and trucks, an LPG Availability Gas Intervention Fund of Sixty Billion Naira (N60,000,000,000) will be established by the Government.

With respect to autogas penetration:

The government intends to support CNG penetration, to set the environment, help to develop fleet markets in some large cities and to ensure adequate gas supply but the government does not intend to directly invest or become operationally involved.

In order to improve availability, the Government will stimulate the demand side to make LPG accessible. This will require fiscal incentives such as reduction in tariffs and duties on LPG equipment.

Accessibility

The accessibility of LPG will require leveraging on existing distribution chains of other industries (such as bottling and beverage industry). It will also involve ensuring

adequate permitting from town planners and the regulator to certify (without undue delay) identified retail sites.

Acceptability

The key target group for the acceptability of LPG as a fuel of choice are low income and medium income earners. The penetration strategy for this group requires identifying and engaging with key influencers amongst communities. Examples of key influencers are:

- Traditional Rulers/ Community Leaders
- Religious Leaders
- Women and Market Associations
- Labour Union Leaders

The government intends to kick-start the market for LPG among the poorest who are currently using kerosene and firewood, which are dangerous to health and destructive on the environment, contributing to desertification.

Affordability

The major reason for the low consumption of LPG in Nigeria is affordability.

Firstly, there are a number of financial disincentives in the current LPG system. For example, VAT is levied on domestic production of LPG and LPG cylinders but not on imported cylinders (there were once two domestic cylinder manufacturers but these have both since folded up due to the financial challenges). No other petroleum product in Nigeria is subject to VAT. In addition, LPG is the only fuel that is not only fully deregulated but is also taxed (VAT is applied to domestic LPG but not to imported LPG, putting domestic gas at a disadvantage to LPG imports).

The government intends to ensure that all petroleum products are treated in a fiscally equivalent manner, such that one product is not financially disincentivised compared with another.

Secondly, the initial cost of acquiring an LPG cooking pack (cylinders, stoves, regulators etc.) as compared to other fuels is higher. Not only are the LPG cylinders specialised, but they are also subjected to import taxes even though domestic production capacity is presently limited. This has contributed to the shortage of LPG cylinders with the estimated number of cylinders in circulation within the country today at approximately 1.5 million units as compared to a minimum requirement of 100 million LPG cylinders in relation to the population. This is a barrier to the growth of the LPG market.

Once the critical supply bottlenecks are resolved, the government intends to introduce pilot programmes (at least two, one in the north and one in the south) of free initial package of SON approved 3/6kg – 12kg LPG cylinders, stoves and basic supply, with consumers expected thereafter to pay themselves for further supplies of the LPG fuel.

Due to a shortage of local cylinder manufacturing capacity, the policy will promote the phased injection of 20 million cylinders over a period of 5 years (for comparison the Indonesian Programme comprised the injection of 60 million units)¹.

8.3.11. LPG Regulation

There are two main regulatory bodies responsible for the LPG sector, the Standards Organisation of Nigeria (SON) and the Department of Petroleum Resources (DPR). SON sets product standards while the DPR is the inspections and compliance regulatory authority. Lack of compliance with the existing regulations which already exist is the major problem.

The government will ensure that the single petroleum regulatory authority will be strengthened so that LPG and other regulations are enforced and complied with.

8.3.12. Governance Structure

It is clear that there is a need for strong institutional roles in addressing the challenge of growing the LPG market in order to create an enabling environment that would attract investment.

8.3.13. National LPG Council or LPG Council

Whilst ultimate responsibility for the implementation of policy for the LPG sector rests with the Ministry of Petroleum Resources, it is recognised that other agencies of Government have a critical role to play in this regard. As such an LPG Council, which is a multi-stakeholder group led by the Vice - President will be established to serve as an interface body between all the agencies of government and other stakeholders in respect of policy issues relating to the LPG sector.

The LPG Council should comprise at a minimum the following key stakeholders:

- i. The Office of the Vice President
- ii. Ministry of Petroleum Resources (**MPR**)
- iii. Ministry of Budget and National Planning (**MBNP**):

¹ This will cost a minimum of Three Hundred and Fifty Billion Naira (N350,000,000,000) over the duration of 5 years (cf. several billion dollars for Indonesia).

- iv. the Department of Petroleum Resources (**DPR**);
- v. Standards Organisation of Nigeria (**SON**);
- vi. Nigeria LNG (**NLNG**): in its capacity as the main supplier of LPG to Nigeria;
- vii. Nigerian National Petroleum Company(**NNPC**) and its subsidiary the Pipeline and Products Marketing Company (**PPMC**);
- viii. Federal Ministry of the Environment (FME_{Env});
- ix. Nigerian Liquefied Petroleum Gas Association (**NLPGA**): the umbrella body for all industry practitioners;
- x. Federal Ministry of Women's Affairs and Social Development (FMWA&SD);
- xi. Federal Ministry of Finance (**FMF**);
- xii. Central Bank of Nigeria (**CBN**);
- xiii. Federal Ministry of Industry, Trade and Investment (FMIT_I);
- xiv. Federal Ministry of Health (**FMH**);
- xv. Nigerian Customs Service (**Customs**);
- xvi. Nigerian Content Development and Monitoring Board (NCDMB);
- xvii. Ministry of Power, Works and Housing.

8.3.14. Task Forces

In order for the LPG Council to execute its role within the context of the four thematic topics elucidated above, the LPG Council will be constituted into four specific sub-groups or task forces as follows:

- i. **Availability Task Force**: to focus on improving LPG supply and delivery. The key challenges in this area are finance and infrastructure related.
- ii. **Accessibility Task Force**: to focus on improved distribution and development of channels to access consumers.
- iii. **Acceptability Task Force**
- iv. **Affordability Task Force**: tasked with driving the effort of reducing the cost of LPG equipment and accessories where the NLPGA has already identified a number of regulatory and infrastructure related costs.

8.3.15. Role of the Ministry of Petroleum Resources

The Ministry of Petroleum Resources shall have the responsibility to monitor and ensure the execution of this policy. The responsibility shall include but not limited to the following:

- i. Constitute the various MDAs, Associations and Parastatals bodies identified in this policy within the National LPG Council under the various taskforces, where such MDAs, Associations and Parastatals bodies would be most relevant
- ii. Monitor the progress of the implementation of the initiative.
- iii. Coordinate between the Task Forces, implementing MDAs and the EGN
- iv. Serve as the secretariat for the LPG Council
- v. Evaluate the impact during the implementation phase
- vi. Co-ordinate all activities relative to the development of the domestic LPG market.

8.4. Gaining Regional African Markets

A policy option for Nigeria is to strive to become the hub for a regional interconnected gas market in West and Central Africa.

This is a long-term aim because:

- Regional African gas markets are not yet big enough and have to be grown over time;
- As a first step, the challenges of managing regional gas export through WAGP, need to be addressed and overcome.

The Nigerian government intends to learn the lessons from WAGP and address them, and to look for opportunities over the medium to long term to expand pipeline gas supplies and LNG sales to neighbouring African countries.

8.5. Financing Gas Projects

Gas projects need to be financed. The policy is to encourage all types of project financing but the Nigerian government direct project-financing role will be minimal in future.

9. DEVELOPING NATIONAL HUMAN RESOURCES

9.1. Current Nigerian Background

9.1.1. Some Unique Features Affecting Nigerian Local Content

The need to develop Nigerian human resources and methods for doing so, are described in the following sections. Much of that discussion applies to any national local content development plan. Nigeria though has some unique features in the petroleum sector which have to be taken into account and considered when developing a local content strategy for the nation.

9.1.2. Local Content in a Depressed Economy

Nigeria is now in the depths of a major recession, and early recovery may be a challenge.

It is more difficult to develop Nigerian local content in a low oil price environment where contractors are cutting jobs. Developing human resources in an environment of cutting human resources is not easy.

Another issue which is more fundamental, and which has more impact in this current era of cost cutting, there is evidence that Nigerian contractors make projects more expensive. Were it not for legislation, project developers would rather import foreign workers and contractors, at a lower net cost to their operations.

A policy approach is to encourage indigenous participation at competitive prices consistent with the law.

9.1.3. Nigeria must be able to Export Skills

A further objective for the development of Nigerian skills is that Nigerian should be at a level that they are in demand around the world.

In many cases of course they already are. Nigerians are to be found in leading positions throughout the world, including in leading position in oil and gas companies worldwide. The issue is that the most successful almost entirely spent most of their training years outside Nigeria, they did not acquire most of their expertise within Nigeria. The human resources part of the Petroleum Policy intends to improve this.

9.2. Introduction

Policy Statement

Developing Nigerian human resources, to build competencies and capabilities to enable Nigerians take full responsibility in managing Nigeria's gas resources.

Strategic Objectives

1. Enhancing the Implementation of the Nigerian Content Act;
2. Building competence across the gas industry;
3. Institutional human capacity building for the Public Sector and Industry;
4. Instilling international oil and gas industry best practice in maintenance and safety;
5. Instilling an international oil and gas industry best practice such as maintenance, safety and awareness campaign.

9.3. Implementing Nigerian Content Policy

9.3.1. Summary of Provisions of the Nigerian Content Act

The Nigerian Oil and Gas Industry Content Development Act 2010 (NOGICD) was enacted to ensure better development of Nigerian skills and content. The main concern was how to increase the participation of Nigerians in the petroleum industry, which has been characterised by large numbers of ex-patriates brought in to the country, at executive and even technical levels.

NOGICD Act is an important step forward in genuinely improving Nigerian content in the gas industry. NCDMB has been set up to manage this and can match its database of Nigerian content with operators' plans for skills needs and training.

9.3.2. Route to Implementation

Sometimes JV partners state that they cannot comply with some provisions of the Local Content Act because the skills they seek are simply not available within the country. The most effective way to deal with this and to ensure compliance with the Act is to take steps to make those skills indeed available within the country.

The Human Resources part of the gas policy therefore revolves around developing local content in petroleum skills and making that available within Nigeria. The gas policy will focus on developing competent workers, possibly through apprenticeships.

9.4. Building Industry Competency

9.4.1. Competent Worker

There are two main ways in which skills can be acquired:

1. **Formal training:** whether long term or short term, normally classroom based teaching;
2. **Supervised experience:** this is practical experience in the workplace where training can be put into practice, and which is certified by a competent supervisor.

A **competent worker** is one who is:

1. Fully and **formally trained**; and
2. **Qualified** following examination with certification from a reputable accredited training institute; and
3. **Experienced** with certified numbers (hours) of supervised experience in each of the different areas of his trade or profession; and
4. **Regularly updated** with new developments and techniques in his trade or profession and where necessary with refresher courses (this is Continuous Professional Development, CPD);
5. Who is **certified and registered as a competent worker**.

Competency training has become an important part of professional training in many countries, and is central to much of training thinking and provision. A competency framework is a system of supervised and monitored relevant practical on the job training and also mentoring.

Nigeria needs a competency framework for the gas industry in Nigeria, operated nationally and in collaboration with international or national bodies who are expert in competency frameworks and their accreditation for the gas industry.

The traditional way of developing competency is through apprenticeships.

9.4.2. Skills Development

There are four main areas for skills development:

1. **Leadership**: this covers the strategic management and leadership skills required for senior management and executive positions;
2. **Management**: this is general management training for middle and senior management and covers the whole range of skills needed to be an effective manager;
3. **Engineering**: this is graduate level engineering, for University graduates, whether from Nigerian or international Universities;
4. **Technical**: this is technician level competency, suitable for those with practical skills, for school leavers or those with some college education. Technical skills include for example wiring or installations, pipe fitting or welding;

9.4.3. International Education

Obtaining good quality qualifications are the first part of the competency framework. The PTDF funds a number of schemes to provide Nigerians with good quality qualifications, including sending Nigerian graduates for University graduate and post-graduate training abroad. Under the gas policy this will continue.

9.4.4. National Education

Nigerian Universities and Colleges need to be encouraged to develop their abilities to produce good quality graduates and improve such that they can be competitive with the best international Universities for producing Nigerian graduates. One way this could be done (for example) is for a Nigerian University to run programmes in collaboration with an international University, even for the international University to award their own degrees with the education delivered through the partner University in Nigeria. This is a model which is being increasingly used in other parts of the world.

9.4.5. Technical & Vocational and Educational & Training TVET

Technical & Vocational and Educational & Training (TVET) is training and education for post - 16 school leavers. This includes **apprenticeships**.

While Nigeria has had a good record for TVET historically, with technical skills accredited by the City & Guilds of the UK. Since approximately the 1980s though, technical training has lapsed significantly. There is now a large gap in the level of technical skills provision in the country, such that IOCs complain that they cannot even find petroleum welders (for example) and have to bring them in on ex-patriate packages from abroad (the costs of which are charged to the JV).

The gas policy recognises the need for technical training, and one of the objectives of the gas policy is to improve the level of technical training within Nigeria.

9.4.6. Supervised Experience

As already mentioned, qualified graduates or technically skilled personnel is not enough. They also need to gain supervised practical experience before they can be called competent. International accreditation bodies have approached the development of competences in several main ways:

1. International accreditation institutes (such as for example, City and Guilds or the Gas Industry Apprenticeship Framework, both in the UK) accredit training organisations who provide an approved course;
2. Alternatively, international accreditation institutes (the Institute of Engineering and Technology for example) do not accredit training, and instead they accredit organisations (companies) to provide a competency based approach to enable engineers to attain supervised practical experience that enables them to attain a Chartered Engineer status;
3. In some cases, an international accreditation institute could approve existing courses.

In order for competency development to work, there needs to be a large and dedicated group of experienced supervisors who can supervise and accredit the practical work experience of the students. These are people who are recognised internationally as competent who are working in the industry. Nigeria will need to ensure that there are

sufficient numbers of competent workers in the industry who can act as supervisors for trainees or apprentices. In other words a “train the trainers” programme will need to be set up to develop accredited work experience.

It is feasible and essential to set up a competency development framework for the Nigerian gas industry. It is recognised though that currently there are not enough already accredited experts to support a competency framework.

9.4.7. Gas Industry Expected to Develop Competency Schemes

While the Nigerian government will do what it can to build the competency building approach in Nigeria, the industry is expected to and will be encouraged to develop gas industry appropriate competency schemes. This may be together with public sector agencies.

The government will look to the private sector gas industry to develop competent worker schemes.

This may (will probably) take the form of apprenticeships. The project-based training of the Nigeria Content Development & Monitoring Board (NCDMB) also provides a good model that could be expanded across the industry. Because of their international experience and expertise in this, the international oil and gas companies are expected to be proactive in developing industry wide schemes.

The government needs to make it clear to the industry what is expected from the industry participants, particularly the international gas companies. The industry for their part are expected to put in place schemes to ensure that competent gas workers are produced and made available to work on projects in Nigeria.

Initially competent worker schemes will be voluntary and not mandated by government. If however, insufficient progress is being seen to be achieved, the government will introduce mandatory measures to ensure the gas industry installs competency or apprenticeship schemes.

9.5. Institutional Capacity Building

Whilst clear legislation is required to move the industry forward, it is recognised that legislation alone will not work. A competent policy and regulatory team, knowledgeable across engineering, finance, law, and related disciplines etc. is also essential for the implementation of the policy and the law.

As well as building expertise in the national gas industry, gas expertise also needs to be built in the public sector, in the regulatory agencies and in the Ministry of Petroleum Resources. The government is aware of the need to build institutional and human capacity and intends to work with industry, educational partners and international development partners to achieve this objective.

9.6. Introducing a Maintenance and a Safety Culture

Among the most important milestones for the sustainable development of the gas sector is to install the highest international best practice standards of maintenance, health and safety. Recent progress in the privatised power industry show the improvements that can be made in a short time when new management techniques are introduced.

The gas policy will insist on the best international maintenance and safety practices being introduced and applied throughout the gas industry.

The gas policy intends to bring about legislation that will make Directors liable to criminal prosecution if they or their company employees knowingly allowed severe safety lapses that lead to serious damage, injury or death to premises, people or the environment.

10. COMMUNICATIONS

10.1. Introduction

Communications are important parts of any gas policy. There are two fundamental purposes for communication of the gas policy to all stakeholders in Nigeria and abroad:

1. Explaining the policy;
2. Changing attitudes.

The Nigerian people, industry, international investors, even members of the government itself, have become to a certain extent sceptical or cynical about reforms in the energy sector. On numerous occasions there have been pronouncements from various parts of government announcing an end to power shortages or fuel crises, but with no apparent change.

There also exists a gulf and lack of understanding between investors and government of their respective expectations and obligations.

Government will develop an appropriate communications strategy which will explain to all stakeholders the purpose, intent, thinking and analysis behind the gas policy.

Audiences need to understand that the gas policy is not a promise of when the lights will stay on. Instead it is to show that the Nigerian government is clear on what it wants to achieve, the reasons why and the steps to achieve the policy objectives. The gas policy will be communicated as a process to arrive at a long-term vision for the nation.

- Internal communications – audiences within government;
- External communications – other stakeholders involved with the gas industry.

10.2. Internal Communications

10.2.1. Ministry

Policies succeed or fail through the efforts of the civil servants and it is important that they are keen and active participants in the policy.

The first task therefore is to explain the policy and its implications to stakeholders within the Ministry of Petroleum Resources. As the government body directly responsible for implementing the gas policy, staff within the Ministry need to be:

- Aware of the direction of the policy and the key parts of the contents;
- Aware of what is required of them individually;
- Persuaded of the benefits for the nation so that they can be motivated to work on its implementation.

10.2.2. Other Government Entities

The same applies to other parts of government, including parastatal organisations such as:

- NNPC;
- NGC;
- Existing regulatory bodies such as PPPRA, DPR etc.

10.3. External Communications

10.3.1. Communication to Stakeholders

External communications will be needed to the other stakeholders in the Nigerian gas industry, covering:

- The general public, the Nigerian people;
- International investors;
- Domestic investors;
- Civil society;
- Donor community;
- Other stakeholders.

External communications to the general public and other stakeholders will take the form largely of media presentations and interviews, seminars, workshops, newsfeeds, websites, mass media and the like.

10.3.2. Gas Industry Involvement and Consultations

The gas industry in Nigeria has been involved in the development of the gas policy, through their participation of industry fora, such as the Nigerian Gas Association, the National Gas Flaring Committee, the National Gas Requirement Working Committee, the OPTS and the Petroleum Club.

This gas policy therefore, while driven by and led by the government, is a joint production from the government and the gas industry community in Nigeria, with domestic and international industry involvement.

11. ROADMAP AND ACTION PLAN

11.1. Summary of Philosophy and Key Actions

The philosophy of the action plan for the gas policy is for the government to put the legislative and commercial framework in place and then let the market develop by itself.

The government will set targets for market development, monitor progress and take appropriate actions to ensure market development takes place. However, gas utilisation in Nigeria is ultimately up to the private sector to deliver.

A roadmap and action plan for delivering the gas policy is set out with different scales for the types of activity:

- Short term: Months, up to one year;
- Medium term: One to two years;
- Long term: Longer than two years.

The roadmap presented below sets out how the gas policy will be implemented, according to the timescales and considering the activities and the parties involved.

11.2. Critical Policy Milestones

There are critical milestones within the gas policy that must be achieved for the policy to be effective. These include:

- Stakeholder consultations;
- Approval of the gas policy;
- Enactment of legislation;
- Establishment of the new gas regulator;
- Producing PSC gas terms;
- Completion of initial infrastructure, namely the ELPS 2 loop and OB3 East-West link;
- Achieving the wholesale market / Willing Buyer – Willing Seller market status as rapidly as possible;
- Substantial progress towards industry wide restructuring.

11.3. Short-Term Activities (Months) – Institutional Level

Timescale: Months (up to one year)

Scope: Institutional

The short-term activities are those that can commence very soon and can reasonably be expected to be completed within a matter of months and within a year.

Those short-term activities which the Ministry of Petroleum Resources can start immediately are those within its direct control, namely institutional activities within the Ministry of Petroleum Resources and NNPC.

Table 7: Roadmap, Short Term (Months), Institutional

Strategic Role	Activities	Parties Involved
Gas policy approval	<ul style="list-style-type: none"> Ministry consultation Wider government, industry and other stakeholder consultation Presidential approval Gazette the agreed and approved gas policy 	MPR Gas Policy Team MPR Gas industry GACN NCDMB PTI PTDF
Communications strategy	<ul style="list-style-type: none"> Internal communications External communications 	MPR Gas Policy Team MPR NCDMB
Legislation	<ul style="list-style-type: none"> Draft petroleum legislation Establish single regulatory authority 	MPR Gas Policy Team MPR DPR PPPRA NCDMB National Assembly
Downstream gas regulations	<ul style="list-style-type: none"> Draft an appropriate network code DSOs 	MPR Gas Policy Team MPR DPR NGPTC PPPRA GACN NNPC Industry
PSC Gas Terms	<ul style="list-style-type: none"> Develop PSC Gas Terms Present the PSC Gas Terms to Industry Finalise PSC gas terms 	MPR / DPR NNPC Gas industry GACN NCDMB
Studies and policies	<ul style="list-style-type: none"> Develop Gas Resource Management Plan Natural gas market study GBI strategy Gas for development strategy and markets study 	MPR Gas Policy Team NNPC/NGMC NLNG LPGA DPR PPPRA GACN

Strategic Role	Activities	Parties Involved
	<ul style="list-style-type: none"> Identify clusters and gas supply to clusters Prepare detailed national LNG strategy Develop LPG penetration strategy and action plan Revise and clarify gas pricing framework Develop tariff methodologies for infrastructure Scoping study for new single petroleum regulator 	NCDMB G&PIC PPMC
Gas flare commercialisation programme	<ul style="list-style-type: none"> FGN / Industry consultation mechanism Gas Flare Commercialisation Study Workshops 	MPR Gas Policy Team MPR DPR GACN NNPC
Downstream	<ul style="list-style-type: none"> Identify and concretise gas supply sources for OB3 Pipeline Progress mature offshore PSC gas projects Progress mature onshore gas projects Identify small-scale gas flare capture projects and develop selection criteria for investors Identify 1-3 infrastructure and gas supply projects for fast-track implementation 	MPR Gas Policy Team MPR DPR PPPRA NNPC NGMC NGPTC
Institutional restructuring	<ul style="list-style-type: none"> Restructuring within MPR Restructure and complete unbundling of NGC Institutional capacity building and training in MPR and sector regulator 	MPR Gas Policy Team MPR NNPC PTI PTDF NCDMB

11.4. Medium-Term Activities (One to Two Years) – Regulatory

Timescale: One to two years

Scope: Regulatory and Institutional

Medium-term activities are those which are largely (but not completely) within the control of the Ministry but which will take a little longer to complete.

These are mainly those activities in the legislative and regulatory areas, which set the framework for the gas industry and market to grow.

Table 8: Roadmap, Medium Term (One to Two Years), Regulatory

Strategic Role	Activities	Parties Involved
International reviews	<ul style="list-style-type: none"> International LNG and gas markets study Regional African market study – identify markets for Nigerian LNG 	MPR MPR Gas Policy Team
Legislation	<ul style="list-style-type: none"> Enact petroleum legislation (Petroleum Industry Reform Bill) Enact Petroleum (Fiscal Reform) Bill 	MPR MPR Gas Policy Team National Assembly
Regulation	<ul style="list-style-type: none"> Complete establishment of petroleum regulator Develop petroleum and gas regulations Develop technical codes and standards Finalise and implement network code Cost benchmarking for facilities Tariff modelling Pricing regulations Market and price monitoring system Transitional pricing Standard licence templates 	MPR Gas Policy Team Petroleum regulator MPR
Fiscal policy	<ul style="list-style-type: none"> Fiscal principles / framework Fiscal rules 	MPR Gas Policy Team MPR
Studies and policies	<ul style="list-style-type: none"> LPG pilot projects for poor (replace wood and kerosene) Alternative fuels strategy – CNG, domestic LNG Supply chain and blockages Identify other gas projects and selection criteria for investors 	MPR Gas Policy Team MPR LPGA

Institutional	<ul style="list-style-type: none"> • Set National Petroleum Policy Directorate within MPR • Initial appointments • Implementation of single petroleum regulatory authority • Scope a competent worker / apprenticeship scheme • Institutional capacity building and training in MPR and sector regulator 	MPR Policy Team Petroleum regulator MPR, NNPC
Gas flare commercialisation programme	<ul style="list-style-type: none"> • Gas flare Commercialisation strategy study • Gas flare Commercialisation Programme Implementation 	MPR Gas Policy Team MPR
Industry restructuring	<ul style="list-style-type: none"> • Implement gas industry restructuring • Enable wholesale gas market mechanisms • Fine tune tariff methodologies 	MPR Gas Policy Team Petroleum regulator
Upstream	<ul style="list-style-type: none"> • Implement Gas Resource Management Plan • Develop portfolio management methodologies • Tighten database of all reserves, production, type, facilities, access to market etc. (also useful for gas flaring programme) • Gas management model • Inland basins commercial terms • Identify offshore resources • Identify access to low cost gas • Update the Gas Infrastructure Blueprint • Summit for marginal field cluster gas development • Ensure gas supply contracts for OB3 	MPR Gas Policy Team NNPC
Infrastructure	<ul style="list-style-type: none"> • Complete and commission OB3 pipeline link • Make progress on AKK pipeline • Resolve Assa North and Ohaji South gas development • Implement 1-3 infrastructure and gas supply projects • Design and implement LPG infrastructure plan 	MPR Gas Policy Team MPR Contractors Gas industry and investors

11.5. Long-Term Activities (Over Two Years) – Industry

Timescale: Over two years

Scope: Industry

After two years, the legislative, regulatory, institutional and commercial framework will be in place. The gas industry will then need to step up and implement the policy in terms of infrastructure projects and growing the Nigerian domestic and export gas market.

Table 9: Roadmap, Long-Term (Over Two Years), Industry

Strategic Role	Activities	Parties Involved
Communications strategy	<ul style="list-style-type: none"> Identify potential strategic partners 	MPR Gas Policy Team MPR
Upstream	<ul style="list-style-type: none"> Bring on new gas from dedicated gas fields from inland and offshore basins 	MPR Gas Policy Team NNPC Gas Industry and investors
LNG	<ul style="list-style-type: none"> Implement LNG downstream strategy 	MPR Gas Policy Team NNPC
Infrastructure	<ul style="list-style-type: none"> Complete and commission AKK pipeline Build gas transmission backbone infrastructure 	MPR Gas Policy Team MPR Contractors Gas industry and investors
Downstream	<ul style="list-style-type: none"> Complete establishment of wholesale gas market 	MPR Gas Policy Team Petroleum regulator Gas Industry and investors
Institutional	<ul style="list-style-type: none"> Institutional capacity building and training 	MPR Gas Policy Team Petroleum regulator MPR, NNPC PTDF PTI

11.6. Timeline

The activities set out above are now set out in a single timeline plotting activities and deadlines.

Figure 16: Timeline of Gas Policy Roadmap

The activities set out above are now set out in a single timeline plotting activities and deadlines.

	First Six Months	Second Six Months	Year Two		Year Three Plus
Activity	2H 2016	1H 2017	2H 2017	1H 2018	2018 +
SHORT TERM					
Gas policy approval					
• Ministry consultation					
• Industry and wider stakeholder consultation					
• Presidential approval					
• Gazette the agreed and approved gas policy					
Communications strategy					
• Internal communications					
• External communications					
Legislation					
• Draft petroleum legislation					
• Agree PSC Gas Terms					
• Establish single regulatory authority					
Downstream gas regulations					
• Develop network code					
• Develop 2017 DSOs					
Studies and policies					
• Develop Gas Resource Management Plan					
• Natural gas market study					
• GBI strategy					
• Gas for development strategy and markets					
• Identify clusters and gas supply to clusters					
• Prepare detailed national LNG strategy					
• Develop and agree LPG policy, market penetration strategy and action plan					
• Revise and clarify gas pricing methodology					
• Develop tariff methodologies for infrastructure					
• Draft an appropriate network code					
• Scoping study for single petroleum regulator					
• Policy re petroleum products & LPG					
Gas flare commercialisation programme					
• FGN / Industry consultation mechanism					
• National Gas flare commercialisation study					
• Workshops etc.					

Downstream					
• Identify gas supply sources for OB3 Pipeline					
• Progress OML 133 gas development project					
• Progress OML 42 gas development project					
• Identify small scale gas projects and develop selection criteria for investors					
• Identify 1-3 infrastructure and gas supply projects to implement quickly					
Institutional restructuring					
• Restructuring of gas within MPR					
• Restructure NNPC, separation of NGC					
• Institutional capacity building and training					
MEDIUM TERM					
Legislation					
• Enact petroleum legislation					
Regulation					
• Complete establishment of petroleum regulator					
• Develop petroleum and gas regulations					
• Develop technical codes and standards					
• Finalise and implement network code					
• Cost benchmarking for facilities					
• Tariff modelling					
• Pricing regulations					
• Market and price monitoring system					
• Standard licence templates					
Fiscal policy					
• Fiscal principles / framework					
• Prepare Draft Petroleum (Fiscal Reform) Bill					
Studies and policies					
• LPG pilot projects for poor					
• Alternative fuels strategy – CNG, LNG					
• Supply chain and blockages					
• Identify other gas projects & selection criteria					
Institutional					
• Set up policy research centre within MPR					
• National gas focal point – initial appointments					
• Scope competent worker scheme					
• Develop with government and industry					
• Institutional capacity building and training					
Industry restructuring					
• Implement gas industry restructuring					
• NNPC restructuring					
• Separation of NGC					
• Enable wholesale gas market mechanisms					
• Fine tune tariff methodologies					

Upstream					
• Implement Gas Resource Management Plan					
• Develop portfolio management methodologies					
• Tighten database of all reserves, production					
• Gas management model					
• Inland basins commercial terms					
• Offshore resources					
• Identify access to low cost gas					
• Update an infrastructure blueprint					
• Summit for marginal field cluster gas development					
• Ensure gas supply contracts for OB3					
Gas flare out commercialisation programme					
• Gas flare utilisation strategy study					
• Implement Gas flare Commercialisation Programme					
Infrastructure					
• Complete and commission OB3 pipeline link					
• Make progress on AKK pipeline					
• Resolve Assa North and Ohaji South gas development					
• Implement 1-3 infrastructure and gas supply projects					
• Design and implement LPG infrastructure plan					
LONG TERM					
Communications strategy					
• Identifying potential strategic partners					
Upstream					
• Bring on new gas dedicated gas fields from inland and offshore basins					
LNG					
• Implement LNG downstream strategy					
Infrastructure					
• Complete and commission AKK pipeline					
• Build gas transmission backbone infrastructure					
Downstream					
• Arrive at wholesale gas market					
Institutional					
• Set up investment promotion support office					
• Develop health and safety culture					
• Institutional capacity building and training					