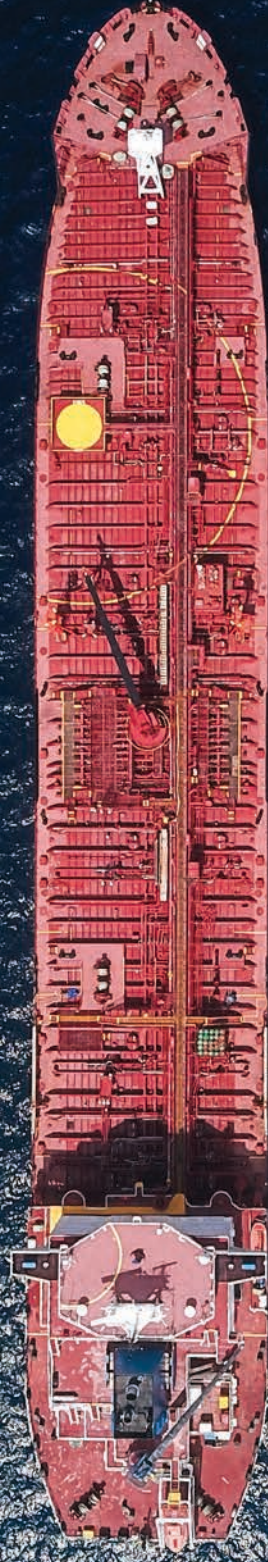


# AFRICA **ENERGY** OUTLOOK

# 2020



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AFRICA  
**ENERGY**  
OUTLOOK

**2020**

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# REVIEW 2019

## Leadership for Transition

**NJ AYUK**  
EXECUTIVE CHAIRMAN  
AFRICAN ENERGY CHAMBER

### Dear Reader,

The global energy industry is going through an important period of transition.

We are witnessing a necessary, gradual shift toward sustainable energy resources. The United States is exporting its shale revolution. Trade patterns between the lynchpins of the global economy – in the U.S., Europe and China – are shifting as businesses adapt to ongoing trade disputes. And, here in Africa, a growing imperative to ensure that natural resources deliver economic uplift for host countries and local communities.

These factors present challenges and significant opportunities for our industry.

History teaches us a lot about transition. In the case of the energy industry, Africa's history dates back to Colonial times, where a nascent coal industry powered the transport of mineral resources, via rail, from the interior to the Atlantic and on to global markets.

Oil exploration came to Africa not long after the first modern oil wells were drilled in the U.S. But a century of exploration and production has not come close to exhausting the potential of this last remaining hydrocarbons frontier. The opportunity is vast: Africa possesses 7.5 percent and 7.1 percent of global oil and gas reserves, respectively, and upstream investment is forecast to grow at a CAGR of 18 percent between 2018 and 2030, well above PWC's global medium-term forecast of 6 percent.

Today we see new markets emerging and growing global demand. World-class discoveries in Mauritania and Senegal are propelling interest in the MSGBC basin; Chad is succeeding in attracting investment across the petroleum value chain; Kenya is our newest oil exporters; and Mozambique will likely be a top-5 gas producer in the next five years.

Energy transitions are seldom just about economics, engineering, or science. A strong and fit oil and gas sector will be one which faces the next phase of transition holistically, head-on and in unison. The Africa Energy Chamber works to build essential bridges of dialogue, trust and value between stakeholders in the industry, including energy firms, government and local communities.

At such a pivotal moment of transition, leadership and initiative are required to position African businesses and their communities at the heart of the extraordinary development which the energy industry promises to deliver over the next decade.

This report is part of that effort. We are providing a comprehensive look at the oil and gas sector across sub-Saharan Africa, with a focus on key strategic and operational developments in the industry for 2020 as well as identifying opportunities for investment.

Whether you represent an energy firm, government, investment vehicle or you're simply interested in African oil and gas, we look forward to you welcoming you into our network and empowering you to push this tremendous industry forward in 2020.

**Thank you.**

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BUSINESS  
**ENVIRONMENT**

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## Introduction

### Africa's Proven Reserves



125 billion barrels of oil

7.3% of global reserves



509 tcf of gas

7.2% of global reserves

Source: BP Statistical Review 2019

#### THE MID-2014 TO 2017 OIL PRICE CRASH SIGNIFICANTLY IMPACTED AFRICA'S OIL AND GAS SECTOR.

Tough economic conditions, as well as political instability, regulatory uncertainty and inadequate infrastructure to evacuate products to market meant that several oil and gas projects were either halted or cancelled. The downturn also had a severe impact on oil-dependent economies – including Nigeria, Angola and Equatorial Guinea – which have experienced slower economic growth and tightening government revenues.

As we look toward 2020, however, the view is very different. International oil companies (IOCs) and African national oil companies (NOCs) are adapting to the lower price environment and remain buoyed by the recent recovery in oil prices. Africa holds significant potential for international investors. At the end of 2018, the continent was estimated to have 509.6 trillion cubic feet (Tcf) of proven gas reserves and 125.3 billion barrels of proven oil reserves<sup>1</sup>. Africa's downstream sector, which has also remained stagnant in recent years, is recovering with new

refinery and petrochemicals complexes being constructed and upgrades to existing ones scheduled in the near term.

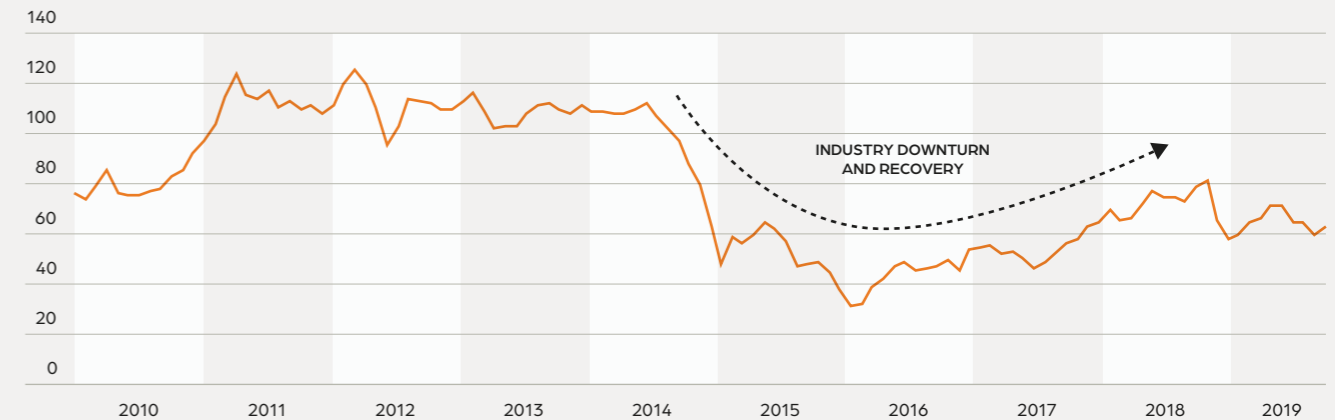
Several African governments are working to improve their upside by providing more attractive fiscal incentives as well as utilising new ways of working to reduce costs and increase productivity. There are multiple new projects which have attracted major investment from NOCs, IOCs and, most recently, global infrastructure financiers interested in mid-stream and downstream infrastructures such as pipelines, storage terminals, gas-to-power initiatives and petrochemicals.

This section of the report provides an outlook on sub-Saharan Africa's oil and gas business environment in 2020 and beyond. It begins with analyses of global energy market conditions in 2019 and their impact on African producers in 2020, provided by Dr Theophilus Acheampong. This is followed by analysis of the key strategic issues that are likely to shape Africa's energy sector in 2020 as well as a look at key developments in the areas of regulation, infrastructure and finance.

1. BP Statistical Review 2019

## Energy Markets – Oil

### Europe Brent Spot Price FOB Dollars per Barrel



Source: U.S. EIA, Thomson Reuters

#### U.S. SHAPES SUPPLY AND DEMAND

Several key market trends have emerged since the price recovery. The first is the United States becoming a net exporter of crude oil and products. IEA forecasts show that gross U.S. oil exports are poised to overtake Russia and close in on Saudi Arabia by 2024. Shale producers are now able to respond more swiftly to price signals than other suppliers, meaning that further price rises could lead to even higher levels of U.S. supply. Equally important, however, is the increasing supply growth from non-OPEC producers like Brazil, Canada, and Norway, as OPEC capacity declines.

On the demand side, economic growth in China and India, along with the growing importance of petrochemicals, will remain key market drivers in 2020. Notwithstanding this, overall demand growth is expected to decline moderately over the coming years due to the impact of ongoing U.S.-EU and U.S.-China trade disputes.

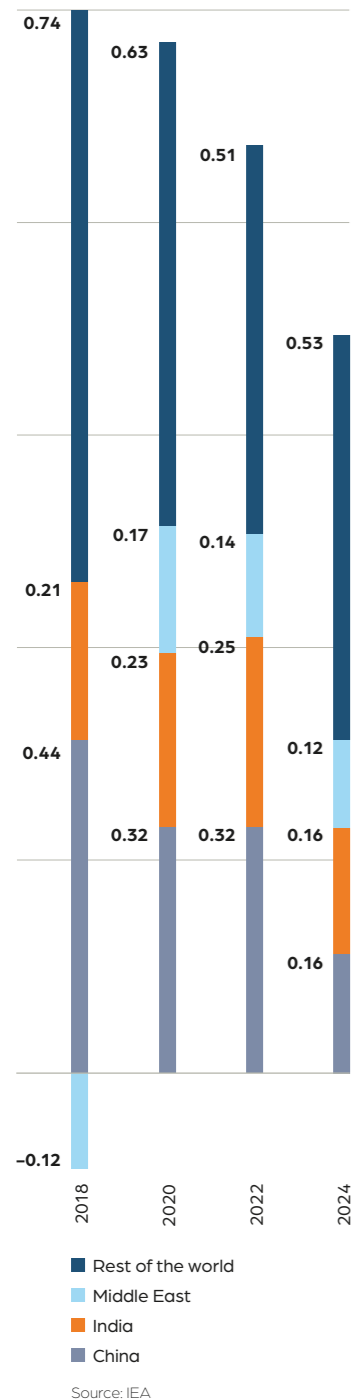
#### PRICE RECOVERY CONTINUES

The recovery in oil prices was sustained throughout 2019 and is expected to be maintained in 2020, with forecasts around the \$60-70 per barrel range, which is consistent with long-term average prices. Brent crude oil prices have averaged \$65.67 per barrel year-to-date, a 31 percent increment over the 2015-17 average price of \$51.03 per barrel. At the same time, global oil demand increased by an estimated 1.8 percent in 2018, driven by strong growth in the United States and China, according to the International Energy Agency (IEA). To meet this demand, there has been a 3.43 percent increase in global oil production from 97.09 million barrels per day (mmb/d) to 100.40 mmb/d from 2015 to 2018, driven primarily by increased U.S. shale production.



**DR THEOPHILUS ACHEAMPONG**  
PETROLEUM ECONOMIST AND POLITICAL RISK ANALYST WITH EXTENSIVE KNOWLEDGE AND EXPERIENCE IN STRATEGIC ADVISORY, REGULATORY AND COMMERCIAL ISSUES IN OIL AND GAS, ENERGY AND MINING. HE IS BASED IN ABERDEEN, SCOTLAND.

Global Oil Demand Growth (mmb/d)

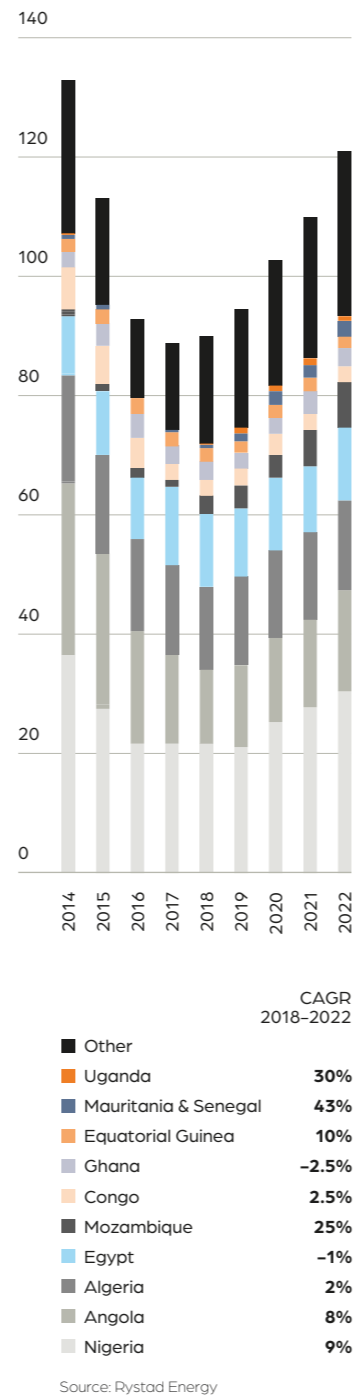


**GLOBAL IMPACT ON SUB-SAHARAN AFRICA**

Beyond commodities prices, there are several factors which are currently shaping the global oil and gas business environment. Most notably, these include the transition to low-carbon future (including the use of natural gas as a transition fuel) underpinned by the Paris Climate Agreement and a sharp focus on efficiencies and cost reduction across the industry, from operators to suppliers. These complex conditions impose constraints on energy firms which require continued capital rationing. In this context, although Africa's diverse energy industry possesses an array of investment opportunities across the value chain, these fundamental global challenges are likely to impact sectoral investments in 2020 and beyond.

Africa's energy landscape is dominated by large IOCs. Thus, their strategic decision-making on the continent is shaped by global developments. While some IOCs are pulling back from the continent (for example, Occidental divesting Anadarko's African assets following a \$38 billion takeover), expect to see the strengthening of strategic alliances between smaller and larger IOC to enhance project viability and competitiveness. One such example is the agreement between U.S. firm Kosmos Energy and Shell to cooperate in offshore projects in Namibia, São Tomé and Príncipe.

African E&P expenditure by country (Billion USD)



**EXPLORING SMALLER MARKETS**

Smaller countries in east and west Africa are likely to drive the exploration and development of new fields in 2020 and beyond. Examples of such projects include Senegal's SNE field development by Woodside Energy and Cairn Energy and the Lokichar Basin project in Kenya by Tullow Oil. Deepwater drilling is likely to continue into 2020 in Africa's frontier regions such as Senegal, Mauritania, Namibia and South Africa as well as in more established markets such as Nigeria, Angola and Ghana. Likewise, several countries, including Congo Brazzaville, Ghana, Gabon and Nigeria, are expected to auction new blocks in year-long licensing rounds.

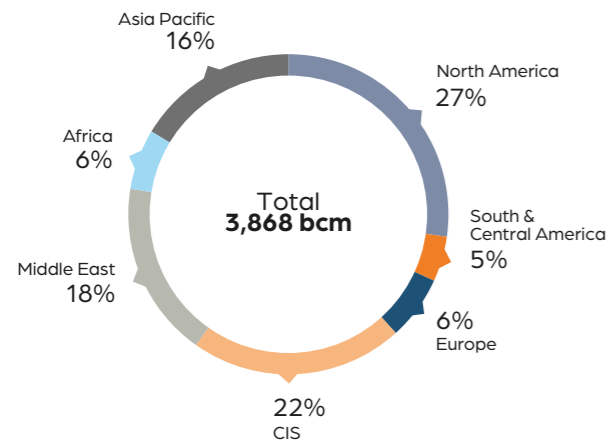
**\$6.1 billion**  
**in CAPEX for Nigerian upstream oil projects currently under development – 35% of SSA total**

(Global Data)

Nigeria will lead the way in terms of upstream expenditure as the continent's largest producer. According to analysis from Global Data, there are currently nine oil projects across SSA which have reached FID; they have a combined total CAPEX value of \$17 billion. Five of them are in Nigeria with a total CAPEX value of \$6.1 billion.

# Energy Markets – Gas

Global Natural Gas Production 2018 (bcm)



Source: BP Statistical Review 2019

## GAS GROWS AND GROWS

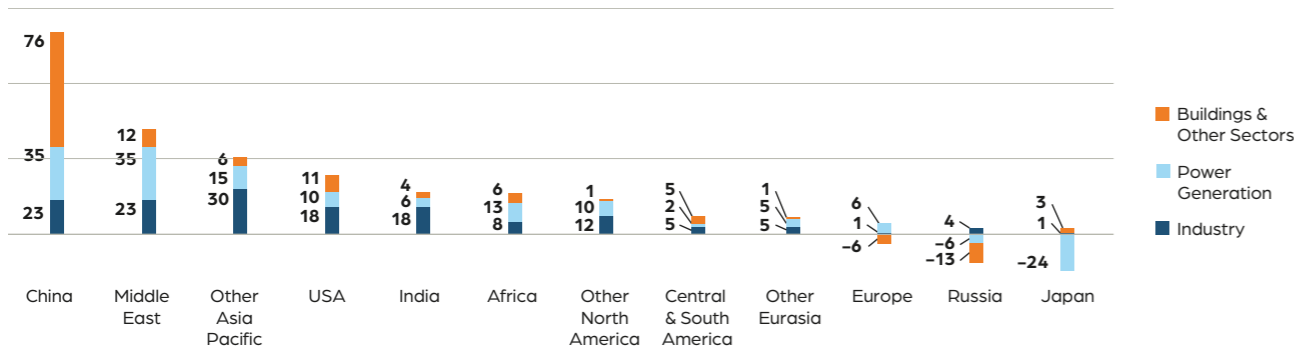
The natural gas market has been growing at its fastest rate over the last decade and is expected to remain as the fastest-growing fossil fuel well into the next decade. Natural gas is widely recognised as a critical transition fuel toward a

low carbon energy future, including by the Intergovernmental Panel on Climate Change. Global demand for gas has increased at an average of 2 percent per annum since 2010, twice the global primary energy demand rate, according to the International Gas Union (IGU).

## Chinese demand for natural gas will increase by 134 bcm by 2024 (IEA)

This growth is driven by booming markets in the United States, China and other emerging markets in Asia. Along with increasing European gas imports, LNG markets are set to grow in 2020 and undergo drastic changes over the next five years as China and India emerge as major LNG buyers, according to IEA estimates. The Asia Pacific region is expected to account for almost 60 percent of total consumption increase by 2024. According to the IGU, China's clean air policies have prompted a move away from coal, making it the fastest-growing market for natural gas. Similarly, across the globe, expect to see the expansion of carbon pricing policies and other initiatives that will encourage the development of low-carbon gas technologies, such as carbon capture utilisation and storage, and hydrogen fuels.

World natural gas consumption growth for selected countries and regions, 2018–2024 (bcm)



Source: IEA

## PRICE CONVERGENCE

These developments mean that gas prices will continue to converge and likely fall at key regional hubs in Europe, North America and Asia, driven by lower project costs and greater efficiencies in shipping. Spot prices since late 2018 at key hubs have fallen in part due to LNG market oversupply as well as new technologies and innovations bringing down project breakeven costs. This trend is expected to continue in 2020.

**70% of global proven gas reserves are recoverable at average breakeven price of <\$3 per MMBtu (IEA)**

## AFRICAN OUTLOOK

There is a promising outlook for the African gas sector. The urgent need for rapid industrialisation will create tremendous opportunities for gas to fuel African societies in a more cost effective and environmentally sustainable manner. Large population increases, particularly in gas producing countries such as Egypt, Nigeria and Ghana, will be one of the critical drivers for African gas demand growth. According to PWC estimates, Africa's energy demands will grow by 60 percent by 2030. The rapid development of projects in Egypt (Zohr Field) and Mozambique (Coral South) demonstrates the outstanding potential for new gas reserves to power industrial growth.

Several countries are restructuring their energy policies to provide more incentives to develop domestic gas reserves (associated and non-associated) to provide fuel for thermal generation and other industrial uses, such as petrochemicals. Significant attention is also likely to be placed on gas-to-power initiatives to meet increasing electricity demand while also reducing gas flaring, especially in Nigeria. The continent is likely to see the emergence of regional hubs and markets with the strategic ambition of procuring LNG imports for gas-to-power projects to replace expensive liquid fuels. Equatorial Guinea's LNG2Africa initiative is an example of this.

SSA Gas Supply-Demand Balance 2017 (bcm)

COUNTRY	WHOLESALE PRICE (\$/MMBTU)	CONSUMPTION	PRODUCTION	PIPE IMPORTS	LNG EXPORTS
Ghana	8,65	0,980	0,652	0,330	-
Benin	8,30	0,044	-	0,044	-
Togo	8,30	0,040	-	0,040	-
South Africa	6,41	5,411	1,126	4,440	-
Ivory Coast	5,90	2,352	0,259	-	-
Cameroon	3,89	0,545	0,545	-	-
Tanzania	3,43	0,848	0,848	-	-
Nigeria	3,08	12,135	43,019	-	30,51
Mozambique	1,66	0,745	4,912	-	-
Gabon	0,80	0,448	0,551	-	-
Equatorial Guinea	0,25	1,200	6,000	-	4,454

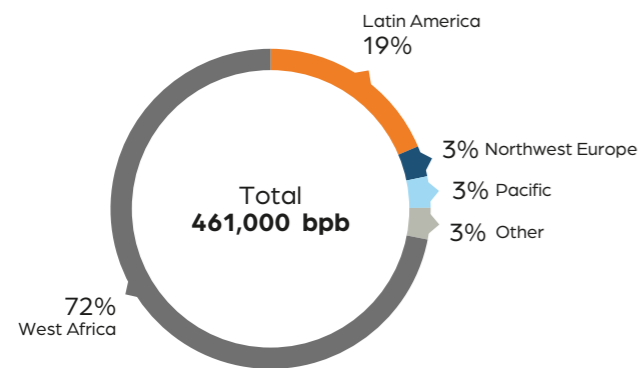
Source: Oxford Institute for Energy Studies (2019)<sup>2</sup>

2. Retrieved from <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2019/01/Opportunities-for-Gas-in-Sub-Saharan-Africa-Insight-44.pdf>



# Strategic Outlook

2019 Heavy Sweet Crude Exports by Load Region (kbd)



Source: Clipper Data

**ENERGY SUPPLY AND DEMAND ARE INTIMATELY LINKED TO THE SHIFTING SANDS OF GLOBAL AND REGIONAL STRATEGIC TRENDS. THIS SECTION PROVIDES AN OUTLOOK ON THE KEY ISSUES INFLUENCING AFRICAN PRODUCERS IN 2020, WITH AN INTERACTIVE LANDSCAPE OF THREATS AND OPPORTUNITIES.**

## IMO 2020 TO BOOST WEST AFRICA

From January 2020, the International Maritime Organisation will implement new regulations that require the shipping industry to use marine fuels with a sulphur content of no more than 0.50 percent. The marine sector

is responsible for half of global fuel oil demand – equivalent to 3.8 million barrels per day in 2017<sup>3</sup>. Thus, the regulation change is having a major impact on refineries and a significant knock-on effect on demand and prices for heavy sweet crude oil grades that are ideal for producing IMO-compliant bunker fuels.

West African producers are very well placed to benefit from the rule change. According to ClipperData, around 75 percent of global heavy sweet crude is produced in the region, with Chad (Doba Blend), Cameroon (Lokele) and Angola (Dalia) accounting for more than 90 percent of that supply. Prices for these grades have been trading at a premium of up to \$3 on dated Brent in August<sup>4</sup>.

Demand for Angolan crude has picked up in 2019, particularly from Chinese refiners. Data from IHS Markit shows an 8 percent year-on-year increase in Angolan exports to China for the period January to July with especial interest in the Cabinda, Mondo and Saturno grades, though overall Angolan market share in China is being squeezed by Saudi Arabia<sup>5</sup>. U.S. sanctions on Venezuelan and Iranian crude exports have also benefited the west African nation.

## TRADE WAR OPENS DOOR

As in 2019, the global economic picture looks uncertain as the United States' trade disputes with China and the EU take their toll. The IEA has cut its forecast for global oil demand growth by 0.1 million barrels per day to 1.3 million in 2020. Tit-for-tat tariffs have hurt China, where economic data shows signs of slowing growth, which could have a direct impact on demand for African crude.

Notwithstanding this risk, however, China's trade war with the U.S. is also creating opportunities for African producers to replace U.S. oil exports, which have fallen dramatically following the introduction of tariffs. Data from U.S. EIA shows that exports of crude and petroleum products have fallen by more than 60 percent year-on-year in the period from January to July. At the same time, in October 2018 Chinese refiners bought around 1.71 million barrels of west African crude per day, the highest level since 2011 – demand across the Asia region has been increasing<sup>6</sup>.

3. Wood Mackenzie  
4. Reuters – August 2019  
5. IHS Markit – August 2019  
6. Bloomberg – October 2018

U.S Crude & Petroleum Products Exports to Chia (thousand barrels)



Source: U.S. EIA

## DAWN OF AFCFTA

In July, Nigeria formally joined the African Continental Free Trade Area paving the way for the creation of the world's largest free trade area. The agreement will be a major facilitator for increasing intraregional trade. Just 16 percent of international trade by African countries takes place between African countries, according to research by the African Development Bank. The new agreement will reduce trade barriers. The African Union estimates that this will boost intra-African trade by 60 percent within three years<sup>7</sup>.

Mineral products, chemicals, machinery and transportation currently dominate intra-African trade. Increased trade and industrial activity will have a knock-on effect on energy demand, particularly for power generation purposes. This trend could provide the necessary momentum and cooperative outlook to spur investment in transnational midstream gas infrastructure to facilitate cheaper power generation across Africa. Initiatives like Equatorial Guinea's African LNG network and the proposed Trans-Saharan Gas

7. BBC News – July 2019  
8. S&P Global Platts – August 2019

Pipeline could become more viable in a more economically interlinked Africa.

## SECURING ENERGY INFRASTRUCTURE

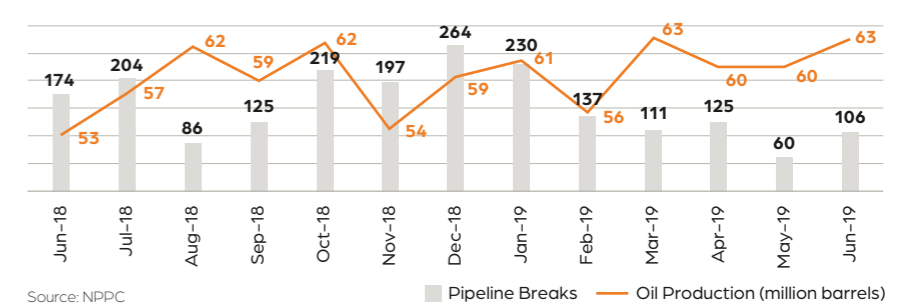
September's drone attack on a Saudi Aramco facility and its impact on global oil prices underscored the relentless challenge of securing energy infrastructure. Producers throughout the Sahel are well accustomed to this reality, with a diverse range of threats affecting the region, from vandalism in the Niger Delta to violent unrest in Libya and community disputes in Kenya.

Senior IHS Markit Country Risk Analyst Dr Theo Acheampong argues that piracy is a major concern

heading into 2020. "Piracy in the Gulf of Guinea and Somalia pose more immediate risks to the sector compared to Islamic Terrorism." However, he also contends that both energy companies and government are working effectively to mitigate the impact on supply. "Governments are resourcing their navies and adopting a regional approach to the issues," he says.

In Nigeria, NNPC's most recent data shows a 77 percent increase in pipeline sabotage incidents between May and June 2019. According to S&P Global Platts, in August, Paul McGrath, Chairman of the Oil Producers' Trade Group of the Lagos Chamber of Commerce of Commerce and Industry, told fellow industry professionals that high security costs are "escalating as peculiarities of the business environment require additional resources be deployed to secure our people and assets."<sup>8</sup> NNPC officials say they are working closely with the government and relevant security agencies to prevent further rises. Despite the spike in incidents, however, total monthly production increased by 2.7 million barrels during the May to June period.

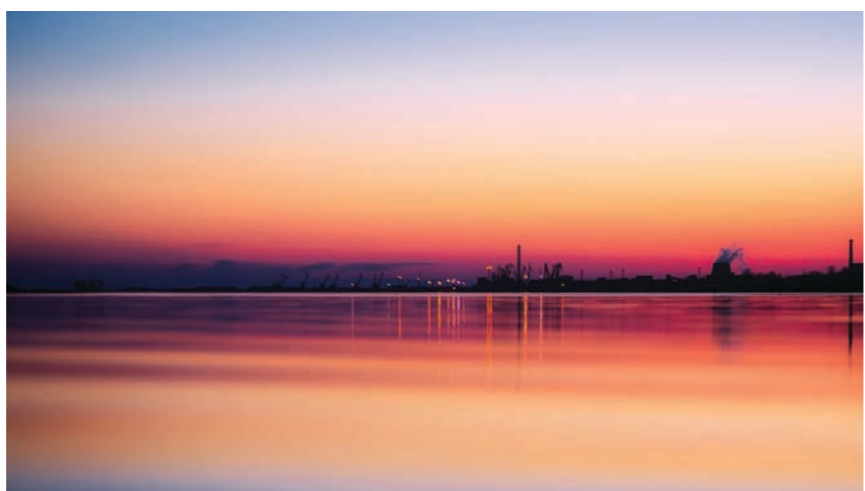
Nigeria Pipeline Breaks and Total Montly Crude & Condensate Production (million barrels)



Source: NNPC

## Regulatory Outlook

WITH PROFITABILITY SQUEEZED BY LOWER PRICES, GOVERNMENTS HAVE RECOGNISED THE IMPORTANCE OF PROVIDING INVESTORS WITH A STABLE AND COMPETITIVE REGULATORY ENVIRONMENT COMBINED WITH EFFICIENT MARKET OVERSIGHT. FROM MAJOR PRODUCERS TO FRONTIER MARKETS, SYSTEMATIC REFORMS ARE RE-SHAPING AFRICA'S ENERGY SECTOR FOR 2020 AND BEYOND.



### PETROLEUM BILL GAINS MOMENTUM

In Nigeria, focus remains on implementing the Petroleum Industry Bill (PIB). Multiple versions of the bill have been developed and abandoned since 2008. However, it has now been disaggregated into four parts, including a Petroleum Industry Fiscal Bill [PIFB]. In July, Ahmed Lawan, the new senate president, promised that senate committees would re-start consultation work on the PIB before the end of the year. Following the February election, President Buhari's

**Following the election, President Buhari now has key allies in place to help deliver the PIB in 2020.**

allies have assumed leadership of both the Senate and House of Representatives. Mele Kyari, Managing Director of NNPC, believes that this political alignment ensures that passing the PIB "will not be difficult," according to a recent Reuters interview.<sup>9</sup>

IOCs will be paying special attention to the final provisions of the PIFB, specifically tax credits and allowances for exploration investment. Analysis from KPMG shows that replacing investment tax credits with a graduated production allowance would lead to a significant increase in the short-run tax liabilities of E&P companies, especially those with large deep-water acreage. Furthermore, they point out that incentives related to upstream gas

operations are less generous in the new fiscal bill<sup>10</sup>.

### BRULPADDA TO SPARK REFORM IN SA?

Systematic reform is also on the agenda in South Africa following Total's Brulpadda offshore gas discovery in February. Industry watchers from law firm Herbert Smith Freehills point out that oil and gas are currently regulated by the same legislation used for the mining sector<sup>11</sup>. They argue that a new legislative framework is necessary and should focus on providing greater transparency, especially in the licencing regime. In August 2018, the government stated its intention to develop a separate legal framework for the hydrocarbons sector, following consultations with industry. As Total

moves ahead with a potential billion-barrel play, the need for regulatory clarity will only grow.

### ANPG TAKES CONTROL

In Angola, 2020 will see President Lourenço's energetic reform agenda move into a new implementation phase. The National Agency for Petroleum, Gas and Biofuels (ANPG) was created in December 2018 to take over SONANGL's mission as market regulator. In a recent interview with The Oil and Gas Year, Paulino Jerónimo (CEO of ANPG) said that his organisation would be focusing on "optimisation" throughout 2020<sup>12</sup>. That will include offering ten blocks in the Congo and Cuanza basins through public tender as well as taking on new responsibilities, such as managing abandonment funds.

### FRONTIER MARKETS REFORMED AND READY

Frontier countries, like Senegal, Benin and Cameroon, have already implemented structural reforms in 2018/19 which they hope will attract new investment in 2020. Benin has seen very little exploration activity in recent years. In January, it adopted a new petroleum code which, among other things, provides a research authorisation period of up to 11 years.

Senegal also implemented

### Senegal, Benin, Cameroon & Gabon have all reformed their hydrocarbons codes since 2018

substantial reforms of its hydrocarbons code in January. The new code promotes public interest in the sector, with increased participation rights for the NOC, higher royalty rates, and provisions to grant exploration rights exclusively to Senegalese-incorporated entities. A new campaign to promote offshore exploration blocks available for tender is expected in 2020.

Gabon is a more established market but there has been virtually no new investment since 2014. In July, the country enacted significant reforms to the fiscal code, including eliminating corporate tax and reducing state profit and royalties. And in August, Malaysia's Petronas acquired the first exploration licence awarded in the country for five years (offshore Blocks F12 and F13), which have the potential to increase output by 200,000bpd, according to

government estimates<sup>13</sup>. Bloomberg reports that Gabon currently has 35 oil blocks available for tender<sup>14</sup>.

### LOCALISATION AGENDA

Many countries have also focused on introducing more robust local content policies. Senegal, Gabon, Senegal, Cameroon and Equatorial Guinea have all taken important action in this area. South Sudan could be next. In June South Africa-based Centurion Law Group led a review of its localisation policies, with a view to replicating regional best practice. And in Nigeria, Simbi Wabote (Executive Secretary of the Nigerian Content Development & Monitoring Board) is pushing to expand the Local Content Act into new sectors of the economy, including power, construction and ICT, which could affect businesses further down the hydrocarbons value chain<sup>15</sup>.

9. Reuters – August 2019

10. Bloomberg Tax – June 2019 (Ayo Luqman Salami & Funke Oladoko, KPMG)

11. Herbert Smith Freehills – June 2019 (Peter Leon, Paul Morton and Patrick Leyden)

12. TOGY – August 2019

13. Bloomberg Tax – June 2019 (Ayo Luqman Salami & Funke Oladoko, KPMG)

14. Herbert Smith Freehills – June 2019 (Peter Leon, Paul Morton and Patrick Leyden)

15. The Guardian (Nigeria) – August 2019



## Finance & Trading

THERE HAS BEEN A LOW LEVEL OF UPSTREAM MERGERS AND ACQUISITION (M&A) ACTIVITY ACROSS THE AFRICAN OIL AND GAS SECTOR SINCE THE OIL PRICE DOWNTURN. ACCORDING TO DATA FROM RYSTAD ENERGY, AFRICA'S SHARE OF GLOBAL UPSTREAM M&A ACTIVITY HAS FALLEN FROM 16 PERCENT IN 2013 (WORTH AROUND \$20 BILLION) TO JUST 4 PERCENT IN 2017 (~\$5 BILLION). THAT REFLECTS THE 71 PERCENT FALL IN EXPLORATION SPENDING ACROSS THE CONTINENT BETWEEN 2014 AND 2018<sup>16</sup>. YET, AS MAJOR IOCS SLOW DOWN, THERE ARE EMERGENT OPPORTUNITIES FOR SMALLER, MORE FOCUSED COMPANIES TO ACQUIRE PERIPHERAL ASSETS AND INCREASE THEIR FOOTPRINT. THESE ARE SOME OF THE KEY FACTORS DRIVING THAT TREND.

### STREAMLINING NOCS

The Nigerian government is seeking to encourage more foreign investment in the upstream sector by reducing its stake in joint ventures with IOCs, such as Shell, Exxon and Chevron. NNPC currently holds majority positions in these entities (ranging from 55 to 60 percent) which it wants to reduce to 40 percent. Such a move could be advantageous

for all parties. For the government, it would lower its share of the cash cost in upstream operations. Nearly 60 percent of total crude oil and gas sales revenue in 2018 was directed toward JV cash calls<sup>17</sup> and the government is in arrears on some payments. For the IOCs, it would mean increased control. However, the extra responsibility may not be desirable at a time of regulatory uncertainty and capital rationing. If NNPC can implement its new Incorporated Joint Venture (IJV) model in 2020, this could encourage greater participation from IOCs. The IJV model will create independent entities which can raise capital through debt or equity, with dividends paid to shareholders.

In Angola, 2020 will see Sonangol push ahead with its reform agenda as the company divests from a large number of joint ventures and investments that are extraneous to its new core mission being a high impact E&P company. Sonangol plans to sell 50 subsidiaries across the globe, from Cape Verde to Singapore and back home, in sectors as diverse as real estate, health and banking. Chairman Sebastião Gaspar Martins believes that the move will make the company "financially more robust"<sup>18</sup> – potentially enabling it to be a more effective upstream partner for IOCs.

### Key 2019 Deals & Developments

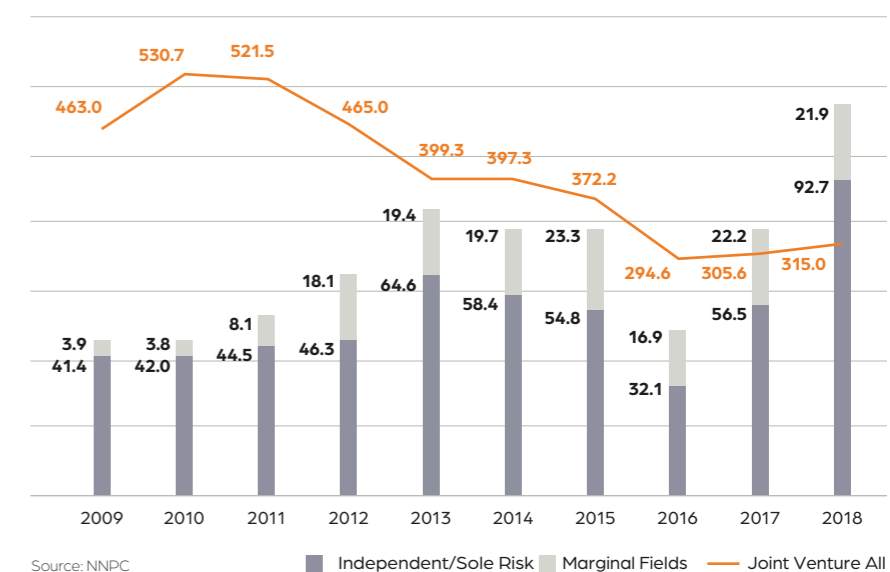
COUNTRY	NEWS
Angola	Maurel & Prom acquires Angola Japan Oil Co 20% stake in Blocks 3/05 & 3/05A for \$80m
Chad	Glencore has puts its Chad oilfields up for sale. Currently producing 7,700 bpd
Congo Brazzaville	Lukoil acquires 25% stake in Marine XII from NewAge for \$800m
Equatorial Guinea	MedcolEnergi acquires Ophir Energy for \$512m following Fortuna FLNG disappointment
Kenya	Qatar Petroleum farms into Eni deep offshore blocks
Mozambique	Total completes \$3.9bn acquisition of Anadarko 26.5% interest in Mozambique LNG project
Namibia	Qatar Petroleum farms into Total's deepwater blocks
Nigeria	Panora Energy sells Nigerian assets to Petro Nor E&P for up to \$35m
Nigeria	Seplats acquires UK independent Eland for \$486m
Nigeria	Lekoil acquires 45% stake from Newcross in OPL 276
Uganda	Tullow \$900m Eni/CNPC farmout falls through

### IOCS RATIONALISE NIGERIA PORTFOLIOS

Nigeria is a multifaceted hydrocarbons market with a range of local, regional and global firms adjusting their posture based on unique strategic priorities as well as wider trends. In 2020, there is likely to be a continuation of major IOCs rationalising their footprint in Nigeria, in some cases as part of a broader divestment strategy or as a more limited portfolio adjustment based on project economics or specific risk assessments.

In October of 2018, semi-nationalised Brazilian firm Petrobras executed a \$1.5 billion sale of its minority stakes in OML 127 and OML 130 to a consortium led by Vitol (including Africa Oil Corp and Delonex Energy). That was followed by widespread reports in April 2019 that Exxon Mobil is exploring a \$3 billion divestment from several fields it partially owns through its JV with NNPC<sup>19</sup>. Analysis from Wood Mackenzie suggests that Exxon's sell-off is likely to be focused on small to medium-sized fields that the company is unwilling to develop due to a lack of JV funding or unfavourable project economics<sup>20</sup>. (Petrobras and Exxon are currently offloading global assets worth a combined \$36 billion.) Shell could seek to adjust its Nigerian portfolio to focus on deep offshore, away from the operational risks associated with the Delta region following a renewal of these licences over the summer<sup>21</sup>. And Chevron could also offload assets, according to analysis from Wood Mackenzie.

### Nigeria Yearly Crude Oil Production by Contractual Arrangement (million barrels)



### Exxon is reportedly exploring a \$3 billion divestment programme in Nigeria

Whatever the reason, these divestments create opportunities for specialised indigenous companies with lower cost infrastructures to acquire valuable licences. However, with NNPC looking to reduce its cost exposure, these smaller firms will have significant financing needs in order to move projects forward. They could prove to be an attractive prospect for regional banks and finance corporations; or joint venture options with other international independents and even international private equity. For example, in July, Norwegian upstream independent

Aker secured \$100 million in convertible bond notes from Africa Finance Corporation to help develop its ultra-deepwater Pecan field offshore Ghana. And Boru Energy, a new London-based venture backed by global private equity giant Carlyle Group, is looking to build a portfolio of non-operated stakes in producing oil and gas assets across sub-Saharan Africa, in deals worth up to \$1 billion<sup>22</sup>.

For potential investors, Nigeria's independent sector can demonstrate a strong track record of production growth averaging 15 percent a year since 2009. Over the same period, output from international majors including Shell, Chevron, Eni and Total and others has fallen by an average of 4 percent per annum due in part to a lack of new projects coming on stream.

16. Retrieved from: <https://yearofenergy2019.com/wp-content/uploads/2019/04/DPR-presentation.pdf>  
 17. The Guardian Nigeria – September 2019  
 18. Macau Hub – September 2019

19. Reuters – April 2019 | S&P Global Platts – April 2019  
 20. Wood Mackenzie – April 2019  
 21. Reuters – September 2018  
 22. S&P Global Platts – October 2019



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# PRODUCTION **OUTLOOK**

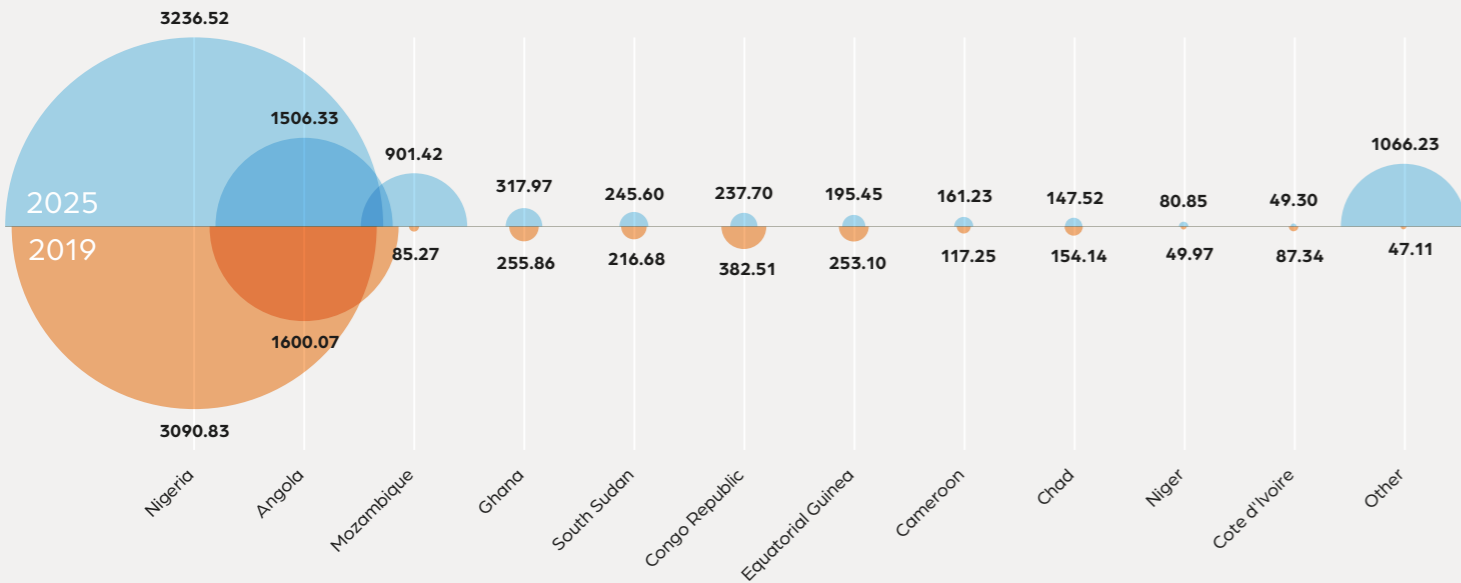
2019 - 2025

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# A Diversifying Production Landscape

Sub-Saharan Africa Total Oil & Gas Production Outlook 2019–2025 (thousand boe/d)



Source: Global Data

WEST AFRICAN PRODUCERS, SPECIFICALLY NIGERIA AND ANGOLA, WILL DOMINATE THE SUB-SAHARAN AFRICAN [SSA] ENERGY LANDSCAPE OVER THE NEXT FIVE YEARS.

However, these two countries' share of total SSA daily production will fall from 73.9 percent in 2019 to 58 percent in 2025. That represents more than a one-fifth loss of market share.

Mozambique's growth is the key driving force behind this shift. The south-eastern African nation is one of the least economically developed on the continent. However, it also holds nearly 3 trillion cubic feet of gas reserves – the third largest on the continent, behind only Nigeria and Algeria. Over the next five years, IOCs, including Eni and Total, will be working to bring more than 30 million metric tons of annual gas production online, catapulting Mozambique into a significant global LNG supplier.

Nigeria is still the pre-eminent SSA oil and gas market, both in terms of production and proven reserves. Converting this potential into

increased capacity, however, will require a more stable policy environment and the development of key infrastructure projects, including the Dangote Refinery and Train 7 LNG plant. Current forecasts suggest a 4.71 percent growth in oil and gas daily production between 2019 and 2025.

Senegal and Mauritania (gas) and Kenya (oil) are small but noteworthy growth markets that should see commercial levels of production come online in the next few years. Ghana and South Africa could also see increased levels of exploration activity.

**Nigeria and Angola's share of total SSA daily production will fall from 73.9% in 2019 to 58% in 2025.**

## West Africa

### NIGERIA

Nigerian energy production is forecasted to grow by 4.71 percent between 2019 and 2025. That period includes a fall of nearly 6 percent between 2019 and 2021, from 3.09 million boe/d to 2.90 million boe/d, before recovering to 3.23 million boe/d in 2025. Total's Egina deepwater field came on stream at the beginning of 2019 and has boosted crude production by nearly 10 percent (just over 200,000 bpd). The development of the offshore Anyala (OML 83) and Madu (OML 85) fields has been slower than expected – they are unlikely to start producing before year end. At their peak, the fields are expected to yield 50,000 bpd and 120 million standard cubic feet per day respectively. The Bonga South West Deepwater Project, which is awaiting FID but could come on-stream by 2022, could also add another 225,000 bpd at peak flow.

There is growing momentum in Nigerian gas but delays in the FID on the Train 7 refinery is holding up other projects which could provide feedstock to the facility, for example Shell's offshore OML-77. However, following FID in December 2018, Shell's onshore Assa North Gas Project could add up to 600 million scf/d once fully developed, with the capacity to expand to 1.2 billion scf/d (around 200,000 boe/d).

**Total's deepwater Egina field adds 200,000 bpd in 2019**

### ANGOLA

Current forecasts estimate that Angola's oil and gas output will fall by nearly 6 percent between 2019 and 2025. The low oil price, combined with Angola's high cost environment (average production costs are \$40 per barrel<sup>23</sup>) and challenging business environment, led to a steep decline in upstream investment in recent years, with production falling by more than 300,000 bpd. However, President Lourenço's new administration is implementing an ambitious reform agenda which is rekindling interest. BP is expected to start drilling wells in its deepwater Platina field (Block 18) by mid-2020 with first oil expected in 2021/2022. The government plans to award 50 blocks over the next five years.

### SENEGAL

Senegal could establish itself as an important rival to west African markets like Ghana, Equatorial Guinea and the Ivory Coast. **Total energy production is forecast to reach 181,000 boe/d by 2025.** Offshore LNG will underpin this growth. BP's ultra-deepwater Greater Tortue Ahmeyim development (which straddles Senegal and Mauritania) is expected to produce first gas by 2022, with at least 15 trillion cubic feet of gas resource. Cairn Energy and partners will also be aiming to get the SNE Deepwater Oil Field online by 2022; initial production is forecast at 100,000 bpd<sup>24</sup>. The project is currently awaiting FID.

West Africa Total Oil & Gas Production Outlook (thousand boe/d)



23. Export.gov (U.S.) – August 2019

24. Woodside Energy | Oil Review Africa – February 2019



IAN SIMMONDS

**GHANA**

There is a positive outlook for the Ghanaian energy sector with **forecasted growth of nearly 25 percent by 2025, to 317,000 boe/d**. In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according to the Ministry of Finance<sup>25</sup>. Aker submitted a \$4 billion development plan for

the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>26</sup>. Tullow Oil has experienced technical challenges in completing wells on the Tweneboa Enyenra Ntomme Oil Field, leading to a 10 percent decline in daily production (from around 100,000 bpd to 90,000). However, CEO Paul McDade insists that the 2020 outlook will be more positive, with several new wells planned<sup>27</sup>.

25. Ministry of Finance (Ghana) – February 2019  
 26. Offshore Energy Today – August 2019  
 27. World Oil – July 2019

**East & Central Africa**

**REPUBLIC OF CONGO (BRAZZAVILLE)**

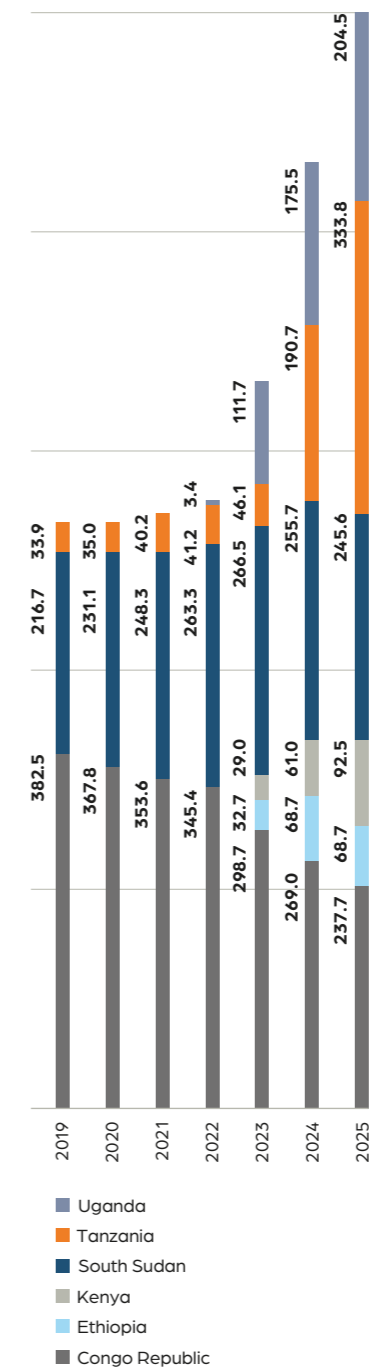
Current forecasts suggest that energy production in Congo Brazzaville is set to fall by nearly 40 percent by 2025. However, there is an optimistic mood in the country following a licencing round in 2018 and a potentially transformational recent discovery. In August, SARPID-OIL, a consortium of local operators, announced a major discovery in the onshore Delta de la Cuvette block. Officials from the company and the government have suggested that the field could produce 983,000 bpd, a yield which would catapult Congo Brazzaville into a top-tier SSA producer<sup>28</sup>. Independent analysts have struck a more cautiously optimistic tone. IOCs with local experience, such as Total or Eni, could soon be farmed-in to develop the find. Benjamin Makaya, head of the state SNPC oil company, told S&P Global Platts in April that he expects to see increased drilling activity in 2020 following the award of offshore PSCs to Total, Kosmos and Perenco<sup>29</sup>.

**La Cuvette discovery could yield 980,000 bpd**

**KENYA**

Kenya is currently producing around 2,000 bpd from the South

**East & Central Africa Total Oil & Gas Production Outlook (thousand boe/d)**



Lokichar basin under its Early Oil Pilot Scheme, led by Tullow Oil<sup>30</sup>. In August, the country achieved an important landmark in exporting its first consignment of crude oil (around 200,000 barrels) to ChemChina. FID on the Turkana development is expected in the second half of 2020, with commercial production scheduled to begin in 2023, once a \$1 billion pipeline to the Port of Lamu is completed. Current forecasts suggest that production will reach around 90,000 bpd by 2025. Successful engagement between IOCs and local communities will be essential to ensuring that Kenya is able to maintain this timeline.

**UGANDA**

Uganda is facing a challenging road to reach first oil by 2022 due to disagreements between project partners. In August, a proposed \$900 million farmout by Tullow Oil to Total and CNOOC in the stalled Lake Albert development broke-down due to a tax dispute with the government<sup>31</sup>. Total subsequently announced that it was stopping technical work on the field and pipeline. In a September statement to the Financial Times, the company said it was waiting for a "clear and stable legal framework and clarity on the project shareholders"<sup>32</sup>. However, Ugandan officials are keen to maintain progress and reach FID in Q4-19. According to analyst Luke Patey, a lack of regional cooperation combined with President Museveni's disputes with IOCs, particularly over domestic refineries, have slowed the development of Lake Albert.

28. Reuters – August 2019 | S&P Global Platts – August 2019  
 29. S&P Global Platts – April 2019  
 30. Financial Times – August 2019  
 31. Financial Times – September 2019  
 32. World Oil – July 2019





## Operator's Perspective:

# Tullow Oil in East Africa

**MARK MACFARLANE – EVP, EAST AFRICA & NON-OPERATED** SINCE 2017, MARK MACFARLANE HAS BEEN LEADING TULLOW'S EAST AFRICA OPERATIONS AND THE FIRM'S TRANSITION TO A NON-OPERATED BUSINESS. HE IS CURRENTLY FOCUSED ON BRINGING THE LOKICHAR DEVELOPMENT TO FID IN 2020.

### **Tullow Oil has pioneered the development of Kenya's South Lokichar Basin for nearly a decade. What is your current projected timeline for FID, construction and commercial production?**

In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.

### **What are some of the key issues that need to be addressed before FID?**

In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.

### **Tullow is a highly experienced African operator. What key lessons have you learnt from your Kenyan operations in recent years, particularly with respect to community engagement?**

In February, Norwegian independent Aker confirmed a significant offshore

resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.

### **Can you offer examples of how Tullow is working with local commercial partners to ensure your investment in the region is having a positive long-term impact in the region?**

In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.

### **What is Tullow's broad strategy in Uganda?**

In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according

to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.

### **A farmout agreement with your Ugandan partners, Total and CNOOC, recently fell through. Have you started the process of finding new buyers for some of your acreage in Lake Albert Basin? What level of interest do you expect?**

In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.

### **What steps do you think the Ugandan government needs take to reassure IOCs that Uganda is a viable investment location?**

In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according

to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.

### **How do you assess east Africa's prospects over the next five years, in terms of its growth as an oil and gas producing region?**

In February, Norwegian independent Aker confirmed a significant offshore resource in the Deepwater Tano Cape Three Points block, with potential recoverable reserves of nearly one billion barrels, according to the Ministry of Finance<sup>3</sup>. Aker submitted a \$4 billion development plan for the Pecan Field in March. The firm is currently evaluating options for the FPSO ahead of an FID. First oil is expected 35 months after FID<sup>4</sup>.



## Southern Africa



IAN SIMMONDS

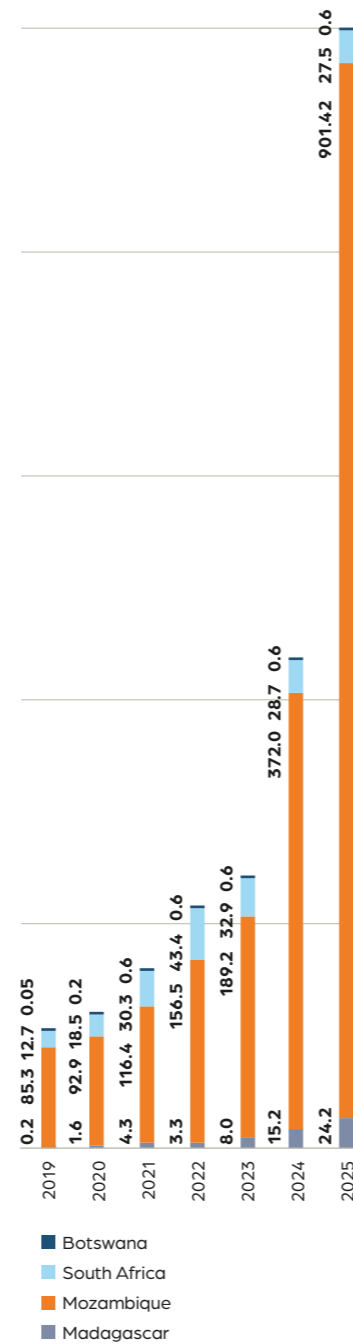
### MOZAMBIQUE

Mozambique is poised to realise the potential of its estimated 3 trillion cubic meters of natural gas reserves<sup>33</sup>. In June, (then operator) Anadarko Petroleum Corp and its partners reached FID on the onshore Area 1 LNG project, which will be capable of producing 12.88 million metric tons per year. While FID is expected on the 15.2 million mt/year Eni-Exxon Rovuma LNG project before the end of 2019. Eni's Coral South FLNG project is expected to come on stream by 2022, with production capacity of 3.4 million mt/year. According to Offshore Magazine, Eni reports that the project will be 60 percent complete by year end<sup>34</sup>. At full capacity, these three projects alone would represent 81 percent of total African LNG exports in 2018 (38.5 million mt)<sup>35</sup>.

### SOUTH AFRICA

Total's Brulpadda gas discovery in February has sparked interest in South Africa's upstream sector. Early reports claimed that there could be up to 1 billion barrels of oil equivalent in the play, though IHS analysts subsequently suggested that the figure could be closer to 200 to 250 million boe<sup>36</sup>. That would still represent an unprecedented discovery for South Africa, according to Nial Kramer, CEO of the South African Oil & Gas Alliance<sup>15</sup>. However, analyst Heidi Vella points out that development costs are likely to be high, due to Brulpadda's location in extreme water depths amidst strong currents that could make using an FPSO unfeasible<sup>16</sup>. Africa Energy, one of the project partners, says that the minimum commercial field size would be 350 million barrels (priced at \$60 per barrel). There are plans to drill up to four more wells before the end of the year.

South African Total Oil & Gas Production Outlook (thousand boe/d)



33. S&P Global Platts – 18 June 2019  
 34. Offshore Magazine – June 2019  
 35. S&P Global Platts – 18 June 2019  
 36. Offshore Technology – May 2019  
 37. Bloomberg – February 2019  
 38. Offshore Technology – May 2019

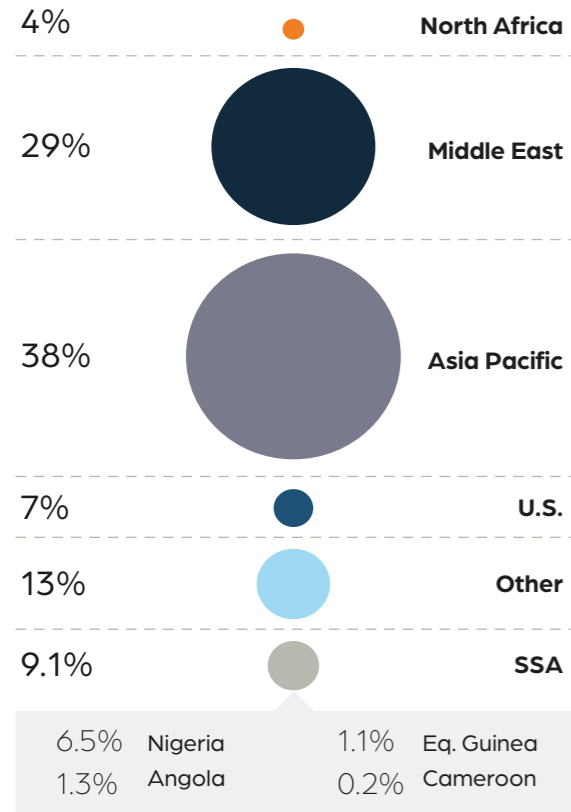


LIFE OF PIX



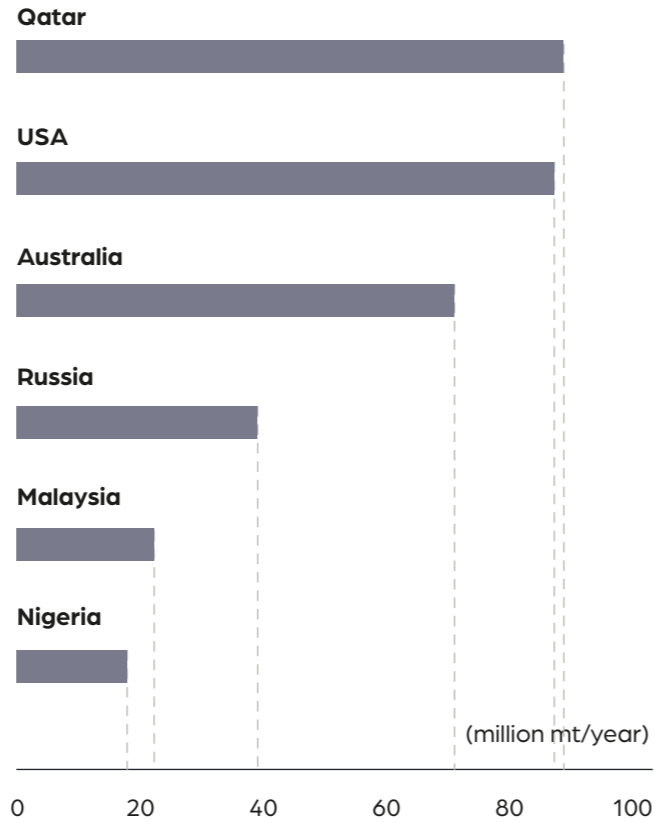
# State of Play: African LNG

Regional Share Global LNG Exports (2018)

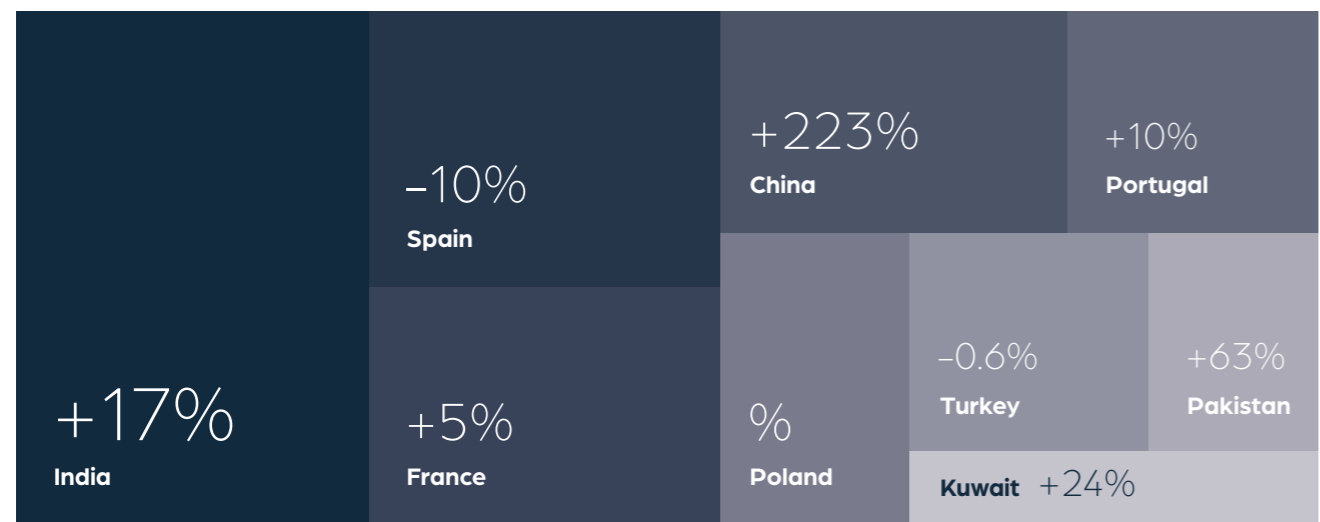


IGU World LNG Report 2019

Top 5 LNG producers by 2025: Platts Analytics



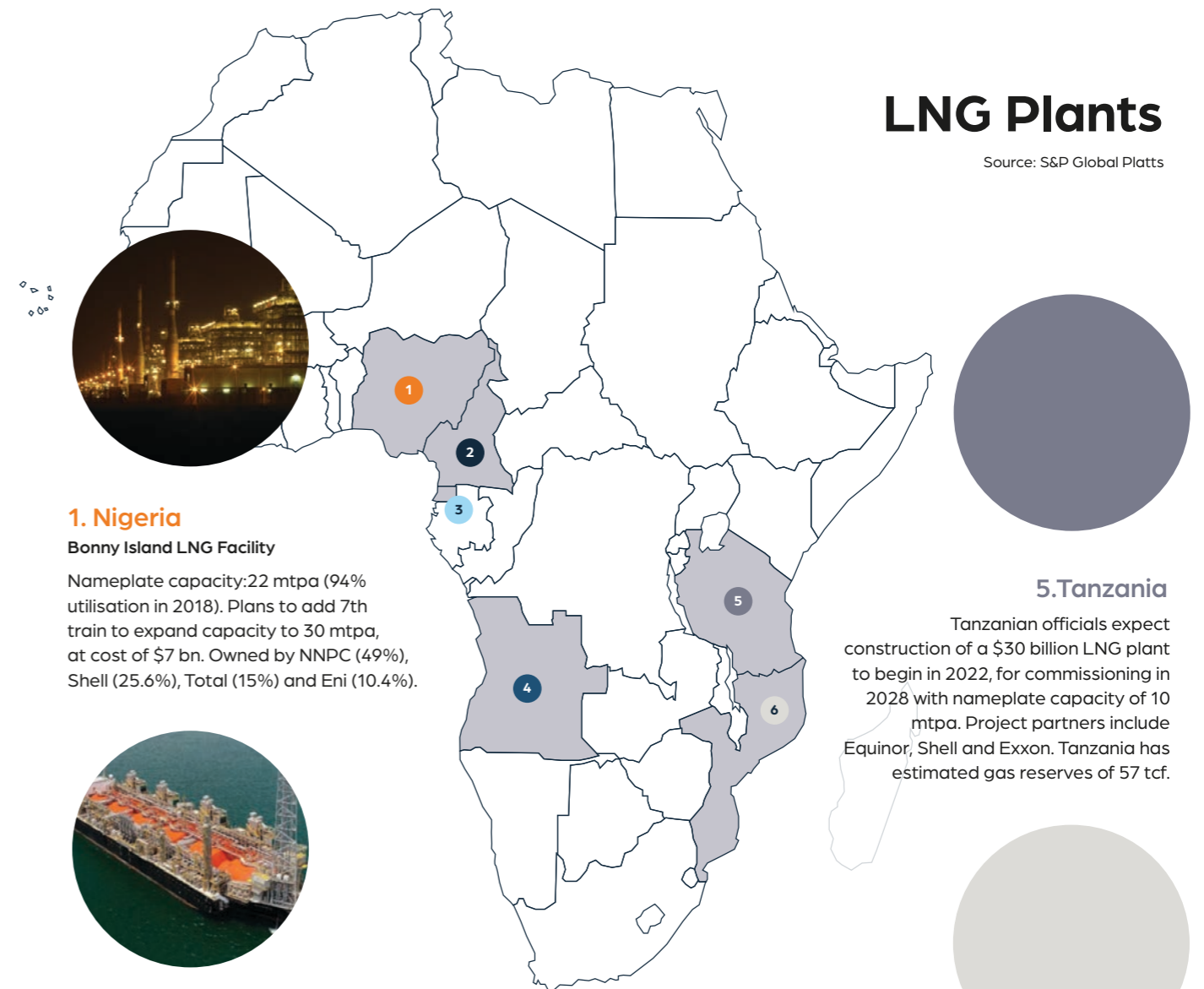
Key SSA LNG Export Markets 2018 by MT (YoY % Change)



IGU World LNG Report (2018/2019)

# LNG Plants

Source: S&P Global Platts



## 1. Nigeria

### Bonny Island LNG Facility

Nameplate capacity: 22 mtpa (94% utilisation in 2018). Plans to add 7th train to expand capacity to 30 mtpa, at cost of \$7 bn. Owned by NNPC (49%), Shell (25.6%), Total (15%) and Eni (10.4%).



## 2. Cameroon

### Hilli Episeyo FLNG, Kribi

Nameplate capacity: 2.4 mtpa (43% utilisation in 2018). Africa's first ever FLNG facility. Tanker operated by Golar LNG.



## 3. Equatorial Guinea

### EQ Guinea LNG, Bioko Island

Nameplate capacity: 3.7 mtpa (96% utilisation in 2018). Plans to add a new regasification terminal at Port of Akonikien (south EQG). Owned Shell (25%), Govt. of Brunei (35.5%) and Mitsubishi Corp (25%).



## 4. Angola

### Angola LNG, Soyo

Nameplate capacity: 5.2 mtpa (80% utilisation in 2018). Owned by Chevron (36.4%), Sonangol (22.8%), BP, Total & Eni (13.6% each)

## 5. Tanzania

Tanzanian officials expect construction of a \$30 billion LNG plant to begin in 2022, for commissioning in 2028 with nameplate capacity of 10 mtpa. Project partners include Equinor, Shell and Exxon. Tanzania has estimated gas reserves of 57 tcf.



## 6. Mozambique

Mozambique LNG exports could reach 30 mtpa by 2025, making it a significant global player. Long-term offtake agreements worth 11.2 mtpa are already in place.

Offtakers	Sales*	Period (years)
Tokyo Gas & Centrica	2.60	Until early 2040s
Shell	2.00	13
CNOOC	1.50	13
EDF	1.20	15
Tohoku	0.28	15
Bahrat	1.00	15
Pertamina	1.00	20
JERA & CPC	1.60	17
<b>Total Volume</b>	<b>11.18</b>	

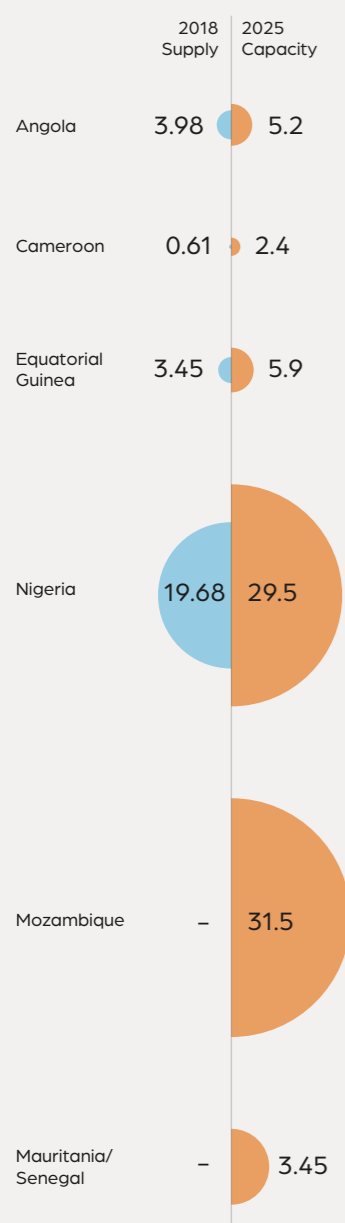
\*(million mt/year)



## In Focus: African Gas

## The Rise of African Gas

Graphic Title



Source: Global Data



**ANISH KAPADIA**  
**AKAP ENERGY**  
 15 YEARS' EXPERIENCE  
 IN EQUITY RESEARCH,  
 INCLUDING AS HEAD  
 OF LONDON RESEARCH  
 TEAMS AT UBS AND TUDOR  
 PICKERING HOLT. CURRENTLY  
 RUNS AKAP ENERGY, WHICH  
 PROVIDES STRATEGY AND  
 FINANCIAL CONSULTING  
 ADVICE TO ENERGY  
 COMPANIES.

**Mozambique's LNG export capacity will reach 30 mtpa by 2025, with \$50 billion of investment**

Sub-Saharan Africa has plentiful gas resources. Over the last decade, huge discoveries in Mozambique, Tanzania, Senegal and Mauritania have delivered a combined total of around 200 trillion cubic feet of recoverable gas. That's enough to provide two thirds of current global supply for around twenty years. On top of this, Nigeria alone has 200 tcf of proven reserves.

Currently, SSA has the capacity to produce 34 million tonnes of LNG per annum. In 2018, throughput was 28 million tonnes (or an 83 percent utilisation rate), which was just over 10 percent of global supply. By 2025, Akap Energy expect capacity to increase by 150 percent, to 84 mtpa, with global market share rising to 15–20 percent, depending on demand growth. Assuming the utilisation rate can increase to 90 percent, achieving this extra market share will require regional production of 10 billion cubic feet per day. That will require \$75 billion worth of investment, two-thirds of which will go to Mozambique.

In part, that investment has been made possible due to the availability of competitive project financing. There was a dearth of major new SSA projects after Angola LNG in 2007. Since 2018, however, a significant number have been pushed forward. The oil supermajors are big believers in African LNG, with Exxon, Shell and Total as the key equity sponsors of the largest projects. Despite higher costs, these firms are committing

#### FLNG DEPLOYMENT IN AFRICA

- Rapid monetisation of large resources (e.g. Senegal/Mauritania)
- Exploiting smaller gas plays in markets without existing liquefaction plants (e.g. Cameroon)

capital to Africa at a time when there are huge opportunities in the United States. African projects, especially on the east coast, have the advantage of proximity to key Asian LNG import markets.

In December 2017, the Coral FLNG Project was Africa's largest ever project financing (at \$5 billion). Since then, Anadarko (whose stake is being acquired by Total) sanctioned the \$15 billion Afungi mega project in mid-2019. And Exxon is due to sanction an even bigger LNG plant by year end. These projects will see Mozambique's LNG export capacity reach 30 mtpa by 2025, with total investment upward of \$50 billion.

FLNG operations have proved popular in Africa for early monetisation of large resource. For example, in Senegal/Mauritania, BP and Kosmos sanctioned the Tortue FLNG project (in December

2018) less than four years after the 15 tcf discovery. Phase 1 of the development involved a 2.5 mtpa facility. There are plans to green light a further two vessels in 2020 at a total cost of \$10 billion. This would increase output capacity to 10 mtpa.

In frontier markets, operators are using FLNG to exploit smaller plays that do not justify investment in an onshore plant. Cameroon is a prime example and this trend is set to continue in 2020. In Ethiopia, a Chinese-sponsored 3 mtpa near-shore FLNG project is expected to go ahead in 2020. While the 2 mtpa Fortuna FLNG project in Equatorial Guinea – which was FID-ready before Ophir Energy failed to secure financing – could be sanctioned in 2020. Similar floating solutions are being mooted for projects in Gabon, the Republic of Congo and Nigeria, to develop smaller stranded gas fields.

Looking out to the long-term (i.e. projects coming online after 2025), Tanzania is one to watch. The country has tremendous resource potential with some 50 tcf of gas discovered offshore by majors including Exxon, Shell and Equinor but political mismanagement has slowed the development of these projects.

In Mozambique, both the Rovuma (Exxon) and Afungi (Total) projects have the capacity to double annual production from the huge resources available, adding a further 30 mtpa of supply. Mauritania has the potential to develop its own 10 mtpa FLNG

#### Ghana will install a floating regasification unit in 2020 to increase LNG imports

project at the Birallah Hub. While in Senegal, the Yakaar and Teranga discoveries could be developed through a 10 mtpa onshore plant. Nigeria has strong growth potential but the Brass (10 mtpa) and Olokola (10 mtpa) LNG projects do not look likely to progress.

There are also opportunities in the mid and downstream sectors. Plans for a Nigeria-to-Morocco gas pipeline would increase interconnectivity between west and north Africa, which makes sense. However, the political and financing challenges of such a project could be prohibitive. The existing West Africa Gas Pipeline (Nigeria-Benin-Togo-Ghana) has been plagued by supply and payment problems.

As a result, some countries in Africa without substantial gas resources are turning to LNG imports. Ghana, for example, will install a new floating regasification unit in 2020. Other countries such as Ivory Coast, Morocco and South Africa have also looked at installing such units. In the power sector, there is also great potential to substitute gas for burning fuel oils – Nigeria, for example, spends an estimated \$30 billion on diesel-generated power.



Adobe

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# INFRASTRUCTURE **OUTLOOK**

2019 - 2025

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## Infrastructure Outlook

### INCREASED INFRASTRUCTURE CAPACITY IS ESSENTIAL TO AFRICA'S LONG-TERM INDUSTRIAL DEVELOPMENT.

At a time when the low oil price is squeezing treasury revenues, private capital is developing key oil and gas infrastructure projects which could have a significant impact on the African energy and power landscape over the next decade.



### DANGOTE REFINERY – NIGERIA

At a projected cost of \$12 billion, the Dangote Refinery is a hugely challenging construction project to undertake in any country. Nigeria's patchy infrastructure has made it even greater. The project was initially slated for completion in 2019. In August, however, this was pushed back to Q4-20. Some industry figures see late-2021 or early 2022 as a more likely scenario. They cite a variety of technical and logistical challenges, including unpredictable weather, according to Reuters<sup>39</sup>. Dangote Group officials rejected this analysis.

On a more positive note, the refinery's tank farms are set for completion in Q4-19 and they may be used as a depot before the refinery's production starts. This would provide an immediate increase to fuel storage capacity.

Nigeria aims to triple its refining capacity to 1.5 million bpd by 2025 in order to reduce its dependence on fuel imports. At full capacity the Dangote Refinery will process 650,000 bpd. Mele Kyari, the new MD of NNPC, has said that he wants the NOC to be supplier of "first resort" to the Dangote Refinery<sup>40</sup>. However, it will be difficult for the government to do that while it maintains a price cap policy which mandates retailers to sell fuel at around 40 cents per litre.

In February, Mr Dangote made clear that his company would not sell its fuel at that price, according to local reports<sup>41</sup>. The fuel subsidy is a very sensitive political issue but with President Buhari not seeking re-election in 2023, he could have the political freedom to abandon the costly policy. Some analysts suggest that NNPC should also abandon its old refineries and focus on Dangote,

- Completion projected for Q4-20. Could be late 2021
- Nameplate capacity of 650,000 bpd enough to supply domestic fuel demand
- More investment opportunities in existing refineries

which could comfortably supply domestic demand. That is not Mr Kyari's view. He wants to revamp the old refineries and engage new operators. There are opportunities for private sector investors to fund this work.

39. Reuters – August 2018  
40. Reuters – 7 August 2019  
41. The Nation – February 2019



### LOKICHAR-LAMU PIPELINE, KENYA

Kenya exported its first consignment of crude oil in August. A fleet of trucks delivered 200,000 barrels of Lokichar light sweet crude to Mombasa Port as part of an Early Oil Pilot Scheme before commercial production can begin in 2023/24. British firm Tullow Oil expects an FID on the project in the second half of 2020, eight years after oil was first discovered in the Turkana region of Kenya.

The \$1 billion, 820km Lokichar-Lamu Crude Oil Pipeline is essential for enabling commercial production. According to Tullow's 2019 half year report, they still need to secure funding and acquire land rights on the pipeline route. That could be challenging. Charles Wanghu points out that disputes between the oil company, government and local communities have repeatedly disrupted the project. He argues that

establishing adequate mechanisms to address community concerns is essential to avoid stoppages, leading to expensive downtime and project delay<sup>42</sup>. The current projection for completion of the pipeline is 2022.

South Sudan could benefit from a new east African pipeline, as it seeks to avoid relying on neighbouring Sudan to export its product. East African regional integration has faltered in recent years, with multiple transnational pipeline and railway projects failing to make progress.

42. Oxford Energy Forum – January 2019 (Issue 117)





ZULIMAN MOHAMMAD

**TEMA LNG TERMINAL, GHANA**

Ghana is set to become sub-Saharan Africa's first LNG importer in 2020 as the Tema LNG terminal project reaches completion.

Ghana National Petroleum Corporation has secured a 12-year contract with Rosneft to supply 1.7 mtpa of LNG (or 250 mmscf/d). Tema LNG Terminal Company – which is controlled by London-based Helios Investment Partners (HIP) – has engaged China Harbour Engineering Company and Jiangnan Shipyard to construct an offshore regassification terminal at a reported cost of \$350 million.

According to HIP, the facility will combine a purpose-built Floating Regasification Unit twinned with an existing LNG carrier, to receive, store and re-gasify the LNG. German firm TGE Marine Gas Engineering is designing an innovative small scale regasification unit for the project. The terminal will be transferred into government ownership after twelve years.

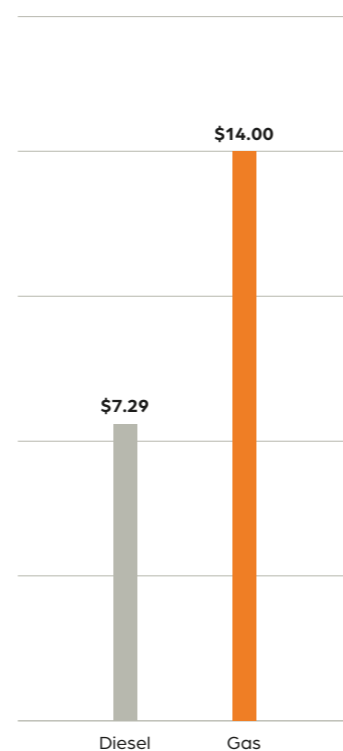
The Tema LNG project will be able to cover 25 percent of Ghana's total electricity generation capacity, with

**TEMA LNG PROJECT**

- Add 250 mmscf/d to Ghana's gas supply – 25 percent of power generation capacity
- Cheaper option to diesel
- Reducing reliance on Nigerian gas

gas providing a cheaper alternative to oil. The deal with Rosneft enables Ghana to diversify gas imports away from Nigeria, which has consistently failed to provide the agreed level of supply since the West African Gas Pipeline started operating (back in November 2011). The emergence of offshore storage and regasification technology is enabling smaller, lower-risk, rapid LNG solutions that could be replicated elsewhere in the region in countries without substantial gas reserves.

Fuel Prices for Ghana's Thermal Plants (2018, per mMBTU)\*



\* 2018 FORECASTS FROM ENERGY COMMISSION GHANA (2018), BASED ON AVERAGE WEIGHTED GAS PRICE BY PURC (2018)

Source: Energy Commission Ghana 2018

**AJAOKUTA-KADUNA-KANO GAS PIPELINE, NIGERIA**

Nigeria is pursuing a long-term strategy to reduce gas flaring and increase domestic power generation capacity. The Ajaokuta-Kaduna-Kano (AKK) Gas Pipeline is a project which helps to further both these aims by creating the infrastructure to supply gas to industrial hubs in the north and south of the country, thereby reducing the need for gas flaring, which is environmentally damaging. Nigeria generates around 3,000 megawatts of power per month from gas-fired power plants, which is approximately 77 percent of total generation, according to NNPC data.

The pipeline will run for 614 kilometres featuring a diameter of 40 inches with the capacity to transport 3.5 billion standard cubic feet of gas per day. Dehydrated wet gas sourced from various sites in the southern region will be fed into the pipeline. The gas will predominantly be used as feedstock for power plants and new petrochemical facilities planned for Abuja, Kaduna, Kano, and Katsina. However, there will be some further processing of hydrocarbon liquids at Ajaokuta to produce liquefied petroleum gas.

NNPC announced the project announced in 2013. Proposals were submitted and approved in 2017; the total estimated cost is \$2.8 billion. The pipeline is being funded through a public-private partnership, in which the contractor assumes 100 percent of the funding cost, but the government leases the asset back under a long-term agreement. There is widespread reporting that CNPC is providing most of the funding for the project. In April 2019, then-MD of NNPC Maikanti Baru announced that the project would be completed by 2022<sup>43</sup>.



PHASE	DESCRIPTION	COST	CONTRACTOR
Phase 1	200km pipeline between Ajaokuta and Abuja Terminal Gas Station (TGS)	\$855m	OilServe/Oando Consortium
Phase 2	193km pipeline between Abuja and Kaduna	\$835m	-
Phase 3	221km pipeline between the Kaduna TGS and Kano TGS.	\$1.2bn	Brentex/China Petroleum Pipeline Bureau Consortium

43. Energy Mix Report – April 2019



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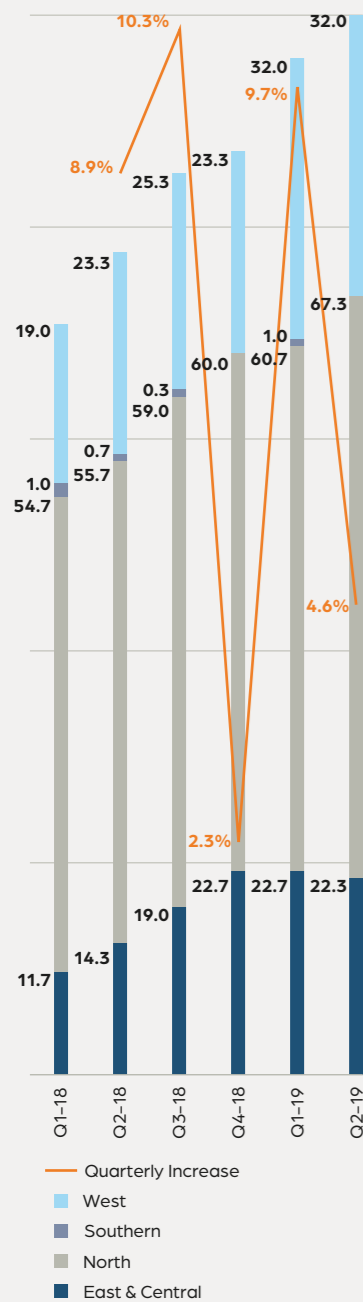
# INVESTMENT **OUTLOOK**

2019 - 2025

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# Introduction

Avg. Active Monthly Rig Count, Africa (2018-2019)



Source: Baker Hughes

## THE OIL PRICE DOWNTURN SEVERELY IMPACTED UPSTREAM INVESTMENT IN AFRICA.

Exploration spending fell by 71 percent between 2014 and 2017 across the continent. In 2018, however, the tide started to turn again as upstream investment reversed its decline and set on-course for compound annual growth of 18 percent until 2030, according to Rystad Energy. There is a lot of interest in deep/ultra-deep

offshore plays and there are new frontiers in Senegal, Mauritania, Chad, Namibia and South Africa. Stalwarts Nigeria and Angola have significant long-term upside with a pipeline of nearly \$100 billion worth of projects which could move forward over the next decade. This section looks at key trends in exploration and upstream project development across sub-Saharan Africa, including profiles and analysis of influential projects and identifying opportunities in the services sector.

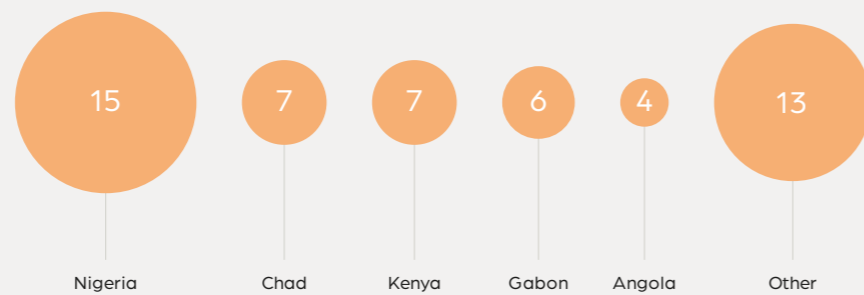
## Rig Count

### NORTH DOMINATES, SSA GROWS

The average number of monthly active rigs across Africa has increased significantly above the global trend since the beginning of 2018 (41% to 15%). North Africa dominates the continent, with 54 percent of active rigs at the end of

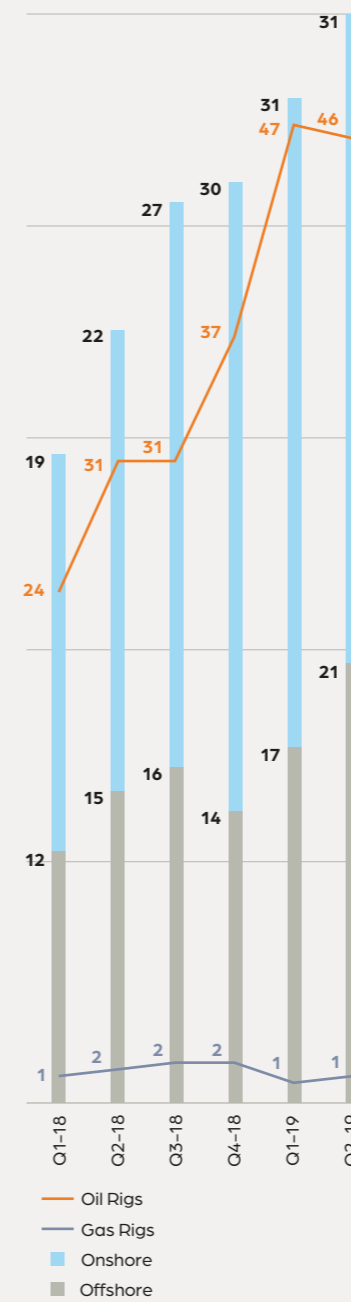
Q2-19. However, sub-Saharan Africa is growing more quickly than the North, with 69 percent increase over the 18-month period, compared with a 21 percent in the North. Overall, Africa as a continent retains a very small share of the global total rig count (just 3.7 percent at the end of Q2-19).

SSA Active Rig Count - August 2019



Source: Baker Hughes

SSA Avg. Monthly Active Rigs by Type

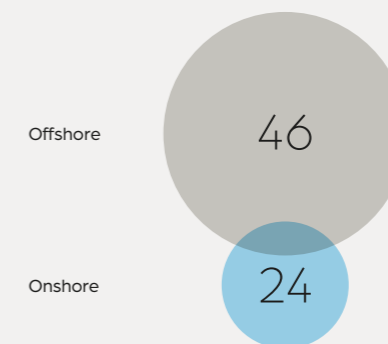


Source: Baker Hughes

As of August 2019, there are 52 active rigs across SSA. Nigeria and Angola account for 48 percent of that total, a reflection of their dominance in the region. Kenya and Chad are also particularly active markets, with 7 active rigs each. Kenya has averaged 8 monthly active rigs over the last eighteen months, as Tullow Oil continues to ramp up toward commercial production in the Turkana Lokichar Basin. In Chad, exploration activity has re-started

since August 2018 following a four-year hiatus. There are two projects currently under development in the small country, with committed CAPEX of nearly \$4 billion and total production capacity of 73,000 bpd. Gabon saw a spike in the number of active rigs at the beginning of 2019, from 4 to 7, by June the number had reduced slightly to 6. Other active rigs are in Cameroon, Equatorial Guinea, Ethiopia, Djibouti, Ghana, Niger and Congo Brazzaville.

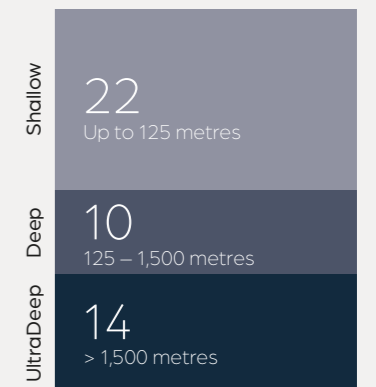
SSA Planned & Announced Projects by Terrain (2019 - 2025)



Source: Global Data

Despite major recent FIDs in the gas sector, exploration activity in SSA is heavily dominated by the oil sector. The number of active monthly gas rigs has averaged just 2 since September 2015. Between January 2013 and September 2014, the average was 4. Some of the gas projects starting-up now were discovered during this period (particularly in the Rovuma Basin). Nigeria has averaged fourteen active oil rigs since January 2018. The data suggests that there is a marginal preference for onshore drilling operations, perhaps a reflection of the low-price environment and the importance of smaller operators in mature fields.

Projects by Water Depth



Source: Global Data

Across the region, however, offshore dominates, both in terms of recent drilling operations and the pipeline of major projects. Angola and Congo Brazzaville have both seen significant levels of sustained offshore drilling activity since July 2018. In Angola, this could reflect positive investor sentiment following recent reforms. Ghana also averaged nearly 3 active rigs throughout the first half of 2019, the highest levels of activity since 2012. In August, two rigs were activated offshore Equatorial Guinea. This is the first sign of exploration activity since 2015, it will be important to watch if this marks the restart of sustained activity.



# Investment Outlook – Oil

Key Planned & Announced Oil Projects SSA (2019–2025)



Source: Global Data (May 2019)

As of the end of H1-19, there were 46 oil projects under development across sub-Saharan Africa. Nine of these are planned (i.e. reached FID), the rest (37) have been announced, with varying prospects for reaching FID in the near term. Nigeria accounts for half of all these projects; Angola is the second most active market, followed by Chad.

A combined total of \$17 billion worth of CAPEX has been

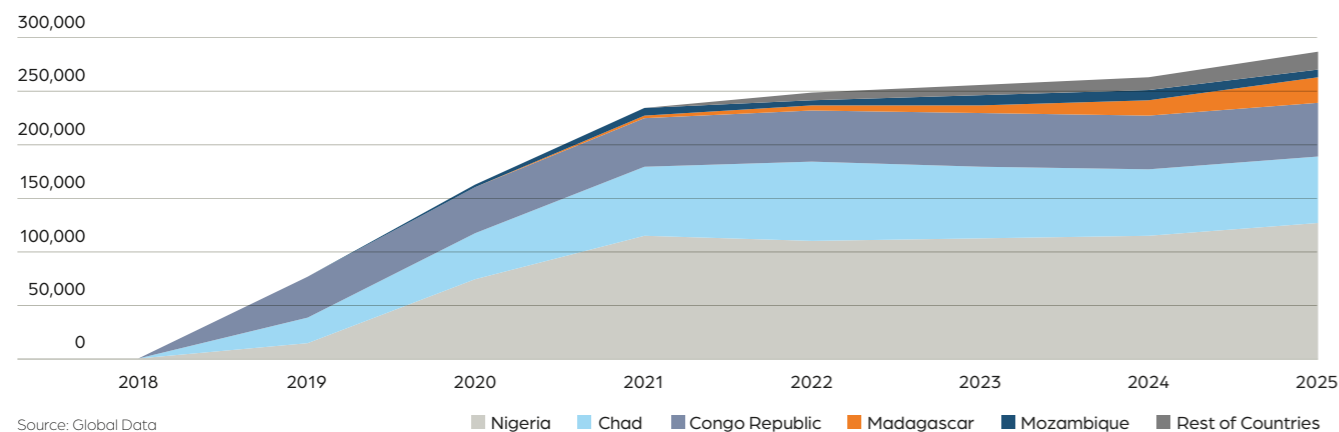
committed to the planned projects. The largest of these is the Anyala-Madu fields offshore Nigeria, at a cost of \$4.41 billion and due to come on stream in 2020. In the Republic of Congo, the Banga Kayo project is of a similar scale (\$4.37 billion), with funding from Chinese investors.

At their combined peak flow, these projects will add 256,000 bpd in extra crude production capacity across SSA. All nine projects are

**\$17 billion CAPEX**  
**256,000 bpd**  
**by 2026**

expected to commence operations in 2019/20; by 2023, 68 percent of forecasted extra production capacity will be at peak flow.

Crude and condensate production from Major Planner Projects by key countries in SSA (bpd, 2019 – 2025)

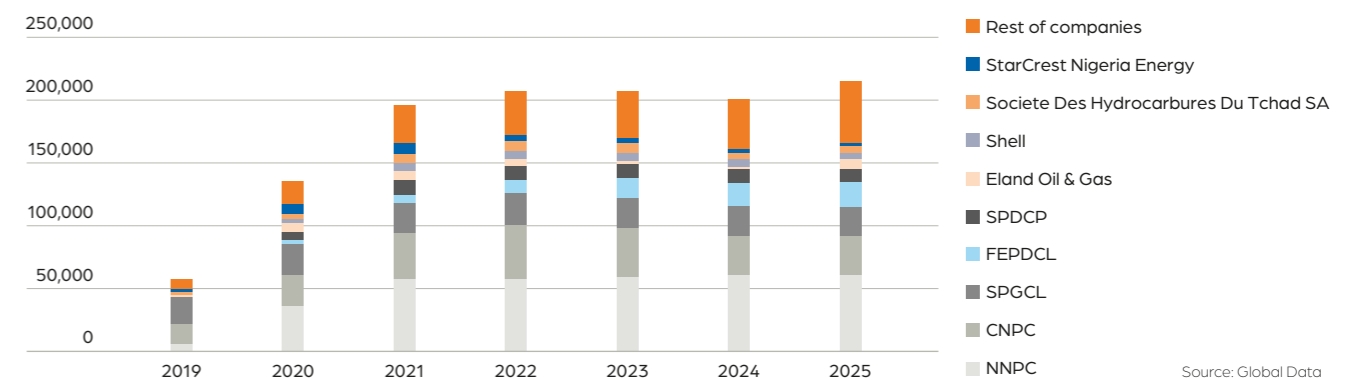


Source: Global Data

## Planned Projects

COUNTRY	PROJECT	TERRAIN	OPERATOR	START	CAPEX	PEAK FLOW (BPD)	CURRENT STATUS
Nigeria	Anyala-Madu	Offshore	First Exploration & Petroleum Development Co.	2020	\$4,418	49,843	<b>Feb 2019:</b> First E&P signed a \$900 million 15-year agreement with Yinson Holdings for bareboat charter and operational maintenance (\$165,000-day). FPSO due to be operational in Q4-2019 <sup>44</sup> .
Congo Republic	Banga Kayo	Onshore	China Congo Wing Wah Petrochemical	2019	\$4,377	50,370	Peak flow expected in 2023
Chad	Daniela Complex	Onshore	CNPC	2019	\$3,081	62,464	Peak flow expected in 2023
Madagascar	Tsimiroro	Onshore	Madagascar Oil Ltd.	2019	\$2,769	32,518	<b>June 2019:</b> Madagascar Oil coordinating with government to improve road access to oil field <sup>45</sup>
Nigeria	Ororo	Offshore	Sirius Petroleum Plc	2019	\$756	8,689	<b>Aug 2019:</b> Sirius Petroleum awaiting confirmation of extension to its licence on the field in order to continue development <sup>46</sup>
Chad	Oryx	Onshore	OPIC Africa Corp.	2019	\$608	10,800	<b>Jan 2019:</b> Chinese HBP Group expected to complete commissioning by January 15 2020 <sup>47</sup>
Nigeria	Ubima	Onshore	Wester Ord Oil & Gas	2019	\$541	3,498	<b>Sept 2019:</b> Extended well tests expected in H2-19. Successful drilling in H1-19 increased 1P reserves to 6.2 million barrels
Nigeria	Gbetiokun	Onshore	NNPC	2019	\$366	35,527	<b>Sept 2019:</b> Output from three wells expected to increase to 16–17,000bpd in Q4 2019 <sup>48</sup>
Nigeria	Omerelu	Onshore	Niger Delta Petroleum Resources	2019	\$103	2,672	Peak flow expected in 2020

Crude and condensate production from Major Planner Projects by Key Companies (bpd, 2019 – 2025)



Source: Global Data

44. IHS Markit – February 2019  
45. Ministry of Finance – June 2019  
46. Offshore Engineer – August 2019  
47. O&G Links – January 2019  
48. Eland Oil & Gas – Press Release

## Project In Focus

## Gbetiokun, Nigeria

Gbetiokun is a greenfield development operated by NNPC, which has a 55 percent stake in the OML 40 licence (onshore Niger Delta). The remaining share is owned by Scottish independent Eland (20.25 percent) and Nigerian firm Starcrest (24.75 percent) through a joint venture called Elcrest. The field was first discovered in 1987, with appraisal wells drilled in the early 1990s. In August 2019, the field came on stream through an early production facility with a capacity of 12,000 bpd. The field has proven reserves of 21.5 million boe.

Elcrest acquired its OML 40 stake in 2012, following an auction by Shell, Total and Eni<sup>49</sup>. This sale was part of a wider divestment programme in which major IOCs sold participating stakes in multiple licences to indigenous companies. In a low-price environment, their low-cost business models have enabled them to invest in these licences at a time when majors are spending less.

The final development plan for Gbetiokun was approved in July 2019. Phase 1 includes plans for five oil production wells from deep reservoirs, three of which are scheduled for 2020. There are also plans for the installation of a new dedicated pipeline to link up

with the Forcados export system. Phase 2 will include six wells from the shallow reservoirs.

The project encountered delays in Q3-19 when the OES Teamwork rig which was being used had problems with its power and pumping capacities. Maintenance work was delayed due to logistical issues, so the company was forced to drill the Gbetiokun-3 well at a slower pace<sup>50</sup>. These challenges are expected to be resolved in Q4-19.

The Opuama field in OML 40 produces around 30,000 bpd with 2P resource of 44 mmbbls.



### GBETIOKUN

- NNPC (55%), Starcrest (24.75%), Eland (20.25%)
- \$366 million in CAPEX
- EPF on-stream August 2019 – 12,000bpd
- Three more production wells in 2020
- Peak flow of 35,000 bpd expected 2021
- 2P resource 38 mmboe

## Ororo, Nigeria

The offshore Ororo field is located in OML 95 (Niger Delta). London-listed independent firm Sirius Petroleum owns a controlling 40 percent stake in the licence which it also operates. The Ororo field was first discovered by Chevron in 1986. The original Ororo-1 well tested at 2,800 bpd but was never developed.

Sirius initially planned to drill two development wells (Ororo-2 and Ororo-3) between Q4-18 and Q1-19, in order to bring the field into production by Q1-19. However, the firm was affected by delays in acquiring the drilling equipment from two separate

service providers (first China Oilfield Services' COSL Force, then Shelf Drilling's Adriatic 1 jackup rig).

Under the terms of the OML licence, production needed to start at Ororo before May 1st 2019. In April 2019, amid delays to the delivery of the Adriatic 1 rig, Sirius applied for a licence extension to the Department of Petroleum Resource (DPR). **As of early October, the request has not yet been granted and drilling activity at the field has ceased.**

Sirius had partly funded its operations in OML 95 through an offtake pre-payment facility with

### ORORO

- Sirius Petroleum (40%), Guarantee Petroleum (30%), Owena Oil & Gas (27%)
- Operator currently awaiting licence renewal from DPR
- \$756 million CAPEX
- Peak flow of 8,700 bpd
- 2C resource 24 mmboe

BP Oil worth \$12 million (agreed in August 2017)<sup>51</sup>. As well as a \$20 million debt facility secured in January 2019 from an Africa-focused credit fund<sup>52</sup>. Both financing arrangements are dependant upon Sirius achieving certain production milestones. Therefore, the company and its partners will be watching closely for a licence renewal decision from the DPR in the coming months.

If the renewal is not granted, it could provide a significant opportunity for another E&P firm with a similar profile to enter or expand in the Niger Delta region.

49. The Chrome Group – March 2011  
50. Energy Voice – September 2019

51. Sirius Petroleum – August 2017  
52. Sirius Petroleum 2018 Annual Report

# Announced Oil Projects

## 1. Angola

**\$37.9 billion**  
**404,000 bpd**

### Cameia

Terrain: Offshore  
Operator: Sonangol  
CAPEX: \$6.2bn  
Start: 2025  
Peak Flow (bpd): 76,984

### Lucapa

Terrain: Offshore  
Operator: Cabinda  
CAPEX: \$5.8bn  
Start: 2023  
Peak Flow (bpd): 79,224

### Orca

Terrain: Offshore  
Operator: Sonangol  
CAPEX: \$8.1bn  
Start: 2023  
Peak Flow (bpd): 76,035

### PAJ Complex

Terrain: Offshore  
Operator: BP  
CAPEX: \$12.2bn  
Start: 2022  
Peak Flow (bpd): 97,999

### PCC Complex

Terrain: Offshore  
Operator: BP  
CAPEX: \$5.6bn  
Start: 2022  
Peak Flow (bpd): 74,205

**PROJECT TO WATCH**

BP is demonstrating its commitment to Angola through multiple new agreements with Sonangol. Most notably, in December 2018, the company announced that it was moving ahead with the deep offshore Platina project in Block 18, in which it owns a 50 percent stake. This marks phase 2 of the asset development: phase 1 started in 2007, with the Greater Plutonio FPSO. The Platina project will consist of a subsea tieback to the FPSO. FID was scheduled for the first half of 2019, with first oil planned for late 2021. It now seems likely that these milestones will be delayed until 2020 and 2022 respectively.

## 2. Ghana

### Pecan

Terrain: Offshore  
Operator: Aker  
CAPEX: \$4,400  
Start: 2022  
Peak Flow (bpd): 123,898

**PROJECT TO WATCH**

Norwegian firm Aker Energy is reviving Ghana's upstream sector with the Pecan discovery in Deepwater Tano Cape Three Points (DWT/CTP) block. In March, the firm submitted a \$4.4 billion phase 1 development plan for the ultra-deepwater project (around 8,000 ft). The company also recently completed its appraisal drilling programme. The Pecan South well could yield an additional 5–15 million boe. The field has total reserves of approximately 334 million bbl. Africa Finance Corporation provided \$100 million of financing to Aker in July through convertible bond notes, with an intention to participate in follow-on fundraising activities.

## 3. Senegal

### SNE

Terrain: Offshore  
Operator: Woodside  
CAPEX: \$7bn  
Start: 2022  
Peak Flow (bpd): 87,034

**PROJECT TO WATCH**

The deepwater SNE field was discovered in 2014 by UK independent Cairn but is now operated by Woodside Energy. In January 2019, Senegalese authorities approved a multiphase technical development and exploitation plan. Phase 1 will see the drilling of 23 production, gas and water injection wells and recover up to 230 million bbl using a FPSO facility (contracts for which have been awarded to Subsea Integration Alliance and MODEC International Inc). The partners, which also include FAR Ltd. (15%) and Petrosen (10%), are completing financing in 2019 before reaching FID in late-2019/early-2020, with first oil expected in 2022.

**\$96.9 billion in CAPEX**  
**1.3 million bpd**

## 4. Nigeria

**\$54.6 billion**  
**837,000 bpd**

### Bonga South West/Aparo

Terrain: Offshore  
Operator: Shell  
CAPEX: \$9.7bn  
Start: 2024  
Peak Flow (bpd): 143,274

**PROJECT TO WATCH**

Bonga Southwest/Aparo (BSWA) has the potential to boost Nigeria's daily production by nearly 10 percent. It would be the largest major deepwater project since Egina, which started in 2013 and came onstream in 2019. In February, Shell invited technical bids for phase 1 of the project. The development will include a new FPSO vessel and 20 deep-water wells, with a production capacity of 150,000 bpd. However, the \$10 billion project has encountered difficulties. The tendering process has been delayed twice already. While Shell and its partners are still in ongoing negotiations with the government over the PSC. FID is therefore unlikely before the second half of 2020.

### Bosi

Terrain: Offshore  
Operator: Exxon  
CAPEX: \$6.2bn  
Start: 2022  
Peak Flow (bpd): 126,784

### Nsiko

Terrain: Offshore  
Operator: Star Ultra Deep Petroleum  
CAPEX: \$8.2bn  
Start: 2023  
Peak Flow (bpd): 95,685

### Owovo West

Terrain: Offshore  
Operator: Esso  
CAPEX: \$8.2bn  
Start: 2024  
Peak Flow (bpd): 138,301

**PROJECT TO WATCH**

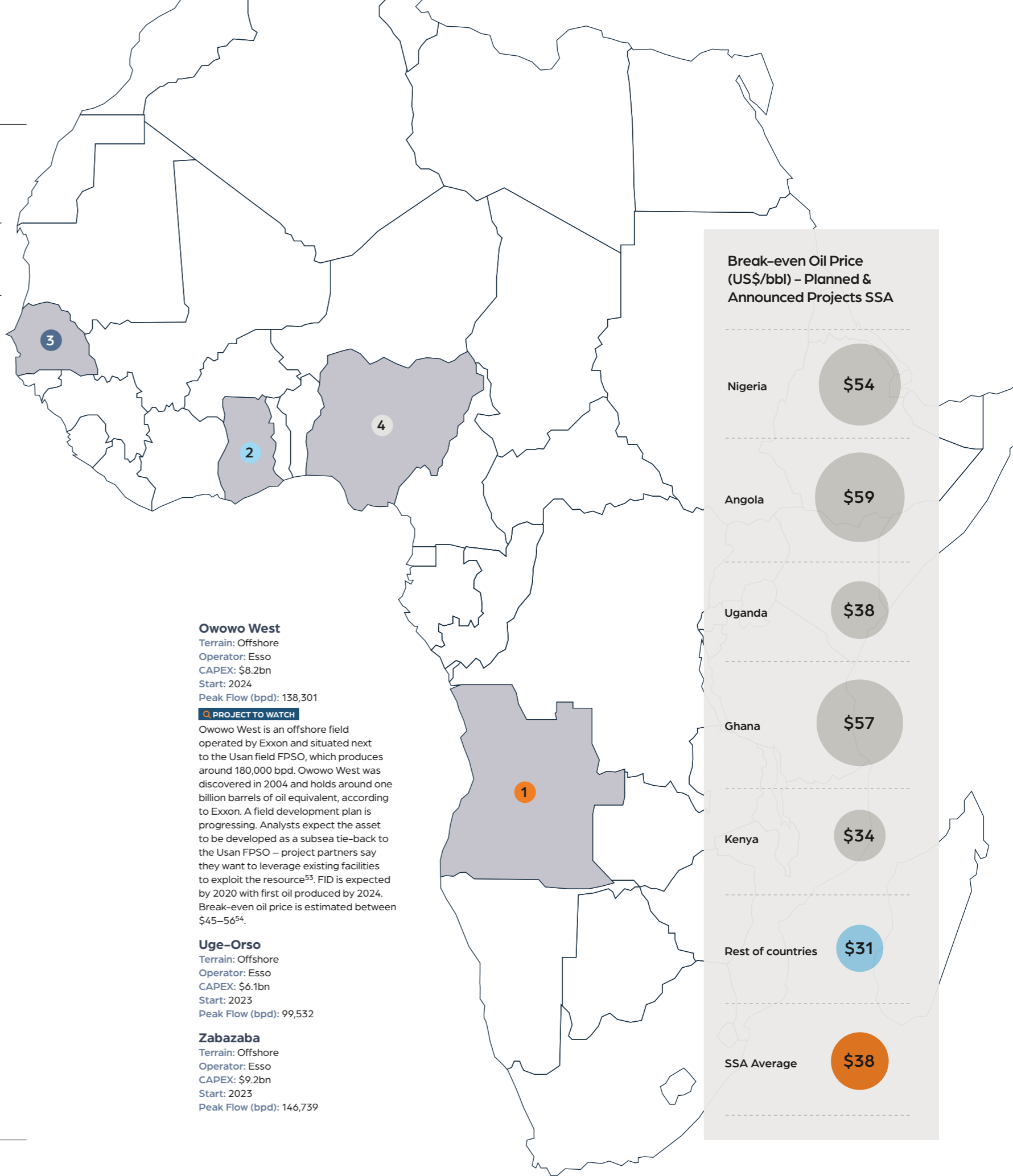
Owovo West is an offshore field operated by Exxon and situated next to the Usan field FPSO, which produces around 180,000 bpd. Owovo West was discovered in 2004 and holds around one billion barrels of oil equivalent, according to Exxon. A field development plan is progressing. Analysts expect the asset to be developed as a subsea tie-back to the Usan FPSO – project partners say they want to leverage existing facilities to exploit the resource<sup>53</sup>. FID is expected by 2020 with first oil produced by 2024. Break-even oil price is estimated between \$45–56<sup>54</sup>.

### Uge-Orso

Terrain: Offshore  
Operator: Esso  
CAPEX: \$9.2bn  
Start: 2023  
Peak Flow (bpd): 99,532

### Zabazaba

Terrain: Offshore  
Operator: Esso  
CAPEX: \$9.2bn  
Start: 2023  
Peak Flow (bpd): 146,739

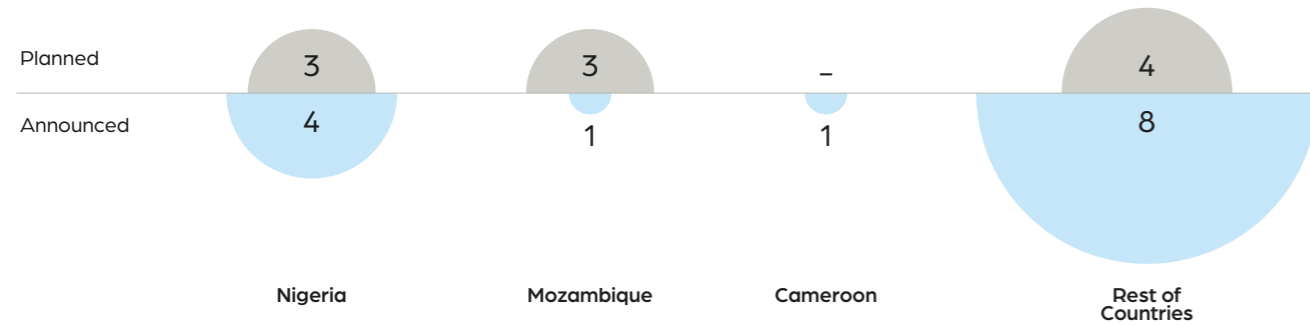


53. Total – Company Presentation  
54. Rystad Energy / Global Data



# Investment Outlook – Gas

Major Planned and Announced Gas Counted by key countries in SSA (2019–2025)



Source: Global Data

The investment outlook for gas is very positive. There are currently 24 projects under-development across sub-Saharan Africa, ten of which have achieved final investment decision (i.e. planned).

IOCs have committed \$44 billion in capital expenditure to the region. Mozambique accounts for nearly 80 percent of that investment, as the country's gas sector finally kicks into production gear after years of

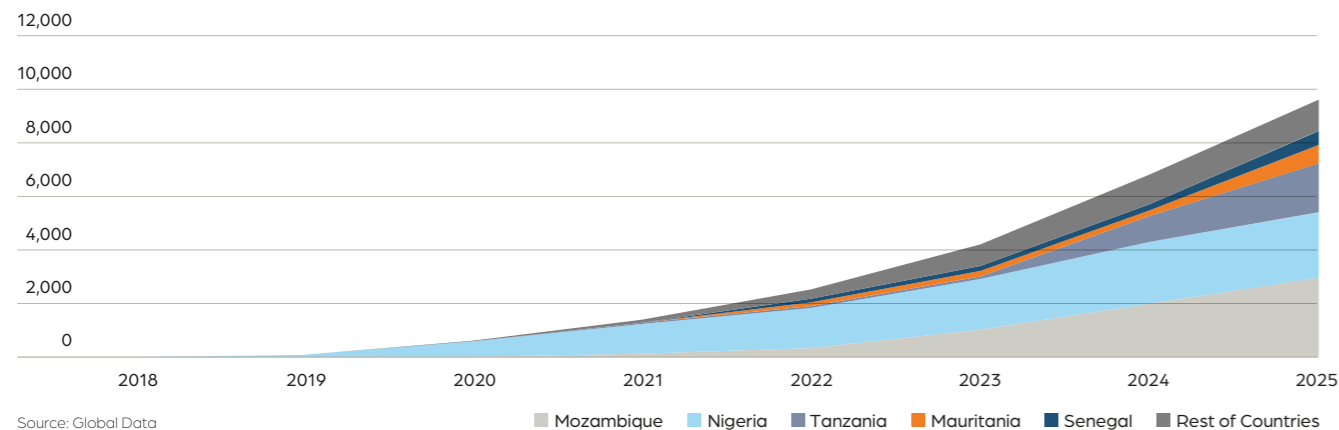
delay. Nigeria will see more modest investment of around \$1.7 billion but there are multiple projects worth nearly \$5 billion (led by Eni/Shell) that could achieve FID in the coming years and expand its production capacity.

Of the 14 announced projects, the Mamba Complex LNG project in the Rovuma Basin (Mozambique) is the most significant. Development CAPEX is projected at over \$30 billion, with production capacity of

**\$43.9 bn in CAPEX**  
**3,651 mmcf/d**

15.2 mtpa; FID is expected in early 2020. Other announced projects cover Tanzania, Congo Brazzaville, South Africa, Cameroon, and Mauritania with a combined CAPEX value of \$53 billion.

Total Gas Production from Major Planned Projects by Key Countries in SSA (mmscf/d, 2019 – 2025)

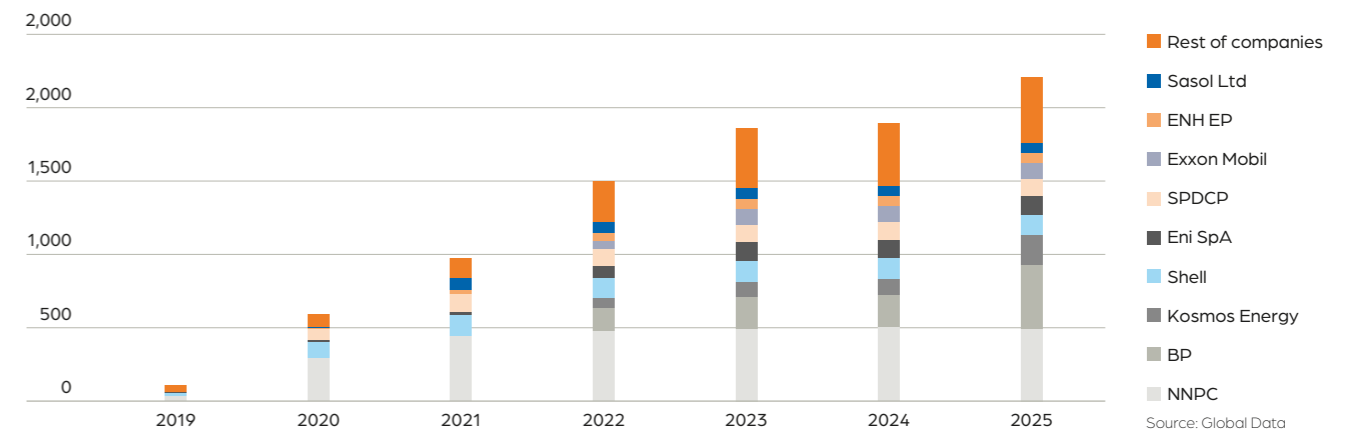


Source: Global Data

Planned Gas Projects

COUNTRY	PROJECT	TERRAIN	OPERATOR	START	CAPEX (\$ US, MIL)	PEAK PRODUCTION (MMCF/D)	CURRENT STATUS
Mozambique	Coral South	Offshore	Eni	2022	9,937	450	<b>Sep-19:</b> Projected expected to reach 60% completion by end of 2019. Smit Lamnalco wins \$200m contract to provide marine services
Senegal	Tortue	Offshore	BP	2022	2,540	400	<b>Sep-19:</b> Contracts awarded for EPCIC of FPSO, SURF and SPS. Project partners add a 'world class resource' discovery at nearby Yakaar-2 (Senegal)
Mauritania	Tortue	Offshore	BP	2022	2,676	400	
Nigeria	Ohaji South	Onshore	Seplat Petroleum	2020	2,431	300	<b>Apr-19:</b> Project partners raising \$700m to fund part of the \$2.4bn project
Nigeria	Assa North	Onshore	Shell	2020	1,825	226	
Nigeria	Southern Swamp fields	Onshore	Shell	2019	1,027	243	<b>Apr-19:</b> Project under construction (linked to Forcados Yokri Integrated Project)
Mozambique	Inhassoro-Temane East Complex	Onshore	Sasol	2020	766	116	Peak flow expected in 2021
Tanzania	Ntorya	Onshore	Ndovu Resources	2021	485	93	<b>Sep-19:</b> Majority stakeholder Aminex (75%) completing a \$40 million farm out with Ara Petroleum. Preparing to drill Ntorya-3 (Chikumbi-1)
Mozambique	Golfinho-Atum Complex (Area 1)	Onshore	Total	2024	22,284	1,423	<b>Sep-19:</b> Total completes \$3.9bn takeover of Anadarko

Gas Production from Major Planned Projects by Key Companies (mmcf/d), 2019–2025



Source: Global Data

## In Focus: African Gas

## Floating Gas Takes Flight



**JOEL SAM** IS AN INDEPENDENT RESEARCHER AND FOUNDER OF ACUITY AFRICA ASIA. HIS WORK COVERS IN FDI ACROSS MENA, WITH A FOCUS ON DEAL STRUCTURES AND ENERGY. HE HOLDS DEGREES FROM THE UNIVERSITY OF CAMBRIDGE AND THE LONDON SCHOOL OF ECONOMICS.

Hilli Episeyo is the world's first converted floating liquefied natural gas (FLNG) vessel. Located offshore Cameroon, it was transformed from a 1970s-built tanker at a cost of \$1.2 billion. It has four liquefaction units and is operated by Golar LNG, who receive an operator (or tolling) fee based on output.

Hilli Episeyo is a much smaller project – in terms of cost and output – than traditional onshore green- or brownfield LNG facilities, such as the upcoming Mozambique LNG project (\$20 billion; 12.9 mtpa) or Nigeria LNG Train 7 (\$10 billion; 8 mtpa). The leasing model is also a departure from that of first generation FLNG projects, such as ENI's Coral Sul, which had an approximate 60:40 debt-to-equity ratio on \$6-8 billion in CAPEX.

#### Agile Business Model

Golar LNG is planning to push its toll-operator model aggressively in 2020. Through liquefaction tolling agreements (LTA), the company supplies and operates refitted FLNG facilities, rather than developing them as assets to be purchased. This agile business model helps to de-risk the CAPEX element of the FID for project stakeholders. Compare Cameroon's Hilli Episeyo with the Fortuna FLNG project in Equatorial Guinea. In the latter case, Ophir Energy failed to secure \$1.2 billion

to build its own offshore vessel. As a result, the government decided not to renew the firm's licence, which led to a \$300 million impairment and subsequent takeover.

Golar LNG, on the other hand, was able to secure 80 percent of the construction financing from Fortune Lianjiang Shipping (a subsidiary of China State Shipbuilding Corporation) using a sale and leaseback structure. The arrangement effectively positions Fortune Lianjiang as lessor and Golar as bareboat charterer, with oil firm Perenco and Cameroon's state-run Societe Nationale des Hydrocarbures (SNH) as final clients. As a bareboat charterer, Golar assumes the operational costs of the vessel, which were \$29.1 million in Q4-2018.

Golar's management has said that tolling receipts from the Cameroon facility will generate \$164 million in EBITDA per year, with approximately \$45 million in operating cash flow, subject to oil price changes<sup>56</sup>. And that every additional dollar in Brent Crude prices between \$60.00 per barrel and the contractual ceiling will yield additional annual operating cash flows of approximately \$3 million.

#### POLITICAL SUPPORT

It must be acknowledged, however, that political will is foundational

for these projects to flourish. With smaller CAPEX outlays, governments seeking the more impactful optics and local content opportunities of onshore LNG might be deterred from FLNG. This is currently the case in Equatorial Guinea, where the administration wants to utilise offshore pipelines to develop Fortuna as part of a regional hub. However, the availability of capital can act as a limiting force on political priorities.

Aside from CAPEX, key considerations for potential FLNG developers include technical implementation risk and long-term LNG prices. By being late adopters of gas monetization strategies and early adopters of unproven technologies, countries like Cameroon and Mauritania find themselves with the unexpected upside of evolving into highly competitive global producers. Table 1 shows how rapid innovation in SSA is driving down the \$/mtpa ratio relative to other regions.

#### OPTIMISTIC OUTLOOK

FLNG is not without its operational and strategic challenges but it has a bright future as the key to unlocking the dollar potential of offshore, stranded gas reserves and monetizing associated natural gas.

Looking out to 2020 and beyond, the successful launch of Golar's

FLNG technology has the potential to raise the upper limit of short-term export growth forecasts in Africa. The project has significantly de-risked the technology while demonstrating a route to market which is realistic for fiscally challenged host governments and mitigates a substantial portion of the cost risk for field developers.



PROJECT	LEAD	STATIONED	ESTIMATED CAPEX	CAPACITY (MTPA)	COST PER MTPA
PLNG	Petronas	Malaysia/Indonesia	\$10 billion	1.2	\$8,333
Prelude FLNG	Shell	Western Australia	\$11.7 billion <sup>56</sup>	3.6 <sup>57</sup>	\$3,250
Coral Sul FLNG	Eni	Mozambique	\$8 billion <sup>58</sup>	3.4 <sup>59</sup>	\$2,352 <sup>60</sup>
Golar Hilli Episeyo	Golar	Cameroon	\$1.2 billion	2.4	\$500

Source: Offshore Technology, author analysis

56. ESI Africa | August 2019

57. The facility capacity is a minimum 3.6mtpa of LNG, 1.3mtpa of natural gas condensate, and 0.4mtpa of liquefied petroleum gas, according to Offshore Technology

58. Offshore Technology | September 2018

59. Eni website

60. <https://www.spe.org/en/print-article/?art=4104>

# Announced Gas Projects

## 1. Mauritania

### BirAllah

Operator: BP  
Start: 2025  
CAPEX: \$18.5bn  
Peak Flow (mmcf/d): 660

#### PROJECT TO WATCH

According to BP estimates, the Greater BirAllah discovery offshore Mauritania is thought to hold up to 60 tcf of gas (initially in place). In February, BP's upstream chief Bernard Looney emphasised the impressive potential of the region to develop into a "major new LNG hub"<sup>61</sup>. He also pointed out that there was no visible cost inflation in the global LNG sector despite a slew of recent FIDs. Following a 2019 appraisal programme, these are all positive indications that will feed into BP's long-term strategic planning in 2020. Kosmos Energy is reducing its stake in the adjacent Greater Tortue Anheym discovery in order to focus on developing BirAllah (and Yakaar-Teranga, offshore Senegal)<sup>62</sup>.

## 2. Nigeria

### Gbaran Phase 3

Operator: Shell  
Start: 2022  
CAPEX: \$1.5bn  
Peak Flow (mmcf/d): 249

### Samabri-Biseni

Operator: Eni  
Start: 2020  
CAPEX: \$1.1bn  
Peak Flow (mmcf/d): 285

### Uzu

Operator: Shell  
Start: 2022  
CAPEX: \$1.2bn  
Peak Flow (mmcf/d): 286

## 3. Ethiopia

### Hilala Complex

Operator: POLY GCL Petroleum  
Start: 2023  
CAPEX: \$3.6bn  
Peak Flow (mmcf/d): 398

## 4. Cameroon

### Etinde

Operator: New Age Cameroon Offshore Petroleum  
Start: 2022  
CAPEX: \$2.7bn  
Peak Flow (mmcf/d): 231

#### PROJECT TO WATCH

The Etinde permit includes multiple hydrocarbons, including oil, condensate and gas. In 2018, British operator New Age (37.5% stake) conducted an appraisal drilling programme in the area which delivered 2P resource of 1 tcf of wet gas. Drilling data has been evaluated throughout 2019 to determine the optimal development strategy. Current plans lean toward a liquids-focused development with lower gas production volume, possibly used for domestic power generation and LNG exports<sup>63</sup>. The current \$2.7 billion CAPEX projection is also likely to be lower. In September, New Age completed a \$800m sale of its stake in the Marine XII permit (Congo Brazzaville), which should generate extra cash to fund its Cameroon operations<sup>64</sup>.

## 5. Congo Republic

### Nkala Marine

Operator: Eni  
Start: 2022  
CAPEX: \$0.7bn  
Peak Flow (mmcf/d): 109

## 6. Tanzania

### Block 1

Operator: Shell  
Start: 2024  
CAPEX: \$13.3bn  
Peak Flow (mmcf/d): 1,027

### Block 4

Operator: Shell  
Start: 2024  
CAPEX: \$9bn  
Peak Flow (mmcf/d): 513

#### PROJECT TO WATCH

Royal Dutch Shell owns a 60 percent stake in Blocks 1 and 4, offshore Tanzania. Following its acquisition of Ophir Energy in 2019, MedcoEnergi holds a 20 percent stake in both blocks, along with Pavilion Energy. Several IOCs are locked in ongoing negotiations with the government to agree commercial terms for the development of major projects to proceed. Upwards of \$30 billion worth of investment is riding on these negotiations. Talks were meant to be finalised in September but could continue throughout Q4-19. Assuming a positive resolution of these negotiations, FIDs are unlikely before the end of 2020.

## 7. Mozambique

### Mamba Complex

Operator: Mozambique Rovuma Venture  
Start: 2024  
CAPEX: \$30bn  
Peak Flow (mmcf/d): 1,000

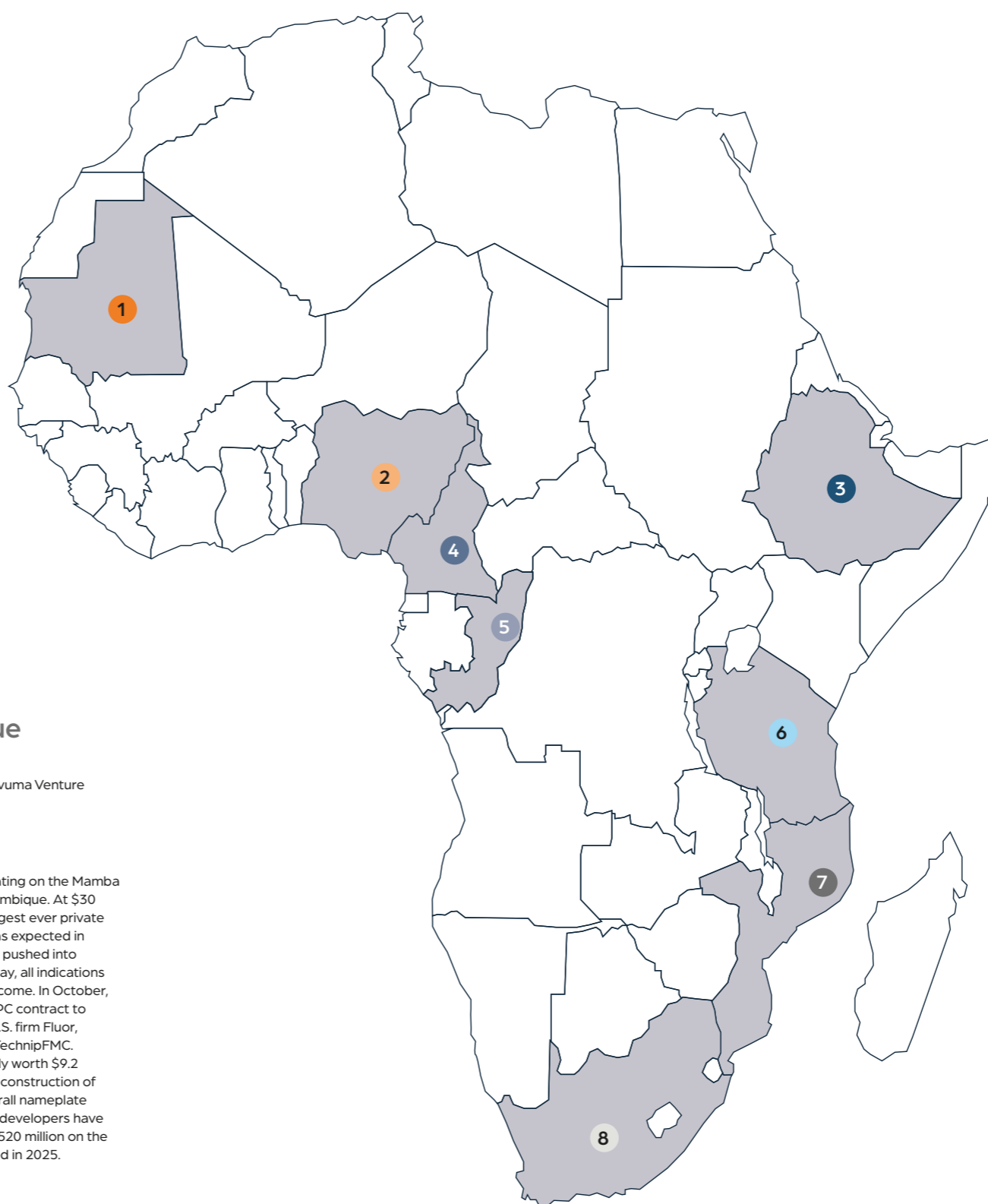
#### PROJECT TO WATCH

Exxon and Eni are collaborating on the Mamba LNG project offshore Mozambique. At \$30 billion, it is set to be the biggest ever private investment in Africa. FID was expected in late-2019 but this has been pushed into early-2020. Despite the delay, all indications point toward a positive outcome. In October, Exxon awarded the main EPC contract to a consortium made up of U.S. firm Fluor, Japan's JGC and France's TechnipFMC. The agreement is reportedly worth \$9.2 billion<sup>65</sup> and will include the construction of two trains providing an overall nameplate capacity of 15.2 mtpa. The developers have also committed to spend \$520 million on the project. First gas is expected in 2025.

## 8. South Africa

### Ibhubesi

Operator: Sunbird Energy  
Start: 2020  
CAPEX: \$1.9bn  
Peak Flow (mmcf/d): 82



### Break-even gas price (US\$/mcf) – Planned & Announced Projects SSA

Mozambique \$3.90

Tanzania \$6.70

Nigeria \$3.00

Mauritania \$9.30

Senegal \$4.80

Rest of countries \$3.10

SSA Average \$4.20

61. S&P Global Platts – February 2019

62. Offshore Engineer – May 2019

63. Offshore Magazine – May 2019

64. Offshore Engineer – September 2019

65. Energy Voice – October 2019



## LNG2Africa

Equatorial Guinea's Port of Akonikien is set to become a hub for the regasification and regional export of liquefied natural gas (LNG). LNG2Africa is an initiative spearheaded by the continent's fourth largest hydrocarbons producer which seeks to develop small-scale LNG projects to supply African gas to countries with limited infrastructure.

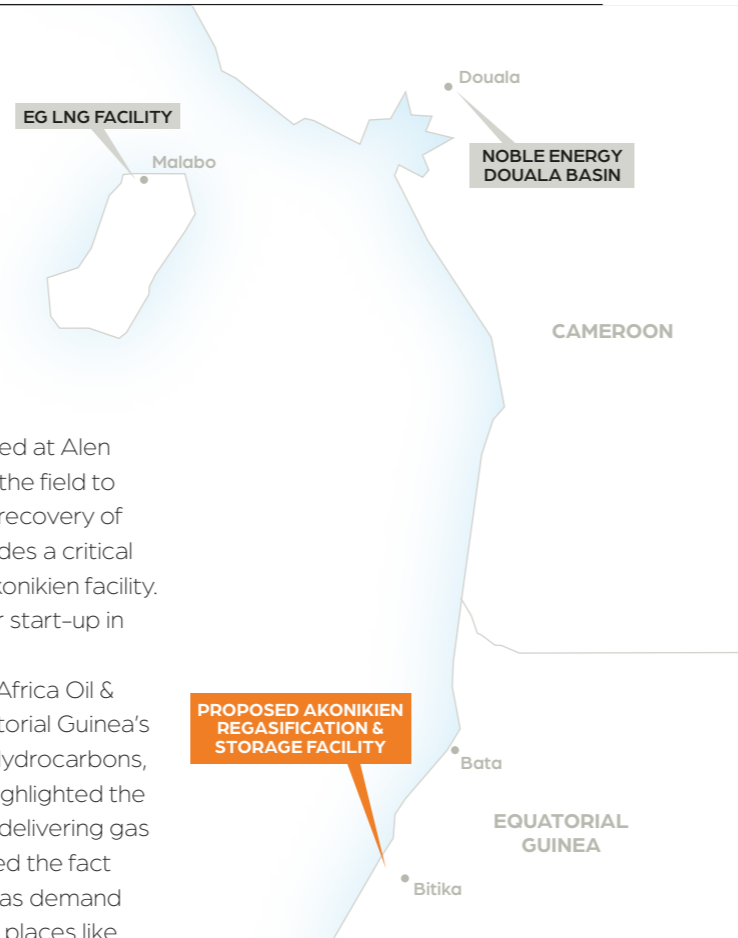
The storage and regasification plant facility at Akonikien is the cornerstone of this initiative. It will be West Africa's first facility of this nature, distributing natural gas to various industries on the mainland and further afield, to countries with the infrastructure to enable LNG import. Nameplate storage capacity is 14,000 cubic meters with 12 bullet tanks. Two German companies, ESC Engineers and Noordtec, have worked alongside local contractor, Elite Construcciones, on the design, development and construction of the facility<sup>66</sup>.

Alongside the Akonikien plant is Noble Energy's Alen Gas Project (AGP). In April 2019, the Texas-based upstream company sanctioned a gas monetization project which will see offshore gas produced at the Alen field sent to the EG LNG production plant located at Punta Europa, Bioko Island. The plant has a nameplate capacity of 3.7 mtpa.

At present, gas produced at Alen is being reinjected into the field to support the enhanced recovery of liquids. This move provides a critical gas resource for the Akonikien facility. The project is slated for start-up in the first half of 2021.

Speaking at 2019's Africa Oil & Power gathering, Equatorial Guinea's Minister of Mines and Hydrocarbons, Gabriel Obiang Lima, highlighted the role of infrastructure in delivering gas across Africa. He decried the fact that, despite growing gas demand across the continent, in places like Nigeria and South Africa, it was not possible to "send one single shipment of LNG to any single African country... because there is no regasification plant of that size."<sup>67</sup>

It's clear that the success of LNG2Africa depends on countries across the continent investing in the necessary infrastructure. South Africa's proposed Richards Bay import terminal is an example of the development which Equatorial Guinea's policymakers would like to see more of. "South Africa needs a lot of gas," says Lima. "There is bigger and growing demand, even in Nigeria. So, the market is there, but the biggest problem for every single African country is...[that] we do not have the infrastructure to receive our LNG."



MINISTER LIMA  
SPEARHEADS  
LNG2AFRICA



Source: Ministry of Mines and Hydrocarbons,  
Equatorial Guinea



66. Hydrocarbon Engineering – August 2019

67. <https://www.youtube.com/watch?v=U3HsXNYq3Ko&feature=youtu.be>



