



# Energy Security and Sustainable Development in Nigeria: The Way Forward

Delivered By:

**Dr. Maikanti Kacalla Baru**, *FNSE*  
Group Managing Director, NNPC

*At*

***Society of Petroleum Engineers' Oloibiri Lecture Series  
and Energy Forum (OLEF) 2019***

April 25, 2019

## Protocol

1. I am pleased to be invited to deliver the state of the Industry Address on this year's theme "Energy Security and Sustainable Development in Nigeria: The Way Forward". This topic is germane and remains the focus for the entire Oil and Gas Industry.
2. I would do my best to lead the discussions by making a brief presentation titled: 'Moving Nigeria towards Energy Self-Sufficiency' and hope that at the end of the Lecture Series, discussants and attendees will have a better appreciation of the issues and actions required so that collectively as an industry, we can work towards actionable steps to emplace enduring and sustainable development for the Oil and Gas Industry in Nigeria in particular.
3. Nigeria is the second largest economy in Africa and dominant in the West African sub-region, with an increasing energy demand. Based on available forecast, Nigeria's real GDP was US\$320 billion as at 2015 with a growth potential of US\$476 Billion by 2025 (averaging 4% per annum).

4. The Country's petroleum product demand is expected to grow from 13.2 million metric tonnes in 2015 to 15.1 million metric tonnes in 2020 and 17.3 million metric tonnes by 2025 while the population growth corresponding to this demand is 182 million in 2015, 207 million in 2020 and 234 million in 2025 respectively. The average population growth rate is 3% per annum.
5. Despite abundant Oil and Gas reserves, Nigeria experiences shortages in electric power. Based on Nigeria's Energy consumption current and forecast, available statistics showed an increase from 6 GW in 2015 to 30 GW by 2025 with the primary source of the current power supply being from hydro and gas. The future consumption which is expected to drive growth by 2025 would need aggressive development of gas and renewables projects to meet the exponential demand.
6. NNPC is at the forefront of providing services to address these energy challenges and guaranteeing sustainable development of solution to the country.

7. Nigeria needs a refining capacity of 1.52 million BPSD in order to meet its PMS requirement by 2025. This capacity requirement includes NNPC's current nameplate capacity of 445,000 BPSD (WRPC, KRPC and PHRC) and Dangote Refinery's 650,000 BPSD. This leaves a shortfall of 427,000 BPSD which is equivalent of 20 million liters of PMS per day.
8. In order to address this shortfall in PMS demand, NNPC is adding 215,000 BPSD of refining capacity through private sector driven co-location at our existing facilities in Port Harcourt Refining Company (PHRC-100,000 BPSD) and Warri Refining and Petrochemicals Company (WRPC-115,000 BPSD) respectively.
9. Additionally, NNPC through its new initiative of establishing Condensate Refineries with private sector participation is providing clusters for in-country refining capacity totaling about 250,000 BSPD which closes the PMS Supply-Demand gap and creates positive margins to the investors.
10. These improved in-country refining capacity plan ensures Nigeria's domestic crude oil utilization of up to 66% with its attendant local manufacturing multiplier effect from associated

industries such as petrochemicals for plastics and polymers used in everything from computers, medical equipment, wind turbines, solar panels, cosmetics, etc. Asphalt for building roads, Toluene for producing paint, ingredient for textiles for clothing and carpets, foams for bedding and furniture, medicines for health, fertilizers for agriculture, lubricants for vehicles and machinery.

11. Upstream producers have an assured offtake for their current crude oil production while marginal field operators can link up to each of the Refinery Hubs and deliver crude oil feedstock at commercial rates.
12. NNPC is spearheading the drive towards increased development of hydrocarbon reserves by ring fencing exploration budgets and increased professional focus on the Frontier Basins through activities of the Frontier Exploration Services (FES) Division.
13. Towards ensuring full energy sufficiency for Nigeria, NNPC is also focusing on developing the Nation's gas resources. The Seven (7) Critical Gas Development Projects (7CGDPs) targeted to deliver about 3 Bscf/d of gas resources to the

gas market by 2020 are at different stages of development in conjunction with NNPC JV partners.

14. For example, the Assa North - Ohaji South (ANOH) Gas Development Project which will develop about 4.3Tcf to increase gas supply by 600MMscfd is ahead of the other Projects. We have completed the Front End Engineering Design (FEED) for facilities and pipelines for this project and have taken Final Investment Decision (FID) in December 2018.
15. On the Current Gas Utilization Initiatives, the following are NNPC's ongoing Gas Infrastructure Development Projects;
  - a. The 342Km X 36" Escravos-Lagos Pipeline System (ELPS II): Capable of delivering 1.1 billion standard cubic feet (bscfd) daily of gas to the domestic market is in progress, achieving over 97% completion. We have commissioned PS1-PS2, PS4-PS5 while PS3-PS4 is under commissioning. NNPC is working towards completing the outstanding 70Km segment within PS2-PS3 by mid-year 2019.

- b. The 130Km X 48"/36" Obiafu/Obrikom-Oben (OB3): This inter-connector pipeline will link the East to the West. It will also channel gas supply to the Oben-Ajaokuta pipeline. It will deliver 2 billion standard cubic feet (bscfd) of gas daily to the domestic market. The project is progressing steadily and currently at 92% completion. With steady progress on the project, the plan is to commission the pipeline by mid-year 2019.
  
- c. The Federal Executive Council has approved the EPC Contractor Financing of the Ajaokuta-Kaduna-Kano (AKK) Pipeline. Discussions are being finalized on financing for the project while early works has progressed. The intention is to apply this financing model on the development of future gas pipelines such as the; QIT to OB/OB pipeline; Obigbo – Umuahia – Ajaokuta pipeline. The AKK pipeline is targeted for completion in 2022.
  
- d. At completion, the AKK pipeline will deliver gas to the planned Abuja, Kaduna and Kano Power Plants which would generate a

combined additional 3,600MW to the National Grid amongst other industries.

- e. Nigeria – Morocco Gas Pipeline (NGMP) Project: An MOU has been executed between NNPC and the Office National des Hydrocarbures *et des Mines* (ONHYM) for the collaboration in the construction of a gas pipeline from Nigeria to Morocco (NGMP). The NGMP Feasibility Study was completed on the 26th of July 2018, while the FEED phase 1 is expected to be finalized by the end of May 2019.
16. Export Projects - The Nigeria Liquefied Gas Limited (NLNG): The NLNG achieved its 2018 production target due to sustained gas supply, plant reliability and availability. The NLNG awarded the FEED contract for Train 7 in July 2018. FEED is expected to be completed in Q2 2019. NLNG has also concluded the funding support arrangements for NNPC's upstream gas supply development Projects where funds are critical.

17. Nigeria has Significant Potential for Renewable Energy Development. The Country enjoys warm tropical climate – relatively high year-round temperatures and two seasons with 33 million hectares of arable land available (where only 10% is in use). There is enormous opportunity to nurture and grow Renewable Energy sources.
18. As you are aware, Nigeria is a signatory to the 2017 Paris Accord. This implies that ‘greening’ of all businesses in-country is feasible. Nigeria’s National Biofuels Policy was gazetted far back in August 2008. NNPC has keyed into implementing the Policy and is at the forefront of harnessing the Country’s Renewable Energy potential.
19. To date, NNPC has carried out seven (7) site specific Biofuels Feasibility studies:
  - i. 3 for Sugarcane
  - ii. 2 for Cassava
  - iii. 2 for Oil Palm
20. The Corporation has signed MOUs with several State Governments and secured proposed project sites. Credible Core investors are being sought after for implementation of the Renewable Energy Projects in Nigeria.

21. For the upstream, we are committed to aggressive production growth and our target is to achieve a reserve level of 40 Billion barrels of crude oil and producibility of 4 Million barrels of crude oil per day by 2025.
  
22. There is an emerging class of new producers within the Oil and Gas Industry who are primarily local independents with a non-diversified portfolio and lean balance sheet. They have become important because approximately 15% of both crude oil and gas reserves and national production lie in their hands. They also require substantial capital for growth. The Nigerian oil and gas landscape is fast changing from IOC-dominated to a much more diversified cocktail of influences involving Locals, Independents and the National Oil Company (NNPC).
  
23. There is increasing global competition on Nigerian crude oil due to the rise of new production centers across the globe particularly in Africa, and Argentina. These portend a new dimension for the Nigerian Oil and Gas Industry. Nigeria, therefore, needs to unlock new barrels as quickly as possible to stay relevant in the new

emerging World. Without adequate funding, we cannot meet the targets.

24. Evolving new funding mechanisms for the Joint Venture operations was part of the focus of the reforms undertaken by Government to eliminate the often difficult cash call regime, enhance efficiency of the management of oil and gas resources and guarantee growth.
25. To encourage the existing players in the Industry, particularly our traditional JV partners, we undertook to settle all outstanding cash call arrears amounting to a negotiated sum of a little over \$5billion. This has restored confidence in the Nigeria Oil and Gas Industry. We have signed third party financing deals with several international and local banks on new oil and gas developments worth over \$3billion despite the depression in 2016/2017. This demonstrates the faith in our Industry and the potentials we can unlock.
26. For our IOC partners, we would continue to leverage the strong credit rating of partners, identify key quick-win projects that are easy to mature with strong cash flow projections and

attract the necessary funding from the capital market.

27. These alternative financing approaches to fund NNPC's JV obligations have helped to renew investors' confidence and stimulate further Foreign Direct Investments. In particular, this has deepened local banks participation in financing the Upstream Sector as the financing are syndicated from local banks and International lenders.
28. It is quite an exciting time ahead for the Nigeria Oil and Gas Industry! The Industry is funding both development and infrastructure through alternative means. NNPC appreciates the cooperation of its Partners, Government and Financiers towards moving the Industry forward. Our goal remains value delivery for all.
29. Based on the International Energy Agency definition of energy security as "the uninterrupted availability of energy sources at an affordable price" and the International Institute for Sustainable Development definition of sustainable development as "development

that meets the needs of the present without compromising the ability of future generations to meet their own needs"; the key words to consider within these two (2) definitions are: availability, affordability, meeting the needs of the present and future generations.

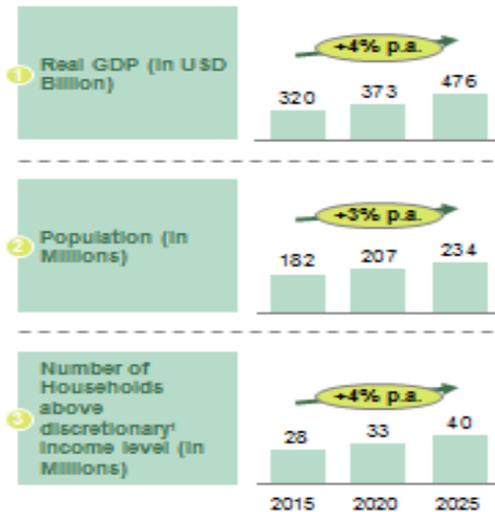
30. As such, I would charge the grey matters of this professional body to proffer an Industry Road Map to guarantee Energy Security and Sustainability for the Nation.
31. The Industry Road map should encompass policy, strategy, structure, execution and funding alternatives.
32. Distinguished Ladies and Gentlemen, I thank you for your attention and congratulate SPE for a successful OLEF in 2019. I wish all participants fruitful deliberations.

**Dr. Maikanti Kacalla Baru**, *FNSE*  
Group Managing Director, NNPC  
25<sup>th</sup> April, 2019

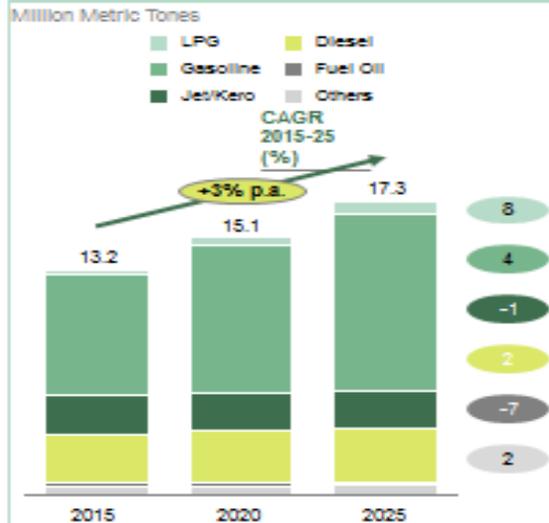
# Appendices

## Nigeria: West Africa's largest economy, with increasing energy demands

### Macro-Economic Overview



### Demand for Petroleum Products



1 money spent on luxury items, vacations and non-essential goods and services in this case population with annual income level >USD5000

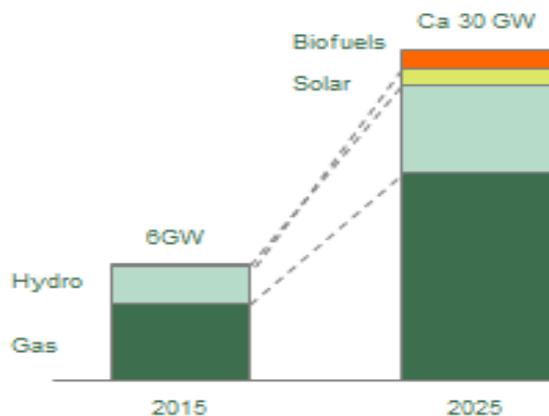
SOURCE: ICIS Supply Demand, Global Insight WMI, KNBS, Bill Research, ITC Trade Map

2



## Despite abundant oil & gas reserves, we have shortages in power...

### Nigeria Energy Consumption Current & Forecast (GW)



- Power supply currently based on gas and hydro
- Significant need for new sources of electric power as the Country develops:
  - ✓ Low (40%) electrification rates
  - ✓ Population and GDP growth
- New sources of power are planned, particularly hydro and renewables— but gas is the major source

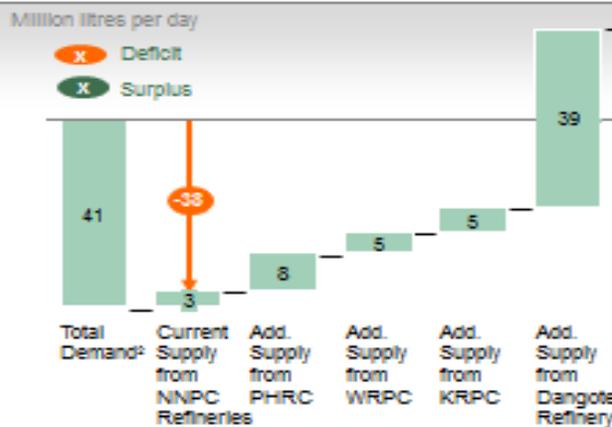
→ Need for gas and renewables projects to meet demand

1



## NNPC refineries could contribute ~50% of the PMS demand gap – however, the Dangote refinery will create new competition

Nigerian PMS demand/ supply 2025<sup>1</sup>



Objectives of Refinery Revamp Effort

1. Develop Roadmap for revamping refineries and improving process equipment capacity utilization
  - Definitive Cost & Schedule for rehabilitation
  - Robust EPC and Financing strategy to ensure success
  - Target *minimum 90% Capacity Utilization*
2. Secure requisite approvals from NNPC Leadership and HMSPR
  - Clear support for Key Enablers required
  - Financiers to work with ORBs to deliver project(s)
  - *Waivers required from BPP, BPE, NCDMB, ICRC*
3. Execute the Roadmap
  - Alignment on Funding / Repayment Mechanism
  - Finalize Project Cost & Schedule
  - Execute Financing agreements / 1<sup>st</sup> Draw on Funds
  - Spare parts procurement, maintenance and/or replacement of equipment as per schedule
  - Includes program to meet low-sulphur fuels mandate
4. Key Enablers are critical for success
  - Security of crude supply; address pipeline vandalism
  - Effective pricing & products evacuation strategy
  - Robust staffing/succession plan
  - *Strong Operations & Maintenance (O&M) Expertise*
5. Effective Stakeholder Engagement
  - NASS / Labour Unions / Communities

### Key notes

- Total PMS demand in the country in 2025 shows that there is a deficit of 38M litres which can in part be filled by NNPC refineries, supplying an additional 18M litres, operating at 90% capacity utilisation

1 Demand and Supply Computations carried out for gasoline (PMS) only which accounts for approx. 30% of major light products  
 2 Total demand ranges from 38M litres/day in 2025 to 41M litres/day according to ICIS projections and bottom-up estimates

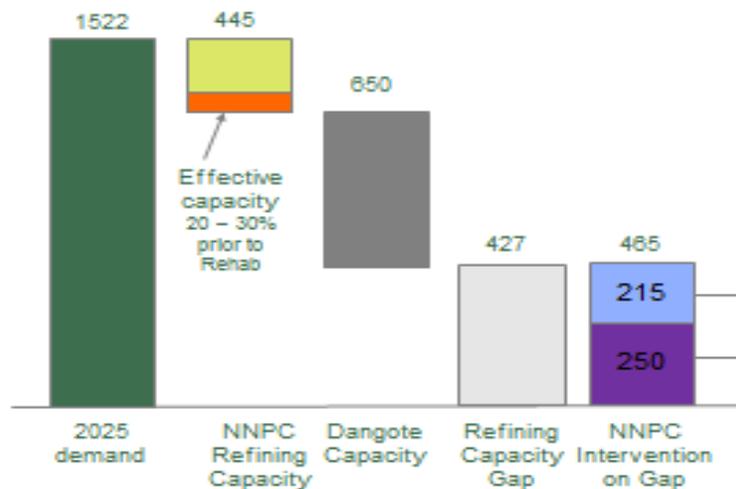
SOURCE: ICIS Research, Dangote Refinery E&A, KRPC, WRPC, PHRC, NNPC Project Team Analysis

5



## ...and insufficient Refining Capacity leading to shortage in fuels supply

Nigeria Fuels Demand and Supply by 2025 (kbbbl/day)



- Fuels demand forecasted to require ~1.5m bbl/day of refining capacity by 2025
- Supply gap currently met by imports, which NNPC co-ordinates
- Exacerbated by current state of refineries, producing well below design capacity
- Future supply gap widens – even with NNPC and Dangote projects
- CP – NNPC Collocation project has reduced the gap (CP)
- CR – NNPC Condensate Refinery programme closes the gap completely (CR)

→ Need to deliver on new refinery projects, and continue with further expansions and supply sources

4



## NNPC is at the forefront of providing services to address these energy challenges

NNPC's operations span entire oil and gas value chain with robust resource base



Energy Source	Potential
Hydropower	14,750MW ( <i>High Potential</i> )
Biomass	Very High Potential
Solar Radiation	3.5 – 7.0 kWh/m <sup>2</sup> / day
Wind	2 – 4 m/s (annual average)
Geothermal	5 Sources known in Nigeria
Ocean, Tidal and wave	Low prospects in Nigeria

Source: Nigerian National Energy Master Plan