Positioning natural gas as fuel of choice for sustainable development in Nigeria

Engr Yusuf Usman
COO Gas & Power, NNPC, Nigeria

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# Table of Content

1. Setting the scene: Africa’s gas & power situation
2. Nigeria’s gas market: status and outlook
3. Focus areas to stimulate domestic gas demand
4. Key gas supply and utilization projects
5. Expanding natural gas supply and utilization (niche markets)
6. Policies and initiatives in Nigeria’s gas sector
7. Concluding remarks
Large gas reserves underpinning production to meet domestic gas consumption (~63%) mostly for power & industries and export commitments (37%).

Many gas projects in the mature and emerging gas provinces/countries being executed to support domestic and export gas demand.

Growing population require more energy supply and to do that sustainably, natural gas and renewables would be pivotal to grow the per capita energy consumption towards the global avg. of 76 GJ up from the continent’s current 15.2 GJ.
Electricity in Africa: Millions in darkness

- **At 39% share, natural gas is the dominant source of fuel for electricity in Africa, largely in N. Africa**
- **Small (5%) but growing electricity generation from renewables (solar & wind), especially for off-grid/mini grid generation in the rural areas**

**Data:** IEA WEO (2020), BP (2020)

**COVID-19** impacted some power projects, but low electricity access will continue to create more demand for power generation.
1. Current gas utilization by segment

- Domestic gas: 1.54 Bscf/d (21.5%)
- Export gas: 3.1 Bscf/d (42.4%)
- Flared Gas: 0.60 Bscf/d (8.7%)
- Re-injection & fuel gas: 1.9 Bscf/d (26.4%)

LNG/NGLs/GTL: 3 Bscf/d

Power: 0.91 Bscf/d
Industries: 0.6 Bscf/d

2. Medium term gas utilization Outlook to 2023/2024

5 Bscf/d Gas Utilization, to be underpinned by ~203 Tcf of 2P gas reserves, gas infrastructure projects and improved security

30 MTPA LNG capacity, with the sanctioning of N-LNG T7, LNG export capacity to grow by 8MTPA

There are initiatives, projects and policies to support gas production & utilization growth in Nigeria on medium and long term horizon.
Focus areas to stimulate domestic/regional gas demand

1. Natural gas supply
   - Increase oil/gas resource exploitation e.g. 15 on-going upstream gas supply projects (to 2023) and 16 post 2023.
   - Leverage on technology and industry experience to increase efficiency

2. Gas and Power (Infrastructure)
   - Provision of adequate gas infrastructure networks, e.g. AKK, OB3 interconnector
   - Integration of gas & power infrastructure
   - Transparent & market driven gas and power prices to support investment

3. Natural gas demand
   - Boost domestic gas utilization to 5 Bscf/d (power, GBIs and commercial)
   - Expand and Integrate domestic/regional power grids (transmission partnerships)
   - Provide support for niche gas markets, e.g. Autogas, LPG, etc.

4. Policy & Cooperation
   - Develop appropriate energy and gas policies and investment packages
   - Foster multi-stakeholder cooperation with domestic, regional and international entities in the realm of gas/energy sectors
Upstream: Gas supply projects in Nigeria

Incremental gas supply project volumes to 2023, MMscf/d

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Planned Completion</th>
<th>Volume (MMscf/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPDC Otumara AG</td>
<td>Q4 2020</td>
<td>20</td>
</tr>
<tr>
<td>SPDC Agbada AG/NAG</td>
<td>Q1 2021</td>
<td>40</td>
</tr>
<tr>
<td>NAOC Ebocha (for Omoku NIPP)</td>
<td>Q4 2020</td>
<td>55</td>
</tr>
<tr>
<td>NPDC Egbea West AG/NAG</td>
<td>Q2 2021</td>
<td>65</td>
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<tr>
<td>SPDC PYP</td>
<td>Q3 2021</td>
<td>45</td>
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<tr>
<td>Exxon/NAOC Swapped Gas Egbea</td>
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<td>100</td>
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<tr>
<td>SPDC Southern Swamp</td>
<td>Q4 2020</td>
<td>100</td>
</tr>
<tr>
<td>OML 18, 24, 55 well development</td>
<td>Q1 2022</td>
<td>144</td>
</tr>
<tr>
<td>OML 42 Odidi Field well development</td>
<td>Q4 2023</td>
<td>200</td>
</tr>
<tr>
<td>NPDC Utorogu NAG 3</td>
<td>Q4 2021</td>
<td>200</td>
</tr>
<tr>
<td>OML 35/62 Okpokonou</td>
<td>Q4 2022</td>
<td>300</td>
</tr>
<tr>
<td>SPDC to drill 16 NAG wells to supply Brass Fertilizer</td>
<td>Q3 2022</td>
<td>300</td>
</tr>
<tr>
<td>Oshí-Úbie (NAOC to drill 19 wells /2 workovers)</td>
<td>Q1 2023</td>
<td>300</td>
</tr>
<tr>
<td>OML 13 Utapeté south well development</td>
<td>Q3 2021</td>
<td>400</td>
</tr>
<tr>
<td>ANOH - SPDC (to drill 6 NAG Wells)</td>
<td>Q4 2021</td>
<td>500</td>
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Incremental gas supply project volumes (post 2023) 2,850 MMscf/d

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<tr>
<th>Project Description</th>
<th>Planned Completion</th>
<th>Volume (MMscf/d)</th>
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<tbody>
<tr>
<td>SPDC Imo River</td>
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<tr>
<td>NAOC Akiri Flare down</td>
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<tr>
<td>Pan Ocean OPL 275</td>
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<td>65</td>
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<tr>
<td>NAOC Swamp Area Flare Down</td>
<td>Q4 2025</td>
<td>50</td>
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<tr>
<td>OML 26 - Abah &amp; Owo well development</td>
<td></td>
<td>100</td>
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<tr>
<td>NPDC Okonko/ Okpolofo GH</td>
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<td>OML 38 fields well development</td>
<td>Q3 2025</td>
<td>114</td>
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<tr>
<td>Bonga Diversion (GigaGas)</td>
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<td>120</td>
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<td>NAOC Isu Flare Down Project</td>
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<td>Akri-Oguta; NAOC to drill 26 wells</td>
<td>Q1 2025</td>
<td>180</td>
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<td>EEPNL Eha/Ebosi</td>
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<td>Samahiri-Bisen (NAOC to drill 10 gas wells)</td>
<td>Q2 2025</td>
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<td>CNI Okan Wet Gas</td>
<td>Q1 2027</td>
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<td>Exxon OSO Gas Plant</td>
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<td>TEPNG Obite Gas Plant</td>
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<tr>
<td>OML 18, 24, 55 well development</td>
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There are enough on-going gas supply project volumes to meet medium/long term gas demand (domestic/export)
**Midstream: Integrating gas pipeline and power infrastructure**

**Northern Axis**

Provision of Gas Infrastructure to support gas-fired power plant projects and growing industrial gas demand.

**Western Axis**

Doubling the Escravos Lagos Pipeline System (ELPS) Capacity to 2 Bscf/d to boost uptake.

**Eastern Axis**

Development of gas resources and provision of more Gas Infrastructure to deepen gas and power uptake.

**Southern Axis**

Development of gas resources and provision of more Gas Infrastructure to deepen gas and power uptake and for flexible gas flow (domgas/LNG).
**Midstream: Highlights of the major gas projects**

**Domestic**

Ajaokuta–Kaduna-Kano (AKK) Gas Pipeline & power plant projects

Brass Gas Hub

**Export**

Nigeria – Morocco Gas Pipeline

West African Gas Pipeline (WAGP)

Nigeria LNG Train 7
Niche gas market opportunity: Clean cooking using LPG

~2.6 billion
People without access to clean cooking facilities
Use inefficient and polluting fuels, e.g. firewood, animal dung, etc. resulting in health and environment issues and reduced productivity especially for women and children who go for miles in search of firewood.

65% in Developing Asia
Increasing access driven by massive distribution of free LPG cylinders and more natural gas infrastructure across the country.

35% in Africa
- Lack of access dominant in sub-Saharan Africa (17% access rate in 2018);
- Access is growing over the years especially in West & East Africa, driven by increase domestic LPG supply, govt. support prog e.g. free cylinder distribution, etc.

Clean cooking continue to increase globally driven by country specific interventions, but still access is very low in many African countries (due to supply chain logistics challenges, price and affordability levels)

Data: IEA Nov 2019
Niche gas market opportunity in Nigeria: D-LPG supply

Approach: Debottlenecking the supply chain for efficient delivery

LPG supply
Increase supply from N-LNG, imports and domestic refineries that supported growth in consumption

Off-take/Off-takers
Increase # of vessels for supply to coastal areas/storages incl dedicated charter

Terminals /Coastal storages
Expansion of existing terminals/jetties to ease congestion

Bulk/semi bulk transportation
More # of trucks for cross country supply and small/medium size truck for dedicated semi-bulk supply to industries, captive power, etc.

Distribution/end-use
Small and modular re-fill/bottling plants and storages for households and commercial customers

Govt./NNPC support initiatives e.g. N-LPG Expansion Initiative and increased private sector participation led to increased D-LPG supply & consumption
Virtual Gas Supply & Distribution: \textit{CNG & domestic LNG}

Use of mini-LNG/CNG cascades to supply gas to remote demand centers for autogas and industrial usage (provision of natural gas vehicles, conversion centres, re-fueling stations, etc.)

Stimulate socio-economic development, lowers govt. import bills on white products and promote sustainable energy security by using green and indigenous energy resource to power the economy.
Policies and initiatives supporting the growth of gas sector in Nigeria

**National Gas Policy**
Policy and actions of the Nigerian Govt. in the natural gas sector Medium to long-term resource exploitation growth and utilization

**NNPC's top 5 Gas & Power priority initiatives**
Execution of critical gas infrastructure blue-print, 5 Bscf/d gas utilization, achieve 5 GW power generation, grow LNG exports and power transmission partnerships/investments

**Nigerian Gas Transportation Network Code (NGTNC)**
Provides contractual framework between the gas transportation network operator and gas shippers aimed at provision of open and competitive access to gas transportation infrastructure

**Nigerian Gas Flare Commercialization Programme (NGFCP)**
Use of 3rd party investors to execute flare gas utilization projects as part of Nig. policy objectives related to GHG emission reduction and economic usage of flared gas

**Flare Gas Regulations**
Reduce environmental and social impact due to gas flaring, protect the environment, prevent waste of natural resources and create social and economic benefits from gas flare capture

**National Gas Expansion Program**
Provides framework and policy support to deepen gas supply and gas utilization in Nigeria (power, CNG, LPG and GBIs)

**National Gas Price Review**
Review and evaluation of domestic gas price to stimulate utilization and investment across the value chain
Concluding Remarks

Africa has enough gas resources to enhance utilization, but requires adequate investment and favorable policies to provide the necessary infrastructure and for the resource exploitation.

Nigeria government and NNPC is vigorously pursuing a number of gas related policies and projects to support the growth of gas for domestic and export markets.

Need to leverage on the growing efforts for sustainable future energy and technological evolution to enhance gas uptake in existing and emerging niche gas markets.

Continue to advocate for gas usage stressing its credentials and communicate emerging challenges and opportunities to policy/decision makers for appropriate actions.

The COVID-19 pandemic provided thrust in global collaboration for energy market stabilization and scientific endeavors and the gas industry should latch on this to enhance cooperation in the gas/energy sector.

Need for continuous sharing of experiences and best practices across the gas value chain.
Thank you for listening