

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

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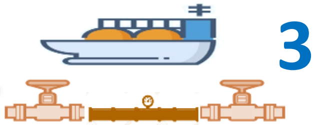
Setting the scene: *Africa's gas potential*

540 Tcf Proven (2P) Gas Reserves (01.01.20)

8.4 Tcf

Natural gas production (2019)

5.3 Tcf Domestic gas consumption (63%)



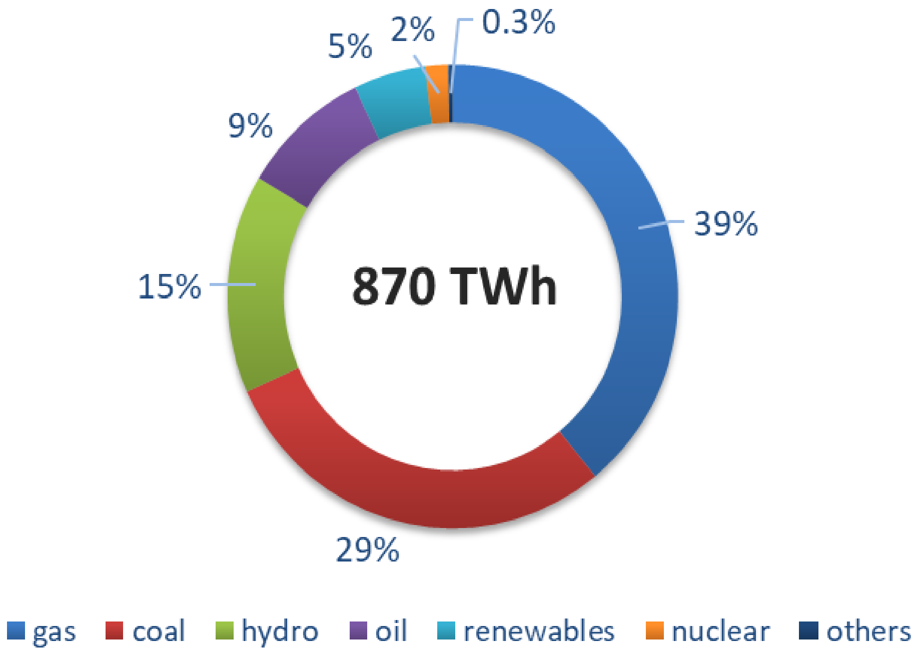
3.1 Tcf Gas exports: LNG & Pipeline Gas (37%)

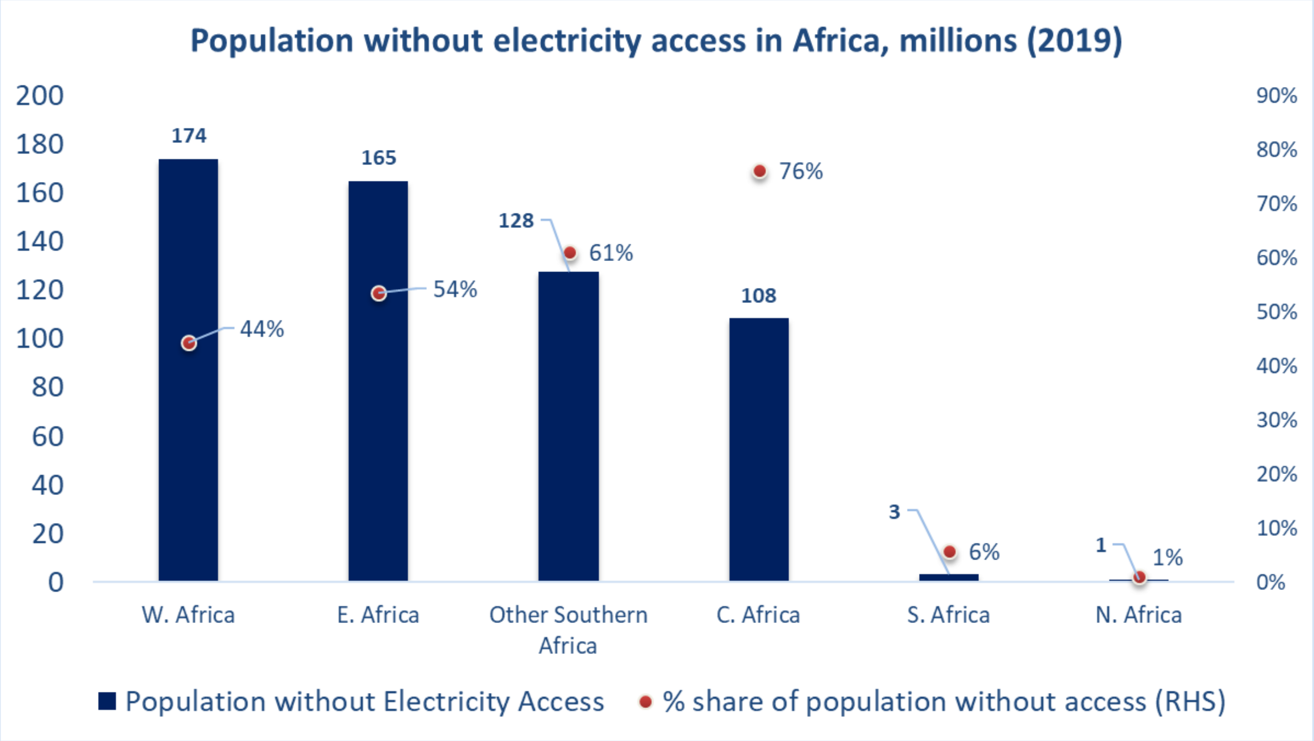
Large gas reserves underpinning production to meet domestic gas consumption (~ 63%) mostly for power & industries and export commitments (37%)

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*





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

- ❑ 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

44%

- ❑ Share of population without electricity access in Africa ➔ **579 mil people**
- ❑ Rural population mostly impacted

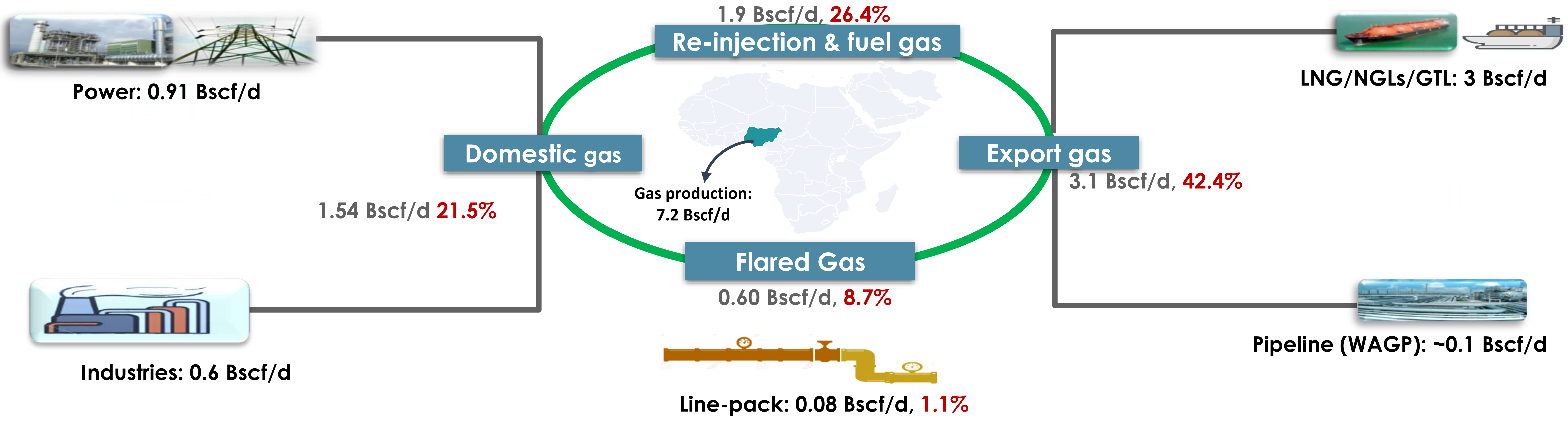
38%

Share of population without electricity access in Nigeria ➔**77 mil people**

COVID-19 impacted some power projects, but low electricity access will continue to create more demand for power generation

Nigeria's Gas Market

1. Current gas utilization by segment



Data: *NNPC March 12, 2021*

2. Medium term gas utilization Outlook to 2023/2024

5 Bscf/d

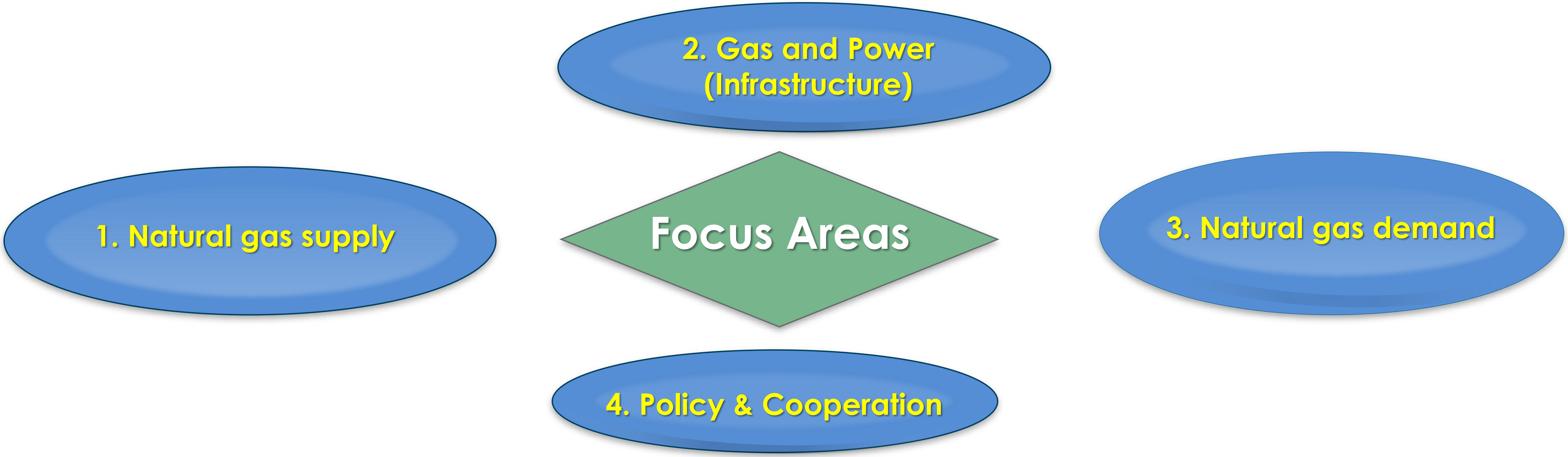
Gas Utilization, to be underpinned by ~203 Tcf of 2P gas reserves, gas infrastructure projects and improved security

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



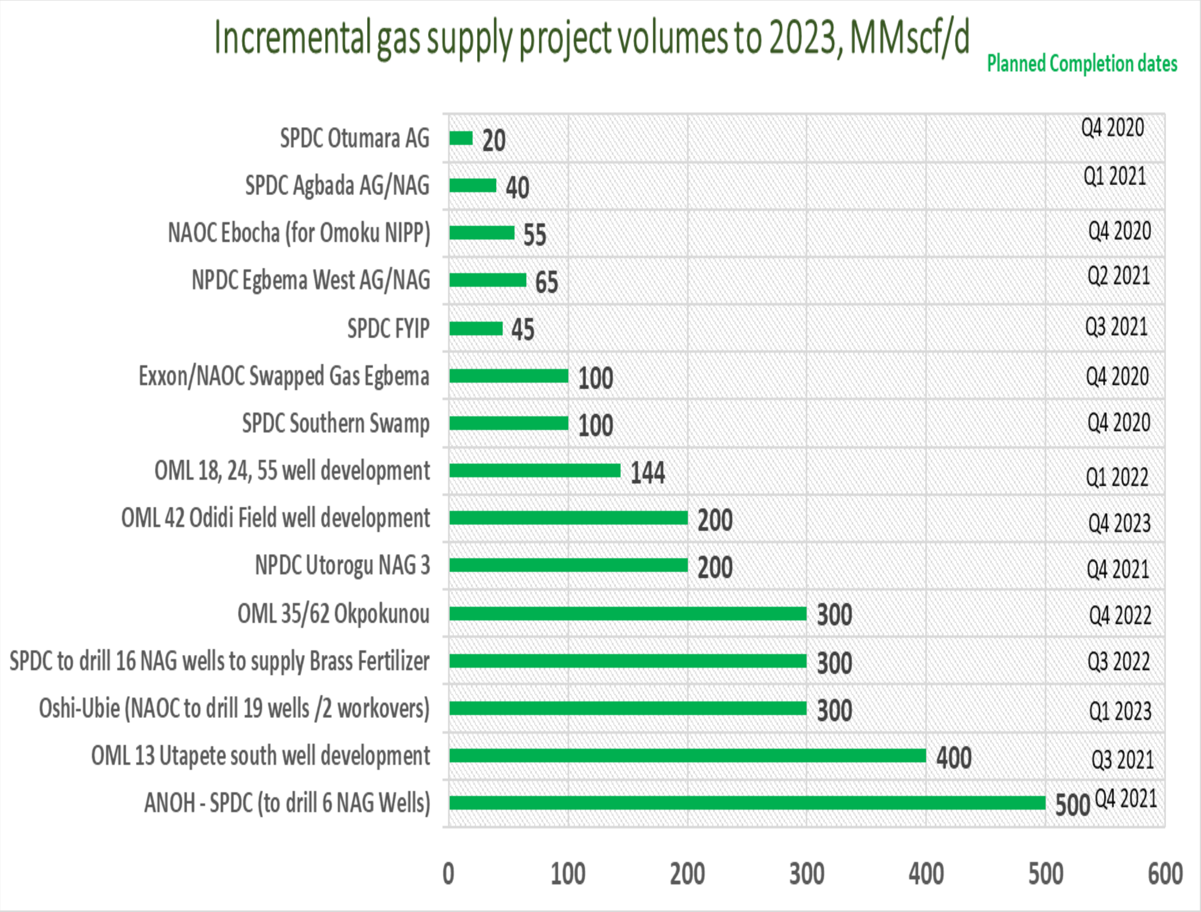
1
- Increase oil/gas resource exploitation e.g 15 on-going upstream gas supply projects (to 2023) and 16 post 2023.
- Leverage on technology and industry experience to increase efficiency

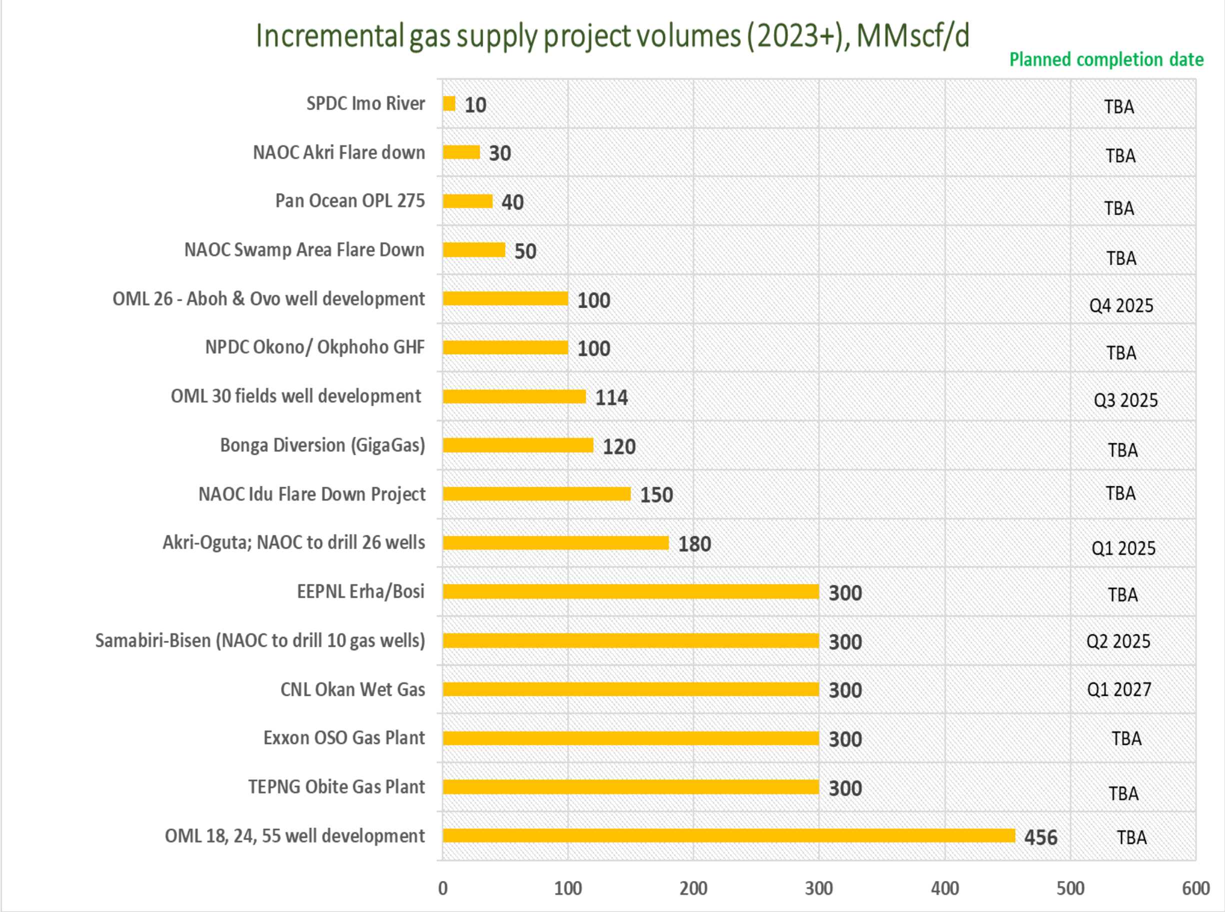
2
- Provision of adequate gas infrastructure networks, e.g. AKK, OB3 interconnector
- Integration of gas & power infrastructure
- Transparent & market driven gas and power prices to support investment

3
- 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
- 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 volumes (to 2023) **2,769** MMscf/d

Incremental gas supply volumes (post 2023) **2,850** MMscf/d

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

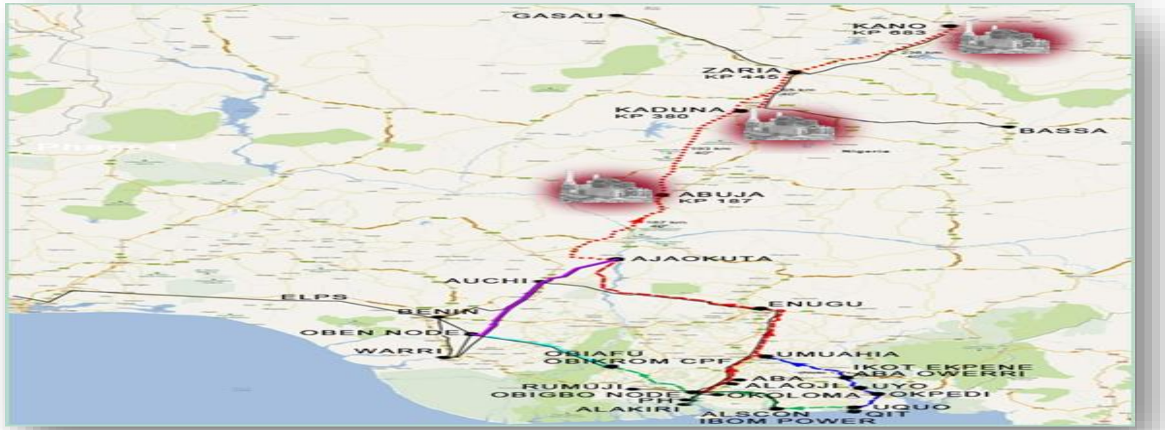
Development of gas resources and provision of more Gas Infrastructure to deepen gas and power uptake and for flexible gas flow (domgas/LNG)

N-LNG Plant

Midstream: *Highlights of the major gas projects*

Domestic

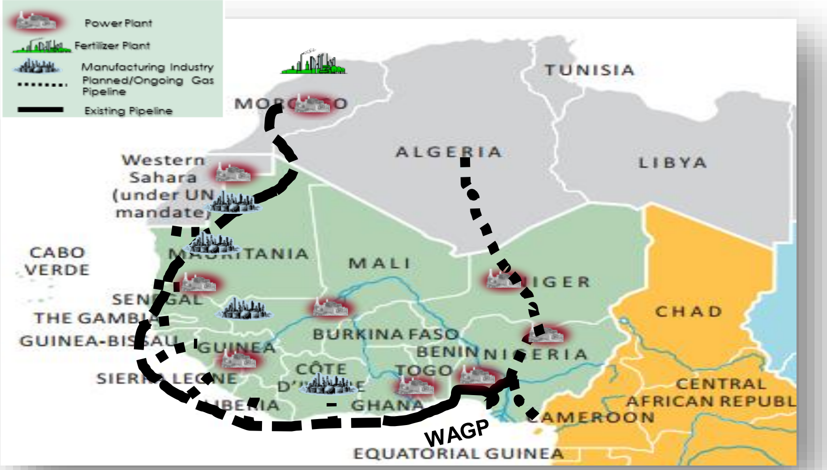
Ajaokuta–Kaduna-Kano (AKK) Gas Pipeline & power plant projects



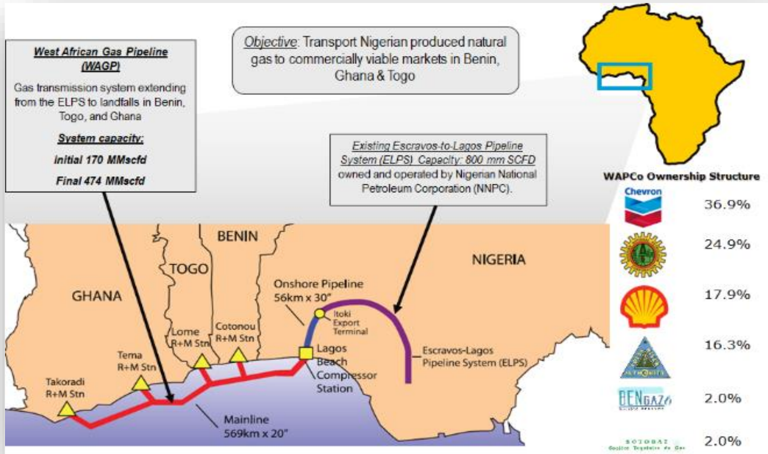
Brass Gas Hub

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

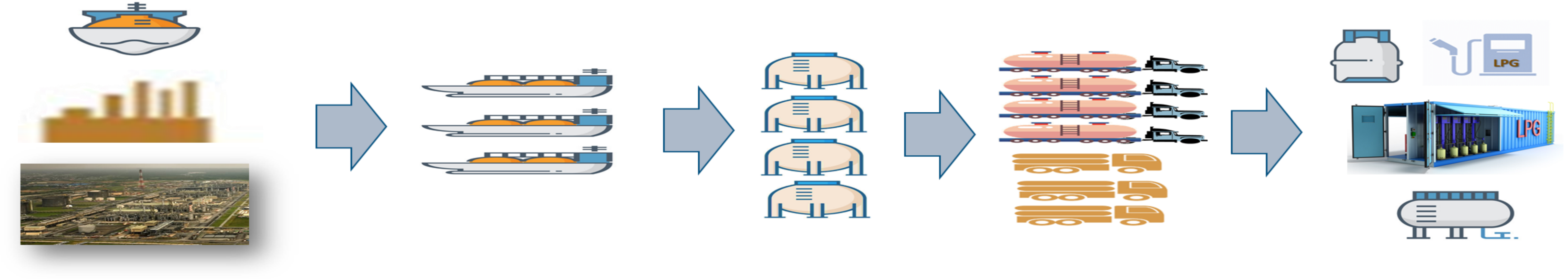
- ❑ Lack of access dominant in sub-Saharan Africa (17% access rate in 2018);
- ❑ Access is growing over the years especially in West & East Africa, driven by increase domestic LPG supply, govt. support prog e.g. free cylinder distribution, etc.

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*

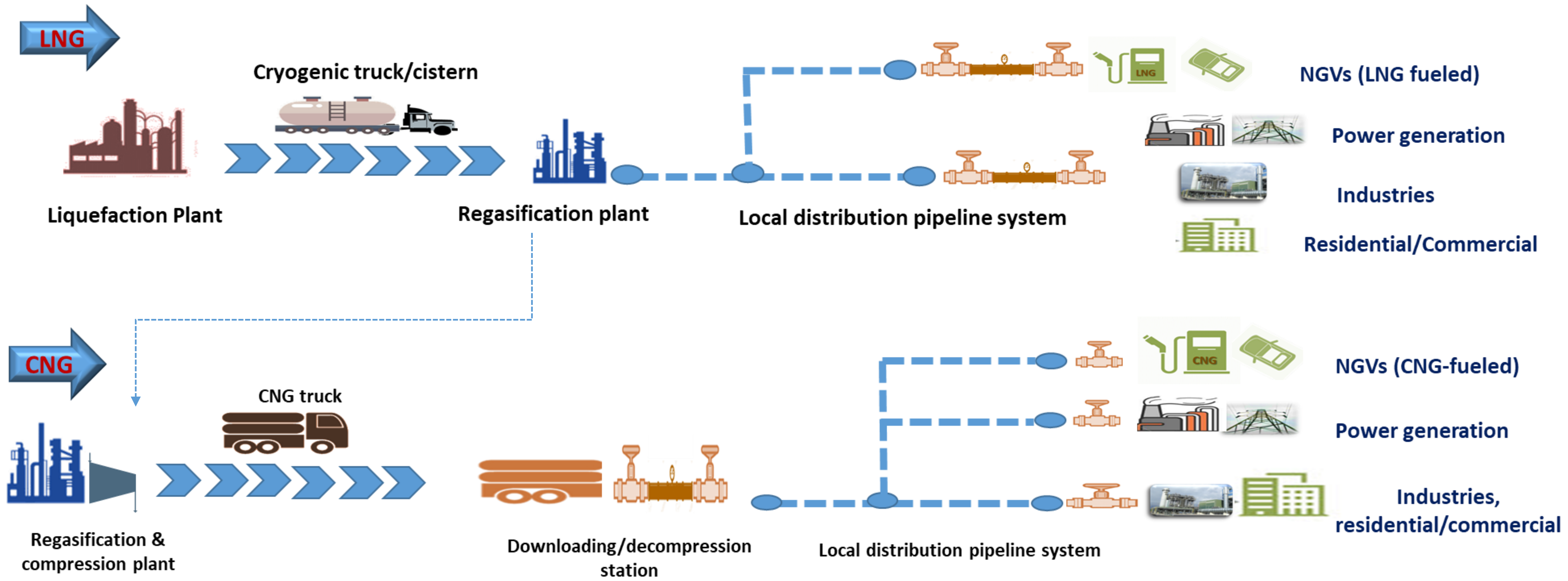
Approach: Debottlenecking the supply chain for efficient delivery



LPG supply	Off-take/Off-takers	Terminals /Coastal storages	Bulk/semi bulk transportation	Distribution/end-use
Increase supply from N-LNG, imports and domestic refineries that supported growth in consumption	Increase # of vessels for supply to coastal areas/storages incl dedicated charter	Expansion of existing terminals/jetties to ease congestion	More # of trucks for cross country supply and small/medium size truck for dedicated semi-bulk supply to industries, captive power, etc.	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: *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

2016 — 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

2017 — National Gas Policy

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

2018 — 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

2019 — 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

2020 — National Gas Expansion Program

Provides framework and policy support to deepen gas supply and gas utilization in Nigeria (power, CNG, LPG and GBIs)

2020 — 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)

2020 — 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