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GAS DEVELOPMENT AND MONETIZATION: UNLOCKING ECONOMIC GROWTH THROUGH STRATEGIC GAS INFRASTRUCTURE

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CERTIFICATION PAGE

This report is certified as an original research work conducted by African Energy Research (AER) in accordance with approved research standards, methodologies, and ethical guidelines.

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DECLARATION

This research report has not been submitted to any other institution for any purpose and all sources of data and references have been duly acknowledged.



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TABLE OF CONTENTS

Contents

1. Introduction and Background	1
2. Industry Overview: The African Gas Landscape.....	2
2.1 Continental Context.....	2
2.2 Nigeria's Gas Sector Specifics.....	4
3. Strategic Analysis: Key Infrastructure Projects and Monetisation Pathways	5
3.1 The OB3 Gas Pipeline: Bridging East and West	5
3.2 The AKK Pipeline Project: Gas for the North	7
3.3 Nigeria LNG (NLNG): The Export Anchor.....	8
3.4 Domestic Gas Utilisation and Gas-to-Power Initiatives	10
3.5 Regional LNG Expansion: The African Corridor.....	12
4. Economic Implications.....	14
4.1 Industrial and Manufacturing Development.....	14
4.2 Export Earnings and Foreign Exchange	15
4.3 Reduction of Gas Flaring	15
4.4 Energy Transition Strategies	17
5. Challenges and Risks.....	18
5.1 Infrastructure Financing	18
5.2 Regulatory and Policy Bottlenecks	19
5.3 Pipeline Vandalism and Insecurity	20

5.4 Environmental Concerns	21
5.5 Market Pricing Issues.....	22
5.6 Operational Sustainability.....	22
6. Lessons Learned	23
6.1 Phased Development Reduces Risk	23
6.2 Security is a Prerequisite, Not an Afterthought.....	23
6.3 Domestic and Export Markets Must be Balanced.....	24
6.4 Regulatory Certainty Drives Investment.....	25
6.5 Local Content and Capacity Building are Essential	25
7. Policy Recommendations	26
7.1 Accelerate Pipeline Completion and Network Integration.....	26
7.2 Reform Gas Pricing and Market Structures.....	26
7.3 Strengthen Flare Elimination Enforcement.....	26
7.4 Enhance Security Architecture.....	27
7.5 Deepen Regional Cooperation	27
7.6 Align Gas Strategy with Industrial Policy	28
7.7 Build Carbon Market Infrastructure	28
8. Conclusion	29
References	31

LIST OF ACRONYMS

AKK	Ajaokuta–Kaduna–Kano
ANOH	Assa North/Ohaji South
Bcf	Billion Cubic Feet
CIT	Companies Income Tax
CNG	Compressed Natural Gas
CO ₂	Carbon Dioxide
DMO	Domestic Market Obligation
DSO	Domestic Supply Obligation
EPC	Engineering, Procurement, and Construction
ELPS	Escravos-Lagos Pipeline System
FLNG	Floating Liquefied Natural Gas
FID	Final Investment Decision
GenCo	Generating Company
GTA	Greater Tortue Ahmeyim
HCT	Hydrocarbon Tax
IPP	Independent Power Project
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MMSCFD	Million Standard Cubic Feet per Day

MMscf	Million Standard Cubic Feet
mtpa	Million Tonnes Per Annum
NCDMB	Nigerian Content Development and Monitoring Board
NDPHC	Niger Delta Power Holding Company
NGFCP	Nigerian Gas Flare Commercialisation Programme
NLNG	Nigeria LNG Limited
NMDPRA	Nigerian Midstream and Downstream Petroleum Regulatory Authority
NNPC	Nigerian National Petroleum Company Limited
NUPRC	Nigerian Upstream Petroleum Regulatory Commission
OB3	Obiafu-Obrikom-Oben
PIA	Petroleum Industry Act
SEZ	Special Economic Zone
SME	Small and Medium Enterprise
tcf	Trillion Cubic Feet
WAPP	West African Power Pool



EXECUTIVE SUMMARY

Africa holds over 550 trillion cubic feet of undeveloped gas, with Nigeria, at 200+ tcf proven reserves, leading the continent's push to monetise gas for industrialisation and energy security. Key projects include the OB3 pipeline (\$700m, linking east-west networks), the AKK pipeline (614km, 72% complete, facing security and financing hurdles), and NLNG Train 7 (adding 4.2 mtpa by 2027). Nigeria attracted over \$5 billion in gas investments in 2024, driven by Petroleum Industry Act reforms. Yet gas flaring persists (192 MMscf in 2024, \$646m penalties), infrastructure financing remains fragile, pipeline vandalism and insecurity disrupt operations, and domestic pricing below international benchmarks discourages investment. Regional LNG capacity is projected to grow from 80 mtpa to 175 mtpa by 2040, with Mozambique, Senegal-Mauritania, and Tanzania adding new supply. Success requires accelerated pipeline completion, dynamic pricing reform, stronger flare enforcement, integrated security frameworks, regional cooperation, and carbon market development. Gas monetisation is not merely an energy policy; it is an economic imperative shaping Africa's future.

INTRODUCTION AND BACKGROUND

Africa holds the world's second-largest volume of discovered but undeveloped gas resources, with more than 550 trillion cubic feet (tcf) of recoverable gas remaining untapped across the continent (African Energy Chamber, 2025). The African Energy Chamber's State of African Energy 2026 Outlook identifies major basins such as Mozambique's Rovuma Basin (129 tcf) and Nigeria's Niger Delta (113 tcf) as epicentres of this potential. Against a global energy landscape reshaped by supply security concerns and the imperative of a just energy transition, African nations are increasingly recognising natural gas not merely as a commodity for export, but as a strategic lever for industrialisation, energy security, and economic diversification (African Energy Chamber, 2025).

Nigeria, Africa's largest economy and most populous nation, sits at the forefront of this transformation. With proven natural gas reserves exceeding 200 trillion cubic feet and ranking among the top ten countries globally, Nigeria has embarked on an ambitious "Decade of Gas" agenda (2021–2030) designed to reposition gas as the cornerstone of its energy transition and economic strategy (News Central TV, 2024). However, decades of underinvestment in midstream infrastructure, persistent gas flaring, regulatory fragmentation, and security challenges have constrained the sector's potential. This case study examines how Nigeria and selected African peers are leveraging strategic gas infrastructure, pipelines, LNG terminals, domestic utilisation programmes, and gas-to-power

initiatives, to unlock economic growth, while navigating the complex interplay of financing, policy, security, and environmental sustainability.



INDUSTRY OVERVIEW: THE AFRICAN GAS LANDSCAPE

2.1 Continental Context

Africa's gas sector is experiencing a renaissance. In 2024, the continent supplied 34.7 million tonnes of LNG, with sub-Saharan Africa contributing 26.9 million tonnes (OilPrice.com, 2024). Nigeria, Angola, Equatorial Guinea, and Cameroon were established exporters, while Mozambique's Coral Sul FLNG and the Senegal-Mauritania Greater Tortue Ahmeyim (GTA) project have added new capacity since 2022. The continent's total LNG export capacity is projected to expand from approximately 80 million tonnes per annum (mtpa) in 2025 to over 175 mtpa by 2040, positioning Africa as a critical global LNG supplier (African Energy Chamber, 2025). Figure 1 below illustrates this projected capacity growth trajectory.

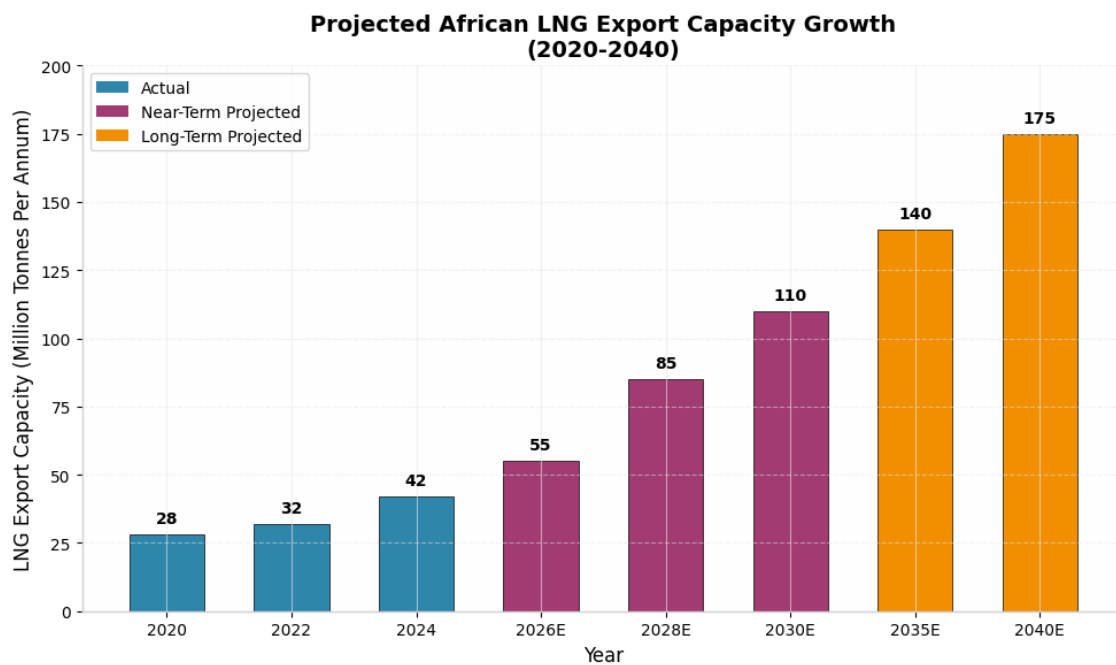


Figure 1. Projected African LNG Export Capacity Growth, 2020–2040. Source: Compiled from African Energy Chamber (2025) and OilPrice.com (2024).

This growth is underpinned by over \$50 billion in confirmed project financing targeting Mozambique, Nigeria, Senegal, and Tanzania through 2030 (African Energy Chamber, 2025). Key projects include TotalEnergies' \$20 billion Mozambique LNG project (restarting after a five-year force majeure suspension), ExxonMobil's \$30 billion Rovuma LNG development, and Shell and Equinor's \$42 billion Likong'o-Mchinga LNG project in Tanzania (Africa Oil & Gas Report, 2024). Africa's geographical proximity to both European and Asian markets provides a strategic advantage, enabling west and southwest African LNG producers to serve as swing suppliers based on price spreads between markets (OilPrice.com, 2024).

2.2 Nigeria's Gas Sector Specifics

Nigeria produces an average of approximately 1,500 billion cubic feet (Bcf) of dry natural gas annually. Of this volume, domestic usage averages 649 Bcf per year, primarily for power generation and industrial applications, while about 517 Bcf per year is exported as LNG via the Nigeria LNG (NLNG) facility (Adebayo, 2024). However, significant inefficiencies persist: in 2022 alone, 188 Bcf of gas was flared,

representing both economic loss and environmental harm (Adebayo, 2024).

Figure 2 presents the breakdown of Nigeria's gas utilisation.

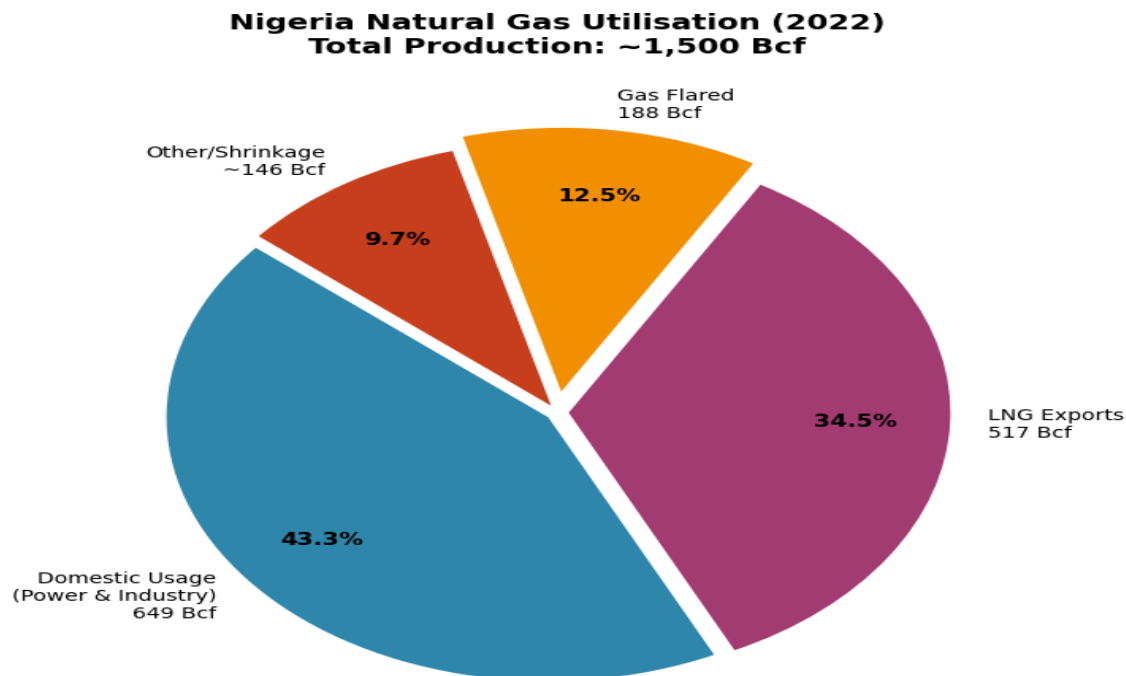


Figure 2. Nigeria Natural Gas Utilisation by End Use, 2022. Source: Compiled from Adebayo (2024) and Veriva Africa (2024).

With proven reserves of 206.5 tcf and current production levels around 1.5 tcf annually, a substantial gap remains between potential and actual output (Adebayo, 2024). The Nigerian government has responded through a suite of policy instruments: the Petroleum Industry Act (PIA) 2021, the National Gas Policy, the Gas Decade Initiative (2021–2030), and the National Gas Expansion Programme (OAL Law, 2022). These frameworks aim to expand infrastructure, reform regulation, develop the domestic market, and reduce gas flaring. The PIA,

in particular, introduced fiscal incentives tailored to gas projects, including reduced royalty rates, tax reliefs, and the establishment of a Gas Sector Infrastructure Fund, designed to make gas development more attractive and commercially sustainable (OAL Law, 2022).

STRATEGIC ANALYSIS: KEY INFRASTRUCTURE PROJECTS AND MONETISATION PATHWAYS

3.1 The OB3 Gas Pipeline: Bridging East and West

The Obiafu-Obrikom-Oben (OB3) gas pipeline is a 127-kilometre, \$700 million interconnector project designed to link Nigeria's Eastern gas pipeline network to the Escravos-Lagos Pipeline System (ELPS) in the West and, by extension, to the AKK pipeline in the North (Adebayo, 2024). Upon completion, the pipeline will bring approximately 2.2 billion standard cubic feet (bscf) of gas into the national network, significantly boosting nationwide gas supply to drive industrialisation and economic growth (Adebayo, 2024).

The project has experienced protracted delays due to the formidable challenge of crossing the River Niger, an operation that remained the major impediment to completion for over three years (Adebayo, 2024). The adoption of Micro-Tunnelling/Direct Pipe Installation technology has enabled progress, with approximately 860 metres out of 1,800 metres achieved as of mid-2024 (Adebayo, 2024). The River Niger crossing has become emblematic of the technical and logistical hurdles facing Nigerian gas infrastructure: the crossing site spans more than two kilometres, and conventional dredging or open-cut methods were ruled out due to environmental concerns, necessitating sophisticated horizontal directional drilling under the riverbed (Adebayo, 2024).

The OB3 pipeline's strategic significance cannot be overstated. By integrating the Eastern and Western gas networks, it will enable the redistribution of gas from production centres in the Niger Delta to demand centres in Lagos and the Southwest, while also creating a pathway for Northern gas delivery via the AKK pipeline (Adebayo, 2024). This integration is essential for balancing supply and demand, reducing bottlenecks, and creating a truly national gas grid.

3.2 The AKK Pipeline Project: Gas for the North

The 614-kilometre Ajaokuta–Kaduna–Kano (AKK) gas pipeline represents the backbone of Nigeria's Gas Master Plan and one of the most strategically important infrastructure projects in West Africa (The Guardian Nigeria, 2024). Intended to boost domestic gas availability, support industrial growth, and stabilise electricity generation in Nigeria's northern zones, the pipeline traverses some of the most challenging terrain on the continent (The Guardian Nigeria, 2024).

Oilserv, the indigenous engineering, procurement, and construction (EPC) contractor responsible for Segment One (303 kilometres from Ajaokuta to the Kaduna-Niger border), has deployed over 520 military personnel alongside local security teams to protect workers and equipment amid persistent security threats (The Guardian Nigeria, 2024). The terrain itself presents formidable engineering challenges: hard rock in Kogi State, swamps, valleys, and sandy clay soils requiring

complex excavation solutions (The Guardian Nigeria, 2024). The River Niger crossing, executed using horizontal directional drilling comparable to the Channel Tunnel methodology, was described by Oilserv's Chairman, Dr Emeka Okwuosa, as "one of the greatest challenges" of the project (The Guardian Nigeria, 2024).

As of mid-2025, Segment One is approximately 83.6 per cent complete, with the overall AKK scheme nearing 72 per cent completion (The Guardian Nigeria, 2024). The December 2025 commissioning target remains achievable, though contingent on sustained security and financing stability (The Guardian Nigeria, 2024). Financially, the project has faced turbulence: initial plans to secure syndicated external loans from China collapsed, forcing the Nigerian National Petroleum Company Limited (NNPC) to resort to internal funding (The Guardian Nigeria, 2024). Under this arrangement, contractors must finance each milestone and later recover costs from NNPC, placing enormous pressure on working capital (The Guardian Nigeria, 2024). Afreximbank has supported the transaction structure, while Fidelity Bank handles the majority of payment flows (The Guardian Nigeria, 2024).

The AKK pipeline's completion will unlock transformative economic potential for Northern Nigeria. Currently, the region relies heavily on diesel and petrol for power generation and industrial energy, with associated high costs and emissions. Reliable gas supply will enable the development of gas-based industries, fertiliser

plants, steel manufacturing, petrochemicals, and ceramics, while supporting gas-to-power plants that can stabilise the region's notoriously unreliable electricity supply (The Guardian Nigeria, 2024).

3.3 Nigeria LNG (NLNG): The Export Anchor

Nigeria LNG Limited (NLNG) remains the flagship of Nigeria's gas monetisation strategy and one of the largest LNG projects globally (Adebayo, 2024). The Bonny Island facility currently operates six trains with a combined production capacity of approximately 22 mtpa, with Train 7 under construction to add 4.2 mtpa upon completion targeted for 2027 (Adebayo, 2024). The Train 7 project, with an estimated cost of approximately \$3.6 billion, represents a \$6.5 billion total investment when combined with the Trains 1–6 debottlenecking project (Adebayo, 2024).

NLNG has been instrumental in generating foreign exchange earnings for Nigeria, reducing gas flaring by creating a commercial outlet for associated gas, and demonstrating that large-scale, world-class energy infrastructure can be successfully developed in Africa (Adebayo, 2024). The facility has shipped LNG to markets across Europe, Asia, and the Americas, establishing Nigeria as a reliable supplier in the global LNG trade.

However, NLNG's expansion plans have faced headwinds. Trains 8–12, originally proposed in 2019, were shelved in 2023 due to a combination of global market

conditions, financing challenges, and the need to prioritise domestic gas supply (Adebayo, 2024). This shelving reflects a broader tension in Nigerian gas policy: the imperative to maximise export earnings versus the need to ensure adequate domestic supply for power generation and industrialisation (Adebayo, 2024). The PIA's domestic supply obligations (DSOs) and the government's "Decade of Gas" agenda have tilted policy toward domestic utilisation, but the revenue from LNG exports remains critical for fiscal stability and foreign exchange (OAL Law, 2022).

3.4 Domestic Gas Utilisation and Gas-to-Power Initiatives

Nigeria's domestic gas utilisation strategy encompasses multiple pathways: gas-to-power, industrial feedstock, compressed natural gas (CNG) for transportation, and liquefied petroleum gas (LPG) for household cooking (News Central TV, 2024). The government has recorded over \$5 billion in new gas sector investments in 2024, attributed to bold policy reforms including strategic Executive Orders and progress on the AKK pipeline (News Central TV, 2024). Figure 3 illustrates this investment trajectory.

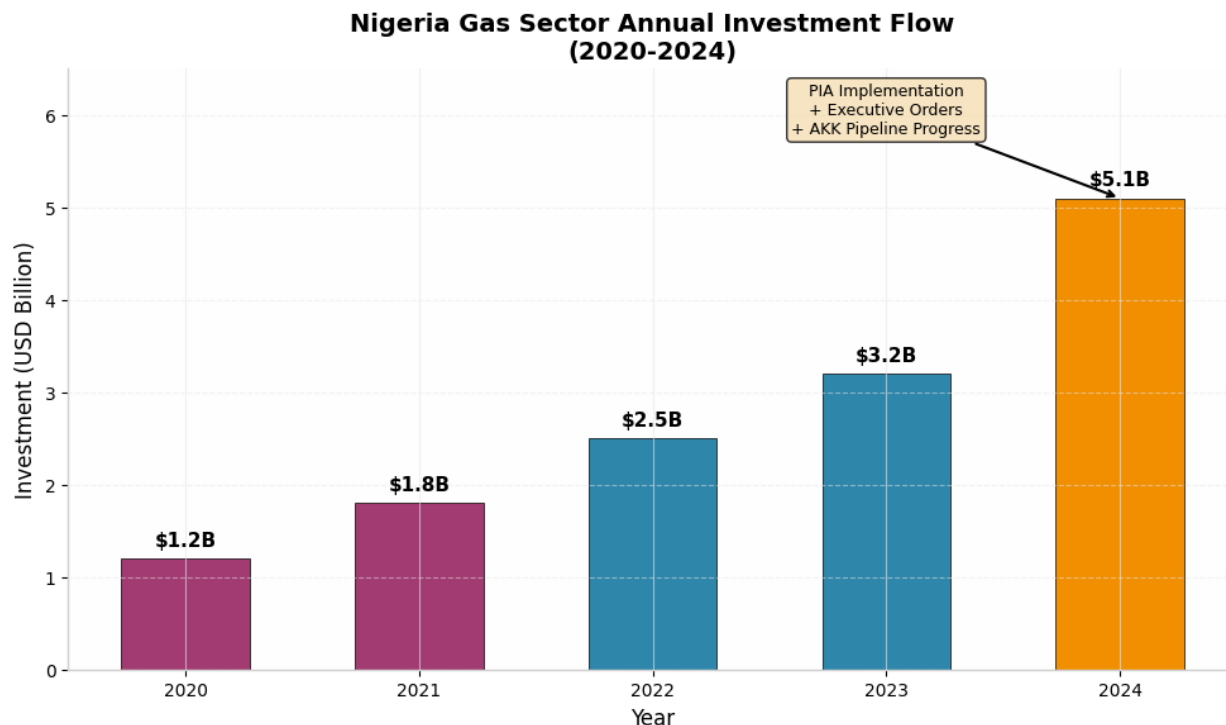


Figure 3. Nigeria Gas Sector Annual Investment Flow, 2020–2024. Source: Compiled from News Central TV (2024) and DOA Law (2025).

The gas-to-power segment is particularly critical. Natural gas constitutes the majority of Nigeria's energy mix and supplies most of the country's electricity (World Bank, 2024). However, the power sector remains plagued by generation shortfalls, transmission bottlenecks, and distribution inefficiencies (World Bank, 2024). The National Energy Compact, developed with World Bank support, outlines a roadmap for sector reform including closing the metering gap (2024–2027), reducing commercial losses, and improving transmission capacity (World Bank, 2024). The Aba Integrated Power Project (Aba IPP), commissioned in February 2024, exemplifies the potential of decentralised gas-fired generation:

the 141 MW facility, equipped with three GE LM6000 gas turbines and a dedicated 27 km gas pipeline, serves as a catalyst for economic growth in Abia State's industrial cluster (DOA Law, 2025).

The "Light Up Nigeria" initiative, launched in the Southeast and Southwest regions, aims to boost power supply to industrial clusters through bilateral sales arrangements between the Niger Delta Power Holding Company (NDPHC) and industrial consumers (DOA Law, 2025). These arrangements bypass the traditional bulk trader model, enabling more efficient dispatch and pricing. The Presidential CNG Initiative, which secured a \$6 million investment for the Arete Mini-LNG project in April 2025, aims to convert one million vehicles to CNG by 2027, reducing transportation costs and emissions while creating opportunities for SMEs in vehicle conversion and refuelling infrastructure (DOA Law, 2025).

3.5 Regional LNG Expansion: The African Corridor

Beyond Nigeria, Africa's LNG landscape is rapidly evolving. Mozambique has emerged as a major frontier, with the Coral South FLNG facility (3.4 mtpa) achieving its 100th cargo by April 2025, and the Coral Norte follow-on project (3.5 mtpa) approved for 2028 operations (African Energy Chamber, 2025). TotalEnergies' \$20 billion Afungi project is restarting after a five-year suspension, while ExxonMobil's \$30 billion Rovuma LNG development targets 18 mtpa capacity (Africa Oil & Gas Report, 2024).

In West Africa, the Greater Tortue Ahmeyim (GTA) project on the Senegal-Mauritania maritime border achieved first gas in January 2025 and first LNG exports in April 2025, turning both nations into LNG exporters (African Energy Chamber, 2025). Phase 1 targets 2.3 mtpa, with Phase 2 aiming to add a further 2.5–3.0 mtpa (African Energy Chamber, 2025). Congo LNG, operated by Eni, brought its first floating LNG unit online in early 2024, with a second unit expected by mid-2026, increasing total liquefaction capacity to 3 mtpa (African Energy Chamber, 2025).

Figure 4 provides a comparative overview of major African LNG projects by capacity and development status.

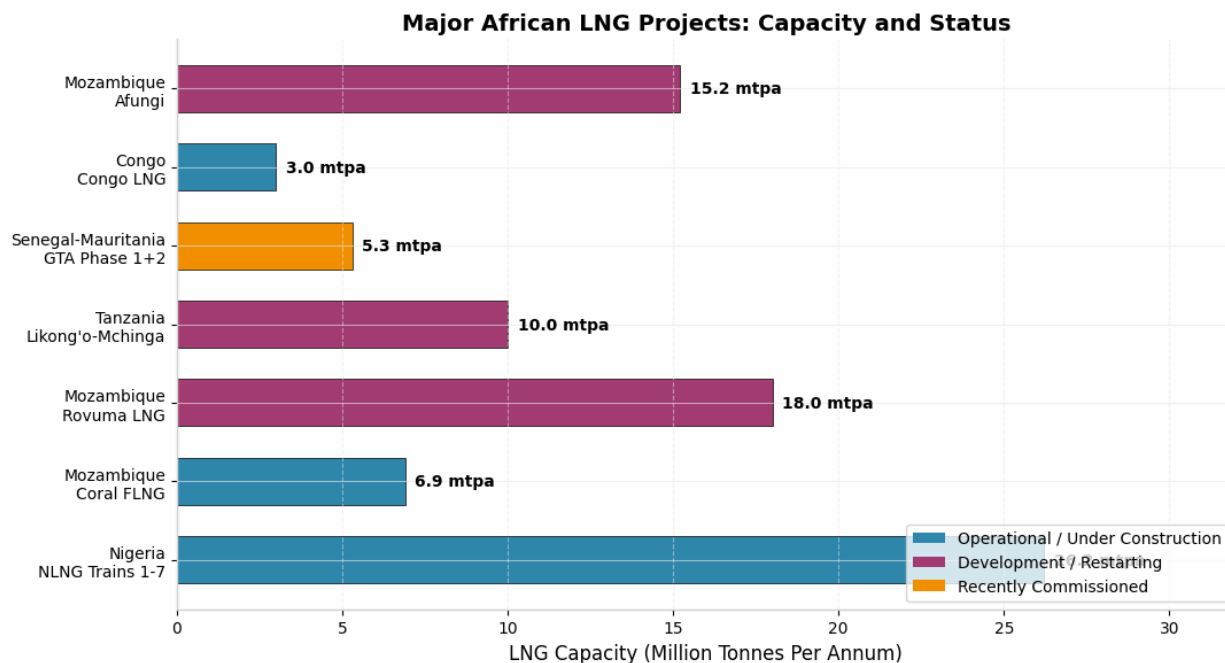


Figure 4. Major African LNG Projects by Capacity and Status. Source: Compiled from African Energy Chamber (2025), Africa Oil & Gas Report (2024), and OilPrice.com (2024).

These projects demonstrate a shift toward modular, phased development, particularly floating LNG (FLNG) technology, that reduces upfront capital requirements and accelerates time-to-market (African Energy Chamber, 2025). For African nations with stranded gas reserves, FLNG offers a viable monetisation pathway without the need for extensive onshore infrastructure (African Energy Chamber, 2025).

ECONOMIC IMPLICATIONS

4.1 Industrial and Manufacturing Development

Strategic gas infrastructure is the sine qua non of industrialisation. The AKK pipeline, for instance, will enable the development of Ajaokuta's steel complex, Kaduna's textile and manufacturing industries, and Kano's processing and packaging sectors, all of which currently suffer from unreliable and expensive energy (The Guardian Nigeria, 2024). The ANOH Gas Processing Plant, a 50/50 joint venture between Seplat Energy and NNPC Gas Infrastructure Company, processes up to 300 million standard cubic feet per day (MMSCFD) of wet gas, producing dry gas, condensate, and LPG (DOA Law, 2025). Mechanically completed in December 2023 and inaugurated in May 2024, the plant supports Nigeria's "Decade of Gas" strategy by providing feedstock for power generation and industrial use (DOA Law, 2025).

Gas-based industries, fertilisers, petrochemicals, methanol, and ceramics, offer high value addition and job creation potential (The Guardian Nigeria, 2024). The Dangote Petroleum Refinery, now fully operational, represents a downstream anchor that will consume significant gas volumes for processing, while the rehabilitation of Port Harcourt, Warri, and Kaduna refineries is expected to enhance domestic crude utilisation and gas demand (DOA Law, 2025).

4.2 Export Earnings and Foreign Exchange

LNG exports remain Nigeria's largest single source of non-oil foreign exchange (Adebayo, 2024). NLNG's six operational trains generate billions of dollars annually, with Train 7 set to add approximately \$1 billion in annual export revenue upon completion (Adebayo, 2024). The broader African LNG export trajectory, with capacity projected to more than double by 2040, positions the continent to capture a growing share of global LNG demand, particularly from European markets seeking to diversify away from Russian supply (African Energy Chamber, 2025).

However, the global LNG market is becoming increasingly competitive. The African Energy Chamber warns that global LNG supply is forecast to increase sharply through 2030, driven by the United States and Qatar, potentially pushing Asian and European benchmark prices down from the \$10–\$13 per MMBtu range seen in 2024–2025 to below \$6 per MMBtu by the late 2020s (African Energy Chamber, 2025). African projects must therefore compete on cost efficiency and reliability while navigating the domestic versus export tension (African Energy Chamber, 2025).

4.3 Reduction of Gas Flaring

Gas flaring has been illegal in Nigeria since 1984 under the Associated Gas Re-injection Act, yet the practice has persisted due to inadequate infrastructure, low

penalty rates, and regulatory enforcement gaps (FIJ Nigeria, 2024). Nigeria is among the world's top nine gas-flaring countries, contributing to approximately 76 per cent of global gas flaring alongside Russia, Iran, Iraq, and Venezuela, despite accounting for only 46 per cent of global oil production (FIJ Nigeria, 2024).

The Nigerian Gas Flare Commercialisation Programme (NGFCP), launched in 2016 and relaunched in 2022, aims to stop gas flaring by implementing gas utilisation projects through third-party investors (FIJ Nigeria, 2024). The Petroleum Industry Act 2021 strengthened this framework by authorising the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) to take gas destined for flaring at flare stacks free of charge, and by introducing the Gas Flaring, Venting and Methane Emissions Regulations (2023) (Veriva Africa, 2024). These regulations mandate operators to develop flare elimination and monetisation plans, maintain detailed emission records, and adopt leak detection strategies (Veriva Africa, 2024).

Despite these measures, progress has been mixed. Nigeria flared approximately 192 million standard cubic feet (MMscf) of gas in 2024, representing 7.69 per cent of produced gas, an increase from 183 MMscf in 2023 (FIJ Nigeria, 2024). Oil companies paid approximately \$646 million in gas-flaring penalties in 2025, the highest recorded in five years (FIJ Nigeria, 2024). The official flare-out target has shifted from 2025 to 2030, reflecting the scale of the challenge (FIJ Nigeria, 2024). The NUPRC's upstream decarbonisation template, made mandatory for all operators seeking licenses and permits from May 2025, represents a more rigorous

enforcement approach (Veriva Africa, 2024). Figure 5 tracks Nigeria's gas flaring volume and penalty trends.

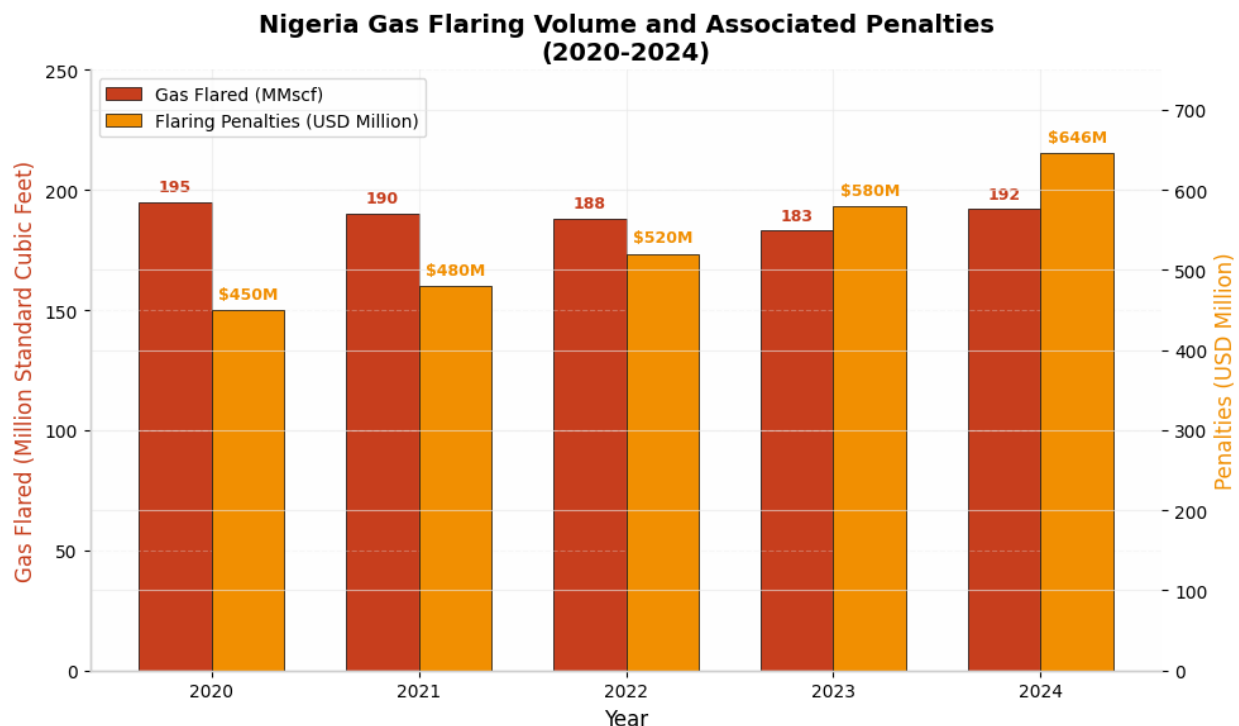


Figure 5. Nigeria Gas Flaring Volume and Associated Penalties, 2020–2024. Source: Compiled from FIJ Nigeria (2024) and Veriva Africa (2024).

4.4 Energy Transition Strategies

Nigeria's energy transition strategy positions natural gas as a "bridge fuel" toward a lower-carbon economy (Veriva Africa, 2024). The National Energy Transition Plan and the Climate Change Act 2021 mandate emission reductions, with Nigeria committing to net-zero emissions by 2060 (Veriva Africa, 2024). The NUPRC's decarbonisation blueprint leverages seven key strategies: using natural

gas as a bridge fuel; zero flaring and methane abatement; carbon market development; technological innovation; operational efficiency; incentive mechanisms; and collaborative risk management (Veriva Africa, 2024).

The promotion of CNG and LPG as cleaner alternatives to petrol, diesel, and biomass for cooking aligns with both environmental and economic objectives (DOA Law, 2025). The Presidential CNG Initiative targets one million vehicle conversions by 2027, while the National Gas Expansion Programme aims to increase LPG penetration for household cooking, addressing the paradox that 67 per cent of Nigerian households still burn firewood despite billion-naira clean cooking targets (DOA Law, 2025).

CHALLENGES AND RISKS

5.1 Infrastructure Financing

Gas infrastructure projects are capital-intensive, long-gestation, and exposed to significant commercial and political risks (The Guardian Nigeria, 2024). The AKK pipeline's experience, where syndicated external loans from China collapsed, forcing NNPC to resort to internal funding, illustrates the fragility of financing arrangements (The Guardian Nigeria, 2024). Contractors operating under milestone-based reimbursement face severe working capital constraints, while international lenders' increasing reluctance to finance fossil fuel projects complicates access to capital (The Guardian Nigeria, 2024).

The World Economic Forum estimates that Nigeria could generate up to \$18.3 billion by leveraging its gas resources during the energy transition, but inadequate infrastructure and limited investments remain critical barriers (Veriva Africa, 2024). Marginal field awardees, particularly new entrants, face financing difficulties as international lenders shift focus from fossil fuels to renewables (Veriva Africa, 2024). Established asset owners with proven reserves and strong financial records are better positioned, while newer entrants may need to rely on equity issuance or technical partnerships (Veriva Africa, 2024).

5.2 Regulatory and Policy Bottlenecks

Despite the PIA 2021's transformative intent, regulatory fragmentation and policy misalignment persist (OAL Law, 2022). The PIA created two new regulatory bodies, the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), but stakeholders report overlapping mandates, bureaucratic delays, and inconsistent policy signals (OAL Law, 2022). The Gas Flaring (Prohibition and Punishment) Bill, introduced in the House of Representatives in 2024 and passed second reading in December 2024, remains stuck at the committee level as of 2026, illustrating legislative inertia (FIJ Nigeria, 2024).

Multiple taxation poses a significant burden. The PIA's fiscal regime imposes Hydrocarbon Tax (HCT) on crude oil, Companies Income Tax (CIT) across the value chain, royalties based on production and price, and various sectoral levies (OAL Law, 2022). Industry stakeholders argue this results in hidden taxation that discourages investment, particularly for indigenous operators and start-ups already facing high operational costs (OAL Law, 2022).

5.3 Pipeline Vandalism and Insecurity

Security remains the most immediate and existential threat to gas infrastructure (The Guardian Nigeria, 2024). The AKK pipeline route through North Central Nigeria has seen repeated attacks on workers, including kidnappings that forced

three-month suspensions of operations (The Guardian Nigeria, 2024). Oilserv's Chairman acknowledged that security protocols have fundamentally altered operations: "You can no longer start at 6 a.m. and go until dusk. Now you must wait for the security forces to clear the site every morning, and you must return before nightfall" (The Guardian Nigeria, 2024). The deployment of over 520 military personnel represents both a necessary response and a significant cost escalation (The Guardian Nigeria, 2024).

The Niger Delta, Nigeria's gas production heartland, has experienced decades of militancy, pipeline sabotage, and crude oil theft (FIJ Nigeria, 2024). While amnesty programmes and community engagement have reduced violence, the underlying grievances, environmental degradation, unemployment, and revenue sharing, remain unresolved (FIJ Nigeria, 2024). Regional LNG projects face similar challenges: TotalEnergies abandoned its Mozambique LNG project for five years due to Islamist insurgency in Cabo Delgado, while security improvements have only recently enabled force majeure lifting (African Energy Chamber, 2025).

5.4 Environmental Concerns

Gas development carries significant environmental risks beyond flaring. Methane, a potent greenhouse gas with 80 times the warming potential of CO₂ over a 20-year period, escapes through venting, fugitive emissions, and incomplete

combustion (Veriva Africa, 2024). The NUPRC's 2022 guidelines for fugitive methane management represent progress, but enforcement remains weak (Veriva Africa, 2024). The construction of pipelines through sensitive ecosystems, rivers, swamps, and forests, risks biodiversity loss and community displacement if not managed with rigorous environmental safeguards (Adebayo, 2024).

The tension between gas as a "bridge fuel" and the global push for renewable energy creates strategic risk (Veriva Africa, 2024). As international climate finance increasingly excludes fossil fuel projects, African nations face difficult choices between immediate development needs and long-term decarbonisation commitments (Veriva Africa, 2024).

5.5 Market Pricing Issues

Domestic gas pricing remains a contentious issue (OAL Law, 2022). The PIA established a Domestic Base Price and pricing framework, but prices are often set below international netback levels to protect domestic consumers and industries (OAL Law, 2022). This pricing gap discourages investment in domestic gas infrastructure, as developers can earn higher returns from LNG exports (OAL Law, 2022). Domestic Market Obligations (DMOs), which require producers to allocate a portion of supply to the local market, introduce counterparty and pricing risks that complicate project financing (OAL Law, 2022).

The gas-to-power sector faces a related challenge: electricity tariffs in Nigeria remain below cost-recovery levels, creating a vicious cycle where distribution companies (DisCos) cannot pay generating companies (GenCos), who in turn cannot pay gas suppliers (World Bank, 2024). The National Energy Compact acknowledges this liquidity crisis and proposes quarterly tariff adjustments toward cost reflectivity, but political resistance to tariff increases remains fierce (World Bank, 2024).

5.6 Operational Sustainability

Beyond construction, the operational sustainability of gas infrastructure depends on maintenance culture, technical capacity, and institutional resilience (The Guardian Nigeria, 2024). Nigeria's history of poorly maintained public infrastructure raises legitimate concerns about the long-term viability of new pipelines and processing plants (The Guardian Nigeria, 2024). The transition from project construction to commercial operation requires skilled personnel, robust maintenance regimes, and reliable supply chains, areas where Nigeria continues to build capacity (The Guardian Nigeria, 2024).

LESSONS LEARNED

6.1 Phased Development Reduces Risk

The success of FLNG projects, Coral South in Mozambique, Congo LNG, and Greater Tortue Ahmeyim, demonstrates that modular, phased development can reduce capital exposure and accelerate revenue generation (African Energy Chamber, 2025). Rather than betting billions on large onshore liquefaction facilities, developers can prove reserves, establish operational track records, and secure financing for expansion on improved terms (African Energy Chamber, 2025). Nigeria's shelved NLNG Trains 8–12 and the pivot toward smaller-scale projects like the 2.8 mtpa FLNG project anticipated by 2028 reflect this learning (Adebayo, 2024).

6.2 Security is a Prerequisite, Not an Afterthought

The AKK pipeline's experience demonstrates that security planning must be integrated into project design from inception, not added as a reactive measure (The Guardian Nigeria, 2024). The deployment of military personnel, community engagement, and local security partnerships have enabled progress, but at significant cost and schedule impact (The Guardian Nigeria, 2024). Future projects must incorporate security risk assessments, community benefit-sharing agreements, and early stakeholder engagement as standard practice (The Guardian Nigeria, 2024).

6.3 Domestic and Export Markets Must be Balanced

The tension between LNG exports and domestic supply is not unique to Nigeria, but it is particularly acute given the country's energy poverty and industrialisation needs (Adebayo, 2024). Regional projects like Senegal's GTA incorporate Domestic Market Obligations (DMOs) that allocate gas for local power generation, but these must be priced attractively enough to incentivise developer participation while remaining affordable for domestic consumers (African Energy Chamber, 2025). Innovative financing structures, such as blended finance, carbon credits, and development guarantees, may help bridge this gap (Veriva Africa, 2024).

6.4 Regulatory Certainty Drives Investment

The surge in Nigeria's gas sector investment in 2024, over \$5 billion, coincided with executive orders and PIA implementation that reduced regulatory uncertainty (News Central TV, 2024). However, the persistence of legislative bottlenecks (such as the stalled Gas Flaring Bill), multiple taxation, and inconsistent enforcement undermines this progress (FIJ Nigeria, 2024; OAL Law, 2022). Investors require predictable, transparent, and stable regulatory frameworks as a precondition for long-term capital commitment (OAL Law, 2022).

6.5 Local Content and Capacity Building are Essential

The AKK pipeline's reliance on indigenous contractor Oilserv demonstrates that local capacity exists and can deliver world-class results under challenging conditions (The Guardian Nigeria, 2024). However, the broader ecosystem, technical training, supply chain development, and financing access for indigenous firms, requires sustained investment (The Guardian Nigeria, 2024). The Nigerian Content Development and Monitoring Board (NCDMB) has made progress, but gaps remain in engineering design, project management, and specialised technical services (The Guardian Nigeria, 2024).

POLICY RECOMMENDATIONS

7.1 Accelerate Pipeline Completion and Network Integration

The federal government should prioritise the completion of the OB3 and AKK pipelines as national strategic imperatives, with dedicated security task forces, streamlined financing mechanisms, and clear accountability metrics (Adebayo, 2024; The Guardian Nigeria, 2024). Upon completion, the focus must shift to last-mile distribution networks that connect industrial clusters, power plants, and urban centres to the national backbone (Adebayo, 2024).

7.2 Reform Gas Pricing and Market Structures

The NMDPRA should implement a more dynamic gas pricing framework that balances affordability with investment incentives (OAL Law, 2022). This could include tiered pricing for different consumer categories, indexed pricing that adjusts with international benchmarks, and targeted subsidies for vulnerable households rather than blanket price controls (OAL Law, 2022). The transition to bilateral contracts between generators and industrial consumers, as piloted in the "Light Up Nigeria" initiative, should be expanded (DOA Law, 2025).

7.3 Strengthen Flare Elimination Enforcement

The NUPRC should enforce the upstream decarbonisation template rigorously, with transparent reporting, meaningful penalties, and public disclosure of flare

data (Veriva Africa, 2024). The Gas Flare Commercialisation Programme should be fast-tracked with streamlined bidding processes, standardised commercial frameworks, and government guarantees to de-risk third-party investments (FIJ Nigeria, 2024). The flare-out target should be backed by legislation with mandatory timelines, not aspirational deadlines (FIJ Nigeria, 2024).

7.4 Enhance Security Architecture

A comprehensive security framework for critical energy infrastructure should be developed, incorporating military protection, community policing, technology (drones, sensors, satellite monitoring), and socio-economic programmes that address root causes of militancy and vandalism (The Guardian Nigeria, 2024). The cost of security should be factored into project economics from the outset (The Guardian Nigeria, 2024).

7.5 Deepen Regional Cooperation

Nigeria should leverage its position as a regional energy hub to develop cross-border gas pipelines, such as the proposed Nigeria-Morocco Gas Pipeline, and regional power pools that enable gas-to-power optimisation across West Africa (African Energy Chamber, 2025). The West African Power Pool (WAPP) provides an institutional framework, but implementation has lagged (African Energy

Chamber, 2025). Accelerated regional integration would create larger markets, improve load factors, and attract investment (African Energy Chamber, 2025).

7.6 Align Gas Strategy with Industrial Policy

Gas infrastructure planning should be explicitly linked to industrialisation targets (The Guardian Nigeria, 2024). The Ministry of Petroleum Resources, Ministry of Industry, Trade and Investment, and state governments should coordinate to identify anchor industrial consumers, reserve gas allocations, and co-locate gas infrastructure with industrial zones (The Guardian Nigeria, 2024). Special Economic Zones (SEZs) with dedicated gas supply, such as the Aba IPP model, should be replicated nationwide (DOA Law, 2025).

7.7 Build Carbon Market Infrastructure

Nigeria should develop a domestic carbon market that monetises methane reduction, flare elimination, and energy efficiency improvements (Veriva Africa, 2024). Carbon credits generated from gas projects could provide additional revenue streams, attract climate finance, and align gas development with international climate commitments (Veriva Africa, 2024). The Climate Change Act 2021 provides a legal basis; implementation requires institutional capacity and market infrastructure (Veriva Africa, 2024).

8. Conclusion

Natural gas represents Africa's most significant near-term opportunity to address energy poverty, drive industrialisation, and participate in global energy markets (African Energy Chamber, 2025). Nigeria, with its vast reserves, established LNG infrastructure, and strategic location, is uniquely positioned to lead this transformation (Adebayo, 2024). The OB3 and AKK pipelines, NLNG Train 7, domestic utilisation programmes, and gas-to-power initiatives collectively constitute a comprehensive strategy to monetise gas resources for national development (Adebayo, 2024; The Guardian Nigeria, 2024; DOA Law, 2025).

Yet the path from potential to prosperity is strewn with obstacles. Infrastructure financing remains precarious, regulatory frameworks require further refinement, security threats demand constant vigilance, and environmental responsibilities must be rigorously upheld (The Guardian Nigeria, 2024; OAL Law, 2022; Veriva Africa, 2024). The experience of the AKK pipeline, where indigenous contractors, innovative engineering, and determined government commitment have advanced a project through terrain and security challenges once deemed insurmountable, offers a template for what is possible (The Guardian Nigeria, 2024). Equally, the persistent failure to eliminate gas flaring, despite four decades of legislation and multiple missed deadlines, serves as a cautionary tale about the gap between policy ambition and implementation (FIJ Nigeria, 2024).

The broader African context, Mozambique's resurgent LNG sector, Senegal and Mauritania's emergence as exporters, Tanzania's pending mega-projects, demonstrates that the continent is entering a new era of gas development (African Energy Chamber, 2025; Africa Oil & Gas Report, 2024). Success will depend on learning from past failures, adapting global best practices to local contexts, and maintaining the political will to see long-term projects through to completion (African Energy Chamber, 2025).

For policymakers, the imperative is clear: create enabling environments that attract investment while protecting public interest (OAL Law, 2022). For investors, the opportunity is substantial: a continent with 550 tcf of undeveloped gas, growing energy demand, and improving project economics (African Energy Chamber, 2025). For African citizens, the stakes are existential: reliable energy for homes, power for industries, and revenues for public services (World Bank, 2024). The strategic development and monetisation of natural gas is not merely an energy policy choice; it is an economic development imperative that will shape Africa's trajectory for generations to come.

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