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The State of African Energy

2024 Outlook Report



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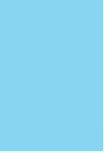
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Key Highlights

- 2023 – 2024 free cash flow and government take evolution in Africa expected to stay relatively flat after steep drop from 2022 to 2023
- Flat free cash flow generation between 2023 – 2024 attributed to stable commodity prices and flattish investment profile in the continent
- National Oil Companies (NOCs) and international oil majors lead the way in free cash flow generation for 2023 – 2024
- 2023 – 2024 annual government take expected to see a 25% drop from 2022 levels but still well over the pandemic period
- 2024 global oil + condensates output expected to be marginally higher than 2023 with Middle East and the Americas driving majority of short-term supply
- Growing road transport and Petrochemical sectors estimated to be the main demand drivers over the next 18 months
- Average stock change or demand vs supply balance over 2H-2023 is expected to be about 2.15 million bpd while 2024 is expected to be much tighter with difference reduced down to about 1 million bpd
- African Organization of the Petroleum Exporting Countries (OPEC) member nations are expected to be the key drivers of Africa's oil + condensates 2023 – 2024 output
- NOCs and majors form the main company segments in terms of working interest liquids production
- Production declines and outages in major OPEC members have led to 100% compliance to OPEC cuts become a compulsion rather than being a choice
- Various production disruptions, both planned and unplanned, are estimated to result in production losses of close to 215,000 bpd over 2023
- OPEC member nations' contribution to African output estimated to remain dominant even in the long-term
- Global gas supply expected to be driven mainly by North America, Middle East, Asia and Russia
- Global gas and liquified natural gas (LNG) demand expected to outrun the supply from currently producing fields and balance largely dependent on newer projects and currently undeveloped discoveries
- Africa joins the top four gas producers to round off the top five LNG exporters globally
- North Africa expected to pump majority of the natural gas supplies while West Africa expected to drive the LNG flows from Africa
- Global upstream spending potential going strong despite industry sentiment of underinvestment
- Potential greenfield spending in the United States, Africa, Asia and Middle East expected to drive a quarter of the overall spending through 2023 – 2030
- Liquid supply potential relatively lower than previous outlook and gas potential marginally higher
- Brent 2023 – 2024 outlook higher than previously estimated
- NOCs and majors – key driving forces behind Africa' short-term supplies, hydrocarbon potential, medium-term production and spending



- Total CAPEX over 2023 – 2030 expected to remain the same as last outlook with differences in timeline of spending
- North and West Africa expected to drive bulk of the cumulative as wells as annual spending through the period
- Liquids remain the key focus and equal split between onshore and offshore spending expected
- Majority of the spending, especially through the second half of the decade, expected to come from currently pre-FEED discoveries
- Nigeria, Libya, Algeria, Angola and Mozambique – the top five spenders over the period & NOCs and majors estimated to incur two-thirds of the total CAPEX
- Actual CAPEX spending forecast closer to “Mean” scenario which models the global warming cap at 2°C
- Drilling and rig demand on the rise till 2024 before assuming a declining trend
- Majority of the rig demand robust with only about 32% based on contingent volumes
- Healthy levels of exploration drilling expected over 2023 – 2025 with Algeria, Egypt, Namibia and Nigeria driving majority of the activity
- 11 high impact wells (HIWs) to be drilled in the next 15 months
- 177 blocks up for grabs as licensing rounds across Africa with to-be-awarded status expected to close in the next 18 months
- Liquids portfolios and majority producing assets driving mergers and acquisitions (M&A) activity so far in 2023
- Africa’s hydrocarbon extraction emissions in the “mid-range” when compared to other regions, but natural gas flaring emissions intensity the highest globally
- Limiting natural gas flaring and utilization and/or monetization of produced natural gas – key to Africa’s upstream sector’s betterment
- Post COP27 exploration acreage awards – Africa accounting for 30% of the global offshore acreage awarded
- Africa expected to have the least potential greenfield spending probability - the ratio between actual spending and potential spending
- Total exploration spend over 2015 – 2025 and discovered volumes over 2019 – 2023 – South America double of that of Africa
- Africa’s overall electricity access rates – significantly lower than global levels and even worse in rural Sub-Saharan Africa
- Majority of projects to improve the regional power capacity currently at concept stage
- Renewables capacity to be driven majorly by solar and onshore wind capacity, with hydrogen taking the growth further during the 2030s
- Onshore wind and solar expected to drive three-fourths of the total renewables capacity in Africa through to 2040, and along with hydrogen capacity drive over 95% of the capacity through 2030s
- Egypt, Morocco, Mauritania and South Africa – key regional renewables capacity drivers
- Natural gas to play a role in Africa’s power mix even in 2050
- European banks, with a negative CAGR in fossil fuel financing in the past few years and strict climate policies, are more prone to fund green projects over upstream projects

1 INDUSTRY REVIEW

1.1 Positive free cash flows expected globally in the short-term

2023 – 2024 free cash flow and government take evolution in Africa expected to stay relatively flat after steep drop from 2022 to 2023

Flat free cash flow generation between 2023 – 2024 attributed to stable commodity prices and flattish investment profile in the continent

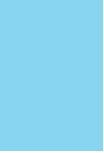
National Oil Companies (NOCs) and international oil majors lead the way in free cash flow generation for 2023 – 2024

2023 – 2024 annual government take expected to see a 25% drop from 2022 levels but still well over the pandemic period

COVID-19 wreaked global havoc and shook the oil and gas industry with oil products' demand seeing drastic drop and oil prices seeing record lows. Post the pandemic, 2022 proved to be yet another extraordinary year for the oil and gas industry as Russian aggression on Ukraine snowballed into multiple decisions taken across the industry and across the globe which are expected to leave a long-term impact. The European Union (EU) decided to cut hydrocarbon import ties with Russia in opposition to the attack on Ukraine; the volatile market led to major players revisiting their investment strategies; and most importantly, the global discussion around energy transition and climate increased beyond any point in the past with gradual upstream investment cuts and simultaneous increased focus on renewables becoming the crux of looking at future of energy industry as a whole.

2022 saw the pandemic impact

lessening and Brent surpassing the US\$90 per barrel mark leading to an initial 2022 average price assumption of US\$70 per barrel. However, the Russia – Ukraine conflict eventually led Brent reaching US\$139 per barrel in intraday trading and eventually settling at close to US\$100 per barrel average for 2022. Since then, while markets settled down relatively and actions from various players led to Brent dropping down to sub US\$85 per barrel mark and expected to stay relatively flat around that mark for the years 2023 – 2024. The free cash flow generation for the years is a mere reflection of this with operators seeing lesser free cash flows driven by lesser revenues due to lesser average oil prices. An observation of the trend of global free cash flow generated per barrel of oil equivalent (boe) suggests all continents are expected to generate positive free cash flows going forward.



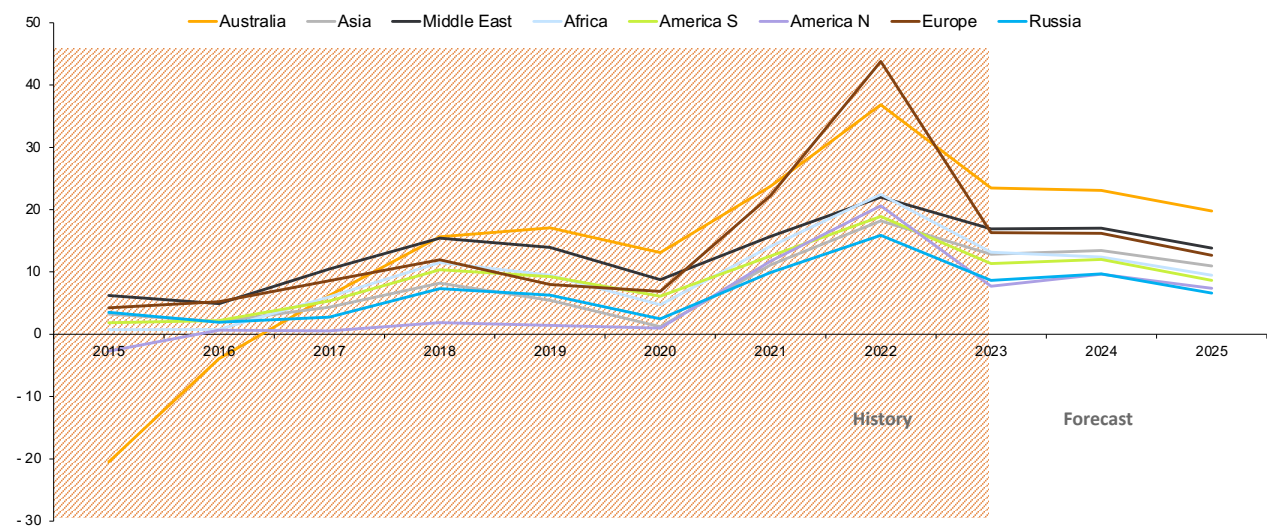
This is in line with the upstream cost cuts expected going forward in the short-term. It is to be noted that the higher investment activities in Australia and United States (US) were responsible for the negative cash flows in the

period from 2012 to 2015, however major investments in the past and delayed sanctioning activity have returned the continents to a positive free cash flow position. Australia is expected to generate maximum free cash flows with

a significant margin in the short-term, around US\$20 – US\$23 per boe over the period 2023 – 2025. As the next investment cycle starts, free cash flow generation is expected to decline gradually in the short-term.

Industry review

Upstream FCF evolution per continent (USD/boe nominal)



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Source: Rystad Energy UCube

1.2 Africa short-term free cash flow evolution in line with global trend

Africa is more in line with other continents with respect to the free cash flows evolution in the short-term and all the African projects are expected to generate a cumulative free cash flows of around US\$55 billion in 2023, roughly in line with the pre-pandemic levels of 2018. The bounce back from the pandemic shockwave of 2020 has led to free cash flow generation increase from 2020 lows of under US\$20 billion to close to US\$95 billion in 2022. The oil price drop and upstream spending strategy revisions have resulted in 2023 levels drop down to around US\$55 billion and

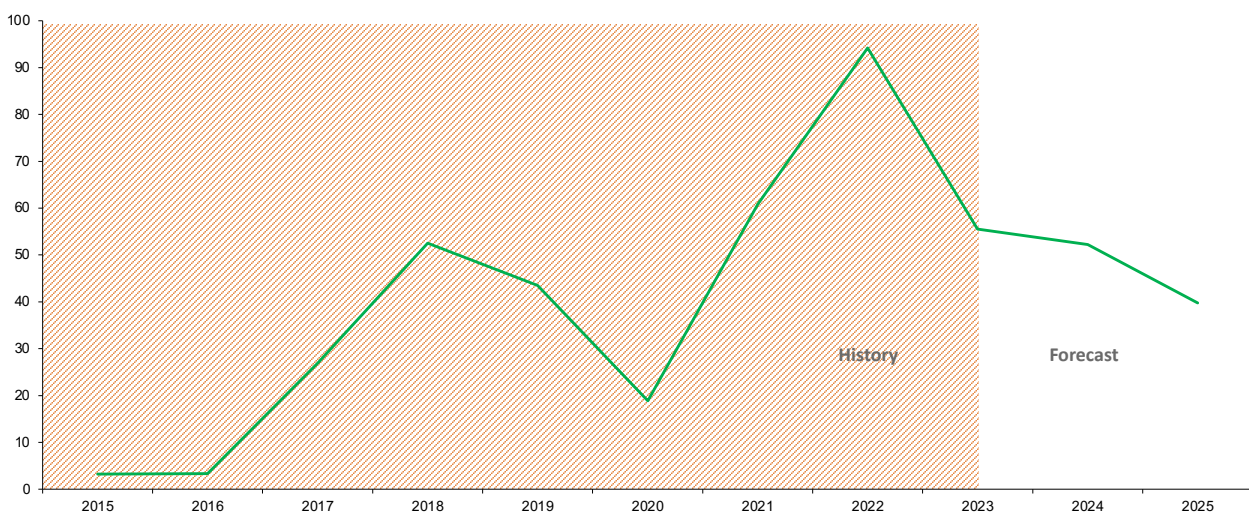
2024 expected to stay at relatively flat at just over US\$52 billion. 2022 seems to have recorded the highest free cash flow in the first half of this decade with 2025 dropping further down to about US\$40 billion

The top 10 companies for the years 2023 – 2024 in terms of free cash flow generation in Africa comprise of a group of NOCs like Algeria’s Sonatrach, NOC (Libya) and Nigeria’s Nigerian National Petroleum Corporation Limited (NNPC Ltd.) and Angola’s Sonangol; and majors like Eni, TotalEnergies, ExxonMobil,

Chevron, Shell, BP and Azule Energy (Eni – BP joint venture (JV) in Angola). While recovery in production is the key driver behind Libya’s NOC being one of the top free cash flow generators in Africa, stakes in most producing blocks in Algeria or partnering with majors on multiple producing blocks in Nigeria and Angola are the drivers behind these countries’ respective NOCs stand in the list of Top 10 free cash flow generators in Africa. Commodity prices is the key reason behind majors generating high free cash flows and their fluctuating respective standings in the top 10.

Industry review

Upstream FCF evolution and forecast to 2025, Africa (Billion USD)

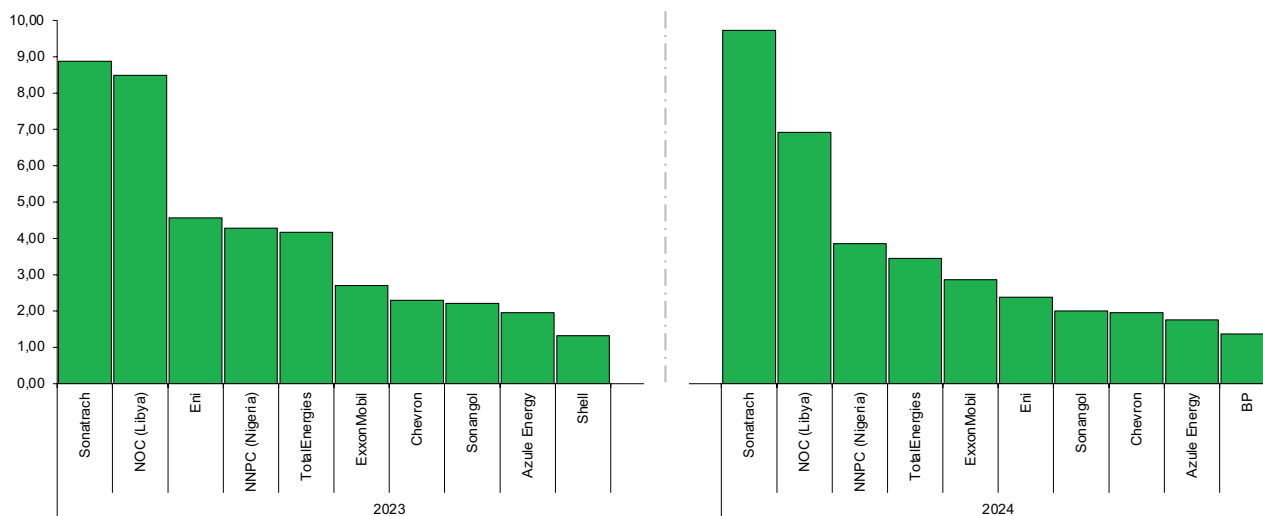


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Source: Rystad Energy UCube

Industry review

Top 10 companies by 2023 and 2024 FCF in Africa (Billion USD)



Source: Rystad Energy UCube

1.3 2023 government take in Africa at 75% of 2022 levels

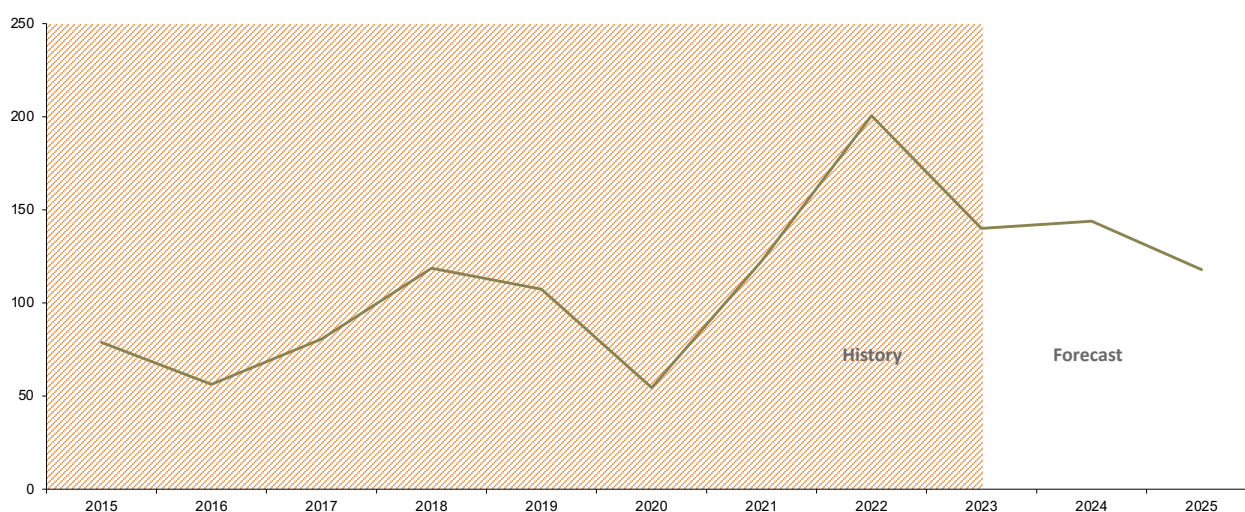
Government take includes various tax parameters such as royalties, profit oil and other taxes paid to the government on an asset level as well as on corporate level by the operators. The government take can vary on different parameters such as production, profitability

and commodity prices etc., depending on the fiscal regimes of the respective countries. Higher revenues mean higher taxes and hence, higher government take. As such, as higher commodity prices have resulted in higher revenues and in turn higher government take in 2022,

lower and relatively flat oil prices mean relatively lower and flat upstream revenues for the years 2023 – 2024 and in turn lower and flat government take for both the years. While government take in Africa exceeded US\$200 billion in 2022, it is expected to be around US\$140 billion – US\$ 145 billion over the years 2023 – 2024. It is to be noted this is still higher than the volatile market period past 2014 price crash and the volatile market during the global pandemic.

Industry review

Government take evolution and forecast to 2025, Africa (Billion USD)



Source: Rystad Energy UCube

2 OIL MARKETS REVIEW

2024 global oil + condensates output expected to be marginally higher than 2023 with Middle East and the Americas driving majority of short-term supply

Growing road transport and Petrochemical sectors estimated to be the main demand drivers over the next 18 months

Average stock change or demand vs supply balance over 2H-2023 is expected to be about 2.15 million bpd while 2024 is expected to be much tighter with difference reduced down to about 1 million bpd

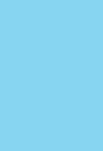
African Organization of the Petroleum Exporting Countries (OPEC) member nations are expected to be the key drivers of Africa's oil + condensates 2023 – 2024 output

NOCs and majors form the main company segments in terms of working interest liquids production

Production declines and outages in major OPEC members have led to 100% compliance to OPEC cuts become a compulsion rather than being a choice

Various production disruptions, both planned and unplanned, are estimated to result in production losses of close to 215,000 bpd over 2023

OPEC member nations' contribution to African output estimated to remain dominant even in the long-term



2.1 Global short-term liquids supply: Driven by Middle East and the United States

2023 saw various key drivers like the OPEC supply cuts, Saudi Arabia’s individual pledge on the cut extension and renewed optimism around the Chinese stimulus and demand that can impact the global liquids (oil + condensates) output in the short-term. Overall, 2023 global average supply is estimated to reach about 82.75 million barrels per day (bpd). Middle East, a region as a whole, and the US are expected to drive over half the output with Middle East adding up to 32% and

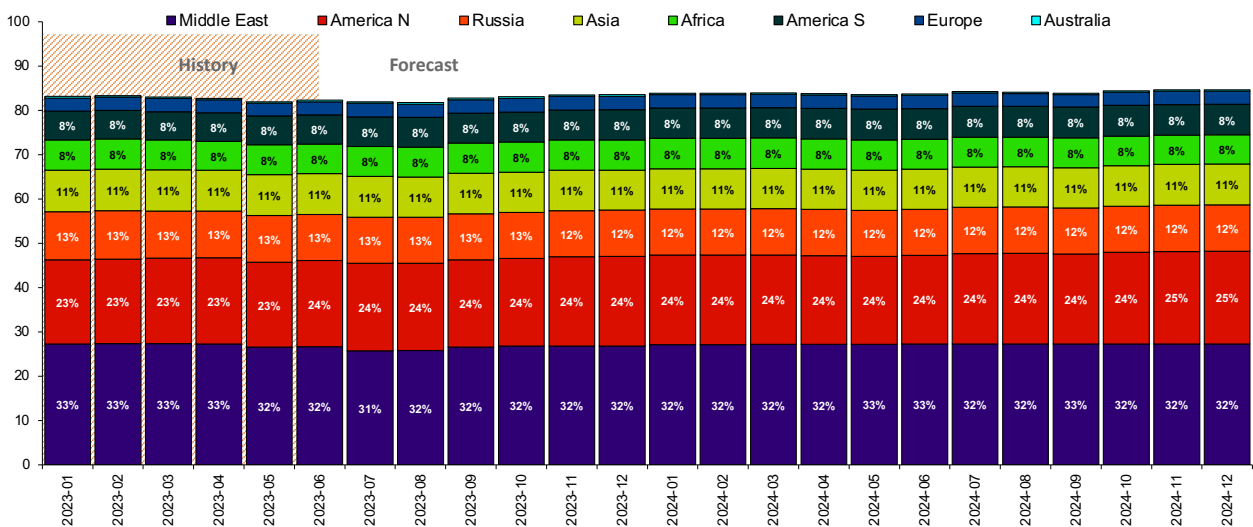
North America pumping 24% of the annual volume.

The outlook for 2024 is a slightly higher output of just over 84 million bpd, a 1.6% year-on-year (YoY) increase over 2023. Middle East and North American Shale are expected to drive over 55% of the total output for 2024 as well. 2023 – 2024 oil + condensates output from Middle East and North America is expected at 26.76 million bpd – 27.26 million bpd and 19.56 mil-

lion bpd – 20.32 million bpd respectively. The Americas, both north and south combined, are expected to see a marginal 4% growth in output YoY while Middle East is expected to see an even smaller 2% YoY growth over 2023 output. Africa 2023 – 2024 output is expected to stay relatively flat at about 6.77 million bpd. The YoY increase driven by Middle East and the Americas is offset by marginal decline in output from the rest of the world – Russia, Asia, Europe and Australia.

Oil markets review

Global short-term crude + condensates supply (Million barrels per day)



Source: Rystad Oil Market Cube

2.2 Global liquids demand – supply balances

Global liquids demand, which saw record distortions during the pandemic era, has seen a relatively “calm” times post that and remainder of 2023 and 2024 is expected to stay balanced and relatively flat. As pandemic restrictions become a thing of the past, road transport and aviation driven liquids product demand constitute to over half the global demand in the next 18 months. Asia, mainly China, and the US drive over 60% of the global road transport + aviation led products demand

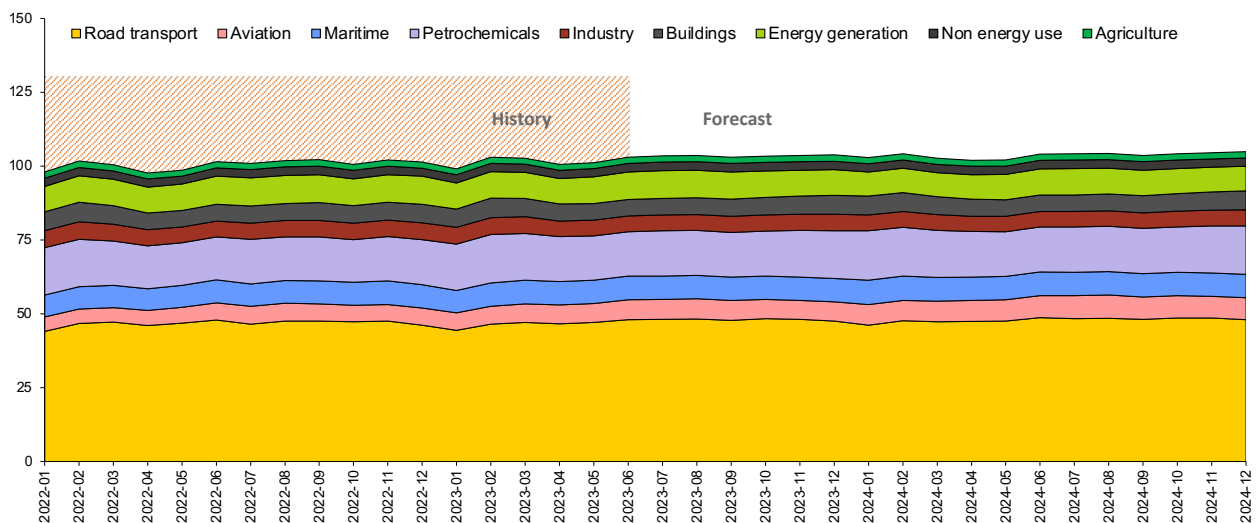
over second half of 2023 and full year 2024. Industrial demand, mainly petrochemical industry driven, is expected to be the second key market driver for global demand over the period. Region-wise, pet-chem sector in the Middle East alongside Asia and the US is expected to be the largest globally in terms of drawing liquids demand. Significant demand is also likely to be driven by energy generation initiatives like power.

Despite the subdued economic ac-

tivity in China and Europe over the second quarter in 2023, the demand did not see a severe dip. Over the second half of 2023, easing macroeconomic pressures, such as the tightening of US monetary policy, should encourage a more optimistic market outlook. The start of summer in the Northern Hemisphere has sparked a surge in crude oil demand, driven by record-breaking temperatures and increased travel, particularly impacting consumption of road and, notably, aviation fuels.

Oil markets review

Global products demand, split by sector (Million barrels per day)



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Source: Rystad Oil Market Cube

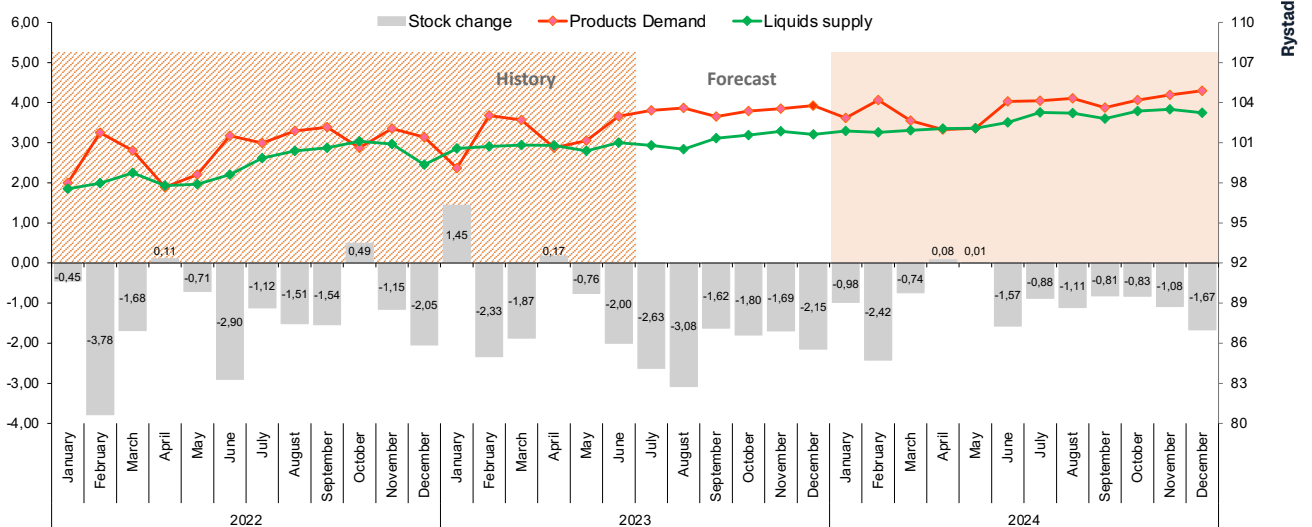
Meanwhile, Saudi Arabia has extended its voluntary 1 million bpd cuts into August. Potential for further extensions to help balance the forthcoming market deficits cannot be ruled out. Alongside this, a decrease in Russian exports is being observed since April 2023 due to intensified local refinery activity, despite considerable reductions in government subsidies. Looking ahead, average product demand over Q3–2023 is expected to increase to over 103.3 million bpd, while supply is predict-

ed at close to 101 million bpd. This disparity would cause a significant 2.44 million bpd deficit in this period. Q4–2023 is expected to be a less intense quarter, with demand estimated at 103.6 million bpd and supply expected to rise to 101.7 million bpd, leading to a relatively lesser deficit of 1.88 million bpd, which would cause substantial stock draws by the end of the year. Regionally, North America’s summer refinery season is set to peak in August with an output of 19.5 million bpd, primarily driven

by robust US demand and strong refinery margins. This would result in a modest net export margin of 200 thousand bpd in August, recovering to 1.4 million bpd in Q4–2023. Simultaneously, Saudi Arabia’s cutbacks will reduce the Middle East’s total net surplus to 16.5 million bpd in Q3, with declining Russian exports adding more strain, particularly on the APAC market, which is projected to experience deficits of 24.7 million bpd in Q3–2023, escalating to 25.4 million in the final quarter.

Oil markets review

Global liquids supply vs products demand (Million barrels per day)



Source: Rystad Oil Market Cube

2.3 Africa short-term supply: 2024 expected to see gradual month-on-month decline

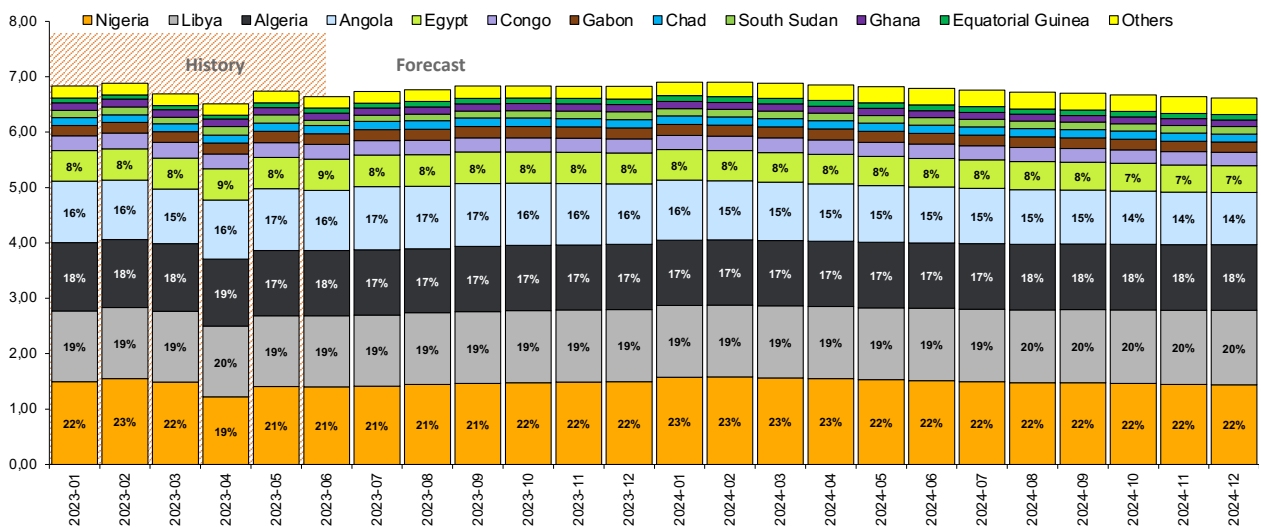
While global outlook for oil production in 2024 is expected to be marginal growth, Africa is expected to stay relatively flat at about 6.77 million bpd average over both the years 2023 – 2024. Africa monthly contribution to global output over the two years is also expected to stay flat at about 8% of the total volumes. However, month-on-month (MoM) production outlook for Africa over 2024 is expected to be a gradual marginal decline from about 6.9 million bpd in January 2024 to about 6.62 million bpd in December 2024. The OPEC member nations in Africa alongside

Egypt, Chad and Ghana are expected to be the key drivers of the oil + condensates output from Africa over the two years. OPEC members – Nigeria, Libya, Algeria and Angola comprise of the top four producers in Africa for both the years with outputs of 1.45 million bpd, 1.29 million bpd, 1.19 million bpd and 1.1 million bpd respectively for the year 2023 and 1.51 million bpd, 1.31 million bpd, 1.18 million bpd and 1.01 million bpd respectively for the year 2024. While these four countries’ oil + condensates flows add up to two-third of the total output for both the years, Nigeria alone

is expected to contribute just over a fifth of the total annual volume and the other three producers are expected to flow just under a fifth of the annual average. Egypt – expected to round off the top five producers in Africa over both the years – is estimated to flow about 560,000 bpd and 520,000 bpd for the years 2023 and 2024 respectively. Libya, currently seeing strong recovery from its civil war lows, is expected to see MoM growth in 2024 along with its neighbour Algeria. Nigeria, rocked by production outages in 2023, is expected to see gradual recovery in 2023 but

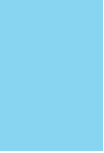
Oil markets review

Short-term crude + condensates supply, Africa (Million barrels per day)



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Source: Rystad Oil Market Cube



gradual decline in 2024. The remaining two producers from the top five are also estimated to see a gradual MoM decline in 2024.

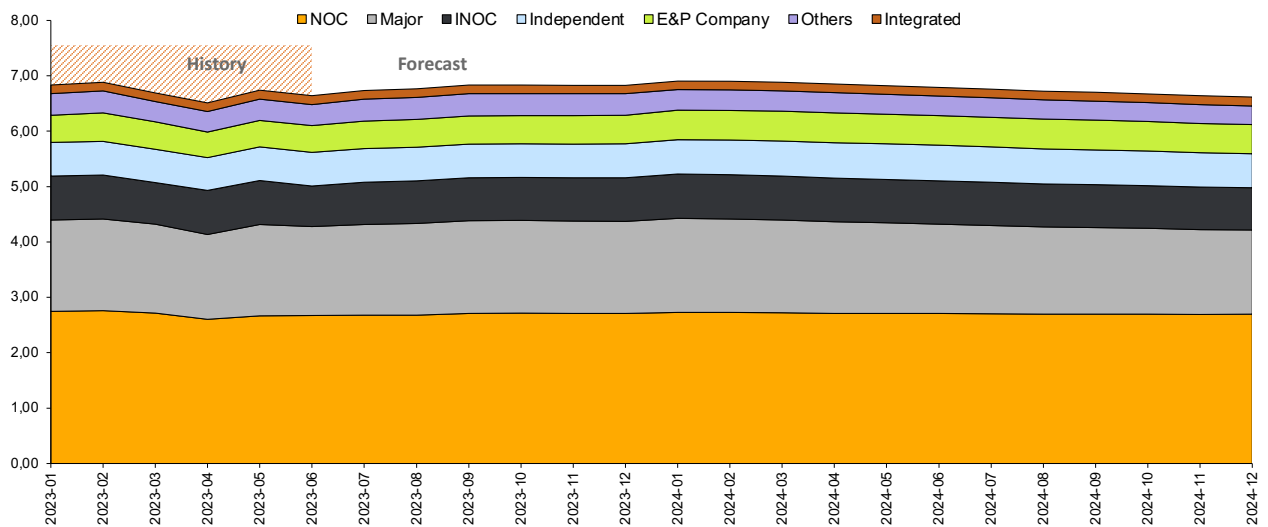
In terms of leading producers of oil and condensates in Africa in the short-term, it is the NOCs, either by being the primary stakeholders like in the case of Algeria or as JV partners (with majors) like in the case of Nigeria, that are expected to lead the way with their working interest stake of the total volumes. 40% of the total oil + condensates supply from Af-

rica in 2023 – 2024 is expected to come from NOCs' stakes in the producing fields. International oil majors like Shell Plc, TotalEnergies, Eni (all three independently or as a JV like Shell Petroleum Development Company (SPDC) in Nigeria), BP (again independently and as Azule Energy (BP – Eni JV in Angola), Chevron and ExxonMobil form the second largest company segment in terms of short-term liquids production in all of Africa. National Oil Companies with International presence (INOCs) like

Norway's Equinor complete the top three segments and together NOCs, majors and INOCs are expected to constitute to three-fourths of the total liquids output in Africa in the short-term. Independents like Tullow Oil which has dominating presence in Ghana and Exploration and Production companies (E&Ps) form the next two large company segments.

Oil markets review

Short-term crude + condensates supply, split by company segment, Africa (Million barrels per day)



Source: Rystad Oil Market Cube

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2.4 Disruptions to OPEC members' flows can dent the continent's output severely

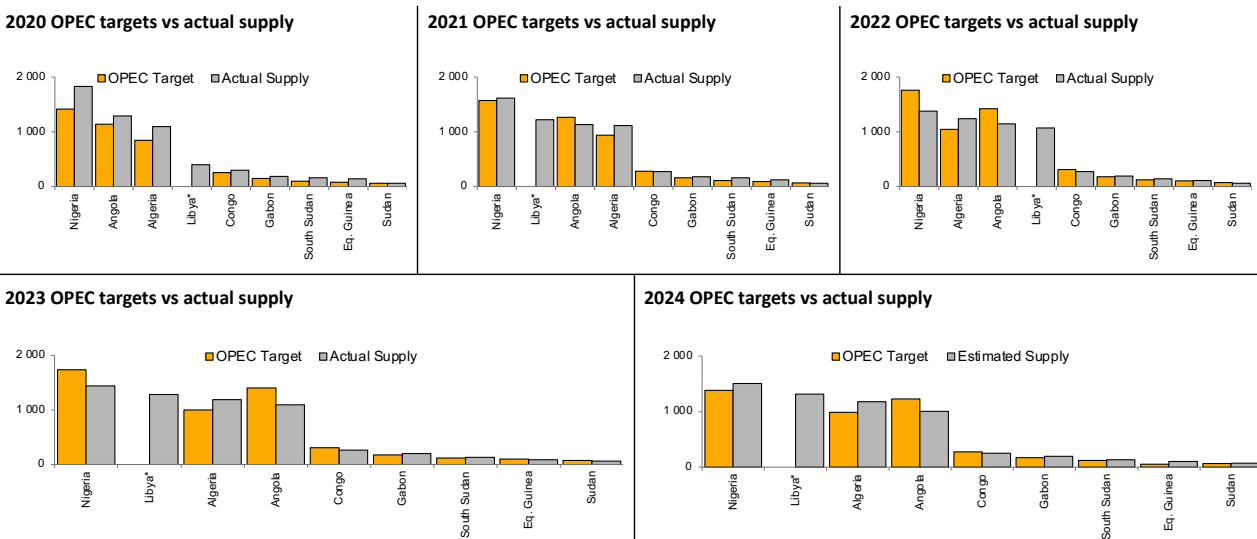
OPEC member nations in Africa were, are and are expected to remain the key producers of liquids in the continent. The membership of OPEC cartel ensures a petroleum exporting country status but also comes with certain regulations, especially in times of market turmoil. These regulations sometimes involve regulatory supply or production cuts where the member nations are given production quotas and are expected to voluntarily cut down their output within these cuts. These cuts are prescribed by the cartel to control the supply – demand balance globally and to control a

volatile market situation or irregularly high or low global oil prices. The member nations are expected to adhere to these cuts so that the cartel maintains its control on the global markets as opposed to losing the market share and control to North American Shale. Historically, the compliance of Africa's member nations to OPEC supply regulations or quotas or cuts has been on the lower side. These countries always had a higher production capacity than the quota and produced higher even at times of YoY production decline. However, the situation has now reversed, especially

with the two largest producers of Africa – Nigeria and Angola. Even when the world as a whole and upstream sector both were dealt a lethal blow in the form of the global pandemic, Nigeria and Angola's actual output for the year 2020 outran the production quota by 30% and 15% respectively. 2021 also saw Nigeria's liquids production marginally exceed the production cap. However, production outages caused by pipeline sabotages, militant attacks and subsequent force majeure imposed by the operators that have historically crippled production in Nigeria, combined with

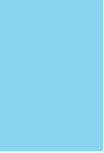
Oil markets review

OPEC members' production targets vs actual supply, Africa (Thousand barrels per day)



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Source: Rystad Oil Market Cube



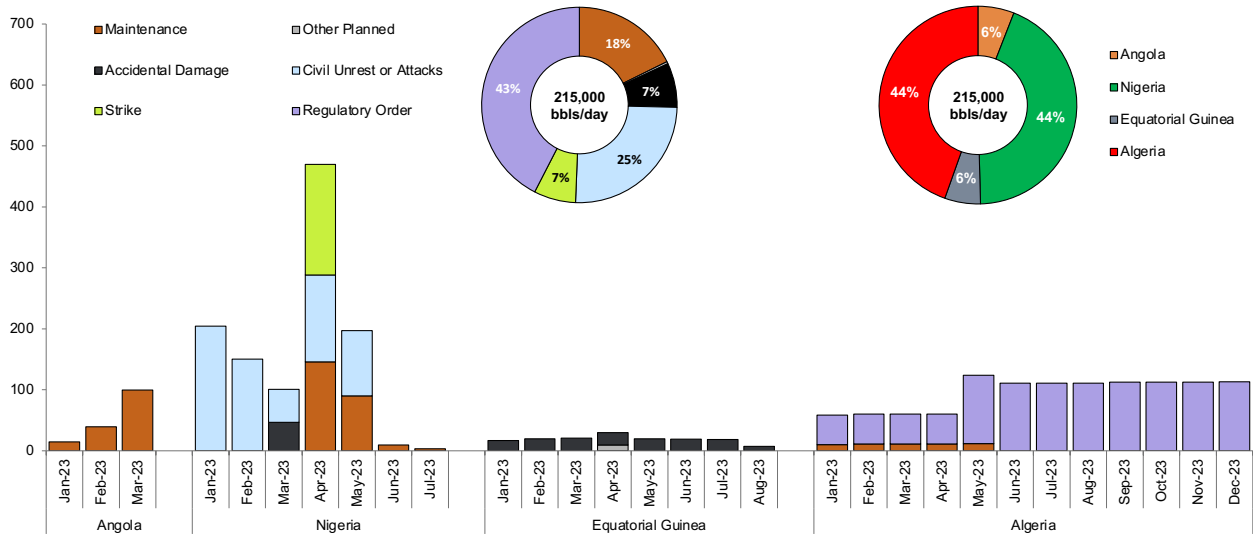
natural decline of legacy fields and lack of new start-ups have altogether led to Nigeria’s output falling short of the production quota and hence showing 100% compliance to OPEC cuts for the years 2022 – 2023. Angola, which saw a cluster of floating production storage and offloading vessels (FPSOs) come online together, entered a terminal decline phase with these projects falling off plateau together and no new developments kicking off; and this put Africa’s second largest oil producer also come short of OPEC production caps for the third year in a row.

Overall production outages over 2023 driven by various factors – both planned and unplanned are an average 215,000 bpd. While planned outages like Algeria’s adherence to OPEC cuts in 2023 and maintenance activities majorly in Angola and Nigeria are estimated to drive close to 60% of these production disruptions in Africa in 2023, unplanned outages like accidental damages to infrastructure, strikes by unions and civil unrest, and attacks on infrastructure are expected to account for the remaining 40% of the total production

outages, provided no such accidents happen going forward over the fourth quarter. In terms of countries driving production outages, two countries – Algeria with its planned regulatory cuts and, Nigeria with its unplanned outages and maintenance activities – are estimated to cause close to 90% of the total supply lost due to production disruptions. Remainder of the production outages have come from Angola and Equatorial Guinea where the cumulative volumes lost are an estimated 25,000 bpd average over 2023.

Oil markets review

Africa 2023 production outages (Thousand barrels per day)



Source: Rystad Oil Market Cube

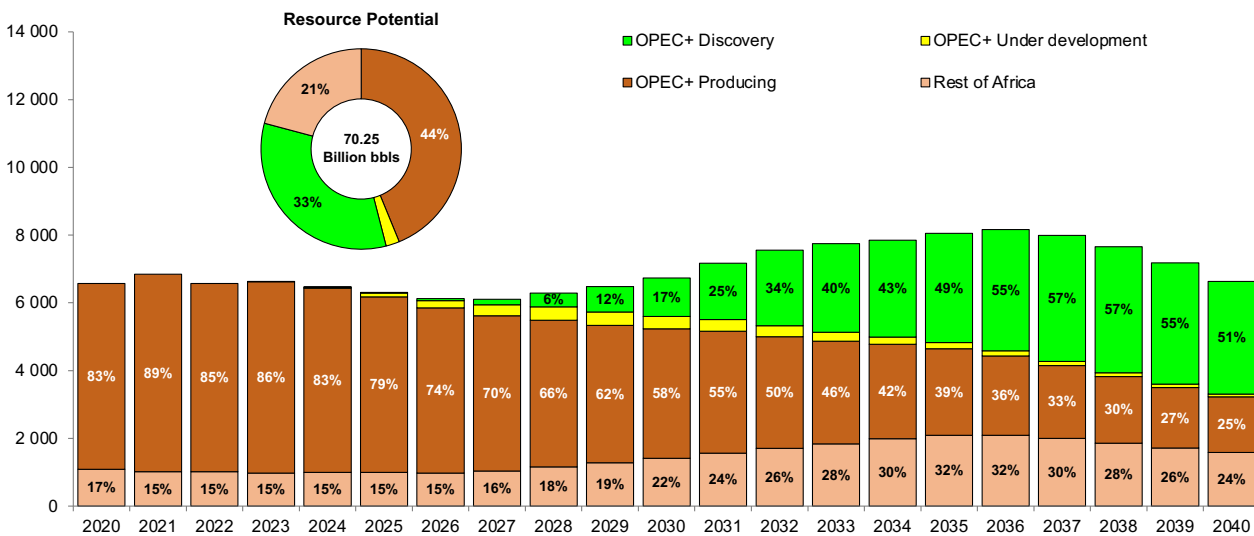
The production outages or an ongoing possibility of such accidents/attacks happening on projects in Africa’s OPEC countries need to be looked at critically as these nations are not expected to flow majority liquids supplies in the short month-on-month (MoM) term but also are estimated to drive bulk of the production in the long-term as well. The current producing projects from OPEC countries in Africa are estimated to hold an estimated 44% of the total liquids reserves potential of over 70 billion barrels (bbls). An additional 33%

is estimated to be the undeveloped discoveries in these countries and 2% from the currently under-development projects. As opposed to this, only just over a fifth of the total potential is from the non-OPEC African counterparts. The significant impact on the production can be seen from the fact that African OPEC countries are estimated to drive about 85% and close to 80% of Africa’s total oil + condensates for the years 2023 and 2025 respectively. While the non-OPEC counterparts’ contribution is estimated to increase from a

mere 15% share in 2023 to close to a quarter of the output by 2030, the dominance from OPEC countries is expected to continue even after the legacy producing projects decline as the newer fields have the potential to take up the role as effectively adding over 50% of the output through the second half of 2030s. As such, the respective administrations of these countries should hold safe and inviting business environment and investment-attractive fiscal terms to keep their individual as well as Africa’s oil flows robust.

Oil markets review

Africa long-term oil + condensates long-term forecast (Thousand barrels per day)



RystadEnergy

Source: Rystad Oil Market Cube

3 GAS MARKETS REVIEW

Global gas supply expected to be driven mainly by North America, Middle East, Asia and Russia

Global gas and liquified natural gas (LNG) demand expected to outrun the supply from currently producing fields and balance largely dependent on newer projects and currently undeveloped discoveries

Africa joins the top four gas producers to round off the top five LNG exporters globally

North Africa expected to pump majority of the natural gas supplies while West Africa expected to drive the LNG flows from Africa

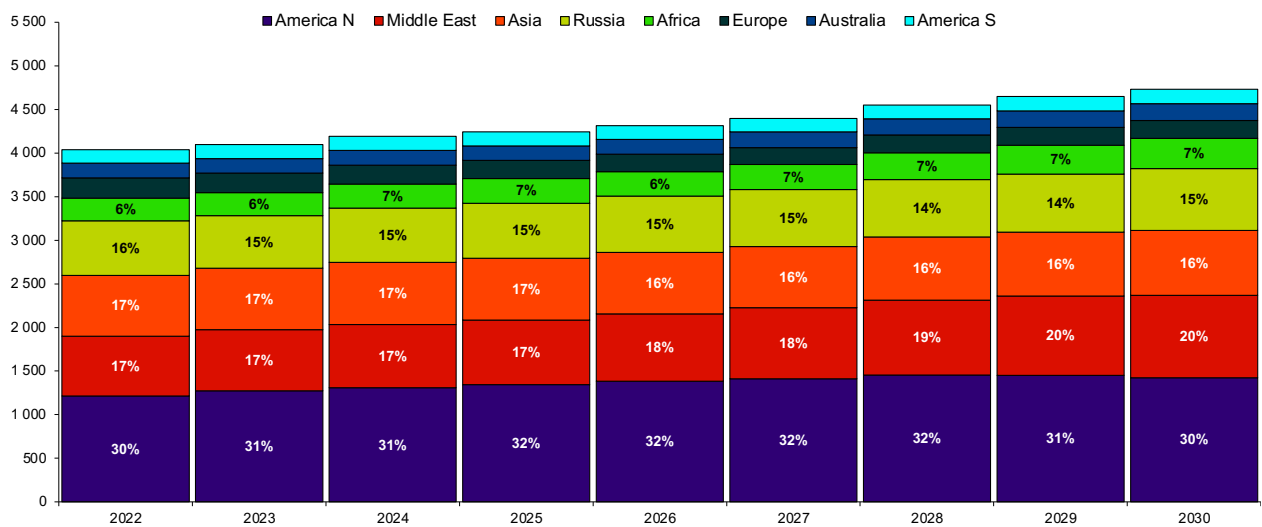
3.1 Global gas supply potential estimated to see gradual growth through the decade

Global natural gas supply evolution through this decade is estimated to see gradual YoY growth from about 4,100 billion cubic metres (Bcm) in 2023 to about 4,250 Bcm in 2025 – a growth of 3.5% over 2023, and further to 4,730 Bcm in 2030 – a growth of 11% over 2025 levels and 15% over 2023 levels. The forecast reflects an average 2% YoY growth from 2023 to 2030. The growth potential was expected to be far higher but the volatility and chaos, caused by the Russian aggression on Ukraine, led to lower forecast especially from Russia. The volumes are expected to be largely driven by

the US, Middle East, Asia and Russia. While the US, on average, is estimated to drive over 30% of the global natural gas output through the period, the top four producing regions together are expected to flow over 80% of the total supplies. Individually, the estimated average YoY growth is expected to be the highest in Middle East and Africa, with a 4% annual growth. All other regions, barring Europe, are expected to see a positive annual growth over the period. Europe is the only region which is expected to see decline in production from about 225 Bcm in 2023 to just over 200 Bcm in 2030.

Gas markets review

Global natural gas supply split by continent, forecast to 2030 (Billion cubic meters)



Source: Rystad Energy UCube

Potential global natural gas supply forecast might be showing a YoY growing trend, but the share of production from the currently producing fields is expected to decrease from just over 90% in 2024 to a little over 55% in 2030. Over the same period, the demand is expected to ramp up from about 4,030 Bcm in 2023 to almost 4,500 in 2030. Also, supply from the producing fields is expected to fulfil just over 90% of the demand in 2024. But this is estimated to decrease to un-

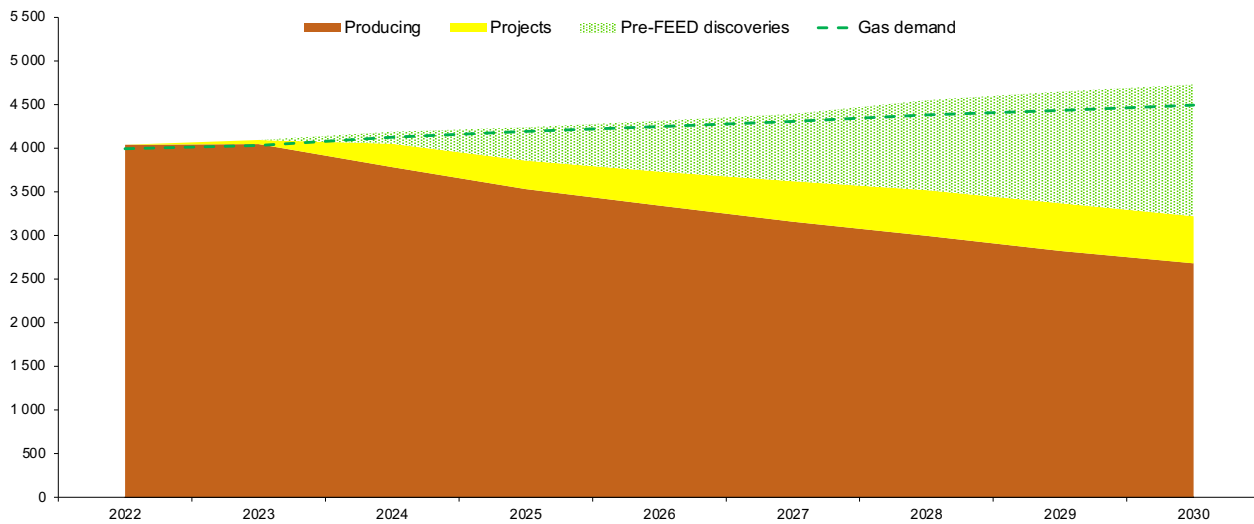
der 60% by 2030. Considering the fact that the production from legacy fields is declining as opposed to the growing demand, the gap between demand and supply can only be closed by supply from the currently under development projects and undeveloped discoveries. The supply potential, including the expected supply from the currently undeveloped discoveries, is estimated to exceed the demand. But if the development timelines of these projects get postponed or if these

projects get downsized, the supply can fall short of the demand.

One positive indicator for natural gas developments is that the upstream operators are now revising their strategies and aligning their future investments more in line with energy transition, and natural gas is being looked at as transition fuel. As such, these developments can be expected to get approved and come online in the currently estimated timelines.

Gas markets review

Global natural gas supply vs demand, forecast to 2030 (Billion cubic meters)



RystadEnergy

Source: Rystad Energy UCube; Rystad Energy GasMarketCube

Source: Rystad Energy UCube; Rystad Energy GasMarketCube

3.2 Global LNG flows estimated to see an average 8% YoY growth in late 2020s

As opposed to the overall natural gas supply potential, LNG export potential, supported by growing liquefaction capacity globally and driven by resilient demand especially in Asia and Europe, is expected to see a steeper growth of about 7% over the period 2023 – 2030 and a marginally higher 8% over late 2020s. LNG projects in the US which have been finding takers from the European markets and projects in the Middle East like

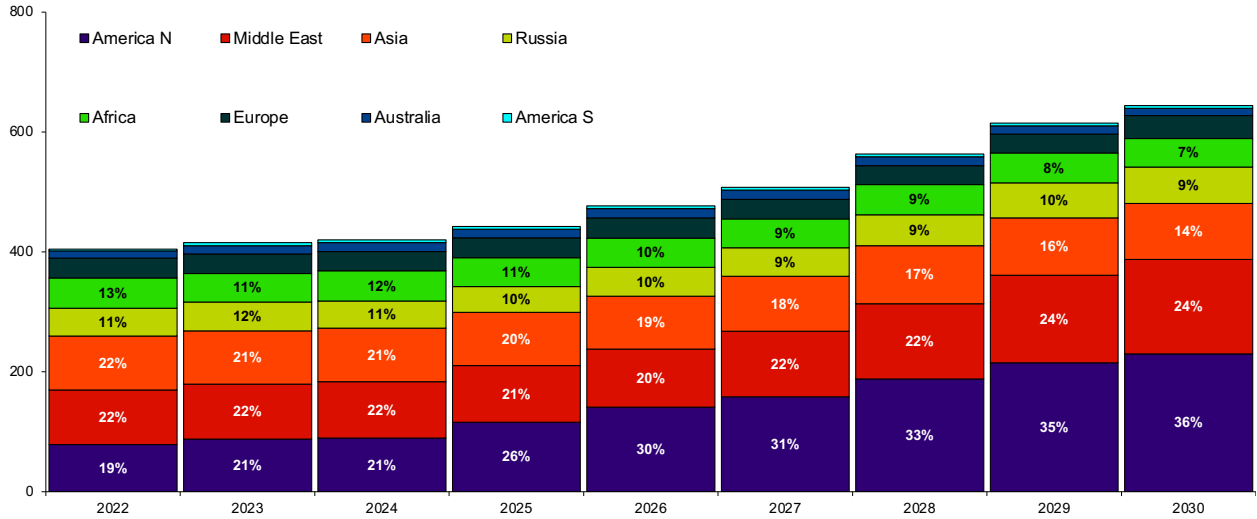
the Qatar LNG which have been signing service contracts for accelerated development make these regions the top LNG exporters globally through this decade.

Multiple LNG developments in these regions have already had their respective final investment decision (FID) taken or are expected to see their FID happen soon. Many of these developments are estimated to come online and start

exporting cargoes within the 2020s and as such are expected to see YoY growth in their respective LNG exports. US LNG exports are estimated to grow from about 88 million tonnes per annum (MMtpa) in 2023 to 115 MMtpa in 2025 and double to 230 MMtpa by 2030. LNG exports from the Middle East are expected to increase from just over 90 MMtpa in 2023 to almost 160 MMtpa by 2030. This level of growth from the US

Gas markets review

Global LNG supply split by continent, forecast to 2030 (Million tonnes per annum)



Source: Rystad Energy UCube

and Middle East along with steady flows from other regions is expected to see global LNG exports increase from about 415 MMtpa in 2023 to just over 440 MMtpa by 2025 reflecting a 6% growth and further to a much higher 645 MMtpa reflecting a 55% growth in LNG exports.

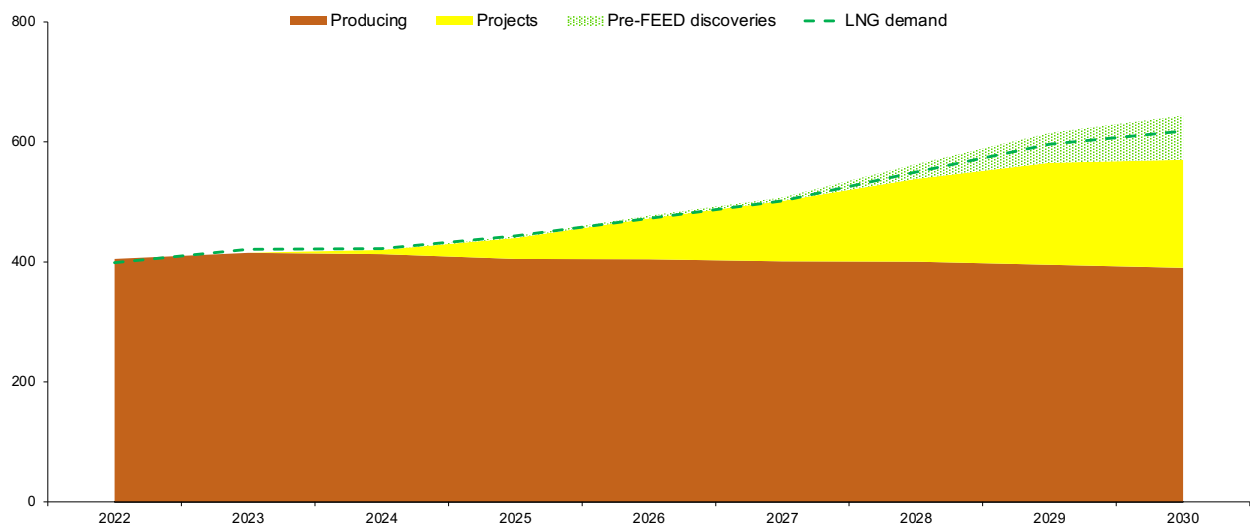
While LNG exports are estimated to see

a healthy growth from 2023 to 2030, the volumes from currently exporting LNG projects are estimated to stay relatively flat at about 400 MMtpa through the period. However, the resilient LNG demand is expected to see an increase from 420 MMtpa in 2023 to close to 620 MMtpa by 2030. Majority of the growth in LNG supply is estimated to come from

the currently under development projects. Currently pre-FEED (Front End Engineering and Design) discoveries are also expected to come online and drive increase in exports through late-2020s. As such these new developments are very important to bridge the gap between supply and demand, similar to global natural gas supply vs demand.

Gas markets review

Global LNG supply vs demand, forecast to 2030 (Million tonnes per annum)



Source: Rystad Energy UCube; Rystad Energy GasMarketCube

3.3 North Africa and West Africa estimated to drive African natural gas and LNG exports respectively

Africa holds immense natural gas potential and has had historical natural gas trade ties with Europe. The continent continues to be in a position to increase its natural gas output and benefit from an under supplied LNG market and resilient demand from Europe. While estimates from the 2023 outlook suggested not many large volumes coming online in the near-term and overall Africa natural gas output declining from 2022 through 2025, estimates from the latest outlook show increase from 2023 natural gas output of about 265 Bcm to

over 280 Bcm by 2025. North Africa drives majority of Africa’s natural gas flows but the output is expected to stay flat through the 2020s. Ramp up is expected through the second half of this decade as Mozambique ramps up its LNG output and new gas start-ups across the continent come online and take the output on an increasing trend. But an increased focus on LNG exports is apparent with an expected uptick in near term LNG flows from the continent. Nigeria and Algeria are expected to drive majority of these export volumes with additional flows

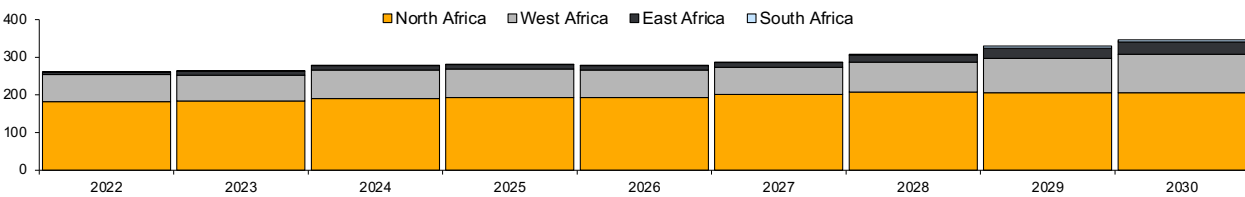
coming from Egypt, Equatorial Guinea, Mozambique and waters off Senegal – Mauritania. Africa stands at a point where it can benefit from historical gas trade relations with Europe, existing infrastructure to export gas to Europe, geographical vicinity to the demand centres and most importantly abundant natural gas potential. It is very important that both the upstream operators and policy makers grasp this opportunity with both hands and solidify Africa’s role as a global natural gas exporter before the opportunity diminishes or even worse, expires.

Gas markets review

Natural gas supply forecast to 2030, Africa

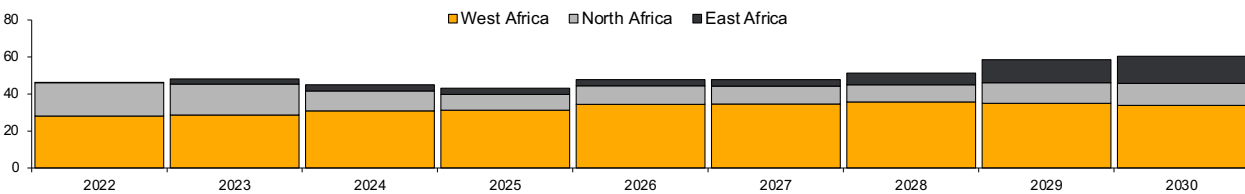
Natural gas supply forecast to 2030

Billion cubic meters



LNG supply forecast to 2030

Million tonnes per annum



RystadEnergy

Source: Rystad Energy UCube

4 GLOBAL INDUSTRY REVIEW

Global upstream spending potential going strong despite industry sentiment of underinvestment

Potential greenfield spending in the United States, Africa, Asia and Middle East expected to drive a quarter of the overall spending through 2023 – 2030

Liquid supply potential relatively lower than previous outlook and gas potential marginally higher

Brent 2023 – 2024 outlook higher than previously estimated

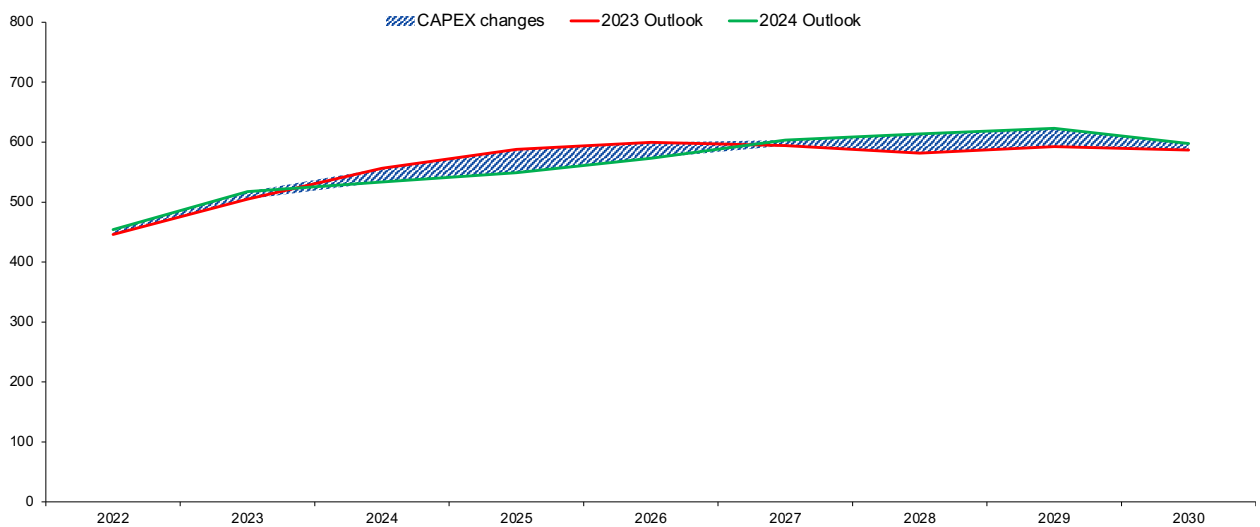
4.1 Global upstream CAPEX – no major revisions from the previous outlook and growth expected from greenfield spending

It has been widely suggested within the oil industry in the post-pandemic era that the current energy crisis is a result of underinvestment in upstream projects on the back of consecutive oil market slumps and the changing strategies of operators. However, persistent claims of chronic underinvestment in the global oil and gas industry appear overblown. Declining upstream levels and investments in recent years have been posited in many quarters as proof of underinvestment, with a shortage of oil said to be on the horizon. While both investments and well activity levels have indeed dropped considerably since 2014, lower unit prices,

efficiency gains, productivity gains and portfolio effects have also made the upstream industry much more efficient. In other words, the industry can do the same as before, but at much lower cost. Analysing how much oil is being developed, it is to be noted that there is no underinvestment and activity is at a healthy level, similar to that seen during the last investment cycle from 2010 to 2014. Investments peaked at almost US\$740 billion in 2014 before falling to around US\$440 billion two years later after the oil price collapse in 2015. There was another drop in 2020 as investments declined to US\$345 billion due to the Covid-19 pandemic

Global industry review

Global CAPEX changes – 2023 Outlook vs Latest Outlook (Billion USD)



Source: Rystad Energy UCube

and consequent lower oil price. The latest outlook suggests investments recovered last year to over \$450 billion as oil and gas activity once again started to increase. Despite this comeback, last year's investments were only 60% of 2014 levels, and it can be easy to conclude that upstream activity has declined 40% since 2014. The unit prices, that happen when the spending occurs and not when the contracts happen suggest that most of the segments

have seen their prices come down by 20% – 30% since 2014. This implies that the oil sector is seeing more activity for every dollar spent now compared to 2014.

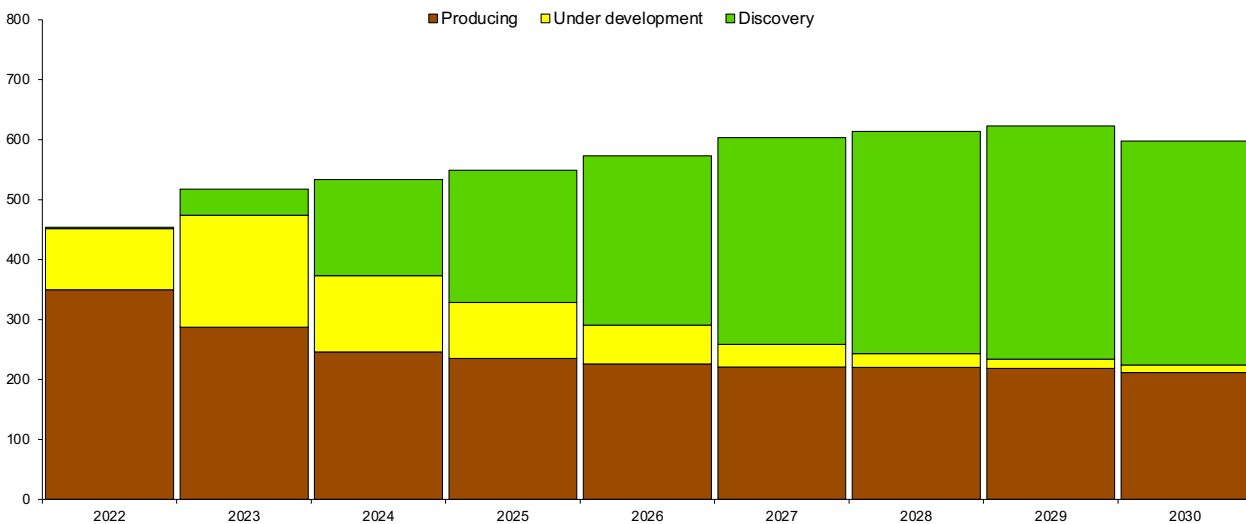
The oil price crash due to the Covid-19 pandemic in 2020 and 2021 left a sizeable dent in investments into upstream assets, but the potential CAPEX spending forecast going forward suggests global upstream investments are ex-

pected to see a YoY increase over the 2020s. Near-term evolution is marginally lower than the previous forecast, but latter half of 2020s is estimated to see a relatively higher spending. As such, contrary to widespread belief, lower unit prices and steady growth in YoY spending suggests that the global upstream industry is not seeing under-investment globally.

Brownfield spending to maintain

Global industry review

Global CAPEX forecast to 2030 split by lifecycle (Billion USD)



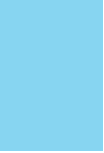
RystadEnergy

Source: Rystad Energy UCube

output from the producing fields together with the greenfield spending on the FID'ed currently under development projects is expected to drive majority of the spending in the short-term from 2023 through 2025. The YoY share of these projects is expected to decline from over 90% of

the total spending in 2023 to about 60% of that in 2025, as the spending on currently pre-FEED projects picks up. Over these three years, producing and pre-2023 approved fields are estimated to drive three quarters of the overall global upstream CAPEX. The second half of the decade, 2026

– 2030, is expected to see a steady relatively flat brownfield spending trend with an average spend of US\$220 billion per annum. As the currently under development fields come online and convert to producing fields, the greenfield spending on them is expected to reduce to



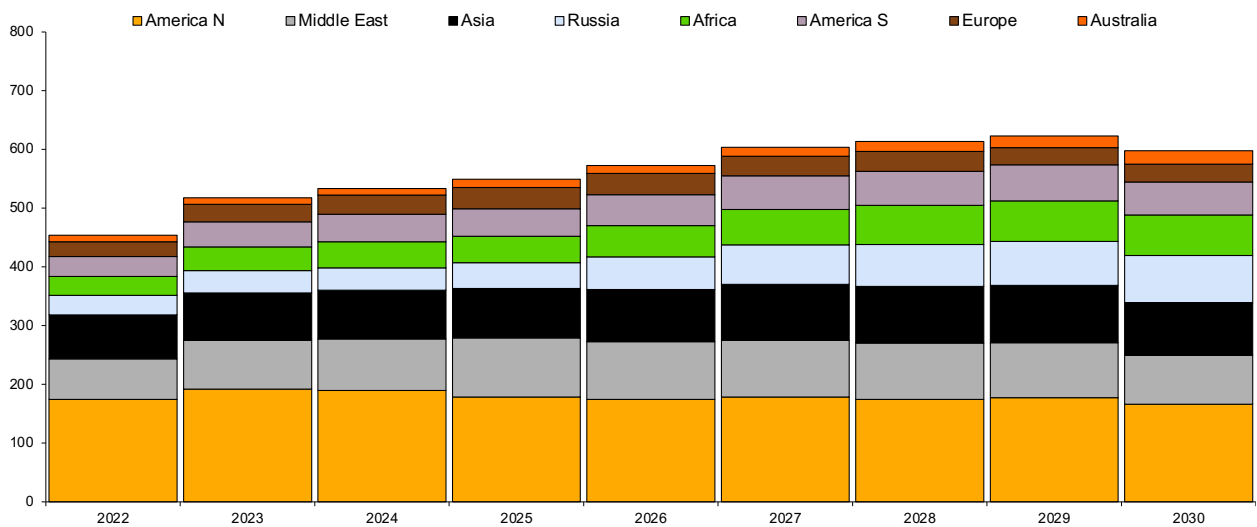
relatively marginal levels. Through this period, the greenfield spending on the currently pre-FEED discoveries is expected to pick up as these projects reach their respective FID's and service contracts – both drilling and facility related – get awarded eventually and payments are made. This spending is expected to see a steep jump by 22% from 2026 levels of just over US\$280 billion to almost US\$345 billion in 2027. 2028 – 2029 spending on these projects is a marginally higher US\$370 billion and US\$390 billion respectively, before reducing to almost US\$375 billion in 2030. The total spend on these projects over the five-year period is an estimated US\$1,760 billion, about 60% of the total upstream capital ex-

penditure. The total greenfield spend over 2023 – 2030 period is an estimated US\$2,745 billion, almost 60% of the total upstream capital expenditure. This ratio increases marginally to close to 65% over the second half of the decade as YoY greenfield spend increases and brownfield spend trend flattens.

North America, predominantly the United States, Middle East, Asia, Russia and Africa, are expected to drive over 80% of the total upstream CAPEX over the period 2023 – 2030 and are expected to be the top five spenders in that very same order. In terms of individual spending trend, Russia, Africa, LatAm and Australia are expected to see a YoY growth

in spending over the period, the remaining regions are expected to maintain a relatively flat or marginally declining spending trend. Greenfield spending is expected to have a larger share of the overall CAPEX over the period and, North America, Africa and Middle East are expected to be the top three regions in terms of the estimated/expected potential greenfield investments. These three regions are expected to drive almost half the greenfield spend with Middle East at No.4 spot, with an estimated share of 15% of the total greenfield expenditure over the period.

Global industry review Global CAPEX forecast to 2030 (Billion USD)



Source: Rystad Energy UCube

4.2 Global hydrocarbons supply – liquids see a decline and gas remains unchanged compared to the previous forecast

While the unit costs may have dropped from the 2014 – 2015 levels, the evolution is in an increasing trend going forward from 2022 through the decade. So, even though the CAPEX as per the 2024 Out-

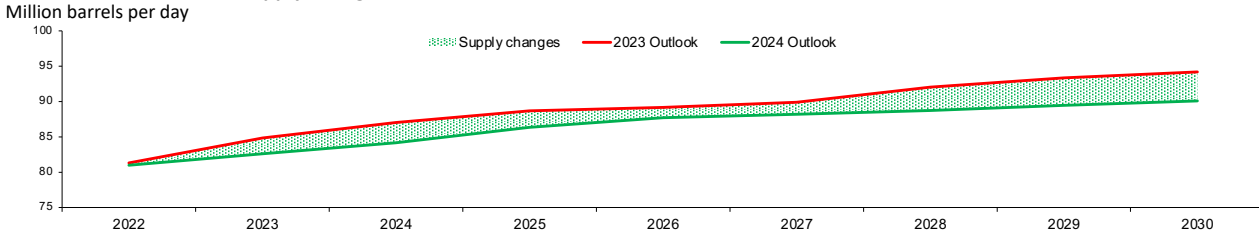
look remained roughly unchanged from the 2023 Outlook, the increase in unit costs is expected to come into effect. The 2024 Outlook suggest the oil + condensates potential supply evolution from

2022 to 2030 is at a lower level throughout the period. Forecast according to the previous outlook was the supply increasing gradually from about 85 million bpd in 2023 to 94 million bpd in 2030. The

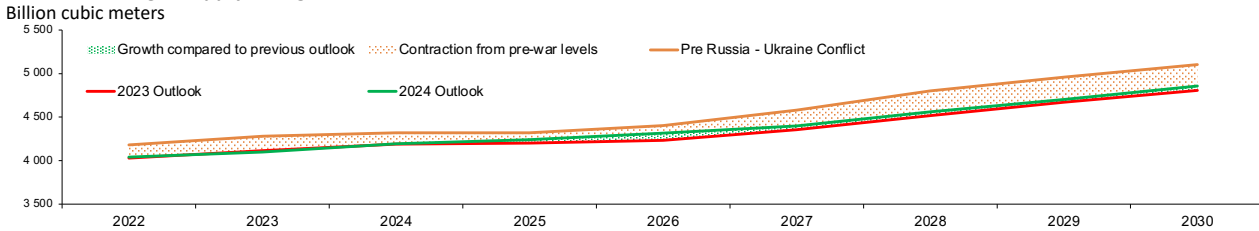
Global industry review

Oil + condensates and gas supply changes – 2023 outlook vs latest forecast

Global oil + condensates supply changes, forecast to 2030

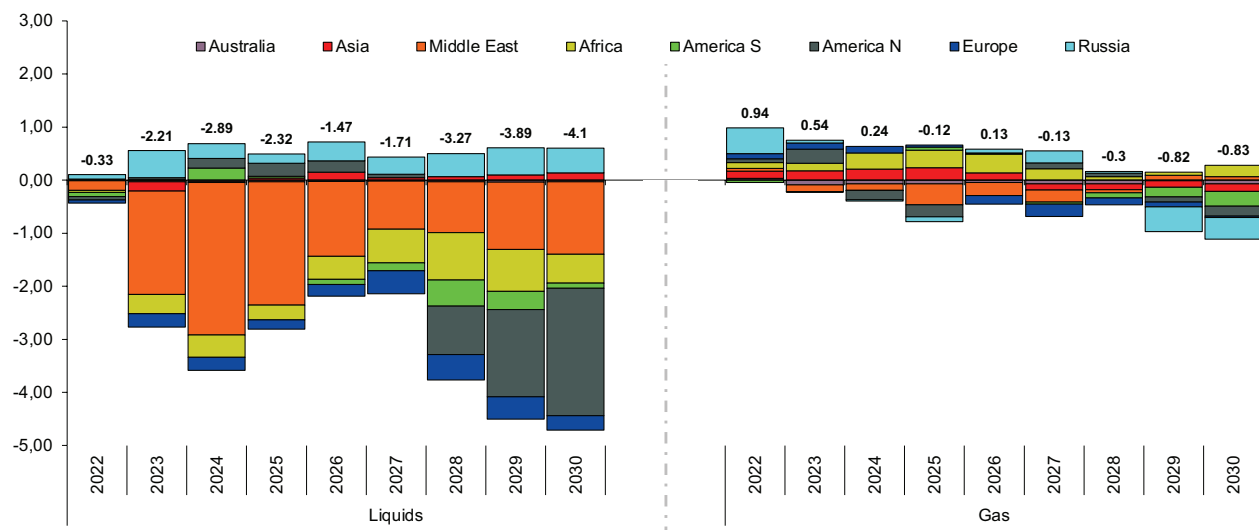


Global natural gas supply changes, forecast to 2030

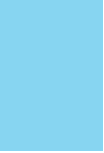


Global industry review

Oil + condensates and gas supply changes – 2023 outlook vs latest forecast (Million barrels of oil equivalent per day)



Source: Rystad Energy RenewableCube



latest forecast puts the forecast at 83 million bpd in 2023 to about 90 million bpd in 2030. However, the natural gas supply is expected to remain almost unchanged from the previous forecast.

The downside revision in liquids supply

forecast is mainly driven by three regions – Middle East, North America and Africa. The Middle East showed a YoY drop in output throughout the period resulting in negative revisions in the overall global output. The near-term supply drops from the region might be due to the OPEC

regulatory cuts as well as voluntary production cuts from the members. The supply drop from Middle East reduced towards the second half of the decade, but the negative revisions in flows from Africa and North America are led to negative revisions in overall global flows.

4.3 Brent revised to higher level due to stronger demand outlook

Global oil prices continued an upward trend that started in late June and prices recovered from \$72 per barrel to \$88 per barrel. The rebound came on the back of a significant market deficit. The extension of Saudi Arabia’s cuts also contributed to the bullish market sentiment. In fact, the oil market has now seen evidence of destocking. Global commercial crude inventories experienced a large drop in July (1.22 million bpd), and preliminary weekly stock data suggested that the US would again report significant draws for August. Through September, negative macro sentiment streaming from China weighed on prices.

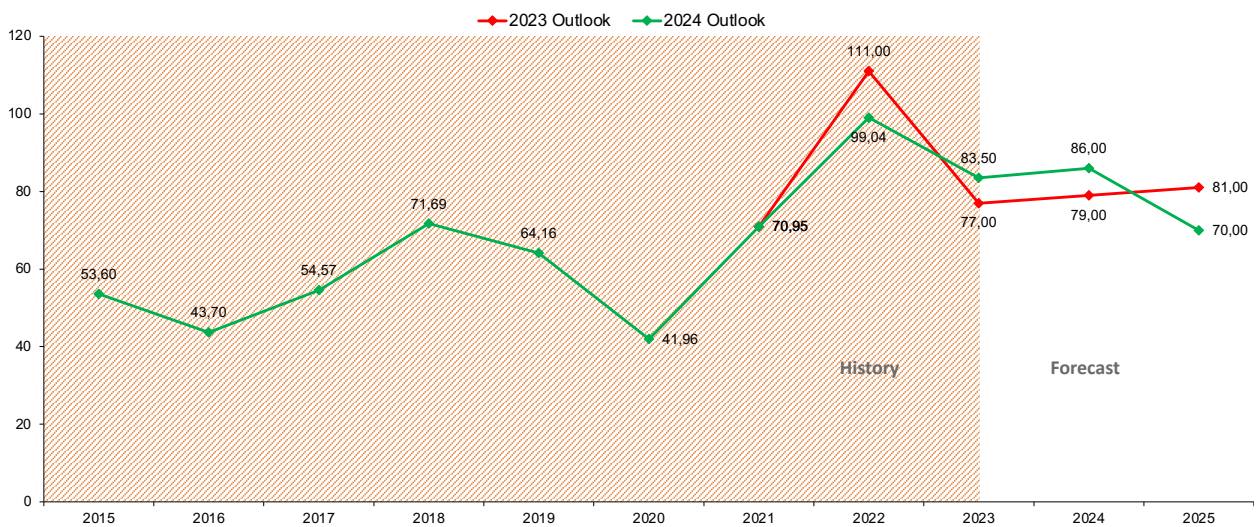
Poor macroeconomic data, real estate problems, and a weak yuan all added pessimism.

While the Chinese macroeconomic situation should be closely monitored, at this point, the Brent outlook remains cautiously optimistic. Moreover, the current negative macroeconomic sentiment could partially be mitigated by an additional extension of Saudi voluntary cuts. The outlook for the rest of the year suggests that upside price pressure will not recede as forecast for global balances points towards a significant deficit in the market and, correspondingly,

the de-stocking process continues. Unsolved liquids balance for the rest of 2023 and the whole of 2024 shows a larger-than-previously expected deficit in the market because of tight supply and a more robust demand outlook. In particular, demand is expected to outpace supply by over 2.2 million bpd between August and December 2023. For 2024, the implied deficit is estimated at 1.9 million bpd. The estimated Brent base case for Q3 2023 is an average \$84 per barrel and \$87 per barrel in Q4 2023. 2024 Brent is an estimated \$86 per barrel due to stronger demand outlook tightening next year’s global balances.

Global industry review

Brent oil price evolution and forecast to 2025, Africa (Billion USD)



Source: Rystad Energy UCube

5 AFRICA INDUSTRY REVIEW

NOCs and majors – key driving forces behind Africa’ short-term supplies, hydrocarbon potential, medium-term production and spending

Total CAPEX over 2023 – 2030 expected to remain the same as last outlook with differences in timeline of spending

North and West Africa expected to drive bulk of the cumulative as wells as annual spending through the period

Liquids remain the key focus and equal split between onshore and offshore spending expected

Majority of the spending, especially through the second half of the decade, expected to come from currently pre-FEED discoveries

Nigeria, Libya, Algeria, Angola and Mozambique – the top five spenders over the period & NOCs and majors estimated to incur two-thirds of the total CAPEX

Actual CAPEX spending forecast closer to “Mean” scenario which models the global warming cap at 2°C

Drilling and rig demand on the rise till 2024 before assuming a declining trend

Majority of the rig demand robust with only about 32% based on contingent volumes

Healthy levels of exploration drilling expected over 2023 – 2025 with Algeria, Egypt, Namibia and Nigeria driving majority of the activity

11 high impact wells (HIWs) to be drilled in the next 15 months

177 blocks up for grabs as licensing rounds across Africa with to-be-awarded status expected to close in the next 18 months

Liquids portfolios and majority producing assets driving mergers and acquisitions (M&A) activity so far in 2023

5.1 NOCs and majors hold the potential and, drive the supplies and spending

African NOCs, through their vast presence across the continent’s upstream operations as working interest owners, and international oil majors, who have been significant stakeholders and investors in the continent’s hydrocarbon sector – form the two driving forces behind Africa’s fossil fuel industry. Whether it is their presence in the form of a JV with majors like in Nigeria, or as

working interest owners like in Algeria, Libya and the likes, NOCs are estimated to hold the largest working interest share of the hydrocarbon potential in Africa and are also expected to own the majority share of the supplies from the continent. NOCs are estimated to flow about 2.63 million bpd of liquids (oil + condensates) and 13.55 billion cubic feet per day (Bcf/d) of gas in the

2023. The volumes are expected to increase to 2.57 million bpd of liquids and 14.17 Bcf/d of natural gas next year. The main NOCs driving these supplies – Algeria’s Sonatrach, Libya’s NOC, NNPC of Nigeria and Angola’s Sonangol, are estimated to drive over 85% of the liquids supplies from NOCs across Africa over 2023 – 2024. These four NOCs’ cumulative natural gas flows

over 2023 – 2024 are an estimated 88% of the total natural gas produced by the NOCs across Africa. It also helps that Algeria, Libya, Nigeria and Angola, where these NOCs operate, drive majority of the liquids and natural gas flows for both the years.

Majors, with their legacy and widespread operations across North Africa as well as Sub-Saharan Africa (SSA), are expected to be the second largest after NOCs, with respect to the company segments driving the oil and gas supplies from Africa. Majors are estimated to flow 1.62 million bpd of liquids and 7.13 Bcf/d of natural gas in 2023 and, 1.55 million bpd of liquids and 7.54 Bcf/d of natural gas in 2024. International National Oil Companies (INOCs) – National Oil Companies that operate globally and independents are expect-

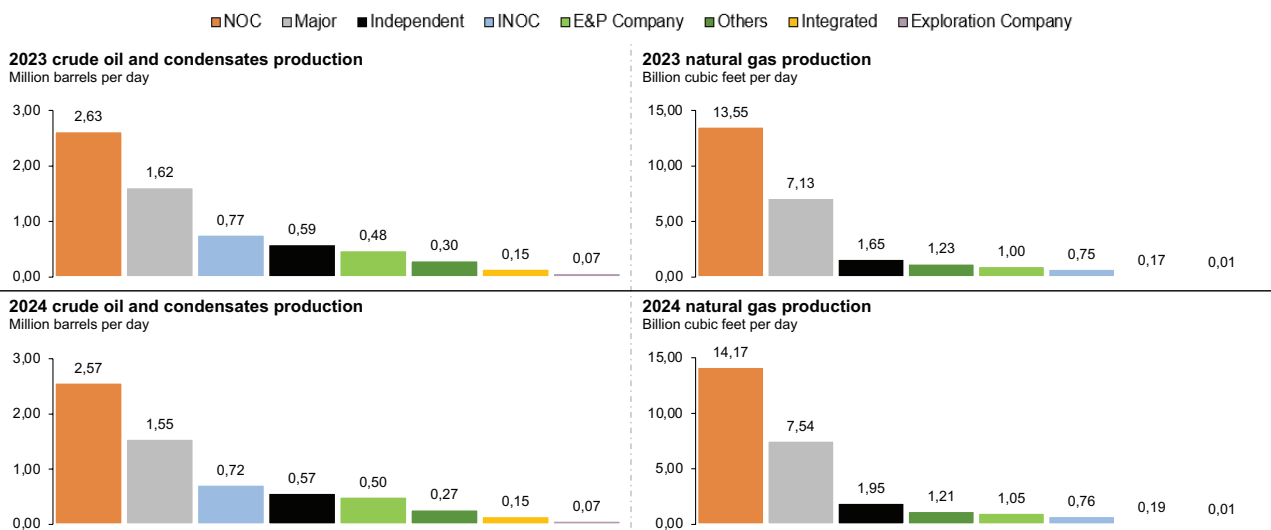
ed to be the company segments with Africa’s third largest liquids and natural gas production respectively, for the years 2023 and 2024. Norway’s state-owned oil company Equinor (formerly Statoil), with its extensive presence in Angola; China’s China National Petroleum Corporation (CNPC), Sinopec, China National Offshore Oil Corporation (CNOOC) and PetroChina, with their vast operations in Chad & South Sudan, Egypt & Angola, Nigeria and Chad respectively; and Malaysian energy group – National Petroleum Limited, commonly known as Petronas, with its producing fields in South Sudan are some of the INOCs operating in Africa and together, these INOCs are estimated to drive three-quarters of the overall liquids output from INOCs in Africa over the 24 month period of 2023 –

2024. Independents like APA Corporation, the holding company of Apache Corporation; Marathon Oil, Wintershall DEA, Perenco, Seplat Energy, Tullow, ConocoPhillips and the likes are expected to form the group of companies with the third highest cumulative natural gas output from Africa for the years 2023 – 2024.

The duo of NOCs and majors in Africa, not only drives the short-term oil and gas production in Africa, but also is expected to be the major drive behind the medium-term supplies till 2030. Between the two of them, NOCs and majors’ company segments are estimated to hold a potential to produce 4.25 million bpd, 4.06 million bpd and 4.44 million bpd of liquids, and 3.45 million barrels of oil equivalent per day

Africa industry review

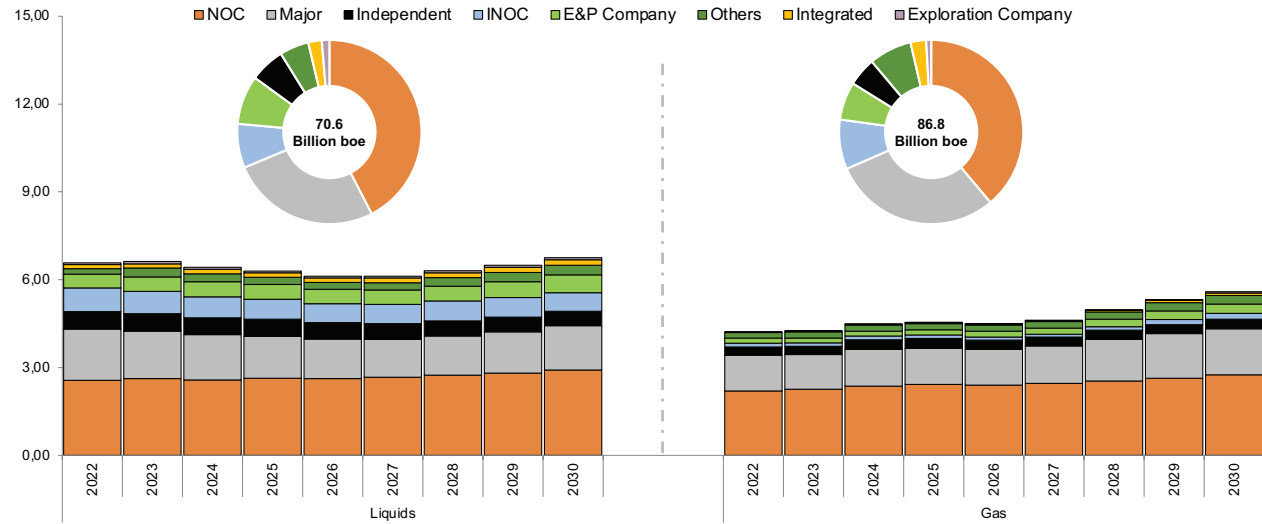
Player landscape in Africa: 2023 – 2024 Production



Source: Rystad Energy UCube

Africa industry review

Player landscape in Africa: Production (Million boe/day) and Resources (Billion boe)



RystadEnergy

(boepd), 3.66 million boepd and 4.32 million boepd of natural gas for the years 2023, 2025 and 2030 respectively. These volumes represent about 65% of the total liquids and 80% of the total natural gas produced in Africa in those respective years. The average

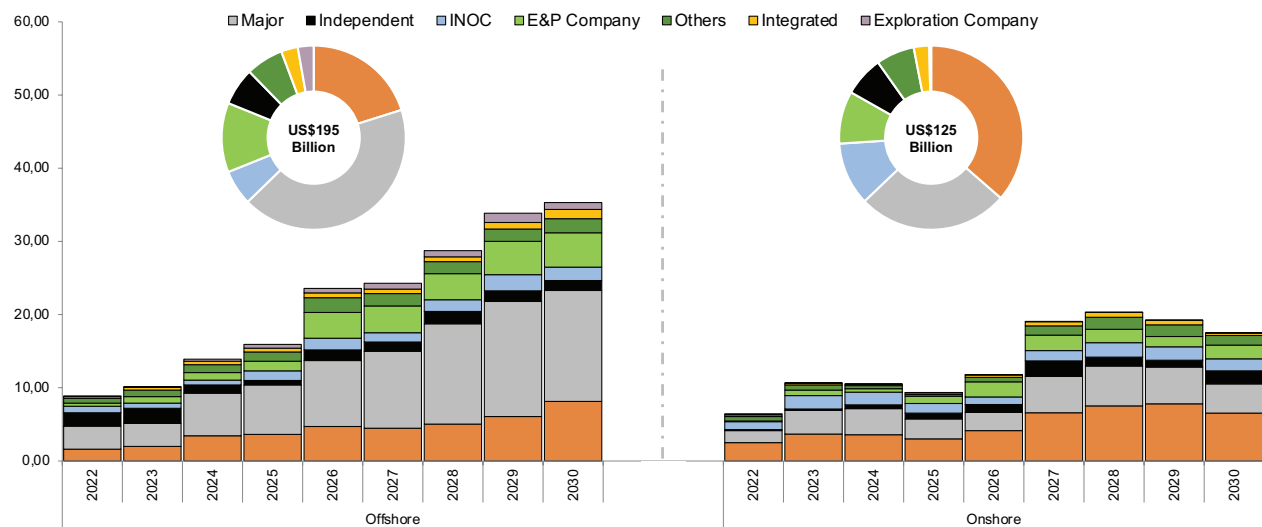
contribution potential of both these company segments put together over 2023 – 2030 period is 65% of the total liquids and 80% of the total natural gas production potential.

NOCs and majors together are ex-

pected to drive bulk of the greenfield spending in Africa over 2023 – 2030. About 65% of the total greenfield spending over 2023 – 2030 in both offshore and onshore supply segments is expected to be driven by these two company segments.

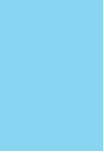
Africa industry review

Player landscape in Africa: Onshore vs offshore greenfield CAPEX Spending (Billion USD)



RystadEnergy

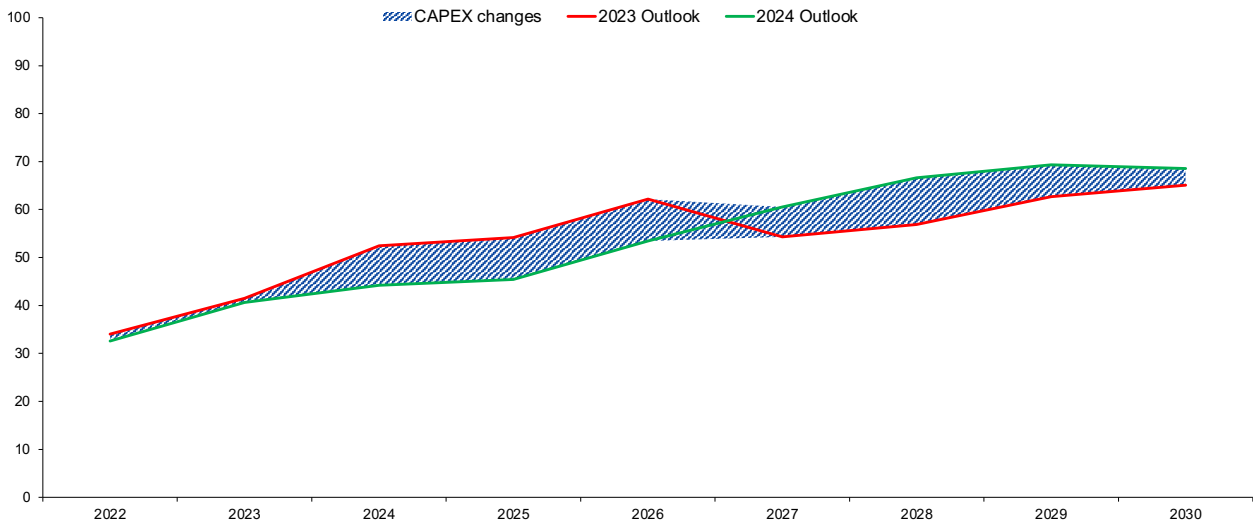
Source: Rystad Energy UCube



5.2 CAPEX revised downwards in the near-term and upwards through late 2020s

Africa industry review

Africa CAPEX changes – 2023 Outlook vs Latest Outlook (Billion USD)



Source: Rystad Energy UCube

Africa potential CAPEX forecast according to the latest outlook is slightly different from the previous outlook where 2023 outlook showed a drop in spending from 2026 to 2027, before taking a gradually increasing trend through to 2030. The latest forecast according to the 2024 outlook, however, suggests a gradual but gentler YoY increase from 2023 all the way to 2030. It is to be noted that the trend variations are a result of a timeline changes in some of the African developments. The overall potential cumulative CAPEX spending from 2023 to 2030 is expected to stay unchanged at close to US\$450 billion. The 2023 – 2026 CAPEX spending is now estimated to be close to US\$185 billion as opposed to US\$210 billion according to the previous forecast. The spending over the second half, 2027 – 2030, reverses with overall potential cumulative CAPEX spending according to the 2024 outlook at a higher US\$265

billion vs a lower US\$240 billion according to the 2023 outlook. The key reason behind this is estimated delays in spending mainly in the form of FID postponements. These delays push the investments to a later timeline but unless there is downsizing, the spending levels can remain the same

In terms of where this estimated spending is coming from, North Africa and West Africa are the big spenders. West Africa is expected to be the region driving over 50% of the potential CAPEX spending through 2023 – 2030. With a few FIDs estimated to happen over the second half of the decade, the already existing under development projects and brownfield investments are the key drivers of these spending levels. With investments expected through the decade, Libya and Algeria drive the North African spending which is almost a third of the overall CAPEX spending in Africa over 2023 – 2030.

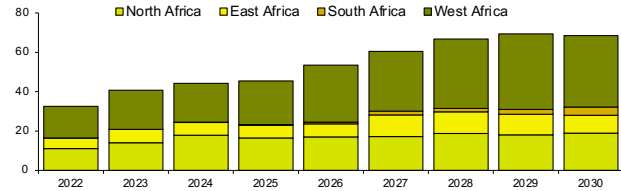
Despite the increasing focus on natural gas, analysis of potential spending over 2023 – 2030 suggests liquids continue to remain the main hydrocarbon drawing over 60% of the total CAPEX. Natural gas, however, is expected to see a gradual increase in share of the total annual expenditure with YoY spending share increasing from about 35% in 2023 to almost 40% by 2030.

The focus or split between onshore – offshore spending is expected to be uniform with just over 50% of the cumulative CAPEX being spent on offshore projects and onshore projects seeing expenditure of just under 50%. Considering the fact that the unit costs on onshore projects are much lesser than offshore projects, it can be said that more onshore developments are expected to kick-off or come online as opposed to offshore fields. Offshore projects' spending is estimated to see a 37% – 15% split between deepwater and shelf

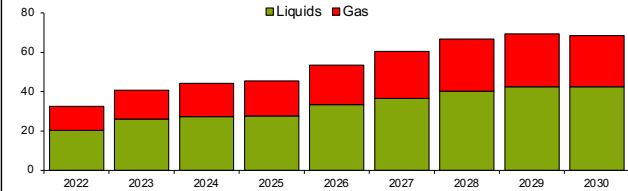
Africa industry review

Africa upstream CAPEX forecast to 2030 (Billion USD)

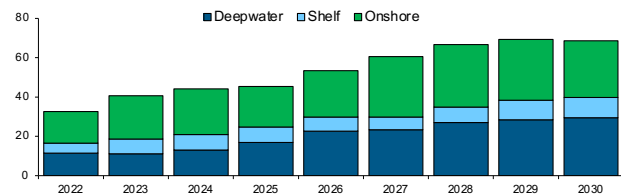
Africa CAPEX forecast split by region



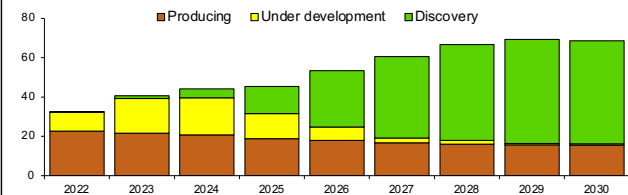
Africa CAPEX forecast split by hydrocarbon



Africa CAPEX forecast split by supply segment



Africa CAPEX forecast split by lifecycle



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projects respectively. Shelf projects are those projects lying in water depths of a maximum of 125m and anything in deeper waters is considered a deep-water development.

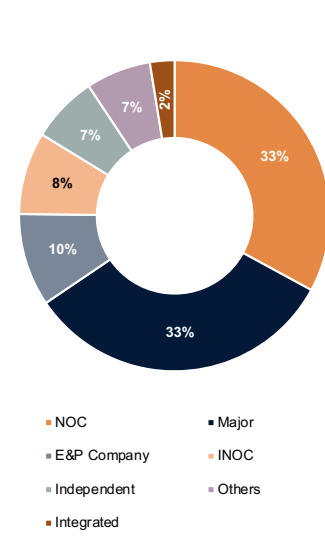
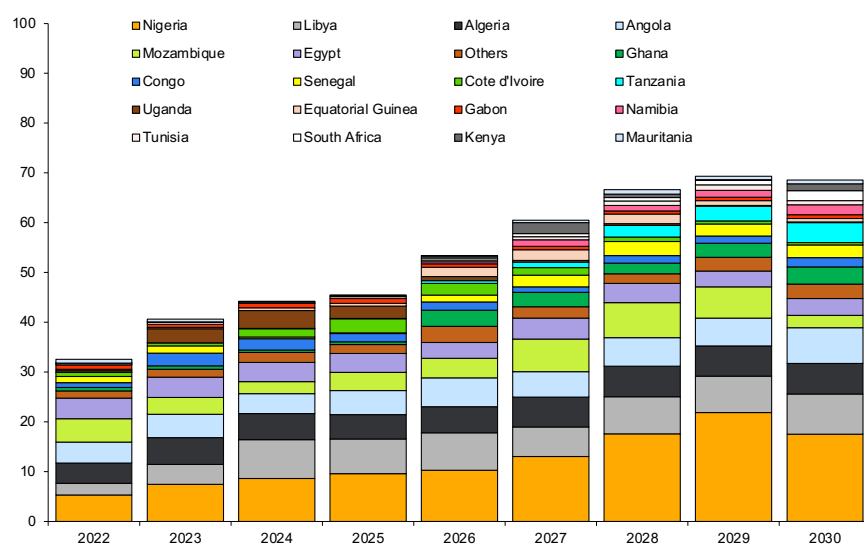
Finally, the spending levels split by lifecycle, or maturity stage of the recoverable resources, suggests Africa is expected to follow a lifecycle split very similar to global spending over the same

time period. The brownfield spending levels are estimated to stay relatively flat through the period. The spending on currently FID'ed under development projects is estimated to peak next year before decreasing to marginal levels by late 2020s. Over the second half of the decade, it is the greenfield expenditure on the currently pre-FEED discoveries, that is expected to drive majority of the total CAPEX spending.

Nigeria, Libya, Algeria, Angola and Mozambique are estimated to drive bulk of the potential spending both YoY and over the 2023 – 2030 period. The countries together are estimated to drive a potential spending of almost 65% of the total spending from Africa. As discussed above, NOCs and majors are estimated to be the main spenders, with over 65% of the potential spending coming from their pockets.

Africa industry review

Africa upstream CAPEX 2022 – 2030 split by country and company segment (Billion USD)



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Source: Rystad Energy UCube

5.3 Actual spending close to 2°C scenario

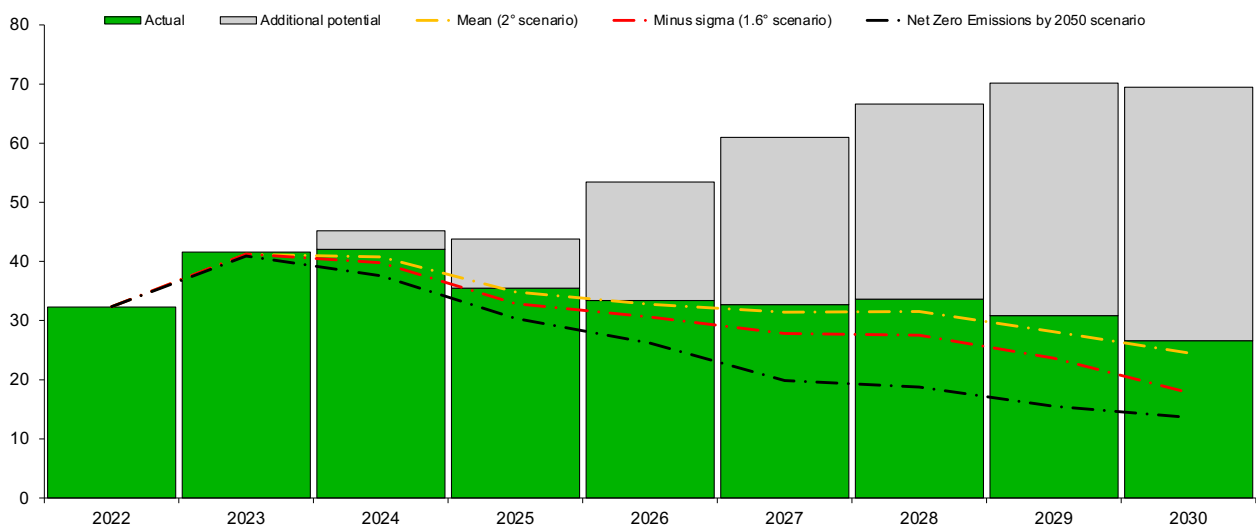
The actual spending share of the overall spending is estimated to reduce from about 95% in 2024 to under 40% by 2030. Actual spending is estimated

over the period 2023 – 2030. It is to be noted that the actual spending level is very close to estimated spending in a “Mean” scenario which results in cap-

climate regulations are expected to drive the spending levels lower and can deal a critical blow to Africa’s upstream sector.

Africa industry review

Africa upstream CAPEX 2022 – 2030 in different scenarios (Billion USD)



Source: Rystad Energy UCube

5.4 Onshore drilling expected to drive overall drilling activity

Wells drilled on the African continent and its continental shelves ultimately represent the activity that ensures hydrocarbon recovery from its underground deposits. An estimated 810 wells were drilled during 2020 with about 651 or 80% drilled onshore and the remaining 159 or 20% drilled offshore. The trend since then has been an increasing number of wells drilled per year in the post pandemic era. 2021 saw the overall drilling rise to about 820 wells, with a similar split of 80% of those

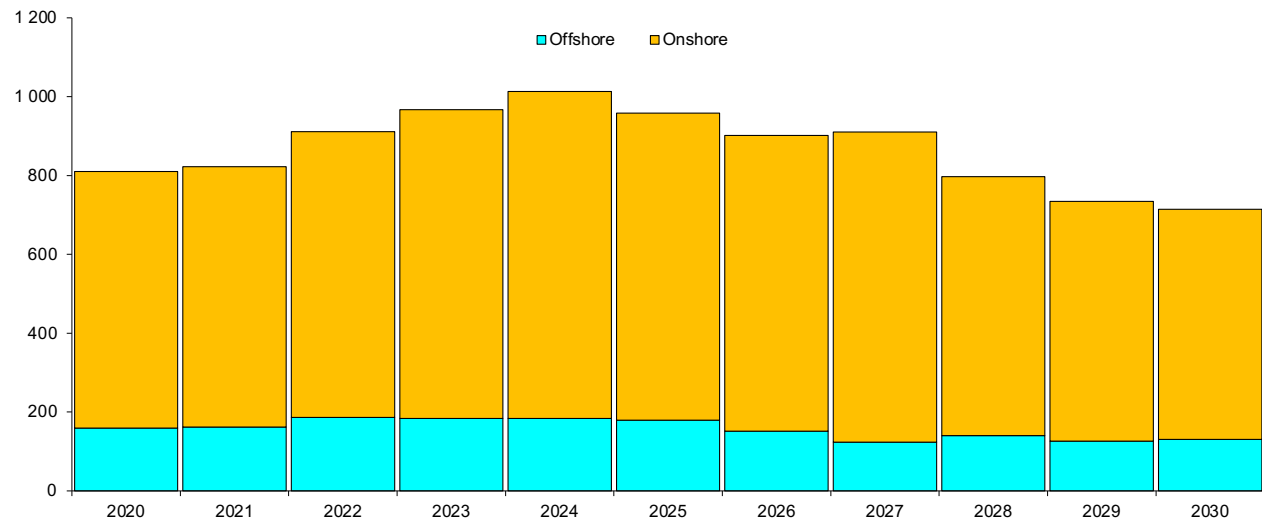
drilled onshore and 20% offshore. 2022 drilling levels saw an 11% YoY increase over 2021, with 910 wells drilled in total. The number is estimated to increase to 967 wells in 2023, a 6% YoY growth and further to 1013 wells in 2024 representing a 5% YoY growth. Increasing drilling activity onshore in the northern and eastern parts of Africa is the main driver behind this growth. Beyond 2024, drilling activity is expected to see a gradual decline equivalent to an average 6% per annum through to 2030. 2025 well

count is estimated at about 960 wells (onshore vs offshore – 180 wells (19%) vs 780 wells (81%)) and at the current expected activity levels, performance of the wells vs actual supply, the count is estimated to drop to about 715 wells – 130 offshore (18%) and 585 onshore (82%) wells. It is also to be noted that the average split between onshore wells vs offshore wells is expected to remain roughly at 80% – 20% split through the period.

The number and type of wells can be

Africa industry review

Africa upstream drilling forecast to 2030 (Count)

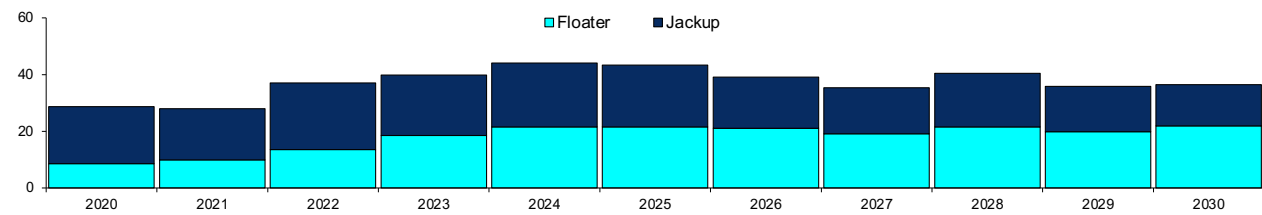


Source: Rystad Energy WellCube

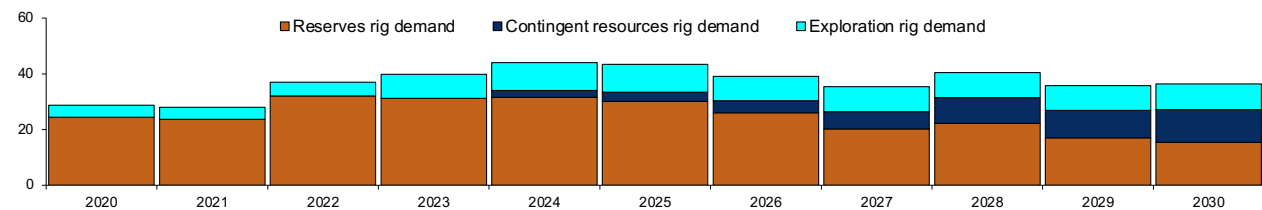
Africa industry review

Africa offshore rig demand forecast to 2030 (Work years)

Africa offshore rig demand



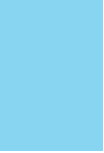
Africa offshore rig demand split by resource lifecycle



Source: Rystad Energy RigCube

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translated into rig demand expectations. In other words, how many drilling rigs have to be operational for a year in order to drill the wells? Jackups are typically used in shallow water with water depth up to 125 meters while floaters serve drilling demand in deeper waters. The rig demand pattern is roughly similar to the estimated number of wells drilled per year. As the number of wells drilled per increase over the period 2020 – 2024, rig demand evolution also saw a similar pattern with demand of about 28 years per year over 2020 – 2021, growing to 37 years, 40 years and 44 years for the years 2022, 2023 and 2024 respectively. The 2024 rig demand represents a 55% growth over that of 2020. This suggest that the rebound that was expected from the pandemic lows happened as significant drilling associated with projects currently under development returned to Africa from 2022. However, going forward, the

rig demand – in line with the expected/ estimated wells to be drilled per year – is in a declining trend.

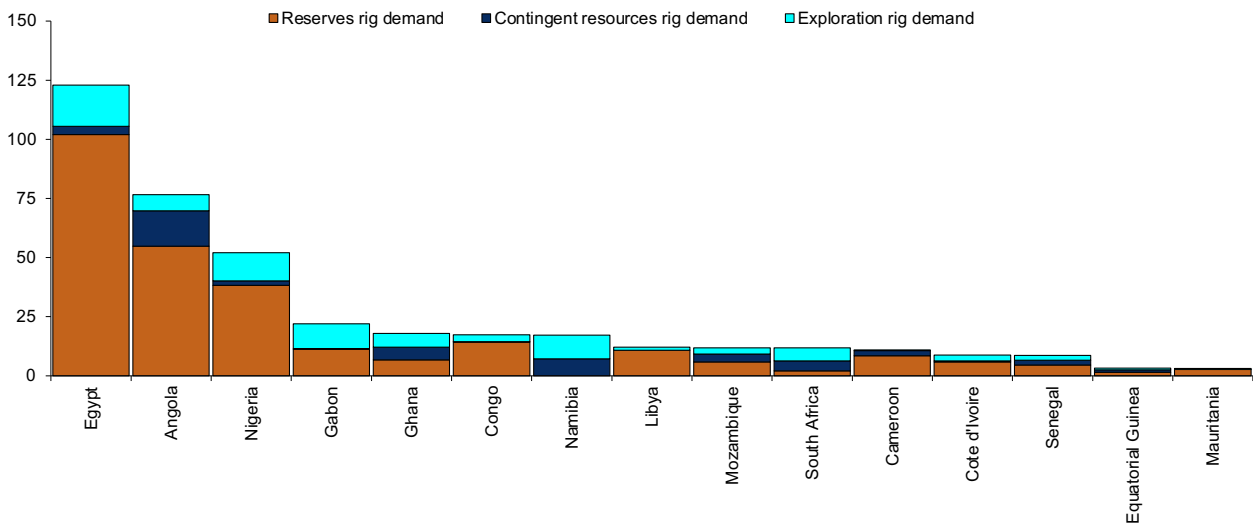
It is also to be noted that the rig demand expansion to an average 44 rig years over the year 2024 is contingent on new projects being sanctioned. The current oil market outlook, greenfield and brownfield investment forecast suggests the combined potential of these new projects and further exploration activity will be able to propel rig demand in Africa towards pre-Covid-19 levels. It is to be noted that the rig demand from the existing projects in-pipeline / in the pipeline is expected to decline marginally through 2025 to 2030 and it is the combined impact of rig demand driven by projects contingent on FIDs and exploration is the driving factor for increase. Any delays in these expected FIDs and/or exploration drilling can lead to further decline and thus, an obvious

blow to production going forward.

Breaking down cumulative offshore rig demand from 2020 to 2030 per country reveals Egypt as the most active country with about 123 rig years followed by Angola and Nigeria. The breakdown of the top 20 countries by rig demand with associated split on what resource class is supporting the rig demand suggests majority of the rig demand is robust with only about 32% related to contingent resources and exploration. Namibia, South Africa, Equatorial Guinea, Ghana and Mozambique round off the top five countries with the highest percentage of rig demand being related to contingent resources implying that rig demand in this particular area is sensitive to investment decisions expected over the period. Most other producing countries show very little dependence on upcoming project sanctions to drive their rig demand.

Africa industry review

2020 – 2030 top 15 African countries' offshore rig demand (Work years)



Source: Rystad Energy RigCube

5.5 Optimistic exploration forecast in the short-term

Africa exploration drilling, which consists of drilling of both wildcats and appraisal wells, is expected to see a steep growth from 2022 levels. The trend is relatively flat through to 2025. The total cumulative well count over 2023 – 2025 is about 375. Estimated annual exploration well count is 132 wells in 2023, 120 wells in 2024 and 123 wells in 2025. Two-thirds of the total wells are expected to be onshore and a little over a fifth of the total wells are estimated to be in the deep waters off Africa. Onshore drilling is majorly driven by the expected exploration activity in Algeria and Egypt, with the exploration well count in these two countries estimated to be almost two-thirds of the total onshore exploration well count. Mega discoveries in the deep waters off Namibia have kicked off exploration in the region and the country, along with Nigeria and Egypt is expected to drive the deepwater exploration drilling over the

period. Similar to the remaining recoverable resource, supply and spending potential, NOCs and majors are expected to drill close to 50% of the total exploration wells between 2023 – 2025.

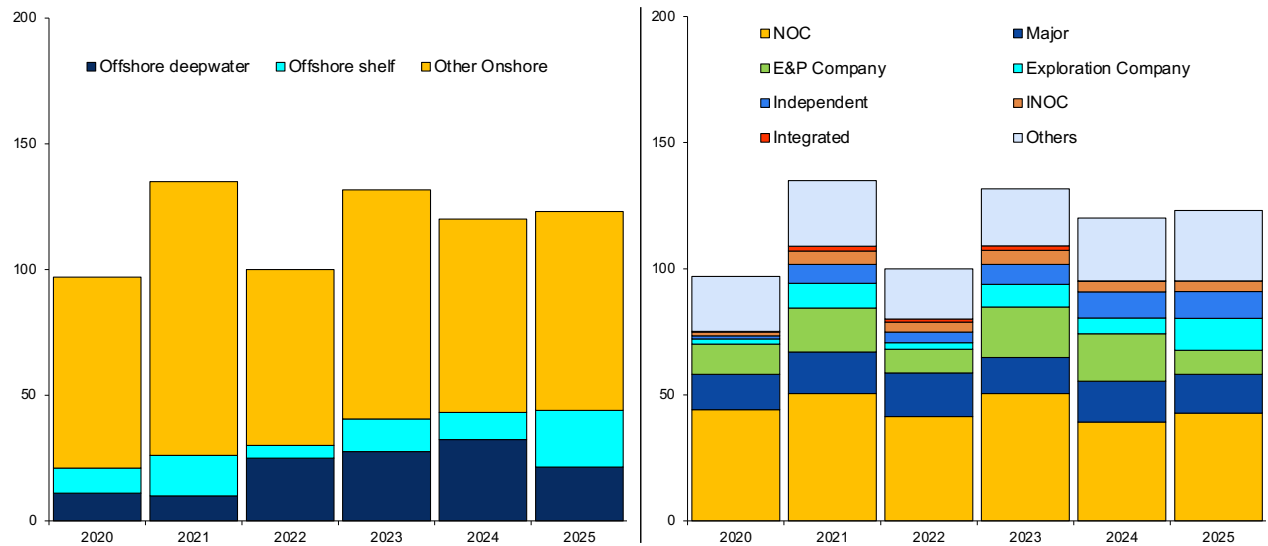
Another positive indicator for Africa's exploration activity is the expected high impact well (HIW) drilling in the continent. Classification of exploration wells as HIWs has to satisfy one or more of the following five criteria –

- Large prospective resources: significant pre-drill estimates by company
- Focus for company: company is pushing for the well
- Emerging basin: well being drilled in area with mostly exploration success but little production yet
- Play opener: well is targeting a new play in mature or frontier area
- Frontier basin: well being drilled in a completely new frontier

2023 has already seen six such HIWs drilled across Africa – one in Mauritania by Shell Plc, one in Gabon by CNOOC, Venus-1A by TotalEnergies and Jonker-1 by Shell Plc offshore Namibia, one well – Raia-1 offshore Mozambique by Eni and finally one well by Eni in Egypt. Eleven more HIWs are expected to be drilled in the next 15 months. Two wells – Cinnamon in Morocco by Eni and an exploration well in the Shell Plc operated North Marina block in Egypt – are confirmed to be drilled before the end of this year. 2023 is also expected to see two more HIWs – Niamou-1, operated by TotalEnergies in Congo and Osprey well offshore Namibia by Eco Atlantic, but the probability is relatively lesser. Seven HIWs are expected to be drilled through 2024 in both mature as well as frontier areas with participation from majors, independents and E&Ps alike.

Africa industry review

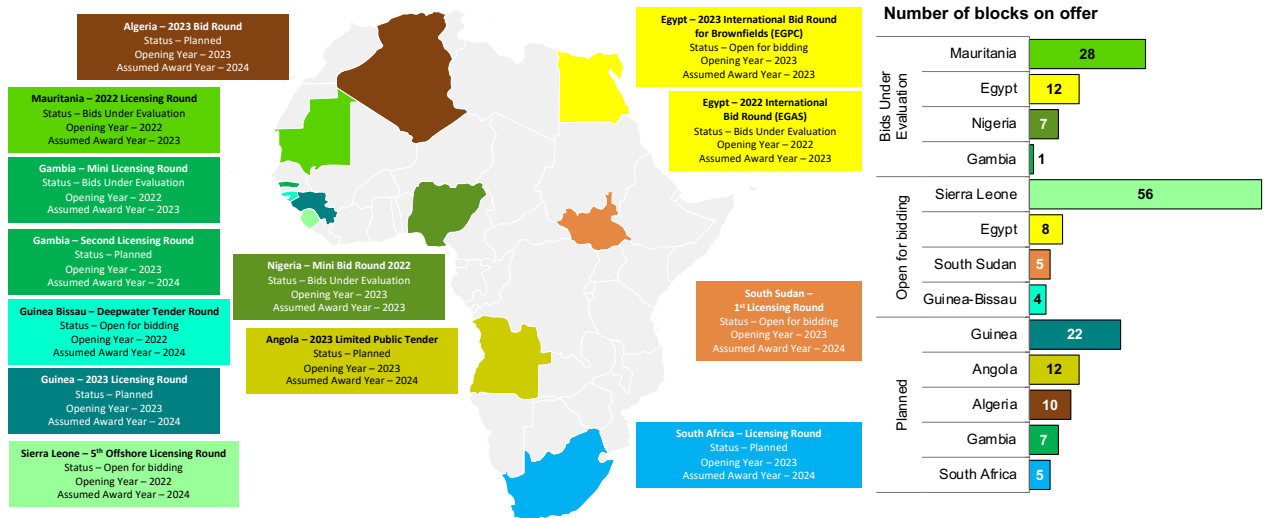
Africa exploration drilling, forecast to 2025 (Well count)



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Africa industry review

Africa upcoming exploration licensing rounds

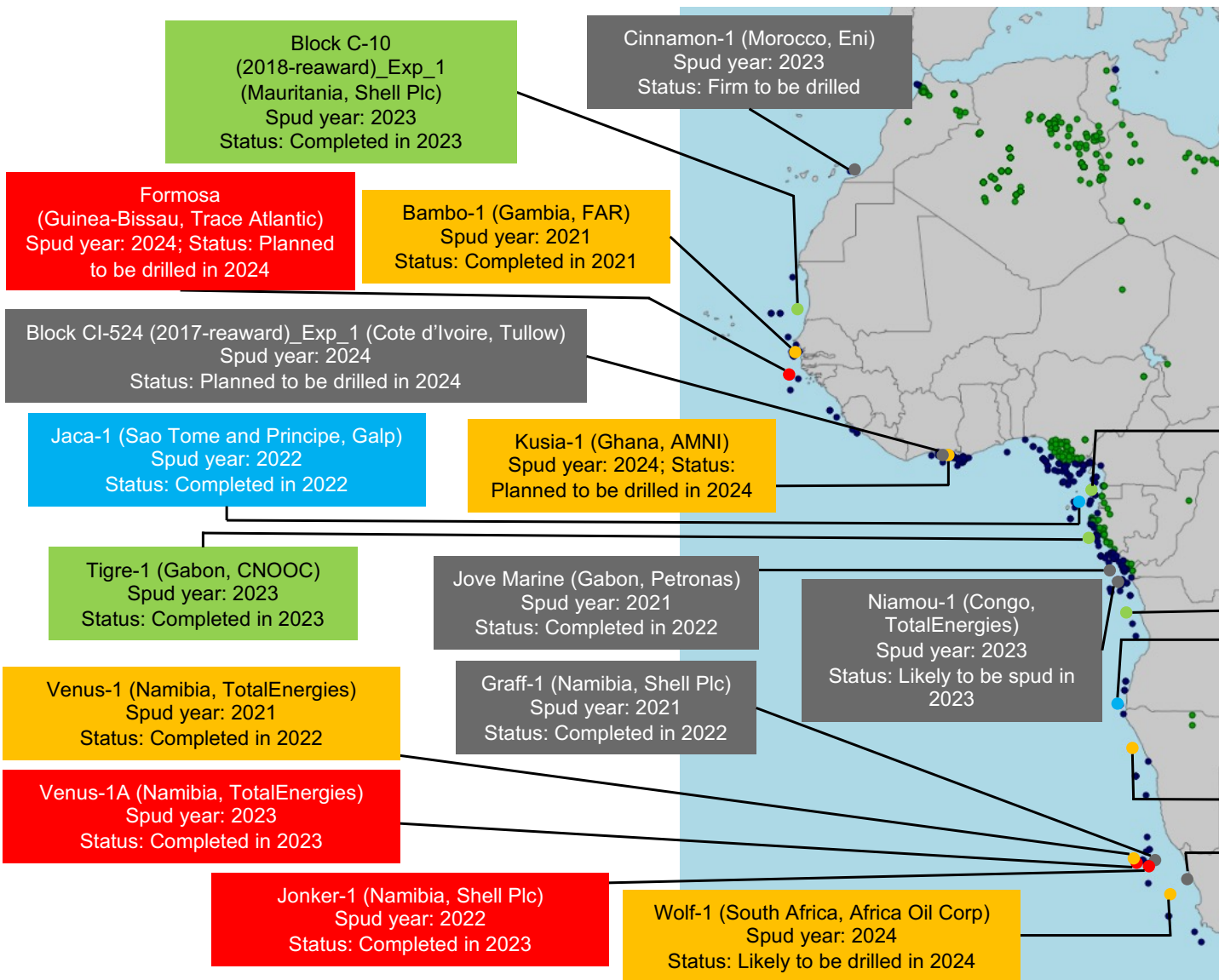


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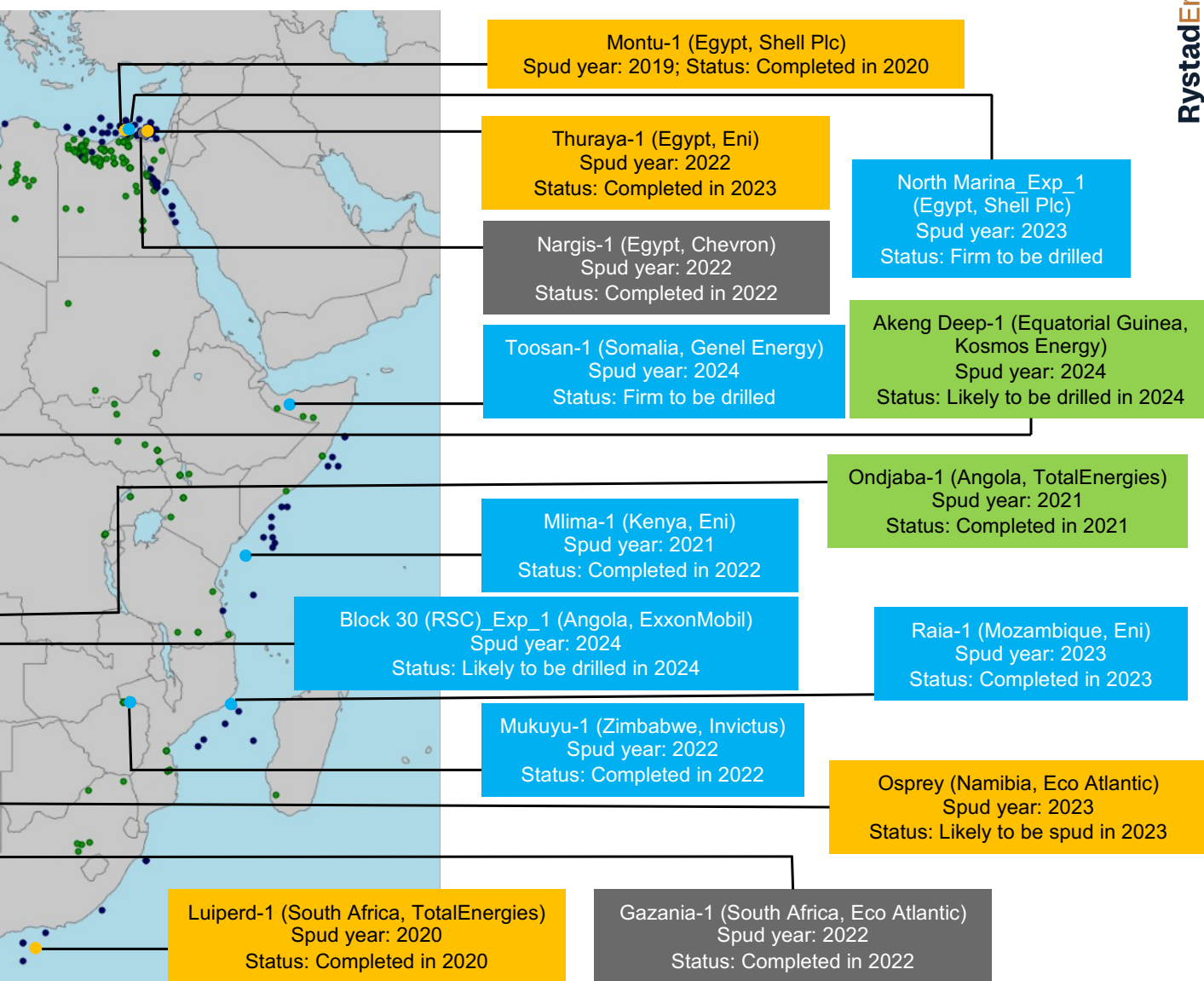
Source: Rystad Energy ECube

Africa industry review

Africa High Impact Wells, forecast to 2025



Source: Rystad Energy ECube



5.6 Producing liquids portfolio most sought as per the M&A deal activity in 2023

M&A activity across Africa in 2023 has resulted in a total transaction value of US\$3.233 billion in deals either announced or closed. It is to be noted that there were no farm-ins from majors except for Eni’s transaction with Neptune Energy wherein Eni acquired stakes in Neptune’s African assets via a corporate transaction where Eni agreed to acquire all of Neptune Energy’s oil and gas assets excluding German and Norwegian operations. On the contrary, there have been exits, mainly from exploration licenses, by the majors. Considering there is exploration interest from the majors in regions like Namibia, it can be said that exploration focus from the Big Oil can be limited to only certain regions in Africa going forward.

Africa industry review

Africa 2023 major M&A deals till date

| Country | Title | Buyer | Seller | Deal value (Million USD) | Status | Field Type | | Lifecycle | |
|---------|--|-------|--------|--------------------------|-----------|------------|-----|-----------|--------------|
| | | | | | | Liquids | Gas | Producing | Pre-start up |
| | Maurel & Prom acquires Gabon-focused Assala Energy for \$730 million | | | 730 | Closed | 100% | | 100% | |
| | Galp Energia divests upstream assets in Angola to Somoil for \$655 million | | | 655 | Announced | 100% | | 84% | |
| | Africa Finance Corporation acquires Ghana-focused Aker Energy | | | 605 | Announced | 100% | | 100% | |
| | Petronas divests assets in Chad to state-owned SHT | | | 371 | Closed | 100% | | 100% | |
| | Octavia Energy acquires interests in Moroccan assets from Sound Energy | | | 141 | Announced | | 81% | 100% | |
| | Eni sells certain onshore Nigerian assets to Oando | | | 86 | Announced | | 89% | 100% | |
| | Afentra acquires additional interest in licenses from Azule Energy for \$48.5 million in Angola | | | 48 | Announced | 100% | | 55% | 45% |
| | Apex acquires interests in six concessions in Egypt from Eni | | | 45 | Closed | 72% | | 68% | 32% |

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Major transactions that drive over 80% of the overall transaction value include US\$500 million+ transactions like –

- Maurel & Prom’s acquisition of Assala Energy for US\$730 million. This gives the oil company, which has financial support from its majority shareholder and hence parent organization, the Indonesian NOC Pertamina
- Angola’s legacy producer Somoil bought into South American Galp Energia’s Angolan portfolio
- AFC Equity Investment, an affiliate of Africa Finance Corporation, a Nigerian multilateral financial institution, acquired 50.79% and 49.21% stakes in Aker Energy from Aker Capital (100% owned by Aker ASA) and TRG respectively. As a result, AFC became a 50% owner of the Deep-water Tano Cape Three Points (DWT-CTP) block, which holds the Pecan project

While Indonesian Pertamina acquired African

assets via its subsidiary Maurel & Prom, its Malaysian counterpart – Petronas finally exited from Chad by transferring its stakes in the producing oil fields of Doba basin and the Chad – Cameroon oil export pipeline to the Government of Chad. Eni struck a deal with Oando to divest its 20% interests in four onshore blocks – OMLs 60, 61, 62 and 63, in Nigeria. This is yet another transaction where an international major is exiting or is looking to exit the Niger Delta, selling their assets to indigenous player(s), due to the challenges like rampant oil theft, pipeline sabotages and the resultant costs for repairs and clean up any environmental damage, court cases and tussles with the indigenous communities. The Italian major also sold its stakes in six concessions in Egypt to Apex International.

The resource-mix of the assets involved in the transactions shows that liquids are the preferred hydrocarbon for buyers. Of the major transactions driving bulk of the valuation, only two transactions involve gas heavy portfolio with the rest being oil fields. Also, recovering

the value paid in an accelerated timeline with minimum investments seems to be the strategy behind farming in as bulk of the assets are in producing phase. A top-level observation from the transactions so far in 2023 suggests indigenous operators buying into producing portfolios and trend of operators sitting on assets without development going on. However, lots of factors come into picture when we look for reasons as to why operators sit on blocks/ discoveries – securing financing being one of the key issues. Energy transition and prioritizing core areas can be the reasons for larger and more financially secure operators – where the investments are scrutinized for more than just financial or funding reasons. As such, it becomes important for administrations to provide good business environment, transparency in operations and swiftness or reason in approving or disapproving development plans to have their respective blocks thrive with exploration and discoveries reach start-ups sooner without operators looking to either sit on them or just exit the region as a whole.

6 AFRICA VS REST OF THE WORLD

Africa's hydrocarbon extraction emissions in the "mid-range" when compared to other regions, but natural gas flaring emissions intensity the highest globally

Limiting natural gas flaring and utilization and/or monetization of produced natural gas – key to Africa's upstream sector's betterment

Post COP27 exploration acreage awards – Africa accounting for 30% of the global offshore acreage awarded

Africa expected to have the least potential greenfield spending probability - the ratio between actual spending and potential spending

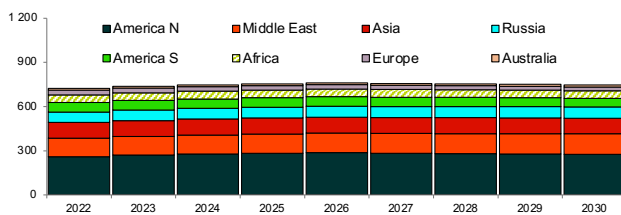
Total exploration spend over 2015 – 2025 and discovered volumes over 2019 – 2023 – South America double of that of Africa

6.1 Avoiding natural gas flaring – key to limiting Africa's emissions

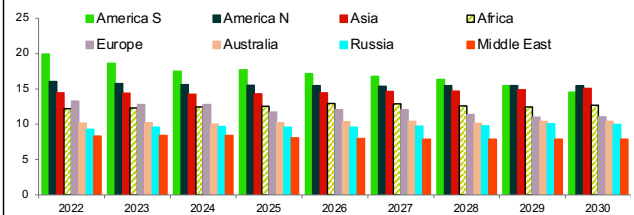
Africa vs Rest of the world

Global hydrocarbon extraction and flaring emissions & emission intensity

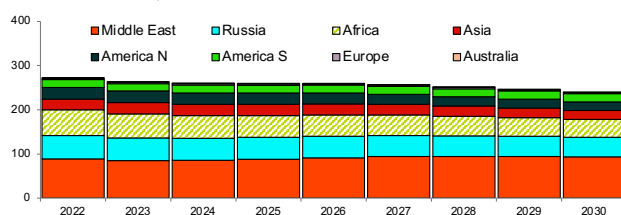
Global emissions due to hydrocarbon extraction
Million tonnes CO₂ equivalent



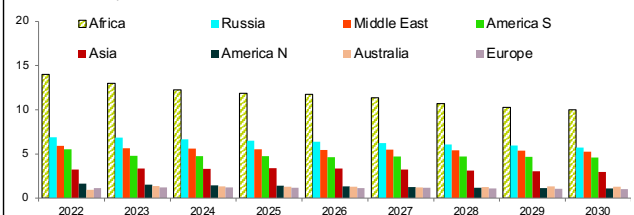
Global emission intensity due to hydrocarbon extraction
CO₂ Emissions per boe



Global emissions due to flaring
Million tonnes CO₂ equivalent



Global emission intensity due to flaring
CO₂ Emissions per boe



Source: Rystad Energy UCube

Alarming rates of global warming have led to climate regulations aiming at capping the global warming at 1.5°C. Global consensus is that these regulations should be strictly imposed on the fossil fuel industry that is responsible for different scopes of emissions ranging from hydrocarbon extraction emissions to operations emissions. These regulations are currently being looked at as universal irrespective of the maturity of the regional industry or the recovery levels of the existing hydrocarbon potential. Also, climate regulations are expected to be implemented uniformly across the regions like the developed western world and the developing nations like those in Africa. The dependence on hydrocarbons in Africa is immense with multiple African economies depending on their respective hydrocarbon exports to international markets and also, fossil fuels are expected to play a significant role in providing universal access to electricity across the continent – both rural and urban. African oil and gas fields, especially in West Africa, are historically labelled as high emission assets and this, along with the risks that the region presents to a stable business environment often put the continent first on the chopping block when it comes to operators deciding to limit their upstream exposure and cut down upstream investments to maintain lower levels of individual emissions.

However, comparison of evolution of estimated absolute emissions from hydrocarbon extraction over the period 2022 – 2030 suggests that Africa stands at sixth in a set of eight global regions. While the estimated average annual emissions due to hydrocarbon extraction from North America are close to 280 million tonnes CO₂ equivalent as opposed to 52 million tonnes CO₂ equivalent from Africa. The production levels are very differ-

ent, so it makes more sense to draw the comparison in terms of intensity of emissions. A similar regional comparison puts Africa in the fourth spot with average per boe emissions of just over 12.5 kg CO₂ equivalent per boe with South America leading the way with almost 17 kg CO₂ equivalent per boe average over the same period. This suggests Africa may not be the region with the lowest hydrocarbon extraction driven emissions and emissions intensity in the world but does not seem like this scenario alone should be reason enough to put upstream investments in Africa on the backburner. South America's production levels are similar to that of Africa, so it is an advantage to Africa that the emissions intensity in the LatAm is much higher. North America and Asia may have higher emissions intensity than Africa, but these regions present relatively better and safer business environments. Asia is also working on improving and boosting its Carbon Capture, Usage and Storage (CCUS) and renewables capacity, taking strides towards making the region more "climate-friendly". As such, the real "competition" is with the South American region where there is legacy production and majors have strong exploration and development pipeline in countries like Suriname and Guyana.

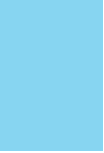
When it comes to gas flaring related emissions, Africa paints a slightly different picture. Africa moves up to the third spot with respect to absolute emissions next to only Middle East and Russia. But Africa's natural gas output potential, over the period 2023 – 2030, is estimated to be just over one-third of that of Middle East and under 50% of that of Russia. This suggests Africa is flaring relatively more volumes of natural gas as opposed to produced gas when compared to the regions that are exhibiting more flaring related emissions. This statement

is further cemented when we look at the comparison of emissions intensity from natural gas flaring between different regions globally. The average emissions intensity from natural gas flaring from Africa over the period 2023 – 2030 is twice that of Middle East and Russia.

This suggests Africa needs to prioritize the following –

- Limit and eventually eliminate natural gas flaring
- Better utilization of produced natural gas –
 - o Monetize the produced natural gas by diverting it demand centres, both domestic and foreign
 - o Re-inject the volumes in areas without infrastructure to support gas monetization and enhance crude oil production

African nations like Nigeria and the likes are already looking at this issue of natural gas flaring and implementing measures like capping on flaring volumes and penalties on exceeding these limits, improving natural gas monetization infrastructure and announcing schemes like "Decade of Gas" to improve ways of utilization of produced gas. These measures, although meeting below par success when compared to targets currently, can be a double benefit to Africa – generate revenues through sale of gas and, limit emissions and make the region more climate-friendly. These issues are key to thriving and stable upstream sector in Africa which turn is very essential considering the continent's dependency on hydrocarbons to bring in revenues via international exports, stable fuel prices for transportation via improved refinery capacity and universal access to electricity utilising the produced gas.



6.2 5% of onshore acreage and 28% of offshore acreage awarded globally post COP27 is in Africa

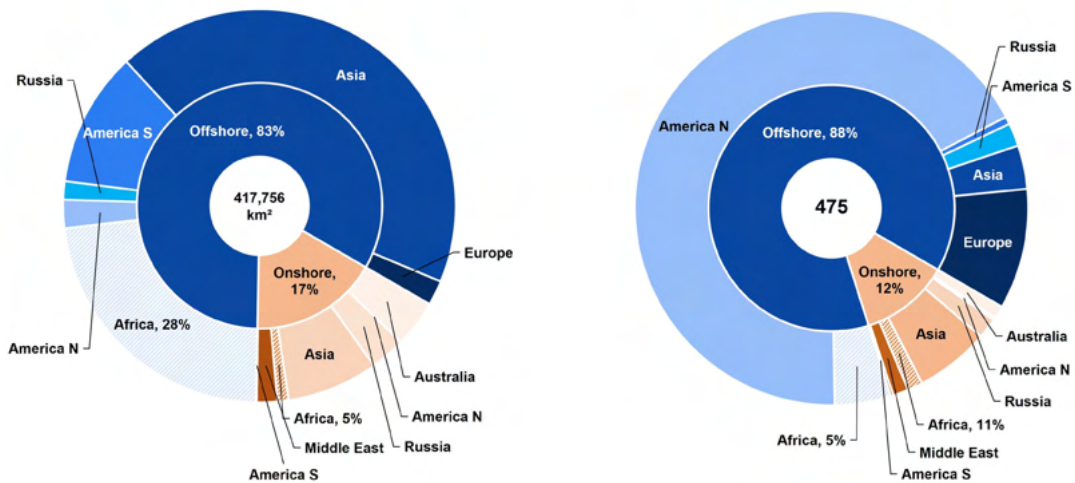
The 2022 United Nations Climate Change Conference or Conference of the Parties of the UNFCCC, more commonly referred to as COP27, was the 27th United Nations Climate Change conference and held from November 6 to November 20, 2022, in Sharm El Sheikh, Egypt. As many resolutions were passed and pledges taken to comply to climate regulations and achieve energy security, the key objective remained the capping of global warming at 1.5°C. One popular sentiment, especially across the spectrum of climate watchdogs and non-profit organizations is the immediate full-stop to funding the fossil fuel industry.

While the European Union (EU) might not agree with this entirely, there has been a strong push to move the industry in a path of energy transition with green sources of energy taking over sooner. These words have not fully translated into actions for a variety of reasons with the next COP summit aiming at “course-correction” to bring the planet on the path towards 1.5°C. Countries, however, seem to have been continuing their own efforts to keep their respective upstream sectors sustaining. This is reflected in the oil and gas exploration acreage awarded globally post the COP27 summit in November

2022. Close to 418,000 km² of acreage has been awarded since November 2022 of which 83% is offshore and the rest onshore. Asia saw the largest exploration acreage awarded covering over 52% of the total offshore exploration acreage awarded and close to 45% of the total onshore exploration acreage awarded. While 28% of the overall offshore acreage and a much lesser 5% of the total onshore acreage was African awarded acreage, it is clear that globally exploration is here to stay, and respective administrations are looking to bring in more upstream exploration investments.

Africa vs Rest of the world

Awarded exploration acreage (km²) and number of exploration blocks post COP27



Source: Rystad Energy ECube; Rystad Energy and Analysis

6.3 Actual greenfield spending less than 50% of the potential spending

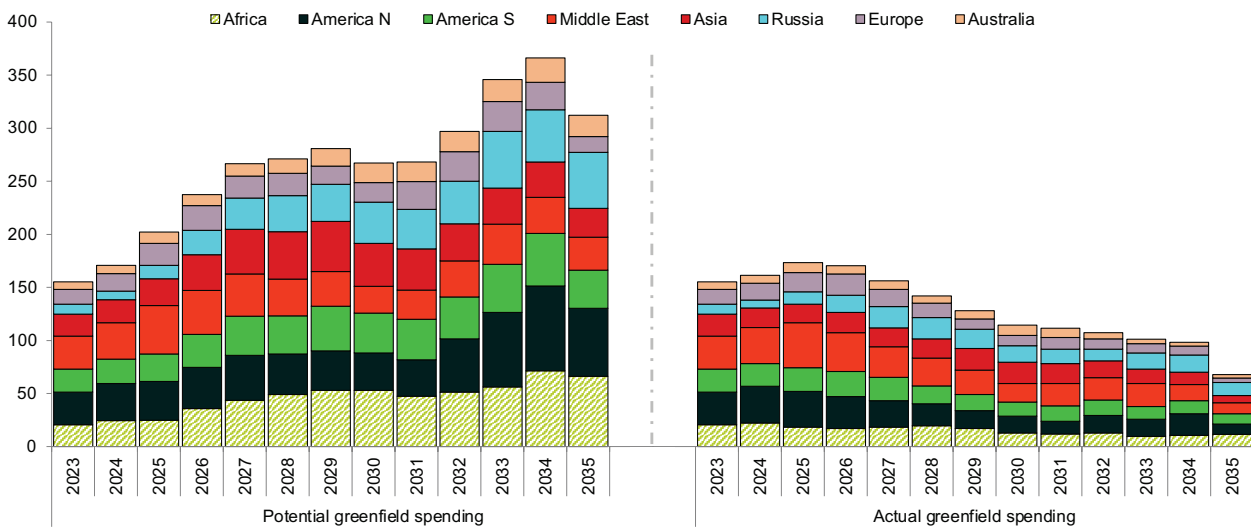
While flaring related emissions can be controlled by driving efficient management of produced gas and efforts to monetize it, and exploration in Africa is well within the levels of what other regions are aspiring to achieve, it is the stark contrast between Africa and other regions in terms of the ratio between the actual spending and potential spending – or the potential greenfield spending probability – is a matter of great concern. Actual spending is all the spending coming from the projects with their respective breakeven prices less than that of forecasted Brent price. Potential spending is the sum of actual spending as well as the spending

coming from the projects with their respective breakeven prices higher than that of forecasted Brent price. In other words, potential spending involves spending on the projects that have a negative valuation or net present value (NPV) currently. For Africa, these projects need to come online for the supply to be sustainable if not reverse the declining trend. However, the actual spending in Africa is about one-third the potential spending. This ratio is close to 0.5 for the Americas, Asia, Russia and Australia and a very healthy, almost, 0.75 for the Middle East. This suggests, regions other than Africa are expected to see a larger share of the potential

spending actually materialize while Africa is the region that needs a larger share of potential spending to happen for the production flows to stay stable. This calls for efforts from both the governments and the operators. Administrations need to make these projects more investor-friendly by allowing tax incentives if the situation calls for it, provide better and less riskier business environments, and show more transparency in processes. Operators need to engage with the administrations and work towards implementing measures where unit costs can be cut down and hence, the breakeven prices can be brought down.

Africa vs Rest of the world

Required vs expected upcoming greenfield spending split by continent, forecast to 2035 (Billion USD)



RystadEnergy

Source: Rystad Energy UCube

6.4 LatAm discovered volumes and exploration spending double of that of West Africa

Almost every benchmarking exercise involving Africa's upstream sector involves a direct comparison with the South American region and for good reason. The deepwaters off both the regions are said to behave in a very similar manner. Both the regions have seen some prolific discoveries, and the trend continued in the past five years as well. A comparison between the overall discovered volumes in both the regions since the beginning of 2019 suggests both regions have had discoveries every year consistently, but there is a clear winner. South America has seen close to 13 Billion boe (Bboe) of oil and gas discovered volumes in the period as opposed to Africa's 7.65 Bboe,

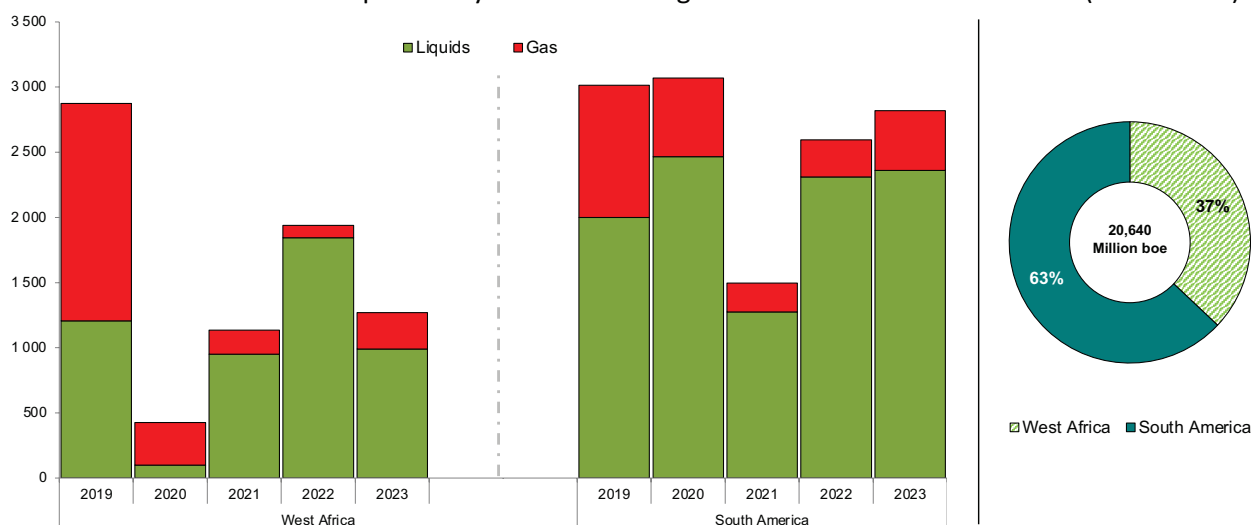
close to 60% lesser. YoY, South America has seen discovered volumes of about 3 Bboe each in 2019 and 2020, close to 1.5 Bboe in 2021, 2.6 Bboe in 2022 and 2.8 Bboe in 2023 running. The overall liquids to gas ratio is 80:20 making the region a booming crude oil hub. In comparison, Africa has seen 2.9 Bboe, 425 million boe, 1,135 Bboe, 1.94 Bboe and 1.27 Bboe in 2019, 2020, 2021, 2022 and 2023 respectively. The split is a relatively more uniform mix of 65:35 between liquids and natural gas.

The overall exploration spend historically since 2015 and forecast to near-term of 2025 suggests that the overall

exploration expenditure (EXPEX) is an estimated US\$90 billion on both the regions. Similar to the discovered volumes above, the 2015 – 2025 EXPEX in South America is double of that of West Africa. 2020 – 2025 EXPEX evolution in both the regions shows an increasing curve – EXPEX in gradual increase over 2020 – 2025 in both the regions. The overall EXPEX on South America over the same period is expected to surpass the EXPEX in Africa by 216%. Clearly, both the regions are competitive and attracting investments will be key to both the regions if they are looking to expand the discovered volumes and also bring these resources to first oil as soon as possible

Africa vs Rest of the world

Discovered resources in the past five years and running – West Africa vs South America (Million boe)

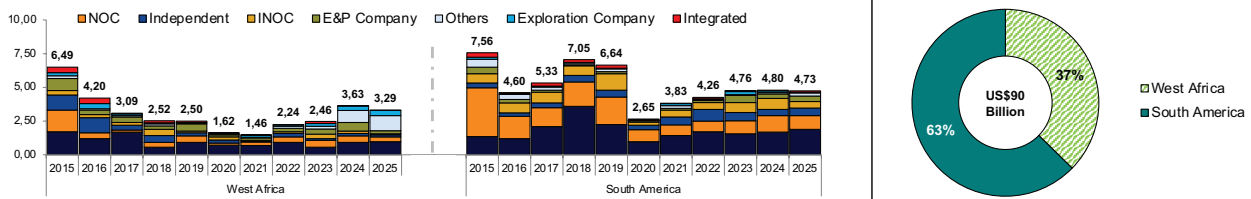


Source: Rystad Energy ECube

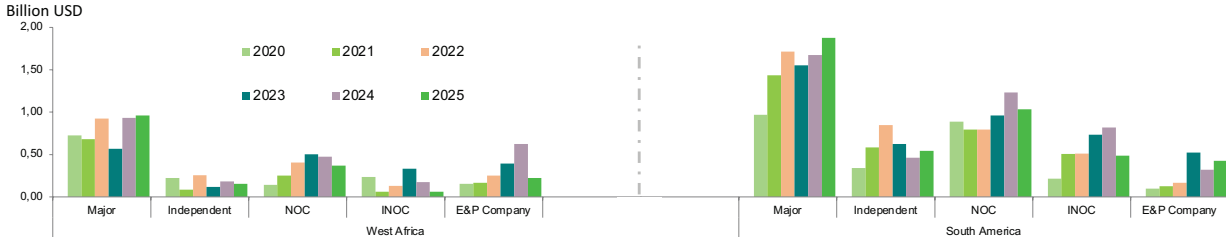
Africa vs Rest of the world

West Africa vs South America offshore exploration spending overview

Exploration cost evolution, forecast to 2025 – West Africa vs South America, split by company segment
Billion USD



Annual exploration cost evolution, forecast to 2025 from main company segments – West Africa vs South America
Billion USD



Source: Rystad Energy ECube

7 AFRICA POWER OVERVIEW

Africa's overall electricity access rates – significantly lower than global levels and even worse in rural Sub-Saharan Africa

Majority of projects to improve the regional power capacity currently at concept stage

7.1 Low level of universal access and even lower rural electricity access

Access to electricity in Africa is still a dream to millions of Africans living in regions and conditions that allow little or no access to electricity. Many countries, especially across Sub-Saharan Africa (SSA), have dismal electricity access rates. As of 2020, as many as 8 countries across SSA had sub-20% levels of electricity access. This, when the world was nosediving into a dark time period with Covid-19 taking millions of lives across the

world. While employment, education and business get significantly impacted by lack of electricity, health sector can be the worst hit sector as electricity is key to smooth functioning of hospitals. While there are a few countries like Ghana, Gabon, South Africa with very good electricity access, issues like the load shedding in South Africa can cripple development. Some of the North African countries are estimated to have over



90% electricity access rate and these countries are working in multiple directions to keep this rate high, sustainable and decrease dependency on fossil fuels. The story is completely different when it comes to SSA. On average, just over 50% of the population across SSA has access to electricity – that’s almost 50% of the population living in the dark.

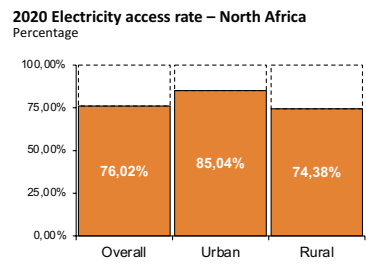
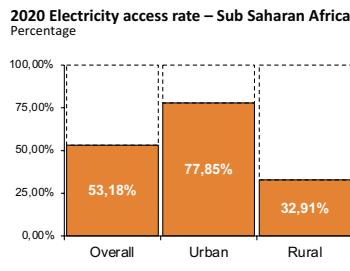
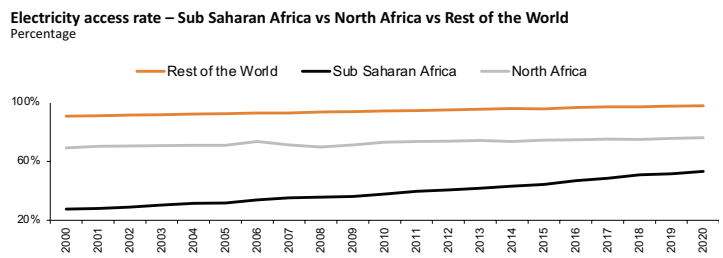
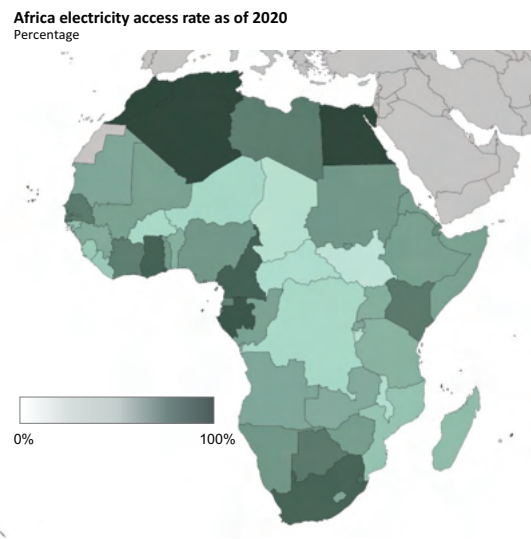
The evolution of electricity access rate across Africa in comparison to global standards shows while rest of

the world stayed over and above 90% levels and gradually moving towards universal access, Africa, especially SSA moved up much faster but the levels where it began put the region at sub-par levels. SSA since the year 2000, has managed to double the average rate of access to electricity, but the region had a little over 25% access rate back then and now has managed to cross 50% mark. The overall access rate across North Africa is estimated to be close to 80% with the cities at 85% levels and about 75% of

the rural population having electricity. While SSA’s average access rate is about 55%, it is largely driven by urban regions where the electricity access is as high as close to 80%. Rural SSA is at a crippling rate of about 33%, meaning two-thirds of the rural population across SSA has little or no electricity access. Serious measures need to be taken by the respective administrations to resolve this issue and enable more businesses, employment, health, education and foreign investments.

Africa Power Overview

Electricity access rate across Africa



Source: Rystad Energy Africa Power Market Analysis

7.2 South Africa – Case study

As mentioned previously, even cities in SSA are dealing with stable electricity as problems like load shedding and power outages persist with the population having to plan their lives around the periods of power outages or incur additional expenditure to maintain power back-up. A key example of this is South Africa. Having seen zero days this year without loadshedding – planned rationing enforced by South Africa’s power utility Eskom to protect grids and to manage power consumption – the country finds itself in a precarious situation as the supply-demand gap continues to widen. The nation is currently on track to surpass the record-breaking 2022 in terms of both stress on the economy and the extent of loadshedding. Although Stage 2 loadshedding is expected at the very least, South Africa is braced for the possibility of Stage 6 or even beyond, provided Eskom restricts unplanned outages to 15 gigawatts (GW).

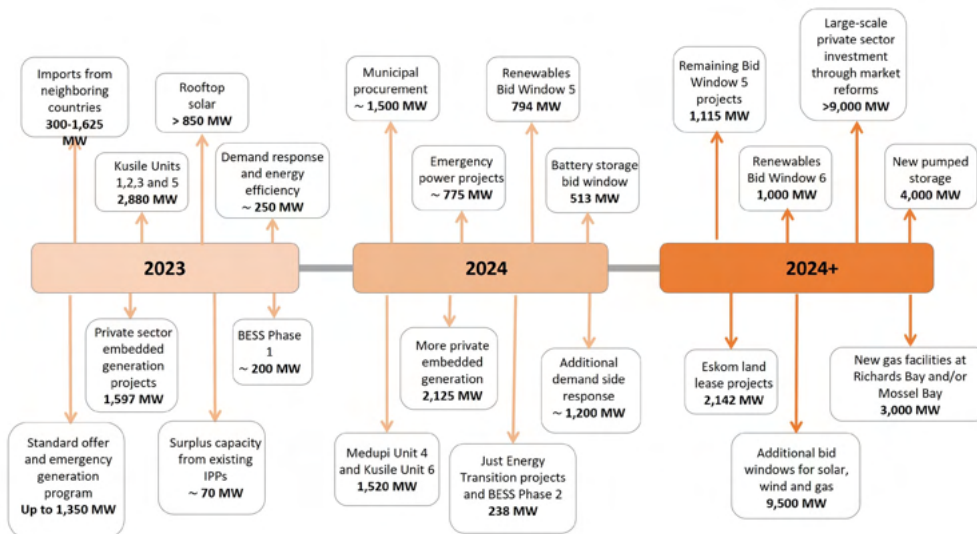
Loadshedding situation has taken a turn for the worse over the last year, with the crippling rolling power outages only being spared on 25 December and 31 Jan-

uary as well as a few other occasions. Power outages have become longer of late, leaving consumers with up to 12 hours of daily blackouts – South Africa has had zero days without loadshedding in 2023. Record-breaking 2022 saw more than twice as much load shedding as any other year, with 2023 already to surpassing the amount of loadshedding seen in the entire previous year and already not far behind 2022 in terms of the duration of loadshedding.

Multiple-fold efforts are being enforced to tackle these issues with the government is also streamlining regulatory processes for power projects, such as reducing environmental authorization timelines by half from the previous 100 days, while grid connection approvals are now provided within six months. A total of 2.8 GW of new renewables capacity under the Renewable Energy Independent Power Producer Procurement Program (REIPPPP) is soon expected to begin construction. Eskom plans to construct its solar and battery storage projects at Komati, Lethabo and Majuba, while other projects at Komati, Lethabo and Sere are

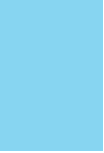
expected to come online this year. With the country favouring renewables in the long term, solar and onshore wind are to play a major role in the transition away from coal and to account for over half the power generation in 2050 compared to nearly 10% today. The government is also eyeing nuclear as it intends to issue a request for proposal for procuring 2.5 GW of nuclear towards the end of this year. In order to boost innovation and economic diversification, South Africa is also making efforts to secure and invest \$98.7 billion over the next five years via its JETIP. The country will, however, only begin reaping the benefits of the majority of these measures towards the end of this year at the earliest. Meanwhile, the tussle between energy security and decarbonization continues for the country as coal continues to dominate, accounting for over 80% of the country’s power generation mix at present but the share of renewables increasing from about 11% today to 20% by the end of the decade. Gas-to-power and battery storage will be essential to provide flexible power and balance intermittent renewables like onshore wind and solar PV.

Africa Power Overview South Africa – Case study



RystadEnergy

Source: Rystad Energy Renewables and Power Solution; South Africa Energy Action Plan, January 2023



7.3 Majority of the regional power capacity in Africa in concept stage

While access to electricity is being taken seriously by multiple administrations and are driving efforts to up the regional power capacity, a top-level overview shows much of the capacity is still in concept phase. The project pipeline across Africa is looking at a capacity of 370 GW – 46 GW from South African projects, 57 GW from East Africa, West African projects' capacity accumulating to 88 GW and finally North African projects driving almost 180 GW. But majority of this capacity – almost 70% of to-

tal capacity in South Africa, 45% in the East, 67% in the West and about 65% in the North – is in concept phase, taking the overall share of projects currently in concept phase to almost 65% across Africa.

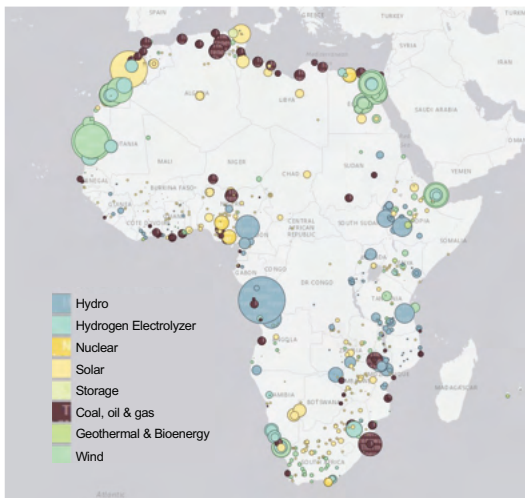
Of the total capacity, solar and wind are expected to drive almost 50%, suggesting the continent is gearing up to move majorly towards renewable energy powered electricity generation in line with its COP27 pledge. Fossil

fuels – coal, oil and gas – add up to a tenth of the total capacity. It is to be noted the capacity here includes the capacity that has come online in 2023 so far and is estimated to come online till 2040, thus including the majority additions to the existing capacity. The fact that only a tenth of this is estimated to be using fossil fuels as energy source shows the increased focus on renewables and the efforts towards reaching a balance between energy security and decarbonization.

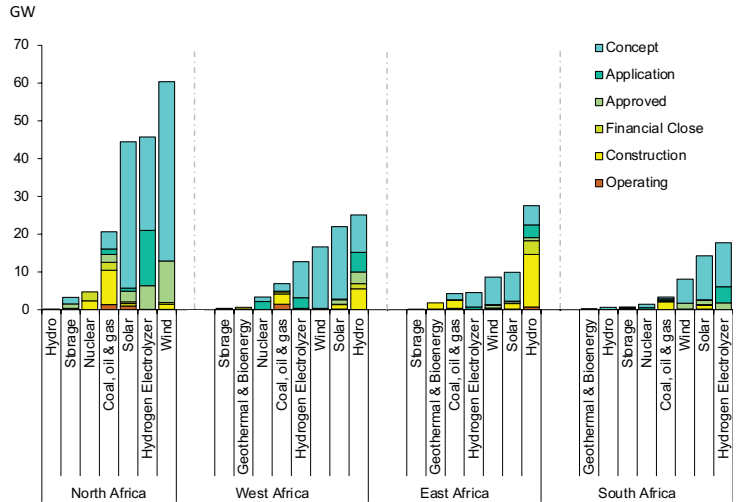
Africa Power Overview

Major power projects and regional capacity overview in Africa

Major power projects in Africa



Regional power capacity in Africa



Source: Rystad Energy Power Cube

8 AFRICA RENEWABLES OVERVIEW

Renewables capacity to be driven majorly by solar and onshore wind capacity, with hydrogen taking the growth further during the 2030s

Onshore wind and solar expected to drive three-fourths of the total renewables capacity in Africa through to 2040, and along with hydrogen capacity drive over 95% of the capacity through 2030s

Egypt, Morocco, Mauritania and South Africa – key regional renewables capacity drivers

Natural gas to play a role in Africa's power mix even in 2050

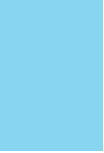
European banks, with a negative CAGR in fossil fuel financing in the past few years and strict climate policies, are more prone to fund green projects over upstream projects

8.1 Onshore wind and solar drive the renewables capacity

2023 renewables capacity in Africa is a mere 24 GW, largely driven by onshore wind and solar capacity. The capacity levels are estimated to stay relatively flat till about 2025 before a jump in onshore wind, solar and hydrogen capacity cumulatively leads to a 55% YoY increase in 2026 capacity over 2025. 2030 onshore wind, solar and hydrogen capacities are estimated to reach about 59 GW, 65 GW and 22.5 GW respectively and drive almost 95% of the continent's renewables capacity. Through the 2030s, the capacity from these three energy sources is estimated to see a gradual increase and the cumulative YoY share as well as the average share of the total capacity during the period is estimated to be north of 95%. This growth is expected to take the continent's overall capacity to close to 290 GW by 2035 and further to almost 360 GW by 2040.

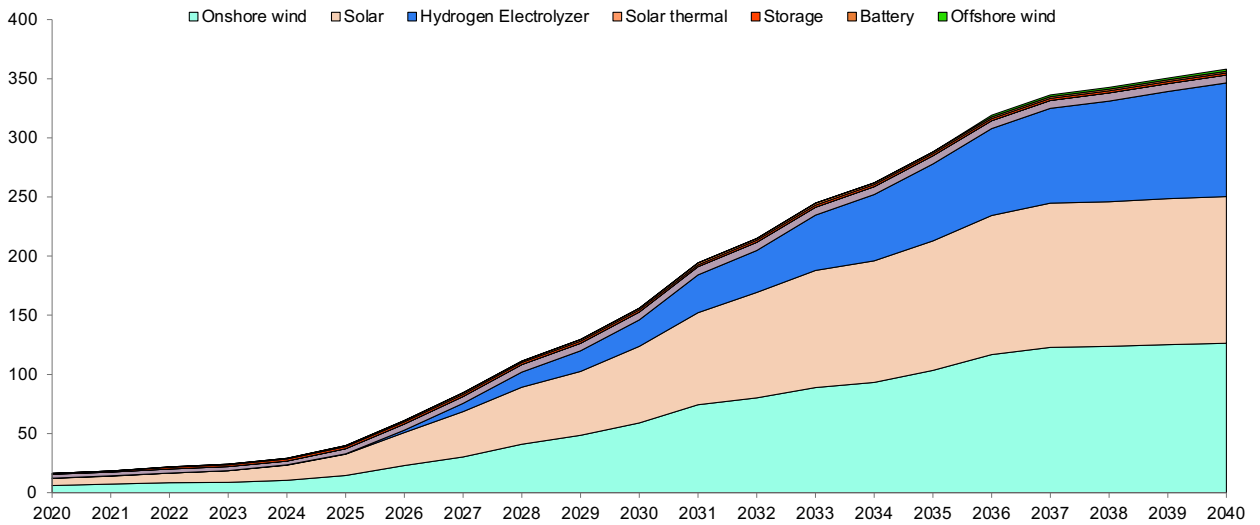
In terms of the current installed or planned to be installed capacity driven by solar, onshore wind and hydrogen energy sources, Egypt leads the way with a cumulative capacity of just over

130 GW – 27. GW of solar PV, 65 GW of onshore wind and 38 GW of hydrogen capacity. However, almost three-quarters of this capacity is still in concept phase. Mauritania, with a total capacity of about 70 GW – 13 GW of solar PV capacity, 21 GW of onshore wind capacity and 35 GW of hydrogen capacity, takes the second place. It is to be noted that most of this capacity is still in concept phase. Morocco, South Africa and Djibouti round off the top five with cumulative capacities of about 65 GW (solar – 20.5 GW, onshore wind – 21.25 GW and hydrogen – 23 GW), 52 GW (solar – 14.5 GW, onshore wind – 14.3 GW and hydrogen – 23.3 GW) and 15.7 GW (solar – 3.5 GW, onshore wind – 7.2 GW and hydrogen – 5 GW) respectively. The trend of majority of this capacity being in concept stage continues for these countries also with three fourths of Morocco and South Africa's capacity and 95% of Djibouti's capacity in concept stage. Nigeria, with its solar PV capacity, and Namibia, with its hydrogen capacity, also join the list of significant players but these projects are all in concept stage as of now.



Africa Renewables Overview

Africa capacity evolution, forecast to 2040, split by energy source (GW)

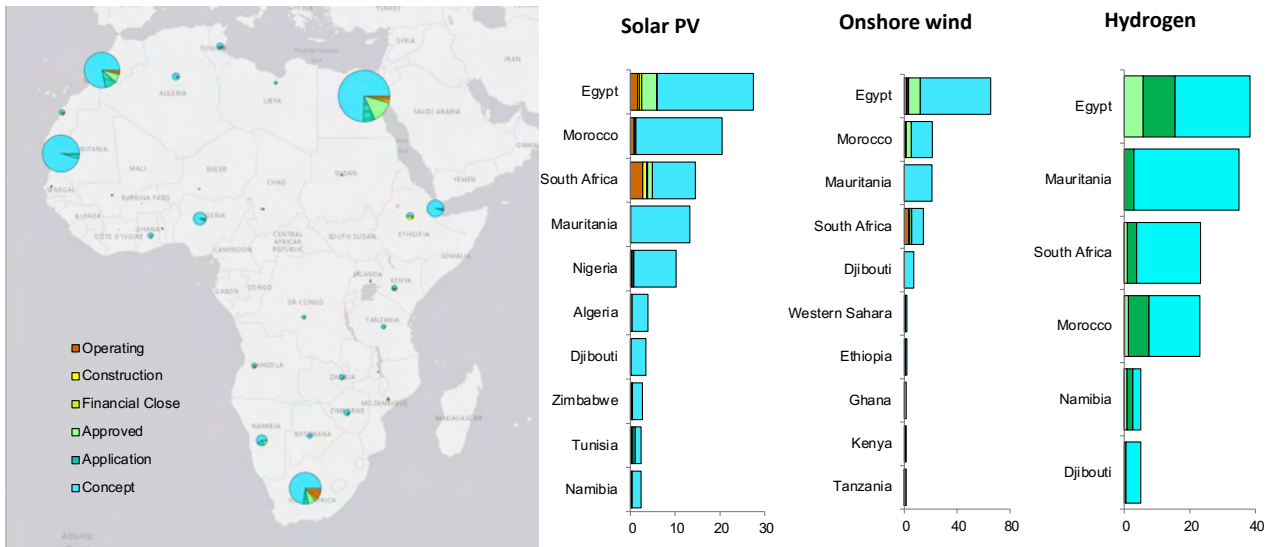


RystadEnergy

Source: Rystad Energy Renewable Cube

Africa Renewables Overview

Major countries with solar PV, onshore wind and hydrogen electrolyzer capacity (GW)



RystadEnergy

Source: Rystad Energy Renewable Cube

8.2 Natural gas expected to play a significant role in Africa power generation

Africa’s power mix currently is dominated by fossil fuels as energy sources with coal, natural gas and liquids (oil and condensates) accounting for three-quarters of the power generated in 2022 and almost 72% in 2023. However, as need for decarbonization takes priority as energy transition regulations and climate policies get stricter, Africa’s renewables (solar PV, onshore wind and hydro) driven power mix’s share is estimated to increase from 25% in 2023 to 32% in 2025 to 47%

in 2030 to 62% in 2040 and finally to about 75% by 2050. While fossil fuels role in the power mix is estimated to decline gradually, natural gas is expected to continue to stay in the mix. Natural gas is expected to drive 30%, 20% and 10% of the power generation in Africa over the years 2030, 2040 and 2050 respectively.

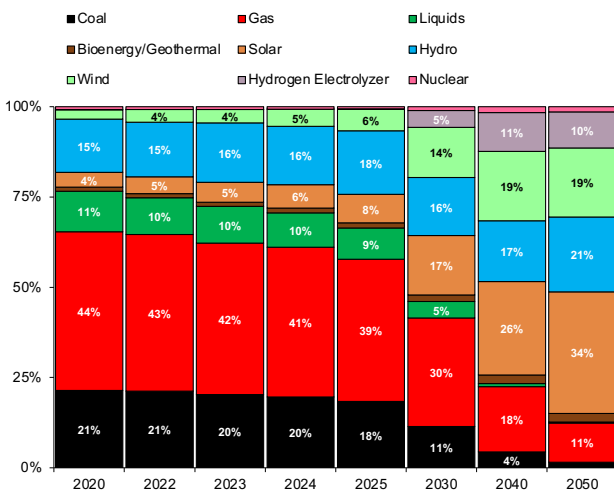
Natural gas being declared as the transition fuel, gas-to-power conversation getting louder, government schemes

like “Decade of gas” and operators shifting their focus to gas over oil, natural gas is expected to play a significant role in Africa’s upstream and power sectors going forward. All four regions across Africa hold huge natural gas potential, much of which is currently stuck in pre-FEED stage and, if and when brought online can help the continent’s gas-to-power ambitions and can also establish Africa as a global LNG hub with cargos destined to international markets like Europe.

Africa Renewables Overview

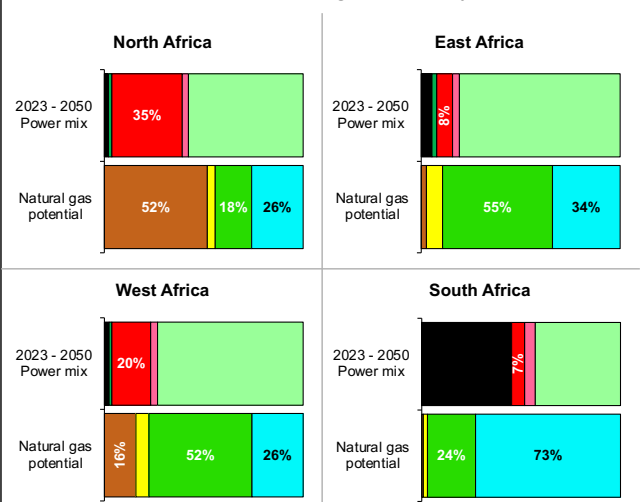
Africa power mix and Africa natural gas potential

Power generation evolution in Africa, split by source



Source: Rystad Energy UCube, Rystad Energy Power Cube

2023 – 2050 Power mix vs natural gas resource potential in Africa



RystadEnergy

8.3 European banks more prone to financing green energy as opposed to fossil fuels

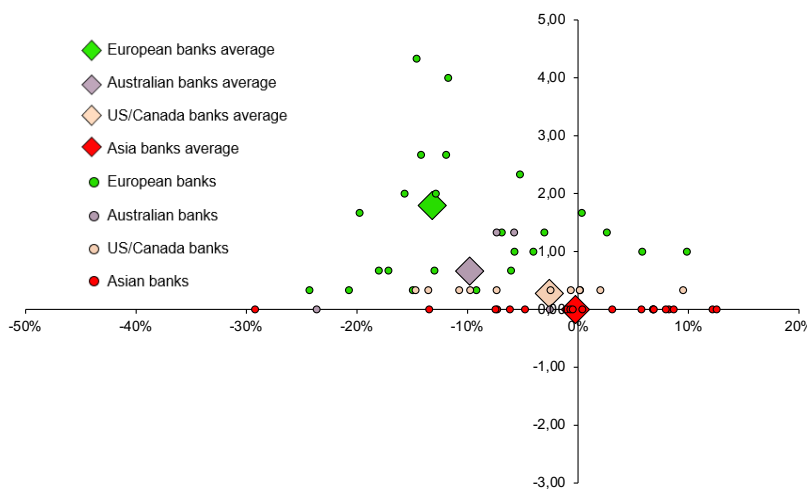
The energy transition era, focused on capping global warming levels, cutting down fossil fuels consumption and decarbonizing the energy sector, has led to financial institutions, especially from Europe, tighten their fossil fuel financing norms towards being more “climate friendly”. Major European financial institutions are reported to have seen a negative compound annual growth rate (CAGR) in terms of fossil fuel financing and have seen their climate policies taking their funding policies progressively away from fossil fuels over the past few years. Over the same period, Asian financial institutions are reported to have maintained a steady CAGR in fossil fuel financing and their respective climate policies either staying undefined or remaining unchanged. While these are contrasting stands, similar stance towards fos-

sil fuel financing and climate policies have been observed from a European bank and an Asian bank in the past few months. BNP Paribas, which is Europe’s largest oil and gas lender and one of the top banks globally in terms of providing capital to the international oil majors, announced it will no longer be financing for new upstream developments as it aims to reduce its upstream exploration and production (E&P) exposure by 80% by 2030 and seeks to align its credit portfolio with net zero climate targets. Singapore’s Oversea-Chinese Banking Corporation (OCBC) also announced that it will not finance any upstream projects that obtained approval for development after 2021. The bank is reported to be targeting a 95% and 55% reduction in absolute emissions from the oil & gas and power sectors respectively by 2030

and 100% by 2040. The bank added that these targets are aligned to the NZE pathway. Moves like these from banks with history of funding oil and gas projects can be significant blows to the sector globally and especially to the sector in Africa which already faces the hurdles of relatively unsafe business environment as opposed to other regions in the world. Both the banks specifically announced stopping of financing newer oil and gas developments and similar strategy from more financial institutions can prove to be serious issue for Africa.

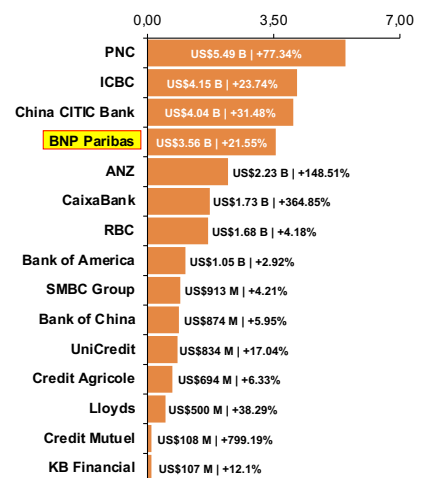
Major global banks’ fossil fuel financing

Major global banks’ climate policy scores vs 2018 – 2022 CAGR in fossil fuel financing



Source: “Banking on Climate Chaos 2023: Fossil Fuel Finance Report” – Oil Change International

2021 – 2022 fossil fuel financing growth



Source: “Banking on Climate Chaos 2023: Fossil Fuel Finance Report” - Oil Change International



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