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Foreword

The African continent continues to boast a vast array of potential opportunities, particularly in the oil and gas (O&G) sector. The sector has historically been a primary driver of economic growth and is once again attracting investor interest as international energy prices recover. Africa's proven oil and gas reserves account for 7.5% and 7.1% of global reserves respectively.¹

However, the continent's challenging operating environment, coupled with a lack of transparency in the resources sector, regulatory uncertainty and policy instability, and an ongoing infrastructure deficit, have often been a deterrent to investment. An additional ongoing constraint is the lack of sustainable economic development gained by harnessing the windfalls of the sector for economic diversification, most recently illustrated by the oil price crash of 2014.

Players in the sector must also be mindful of disruptors that are likely to change the face of the O&G industry. These include the rising global demand for liquefied natural gas (LNG); the growing prominence of renewables, which could have far-reaching implications for the African O&G sector; and the ongoing United States (US) and China trade dispute which could disrupt global trade, oil markets and supply chains.

Furthermore, digitalisation is already having an impact on the global O&G sector, and is set to increasingly disrupt Africa's O&G sector, where almost 30% of production stems from legacy fields. Sub-Saharan Africa (SSA) has a large portfolio of "digitally behind" assets, which would not only greatly benefit from digitalisation, but also risk becoming obsolete if digitalisation is not embraced. The SSA O&G space is ripe for disruption, presenting ample opportunity for producers and other industry players.

Our report looks to provide an overview of the most notable destinations for O&G activity and investment across nine of SSA's O&G-producing countries, and thus a focus on where to play in what remains an upstream-focused industry. We conclude by providing an overview of the key considerations to winning in the African O&G sector and to overcoming the challenges identified.

As a team we welcome your thoughts on this and future editions of the report.

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Systemic Challenges facing Africa's O&G sector

Ongoing policy uncertainty can weigh heavily on countries' sector and growth outlooks.

Regulation and the policy environment

Regulatory uncertainty has been one of the greatest challenges facing players in the hydrocarbon space in Africa. While challenging physical environments, alongside geopolitical and financial barriers to resources, are notable concerns in the global O&G sector, regulation and policy dealing with the issuing, maintenance and royalties of O&G rights can pose the biggest practical challenges and risks in the African O&G space.

Furthermore, the old paradigm of simply doing the bare minimum to comply with local legislation in order to obtain an operating licence is no longer sufficient to achieve long-term operational stability. Multinationals not only require a regulatory licence, but also a socio-economic licence, in order to operate in many countries on the continent.

Similarly, the interpretation of legislation, such as different tax regimes applicable to foreign O&G companies, can be a major challenge. This includes applying local tax regimes, especially tax incentives, to foreign companies. Local tax agencies and national oil companies may have conflicting views on the same regimes and incentives, creating confusion.

As the required capital investment for the sector is often sourced from abroad, the lack of a conducive business environment for foreign investors associated with regulatory uncertainty or overly complex regulation has led to delayed exploration and final investment decisions (FIDs) on projects and even to the withdrawal of investors.

The flux in the regulatory and policy environment, however, is often premised on national governments' attempts to try and balance the economic value derived from the O&G industry with both current and future social needs. As with mining, the O&G sector will continue to experience scrutiny from regulators as governments try to extract higher revenues and values, and attempt to set up mechanisms for localisation to ensure

more inclusive growth. Creating value beyond compliance will increasingly become a focus for navigating overregulation in the African O&G sector.

Overregulation can also be extremely burdensome. Oil production in the East Africa Rift Valley faced nearly a decade of delays due to non-enabling government policies.

As creating policy that is conducive to investment in the sector requires consultation with various stakeholders, including labour, civil society, tax authorities, environmental agencies, affected communities, the private sector and government, it may take years for new regulation to be passed, prolonging uncertainty.

Ongoing policy uncertainty can weigh heavily on countries' sector and growth outlooks. For example, in Nigeria, the Petroleum Industry Governance Bill (PIGB) was passed by the House of Representatives in January 2018, nearly two decades after it was first mooted. The PIGB is the first of four bills relating to the hydrocarbon industry and promises to bring greater transparency.

In Angola, a number of policies passed in early 2018 aim to reform the O&G sector under the country's new government. The most significant change is the restructuring of the national oil company (NOC) Sonangol, which transfers a number of responsibilities such as managing bids for new oil concessions to the National Agency of Petroleum and Gas. Uncertainty remains regarding the implementation of other reforms in the O&G sector, ultimately inhibiting the government's objective of attracting investment in the sector.

Corruption and transparency

Africa has consistently been the worst performing region on Transparency International's Corruption Perceptions Index (CPI).² This continues to have a detrimental effect on investment, particularly in industries where there are other destination options available with less corruption.

Not only does corruption make the process of building and investing in projects more troublesome and lengthy, it also adds an element of risk to international companies that wish to do business in countries where corruption is rampant.

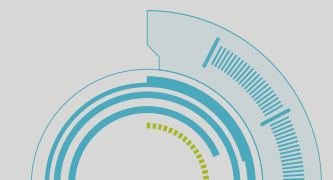
Looking at the latest results of the CPI, SSA's performance was once again lamentable, with a median ranking of 107th out of 180 countries for SSA. Of the five worst-performing SSA countries in the CPI, four are in the bottom 10 of the 2017 rankings.

Interestingly, SSA's more reasonable performers on the index are countries not well-endowed with hydrocarbon resources. Additionally, the rankings of all but two of the SSA O&G countries covered in this report deteriorated between 2016 and 2017.

With international companies increasingly being held liable for corrupt practices, and under closer scrutiny than ever before, it is imperative that anti-corruption practices and procedures are put in place, by both companies and governments alike.

The Extractive Industries Transparency Initiative (EITI) is a global standard for the good governance of mineral resources, oil and gas, and has been adopted by 24 countries in Africa. In the wider African context, Transparency International noted that its 2017 CPI "points to a more hopeful future for Africa". Countries like Cape Verde and Rwanda have shown that corruption is manageable, while long-term anti-corruption efforts in Côte d'Ivoire and Senegal are beginning to bear fruit.

Corruption Perceptions Index ranking, 2017 (out of 180)



Least Corrupt

Botswana	34
Seychelles	36
Cape Verde	48
Rwanda	48
Namibia	53



Most Corrupt

Angola	167
Equatorial Guinea	171
Guinea-Bissau	171
South Sudan	179
Somalia	180

Better fiscal terms and lower costs when competing for investments in the sector could go a long way towards making SSA projects more attractive to international investors.

Remaining competitive amidst high costs

Although the oil price has picked up during 2018, cost pressures are set to continue as producers aim to realise greater operating efficiencies. While industry activity is improving along with higher energy prices, producers are still focusing their investment on projects with lower capital, operational and regulatory costs, lower risk and higher returns.

This affects SSA projects particularly where political risk and infrastructure constraints are relatively high, thereby adding a risk premium to financing costs in the region. The nature of cost-cutting measures means SSA projects often come off second best to other investment destinations without similar risk premiums.

Furthermore, most of SSA's hydrocarbon projects have high cost implications as they tend to lie offshore, often in deep water. The highly capital intensive nature of these projects means that they are very susceptible to cost-cutting.

Better fiscal terms and lower costs when competing for investments in the sector could go a long way towards making SSA projects more attractive to international investors.

Given the significant capital requirements of O&G projects and the risk averse approach of financial institutions towards projects in Africa, producers frequently struggle to raise the required funds for new SSA projects due to limited market capital for exploration.

Currency volatility also remains a concern in SSA for international financing institutions, particularly as advanced economies (led by the US) tighten monetary policy, which could contribute to the depreciation of SSA currencies.

Costs are further inflated due to the lack of sufficient enabling infrastructure across the continent, which both increases transaction costs and hinders competition, innovation and productivity. The African Development Bank recently estimated Africa's annual infrastructure gap at US\$130bn-170bn, up from the previously widely quoted US\$93bn per annum.³

Gross fixed capital formation⁴ (GFCF) as a percentage of gross domestic product (GDP), which is indicative of infrastructure spend in countries, remains low and insufficient in most SSA economies. Among key SSA O&G-producing economies, it is only Congo-Brazzaville, Equatorial Guinea and Gabon that regularly spend over 30% of GDP on infrastructure – with 30% considered to be ideal for meeting development needs.⁵

Nigeria and Angola, SSA's two most significant O&G producers, consistently underspend on infrastructure, spending on average the equivalent of 15.1% and 12.9% of GDP respectively between 2010 and 2016.

Disruptors in the African O&G sector

Natural gas consumption recorded its fastest increase since 2010 in 2017.

Higher gas consumption over the long term

The drastic increase in shale oil production in the US disrupted that country's energy sector immensely, with the world's largest economy no longer a net energy importer. This upheaval in the energy sector is set to extend from the US to a more global disruption, and, indeed, to Africa.

Natural gas consumption recorded its fastest increase since 2010 in 2017, growing globally by 3%. This increase was led by a sharp 15% rise in natural gas consumption in China.⁶

Beyond just natural gas, LNG supply is increasing rapidly, with multi-billion dollar export terminals coming online in the US⁷, with more to come in the future; offshore LNG terminals in Mozambique are expected to commence production as soon as 2023.⁸ LNG trade volumes had already increased from barely 100m tonnes in the early 2000s to 252m tonnes by 2016.⁹

Although Africa's share of total global LNG production in the future is likely to remain relatively small new LNG facilities are at various stages of development in at least nine African countries.¹⁰

As a region, Africa accounts for about 5.8% of gas production and 3.9% of consumption globally. The continent is also the third fastest-growing regional consumer globally, behind the Middle East and Asia Pacific, with consumption having grown by 4.8% per annum between 2005 and 2015.¹¹

South Africa and Nigeria – SSA's largest economies – are likely to remain key consumers in the region, while consumption in Ghana and Mozambique is expected to see the largest increase going forward.¹²

Domestic consumption of gas is currently constrained by limited domestic production and a lack of necessary infrastructure. SSA does not have the requisite pipelines to transport gas, nor are power utilities or industry able to effectively utilise gas for power purposes. Another significant barrier is the current lack of sufficient offtake demand (buyers of future production).

As these barriers diminish in the medium to long term, it is expected that local consumption of gas in SSA will grow substantially, at the same time as consumption in the Eurozone will decrease due to market saturation. SSA is seen as one of the few global, long-term growth opportunities.

Energy transition – the increasing role of renewables

The prominence of renewables is rising, given the lower cost structures of more reliable, affordable and greener solutions. This is underpinned by increasingly energy-efficient, sustainability focused and climate-conscious trends globally. Consequently, the energy landscape is changing rapidly with far-reaching implications for global energy industries and actors, including oil companies and oil-exporting countries.

While power generation from traditional sources will still account for an important share of the energy mix in Africa for the foreseeable future, SSA countries too are reducing their dependence on coal- and oil-based energy sources. With demand drivers for power including rising household income levels and urbanisation, countries are diversifying into more sustainable solutions, particularly non-hydro renewables, as the rapidly decreasing cost of these technologies makes them increasingly more viable.

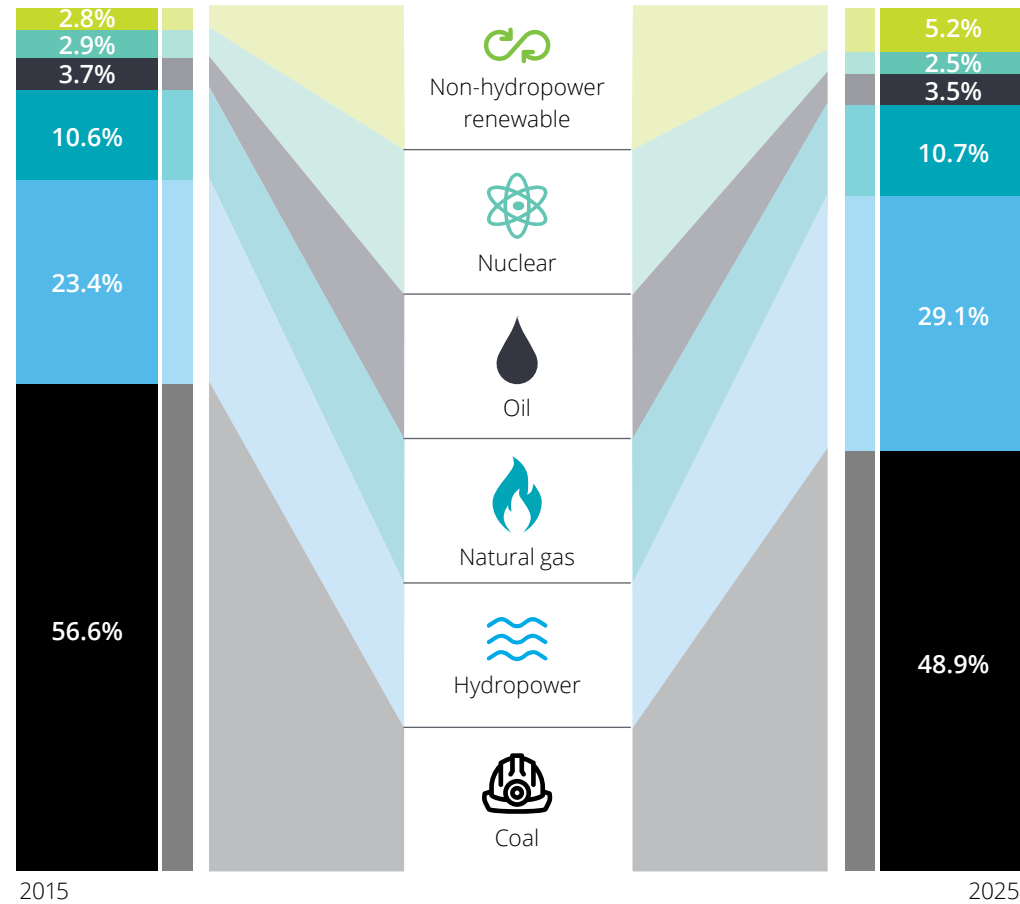
By 2025, non-hydro renewables are expected to have nearly doubled their electricity generation contribution to the energy mix from 2015 values. However, SSA hydropower's share of total electricity generation is only expected to increase from 23% to 29% over the same 10-year period.¹³

For some, renewables pose a threat to their very existence, but players in the O&G sector should see renewables as an opportunity, rather than as a threat.

O&G players must carefully consider how best to position themselves in order to take advantage of the changing energy landscape.

While it may be tempting for some to adopt a wait-and-see strategy so as not to move away from their core business models, these companies are at risk of falling behind the curve and losing out to more forward-thinking O&G players.

SSA's changing energy mix, 2015 & 2025f (% share)



Source: Fitch Solutions, 2017
 Note: SSA countries included are Angola, Botswana, DRC, Côte d'Ivoire, Cameroon, Ethiopia, Gabon, Ghana, Kenya, Mozambique, Namibia, Nigeria, Sudan, Tanzania, Uganda, South Africa, Zambia, and Zimbabwe.

Digitalisation in the O&G sector

Approximately 40% of global crude oil and natural gas production originates from fields that have been in operation for over 25 years.¹⁴ In Africa, almost 30% of production stems from these so-called legacy fields. The O&G industry therefore has a large portfolio of “digitally behind” assets, which would greatly benefit from digitalisation.

In an effort to lower costs and increase efficiency, upstream O&G companies have started to digitalise their operations, for both existing and new projects. In the long term, this could result in a transformation of core assets and the adoption of new operating models. It is estimated that even a 1% gain in capital productivity could help offset the cumulative net loss of US\$35bn reported by listed upstream, oil field services, and integrated companies globally in 2016.¹⁵

Digitalisation should lead to increased productivity, safer operations and cost savings – completely transforming the industry and resulting in more resilient producers that are less affected by global price fluctuations.

In general, the exploration segment of the industry has already moved ahead of development and production in terms of digitalisation. For example, using seismic imaging, an operator in Equatorial Guinea was able to enhance interpretation and identify prospects earlier, allowing the company to acquire interest in the block from new partners.

The implementation of digitalisation can be segmented and customised depending on a variety of factors. For example, a high-potential field may merit the installation of advanced distributed sensors to provide new insights on the operating conditions of a well both above and below the surface.

Moderate-potential fields could benefit from pervasive sensors, while a field with low potential may require standard automation and monitoring solutions to keep the well running at optimal levels. By some estimates, optimising production through the use of digital platforms can generate US\$20m in annualised cash flows on a 100-well project (approximately US\$20bn at an industry level).¹⁶

To strike a balance between the cost of digitalisation and the associated value gained from the investment, industry stakeholders should collaborate and develop common data standards. So far, the industry as a whole has only scratched the surface in terms of digitalisation.

As players in the sector become increasingly digitalised, the industry, particularly in Africa, will have to transform and adapt.

To strike a balance between the cost of digitalisation and the associated value gained from the investment, industry stakeholders should collaborate and develop common data standards.

Digital's value for O&G exploration, development, and production



Exploration

Objective	Rightsizing existing resource portfolio, including identifying sub-commercial, marginal resources that are reducing profitability and locking up significant capital.
Current standing	Standardised data, advanced algorithms, and the use of high-performance computers put the operation at the analyse and visualise stages.
Suggested digital leap	Augment the visual cognition of geoscientists using machine learning to reveal the geography.
Potential value	Higher extraction certainty and deeper commercial viability of 2P (proved and probable) reserves that form 50% of 1P (proved) reserves.



Development

Objective	Breaking data silos and finding the digital return on investment (RoI) to keep the pace and direction of innovation intact.
Current standing	Distinct objectives, proprietary tools and the lack of standardised data create integration issues.
Suggested digital leap	Integrate and analyse by securely layering integration frameworks and analytics on diverse drilling data using open source architecture.
Potential value	Annualised well cost savings of over US\$30bn for upstream players.



Production

Objective	Breaking the never-ending cycle of upgrading and retrofitting equipment in existing fields without spending much.
Current standing	Continuity of operations and a legacy asset base explained the less sensorised state of the operation.
Suggested digital leap	Sensorise by following a layered data generation strategy and extend the analyses to a reservoir level.
Potential value	Additional cash flows of over US\$20bn apart from cost savings on equipment failure and repair.

Source: Deloitte Insights, 2017

At a time of rising oil supply, an escalating trade war could curtail oil demand through a slowdown in global trade, and waning demand in emerging markets.

Trade disputes disrupting markets

The ongoing trade dispute between the US and China has the potential to alter how global energy trade and related supply chains function. This disruption poses a risk to trade, to economic growth, and to oil markets.¹⁷

At a time of rising oil supply, an escalating trade war could curtail oil demand through a slowdown in global trade, and waning demand in emerging markets (and even industrial countries), thereby asserting downward pressure on oil prices. With emerging markets, particularly oil-exporters in SSA, only now starting to recover from the oil price crash of 2014, downward pressure on oil prices could have severely adverse consequences.

Furthermore, new tariffs, whether imposed by the US, China, or elsewhere, hold the risk of compromising ongoing and future O&G projects by making them unprofitable.

Similarly, new “safeguard tariffs” on steel and aluminium, announced by the US in March 2018, have seen costs creeping upwards and have already started to disrupt the O&G supply chain – a complex, global system.

Will the trade dispute burgeon into a full-blown trade war between the US and China, or dissipate into skirmishes to appease political bases? Will these disputes spill over to other countries and regional trade blocs? Will global trade slow sharply, leading to a global economic slowdown?

While these questions remain unanswered for now, O&G players need to be cognisant of these risks and should plan for several outcomes, given the possible disruption to oil markets and related supply chains.

Where to Play

SSA's Key O&G Producers



Nigeria

Oil Resources	30 079.99 million barrels
Oil Production	671.59 million barrels
Gas Resources	91 972.9 bcf
Gas Production	1 652.5 bcf



Equatorial Guinea

Oil Resources	1 110.01 million barrels
Oil Production	53.85 million barrels
Gas Resources	14 301.5 bcf
Gas Production	336.5 bcf



Angola

Oil Resources	17 645.23 million barrels
Oil Production	596.60 million barrels
Gas Resources	32 792.4 bcf
Gas Production	196.8 bcf



Ghana

Oil Resources	2 537.45 million barrels
Oil Production	57.46 million barrels



Gabon

Oil Resources	4 922.14 million barrels
Oil Production	73.12 million barrels



Congo-Brazzaville

Oil Resources	5 328.31 million barrels
Oil Production	124.03 million barrels





Uganda

Oil Resources 2 671.83 million barrels



Tanzania

Gas Resources 114 915.4 bcf
Gas Production 52.5 bcf

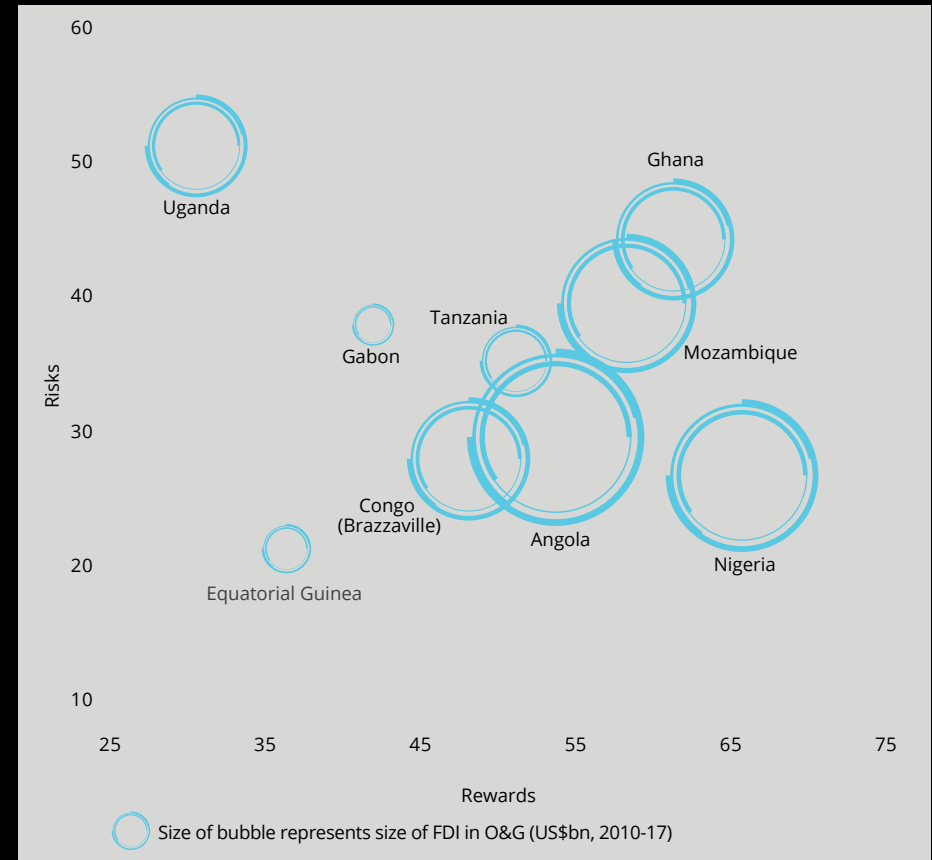


Mozambique

Gas Resources 204 747.3 bcf
Gas Production 152.3 bcf

Foreign direct investment (FD) in Africa's O&G sector has tracked perceived attractiveness, both in terms of higher rewards and lower risks.

Risks, Rewards and FDI in Africa's O&G Industry



Source: Based on Fitch Solutions' Risk Reward Index, 2018; and fDI Markets, 2018
Note: Bubble size is indicative of size of investment based on FDI announcements in the O&G industry in each country between 2010 and 2017. Risks and Rewards are calculated based on a number of industry and country risks and rewards by Fitch Solutions. A higher risk score indicates a lower risk.

The country snapshots of African O&G producers that follow provide an overview of the most notable destinations for O&G activity and investment across nine of SSA's O&G-producing countries, and thus a focus on where to play in what remains an upstream-focused industry.

Angola



Why O&G in Angola?

Angola is SSA's second largest oil producer, with the second largest oil resources. The new government aims to revitalise the O&G sector by encouraging foreign companies to invest in both the up and downstream markets.

O&G sector developments

As per its agreement with OPEC, the state-owned energy company, Sonangol, reduced its oil output from January 2017 in order to help support oil prices. This resulted in a moderate rise in the oil price, leading to government revenues increasing in 2017, with further increases expected in 2018.

Oil price fluctuations impact directly on Angola's economy as oil represents one third of the economy and 95% of exports. The new government established after the 2017 elections is trying to diversify the economy, but this has proven to be difficult. Despite the fossil fuel sector's contribution to GDP, the industry only employs 0.5% of the country's workforce, thereby impeding inclusive growth.

With the new government in place Isabel dos Santos was dismissed as head of Sonangol in November 2017 and was replaced by veteran Sonangol executive, Carlos Saturnino. This initiated a major reorganisation of the company led by the Minister of Petroleum. As part of the restructuring, some of Sonangol's responsibilities were transferred to the National Agency of Petroleum and Gas to encourage transparency and avoid conflicts of interest.

The new agency is responsible for managing bids for new oil concessions, managing production-sharing agreements, and representing the state in the sharing of profits from oil concessions. Sonangol's objectives are to refocus on the exploration, production, refining and distribution of oil and gas, predominantly through partnerships with major global oil players.

Through a number of policies passed in early 2018, the Angolan government aims to revitalise the O&G sector by encouraging foreign companies to invest in both the up and downstream markets.

Angola has the fourth largest proven natural gas reserves in SSA, but the country only produces small amounts of commercially marketed gas. A presidential decree passed in early 2018 includes incentives to attract investment to tap into the high potential of Angola's gas resources.

Regulatory update

The Angolan Ministry of Petroleum governs the O&G sector. The ministry is responsible for the granting of licences for exploration and production, developing industry policy and guidelines, as well as co-ordinating and regulating the activities of the sector.

Due to the recent restructuring of government oil entities, a number of new regulations were passed into law in early 2018. As the government aims to reignite the oil sector, further policy updates are expected in the coming years.

Relevant legislation includes:

- Petroleum Activities' Law (10/04)
- Taxation of Petroleum Activities Law (13/04)
- Customs Petroleum Activities' Law (11/04)
- Foreign Exchange Law for the Petroleum Sector (2/12)
- Presidential Decree No. 7/18 (05/18)



Macroeconomic Indicators

2018f-23f

Real GDP growth (avg)	2.8%
Fiscal deficit (avg)	0.9% of GDP
Public gross debt (avg)	69% of GDP



Comparative Rankings

2017/18

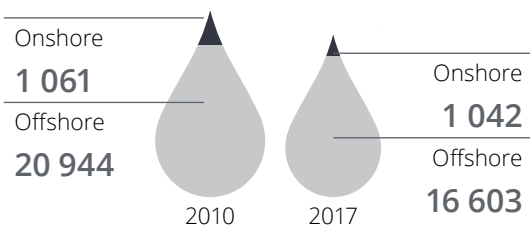
Ease of doing business (out of 190)	175 ↑
Corruption Perceptions Index (out of 180)	167 ↓
Index of African Governance (out of 54)	45 ↓



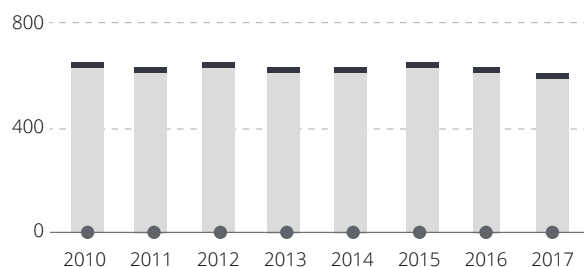
Key Tax Rates

Income tax – Companies	Rate
Standard corporate rate	30%
Withholding taxes	Rate
Dividends or profit sharing	10%
Interest	5/10/15%
Royalties	10%
Capital gains derived from the disposal of shares or other securities that generate income subject to tax	10%
Other residual income arising from capital investment	15%
Payments for services of any nature	6.5/10.5%

Oil resources (million bbl)



Oil production (million bbl)



Oil resources, production, exports & consumption

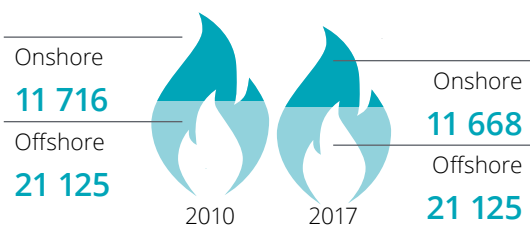
Angola has approximately 17.6bn barrels of oil resources, almost 95% of which are located offshore. Angola's resources have been steadily declining, decreasing by 20% between 2010 and 2017. During the oil downturn, low levels of investment in exploration led to few new oil discoveries. However, spurred by recently implemented government incentives to invest in exploration, Eni discovered an offshore reservoir of up to 300m bbl in mid-2018.

Oil production decreased by 7% between 2010 and 2017 due to a lack of development activity and exploratory investment. However, the launch of the Kaombo project is set to contribute to production growth in the coming years, together with other large projects that are expected to commence their activities by the end of 2018. Production of refined products only meets 20% of domestic demand for medium and heavy fuels. Angola's 2017 crude oil exports amounted to US\$31.7bn and

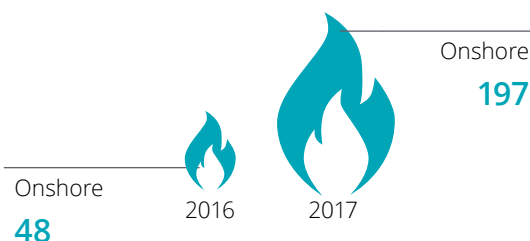
are expected to continue growing, benefiting from Chinese demand, after having lost the US as a market due to an uptick in US shale oil production. Angola is one of China's largest crude oil suppliers. Angola's exports of refined products are limited and the market is becoming increasingly saturated.

Consumption of refined petroleum products has remained subdued over the last few years, decreasing by 10% between 2010 and 2017. Consumption is expected to grow by 26% from 34.2m bbl in 2017 to 43.22m bbl by 2023. Angola is reliant on fuel imports due to a lack of refining capacity and this trend is expected to continue.

Gas resources (bcf)



Gas production – onshore (bcf)



Gas resources, production, exports & consumption

In 2017, Angola had almost 33 000bcf in gas resources, of which approximately 65% were located offshore. Estimates regarding Angola's gas resources have remained steady since 2010. Exploration of the Lower Congo Basin could increase Angola's reserve base significantly.

Angola's gas industry is still immature, with onshore gas production of 196.8bcf in 2017. The government aims to develop the country's non-associated gas resources to boost domestic gas production. Most of the country's natural gas production is associated with oil production and is flared or reinjected into oil fields to increase oil production.

Angola only exports gas in the form of LNG. Total LNG exports in 2017 were 124.3bcf. At the end of 2017, Vitol, Glencore and RWE signed long-term offtake agreements with Angola LNG. This will encourage consistency in the country's gas

production. Angola's LNG exports may weaken as the high LNG supply worldwide and a weakening growth in consumption are putting strain on the LNG.

Domestic gas consumption has been growing strongly over the last few years. This growth is expected to continue, with consumption expected to more than double between 2017 and 2023. The start-up of the Soyo combined-cycle plant in mid-2017 will contribute to this growth. The capacity of the plant is 750MW and it is expected to utilise 15.2bcf gas per year – approximately 40% more than the country's total consumption of 38.8bcf in 2017. However, there are several gas consumption constraints, including a lack of gas pipeline infrastructure, severe financial strain on the country's utility companies, subsidised liquid fuels, and large distances between gas production locations and core consumption areas.

Key foreign investments in O&G

Between 2010 and 2017, US\$20.7bn worth of FDI announcements were made across 10 projects in Angola's O&G sector.

The largest foreign investment in that period was in 2014 by Total, together with Sonangol, Sonangol Sinopec, Esso and Galp Energia. The investment was used to develop the offshore Kaombo oil project located off the coast of Angola. The production capacity is expected to be 84m barrels of oil per year with estimated reserves of 650m barrels.

Estimated Total
Capital Investment
US\$20.7bn

Total No of FDI
projects

10



O&G infrastructure update

Angola's offshore production, storage and export infrastructure is relatively well developed. Onshore infrastructure is limited.

The downstream oil sector is unable to meet domestic demand. Angola's only operational refinery in Luanda has a capacity of 65 000 b/d, but currently produces fewer than 40 000 b/d. However, in mid-2018 Sonangol signed a US\$220m agreement with Eni for upgrades that aim to boost production at the Luanda plant.

To continue its objective to develop downstream capacity and wean the country off refined oil imports, Carlos Saturnino, the chairman of Sonangol, has announced that new refineries in Cabinda and Lobito will be completed in two and four years respectively. These proposed refineries will increase the country's refining capacity to over 300 000 b/d.

Talks between the governments of Zambia and Angola to construct an oil pipeline between Lobito and Lusaka have resumed, following their postponement in 2013. The pipeline is expected to cost upwards of US\$2.5bn with a capacity of 100 000 b/d. Although construction has not yet started, a memorandum of understanding (MoU) was signed in late 2018, suggesting that the project will be revived.

Gas infrastructure, particularly onshore infrastructure, is quite restricted. As oil exploration continues, Angola will need to address its current lack of capacity to process the large volume of associated gas produced.

Angola's only LNG terminal was completed in 2013 with a capacity of 250.6bcf. The US\$10bn plant processes gas from the Soyo region. Gas is transported to the terminal from offshore oil fields via a 500km network of pipelines, many of which are still under construction. The facility processes gas from Blocks 0, 1, 2, 14, 15, 17 and 18. The plant is expected to produce LNG for domestic consumption and export.

Recent project developments



Upstream

- In mid-2018 Eni announced a new oil discovery in Block 15/06. The new oil find is estimated to contain between 230m and 300m barrels of light oil.
- In mid-2018 part of the Kaombo megaproject (Total and others) came online in Block 32. It currently produces 115 000 barrels per day and is expected to peak at 230 000 barrels per day when the second half comes online in 2019.
- No current gas projects are underway as the industry is relatively immature (most will be from flaring in coming years). The Kwanza Basin (discovered by Sonangol in 2016) is the most promising at 2.8trn cubic feet, but is not expected to be relevant for at least a decade.



Downstream

- There has been no update on the Soyo and Lobito refineries suggesting that construction has been suspended for both projects. This is a major stumbling block to the government's objective of increasing downstream capacity.



Congo-Brazzaville

Why Oil in Congo-Brazzaville?

Congo-Brazzaville is SSA's third largest oil producer and third largest holder of oil resources. The country's recent affiliation with OPEC this year increases its investment attractiveness.



Oil sector developments

To reverse the decline in reserves and increase investment, the government is proceeding with a licensing round to offer 18 blocks – located both onshore and offshore – to encourage exploration. The results are expected to be announced in mid-2019.

Total's offshore Moho Nord project and Eni's Nene Marine field are two sites that are expected to increase oil production over the next few years. However, national oil production will remain relatively stable for the foreseeable future.

Gas production, predominantly a by-product, will remain limited for the near future; however, the industry's contribution to the economy may increase with New Age's potential offshore gas resources development, which consists of a small floating LNG (FLNG) unit in offshore Block Marine XII. Production is not expected until at least 2022.

Regulatory update

An update of the Congolese Hydrocarbons Code of 1994 was approved by Parliament in November 2016. The new code states that oil royalties have been reduced to 12% from 15% and gas royalties have been cut to 5% from 15%. The new code also bans gas flaring, requiring instead that excess gas be channeled into industrial projects.

Oil resources, production, exports & consumption

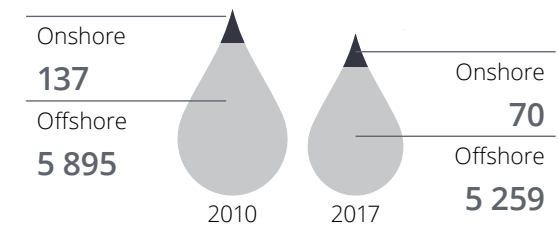
Congo-Brazzaville has approximately 5.3bn bbl of resources. The share of oil resources located offshore has increased from 87.5% in 2010 to 97.6% in 2017. There is the possibility that Congo-Brazzaville may hold oil and tar sands deposits, but exploration is still ongoing and the viability of the project is uncertain.

Production is expected to increase substantially and peak in 2019 as several projects come online. The Total-led Moho Nord 2017 extension is expected to add 36.5m bbl a year and Eni's Nene Marine is expected to ramp up production to 51m bbl a year.

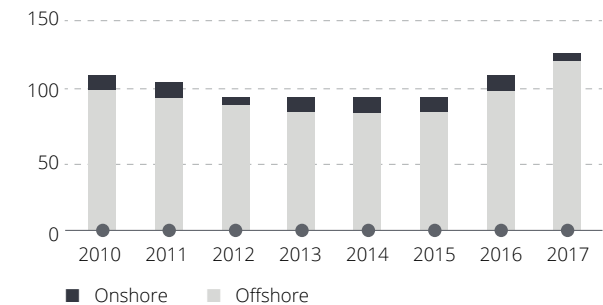
Crude sales currently account for 75% of Congo-Brazzaville's exports. The potentially drastic increase in oil production in the coming years will boost crude oil exports until 2019, after which production is expected to decline. The Chinese market is the country's main crude oil export destination, accounting for 70% of the country's crude exports.

The lack of refinery capacity in the country forces the Congo to import refined products. Refined products consumption grew 28% between 2010 and 2017 and it is expected to continue growing at a similar pace. Consumption growth will be driven by the country's rapidly expanding population. Distillate fuel accounts for more than half of the country's total refined products consumption, followed by motor gasoline and jet oil.

Oil resources (million bbl)



Oil production (million bbl)



**Macroeconomic Indicators** 2018f-23f

Real GDP growth (avg)	0.8%
Fiscal deficit (avg)	7.4% of GDP
Public gross debt (avg)	92% of GDP

**Comparative Rankings** 2017/18

Ease of doing business (out of 190)	179 ↓
Corruption Perceptions Index (out of 180)	161 ↑
Index of African Governance (out of 54)	42 ↓

**Key Tax Rates**

Income tax – Companies	Rate
Standard corporate rate	30%
Companies with a temporary authorisation to operate (ATE) in Congo	7.7%

Withholding Taxes	Residents	Non-residents
Dividends	15%	15%
Interest	n/a	0/20%
Royalties	n/a	20%
Technical service fees	n/a	5.75/20%

Key foreign investments in Oil

The only FDI announcement in Congo-Brazzaville since 2010 was in 2013 by Total. The announced capital investment was US\$10bn. The offshore production site has a capacity of 140 000 barrels of oil per day.

Estimated Total
Capital Investment
US\$10bn

Total No of FDI
projects

1

**Oil infrastructure update**

The only refinery in Congo-Brazzaville is operated by Société Nationale des Pétroles du Congo (CORAF). The refinery has a capacity of 21 000 b/d, but is likely underutilised. Since 2008, the government has proposed privatising and expanding the refinery to 100 000 b/d, but a committed investor has yet to be found.

There are two oil terminals located at the ports of Pointe Noire and Djeno. The only pipelines are subsea, linking offshore fields to the export terminal at Djeno.

Recent project developments**Upstream**

- Production from Total's Moho Nord Project (brought online in 2017) is expected to reach its production target of 140 00 b/d in the near future.

Equatorial Guinea



Why O&G in Equatorial Guinea?

While lacking new discoveries and working maturing oil fields, Equatorial Guinea is an established oil producer and second largest producer of natural gas in SSA.

O&G sector developments

In August 2017, the government signed an agreement with Ghana to supply gas over a 15-year period. The agreement stipulates that Equatorial Guinea will supply between 150 mcf and 200 mcf of LNG per day.

In May 2018 the government announced plans to develop a natural gas megahub, linking onshore processing and offshore production facilities. The project is being led by the Ministry of Mines and Hydrocarbons, in collaboration with O&G companies. Further details have not yet been released.

The FID for the Fortuna FLNG plant is expected at the end of 2018. It is estimated that production will only start in 2022, later than the expected commissioning date of 2020, due to difficulties in securing finance. Guvnor Group has been nominated as the preferred LNG offtake buyer for the project.

Equatorial Guinea joined OPEC in 2017 and committed to reduce its oil output in order to contribute to the recovery of the oil price. OPEC membership has economic benefits, as it provides the possibility of attracting capital from other OPEC members. During the Guinea-Saudi Arabian Economic Forum, an agreement was reached with Arabian Energy of the UAE to develop the Bioko oil terminal. The project remains a long way from realisation, but it has the potential to be the third largest oil storage facility in SSA.

Kosmos Energy in partnership with Trident Energy bought an 85% ownership stake in the off-shore Ceiba and Okume oil fields on a 50-50 basis from Hess Corporation. Kosmos also signed three new exploration and production contracts with the government and state oil company GEPetrol.

Overall, a lack of recent major discoveries coupled with maturing fields is expected to result in oil and gas resources shrinking in the coming decade.

Regulatory update

In 2015, the government published a Financial Law which cancels all tax and customs exceptions arranged with companies violating existing contracts. This has elicited concern regarding regulatory stability, harmed the government's credibility, and thus damaged investor trust in the country.



Macroeconomic Indicators

2018f-23f

Real GDP growth (avg)	2.1%
Fiscal deficit (avg)	1.2% of GDP
Public gross debt (avg)	36% of GDP



Comparative Rankings

2017/18

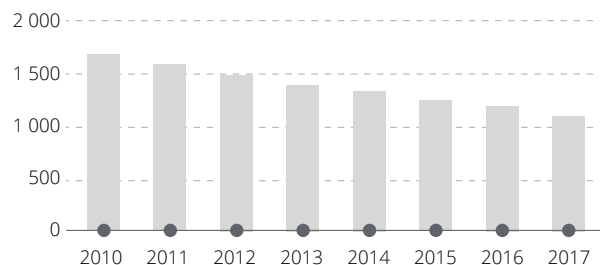
Ease of doing business (out of 190)	173 ↑
Corruption Perceptions Index (out of 180)	171
Index of African Governance (out of 54)	46 ↑



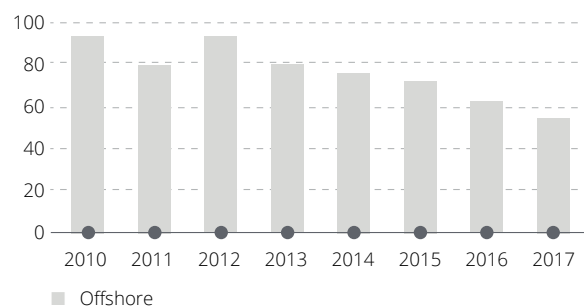
Key Tax Rates

Income tax – Companies		Rate
Basic rate		35%
Withholding Taxes	Residents	Non-residents
Dividends	n/a	25%
Interest	n/a	25%
Royalties	n/a	10%
Technical service fees	n/a	10%
Capital gains	n/a	25%
O&G services	6.25%	10%
Mobilisation, demobilisation and transportation services related to O&G	5%	0%

Oil resources (million bbl)



Oil production (million bbl)



Oil resources, production, exports & consumption

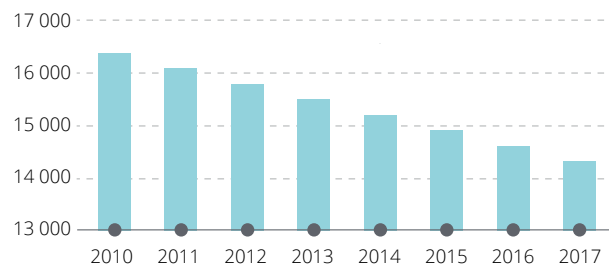
All of Equatorial Guinea's oil resources are located offshore. The country's oil resources have been steadily declining and decreased by a third between 2010 and 2017. In 2017, it was estimated that Equatorial Guinea had 1.1bn barrels of oil resources.

Crude oil production was 54m bbl in 2017, produced entirely offshore. From 2010 to 2017, production decreased by 42% and is expected to continue declining in the coming years due to a lack of new discoveries and maturing oil fields. Reserves and production are currently concentrated in six key fields, with the largest, the Zafiro oil field, operated by ExxonMobil. Life extension projects and a recent oil discovery may moderate the expected decline.

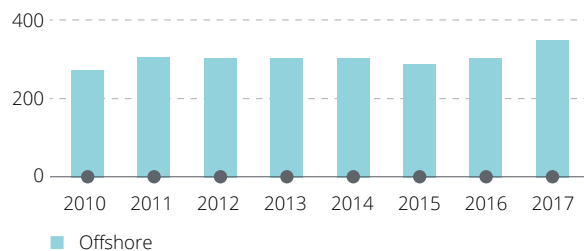
Crude oil exports are set to continue to decrease, in line with the expected fall in oil production. Equatorial Guinea exports all of its crude oil, given the lack of refining capacity. After the shale oil boom in the US, the world's largest economy stopped importing Equatorial Guinea's crude oil. This forced the country to extend its exports to Asia and Europe, mainly India, Spain, South Korea and China.

Domestic refined products consumption increased by 20% between 2010 and 2017 and is expected to remain stable until 2023. The moderate consumption growth is mainly due to subsidies on petrol and diesel. Nonetheless, consumption of refined products is very limited in the country and the economic environment will constrain consumption growth. A lack of local refining infrastructure, high import costs of refined products, and the small population will also adversely affect consumption rates.

Gas resources (bcf)



Gas production (bcf)



Gas resources, production, exports & consumption

Equatorial Guinea had 14 301 bcf of gas resources in 2017. All the fields are located offshore. Gas resources have been steadily declining, decreasing by 12.3% between 2010 and 2017.

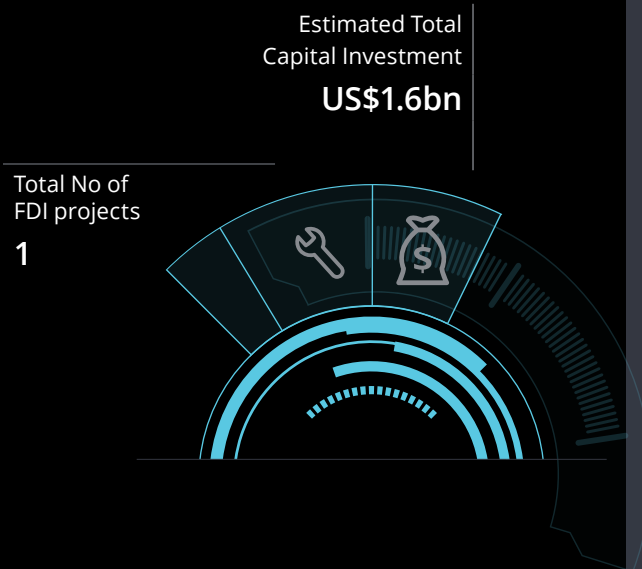
Gas production reached 337 bcf in 2017, with all production done offshore. Production has increased by 26% between 2010 and 2017, but is expected to decline in the coming years due to falling output from the Alba and Zafiro fields. Most of Equatorial Guinea's gas production comes from the Alba associated gas field, offshore from Bioko Island. The Zafiro oil field, operated by ExxonMobil, also produces high amounts of associated natural gas, but most gas is flared at the wellhead. The largest contributor to gas production in the coming years will be Ophir Energy's Block R, with first production expected in 2022.

Equatorial Guinea is a net exporter of LNG, which is exported via the onshore LNG plant Punta Europa, mostly fed by gas produced at the Alba field. Almost all of the country's LNG exports are directed to Asian countries, including Japan, China and Singapore. Equatorial Guinea is also aiming to export within West Africa and has signed agreements with the governments of Burkina Faso, Ghana and Togo. Exports are expected to remain stable in the immediate future and should start growing in 2022 when Ophir's Fortuna FLNG project comes online.

Domestic gas consumption decreased by 25% between 2010 and 2017; however, it is expected to grow by 17% between 2017 and 2023. Growth is set to be spurred by the government's efforts to limit its over-reliance on refined oil products and include more domestically produced gas within the energy mix.

Key foreign investments in O&G

Only one FDI project – the Alen condensate/gas-recycling project – has been announced in Equatorial Guinea since 2010. This project required an investment of US\$1.6bn by US-owned Noble Energy. The lack of investment in the O&G sector is largely due to the maturity of the country's oil fields, along with a lack of new discoveries.



O&G infrastructure update

Punta Europa, Equatorial Guinea's only onshore LNG plant, completed in 1999, is located on Bioko Island. Most of the gas fed to Punta Europa is from the Alba field. In 2007, a 17-year purchase and sales agreement was signed with BG Gas Marketing for the LNG.

The Luba Freeport oil port has a capacity of 20 000m³ for chemical and oil field supplies. The port is currently undergoing an expansion, with a planned capacity increase to 100 000m³.

Recent project developments



Upstream

- The FID for Ophir's Fortuna FLNG is expected by the end of 2018. If approved, the project will come online by 2022.



Downstream

- The US\$500m Bioko Oil Terminal project (undertaken by Arabian Energy and the local government) will be West Africa's largest oil and petroleum products storage facility (and the third largest in SSA), with 22 storage tanks and a capacity of 1.2m m³. Construction on the project is expected to start at the end of 2018.



Gabon

Why Oil in Gabon?

Gabon holds SSA's fourth largest oil resources and is also the fourth largest oil producer in the region. Plans for revisions to the Hydrocarbon Code hold potential to attract new investment.



Oil sector developments

Offshore exploration in Gabon is expected to increase in the coming years after a prolonged period of subdued activity. Gabon rejoined OPEC in 2016, and the oil price coupled with policy reform is expected to drive higher exploration and investment. Significant potential is held in Gabon's costly but prospective deep-water pre-salt exploration.

Major divestments of mature assets by Total and Shell have included the sale of assets to Perenco and Assala Energy (Carlyle Group) respectively.

Regulatory update

The current Hydrocarbons Law was introduced in Gabon in 2014, providing a legal framework for oil and gas industries, while expanding the scope of activity for the Gabon Oil Company (GOC). The law entailed environmental protection standards and put limits on gas flaring.

However, in April 2018 the Gabonese Minister of Petroleum announced that the government will undertake a complete revision of the Hydrocarbons Code due to the need to adapt to lower oil prices in previous years. The revisions will make licensing and fiscal terms more competitive and flexible for oil and gas companies, including revisions to company tax and value added tax.

Oil resources, production, exports & consumption

Gabon has a total of 4,922m bbl of proven oil resources, of which 87% are located offshore and 13% onshore. Gabon's resources declined by 12% between 2010 and 2017 due to the maturity of a number of the country's oil fields.

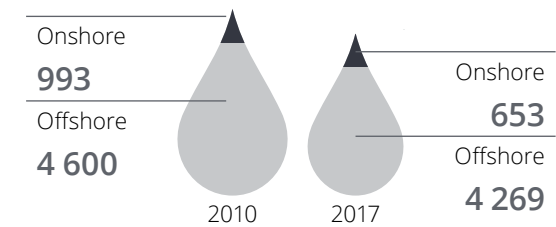
Production was 73.12m bbl in 2017, approximately half of which was onshore and the other half offshore. Production has decreased by 30% since 2010 and is expected to continue shrinking as a consequence of the mature status of many fields, strong depletion rates, and a lack of new discoveries. However, the fall in production rates could be mitigated by redevelopment works and investment towards field life extensions.

Most of Gabon's crude production is exported as there is almost no refining capacity in the country. Gabon's net oil exports will continue to fall, mainly due to declining oil production.

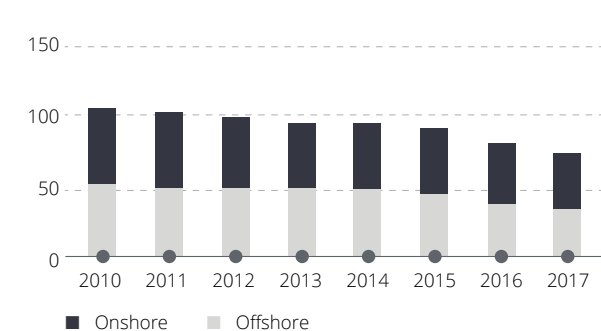
The US has been Gabon's main export market for years; however, a surge in US light sweet oil production has limited Gabonese exports to the US since 2010. This has forced Gabon to start diversifying exports with Europe and several Asian countries. Gabon's crude is still favoured above other West African countries' crude due to its low sulphur content.

Gabon's refined fuels demand is relatively low, at 7.9m bbl in 2017. Consumption is expected to grow by 24% between 2017 and 2023, driven by rising consumption in the transport sector and higher public expenditure. However, an increasing focus on gas and hydropower will constrain oil consumption as heavy fuel-fired generation in the power sector demands the bulk of residuals consumption.

Oil resources (million bbl)



Oil production (million bbl)





Macroeconomic Indicators 2018f-23f

Real GDP growth (avg)	3.9%
Fiscal deficit (avg)	0.4% of GDP
Public gross debt (avg)	53% of GDP



Comparative Rankings 2017/18

Ease of doing business (out of 190)	167 ↑
Corruption Perceptions Index (out of 180)	117 ↓
Index of African Governance (out of 54)	23 ↑



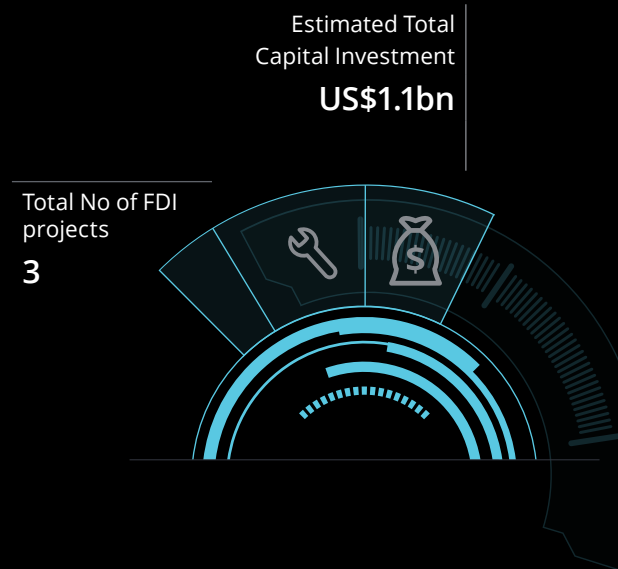
Key Tax Rates

Income tax – Companies	Rate
Standard corporate rate	30%
Companies operating in oil and mining sectors	35%

Withholding Taxes	Residents	Non-residents
Dividends	10/20%	10/20%
Interest	20%	20%
Royalties	n/a	20%
Technical service fees	9.5%	20%

Key foreign investments in Oil

There have been three FDI project announcements in the last eight years. The two main investments, both of which were announced in 2010, were directed towards O&G extraction.



Oil infrastructure update

The Port Gentil refinery, built in 1967, is the only significant downstream oil asset in Gabon and has a capacity of 24 000 b/d.

Sté Gabonaise d’Entreposage des Produits Pétroliers (SGEPP) is the only oil storage company in Gabon and its biggest storage facility is located in Libreville. This facility stores oil and gas and has a capacity of 151 000 bbl for oil products.

Most of Gabon’s oil exports depart from the Cap Lopez Oil terminal, which has a capacity of 4m bbl. Gabon’s oil pipelines infrastructure is approximately 1 600 km long.

Recent project developments



Upstream

- In August 2018, an oil discovery was announced by Panoro at the Ruche North East Marin-1 well.
- Petronas announced a discovery at its ultra-deep exploration well in Block F14 in March 2018.



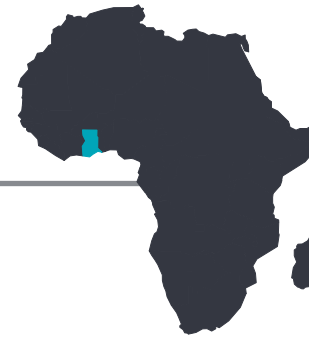
Downstream

- No progress has been made on the Samsung refinery proposed in 2012 for the Port of Gentil, suggesting that the project is unlikely to be built.

Ghana

Why Oil in Ghana?

Ghana is SSA's newest oil producer. The country has seen the highest growth in oil production since 2010.



Oil sector developments

With Ghana and Côte d'Ivoire's running maritime border issue resolved in September 2017 by the International Tribunal of the Law of the Sea who ruled in favour of Ghana, SSA's newest oil producer could continue with explorations in this disputed area and carry on drilling.

In late 2018, Ghana launched its first offshore licensing round, with six blocks on offer. This development has contributed to the rise in exploration activity from firms such as ExxonMobil in 2018.

Regulatory update

In early August 2016, Ghana's Parliament passed a long-debated Petroleum Bill which seeks to create a legal and regulative framework in order to respond to new developments in the petroleum industry. This should improve the country's broader regulatory environment and remove a major barrier to exploration.

The main legislation governing the O&G sector is thus the Petroleum (Exploration and Production) Act, 1984 revised in 2016.

Oil resources, production, exports & consumption

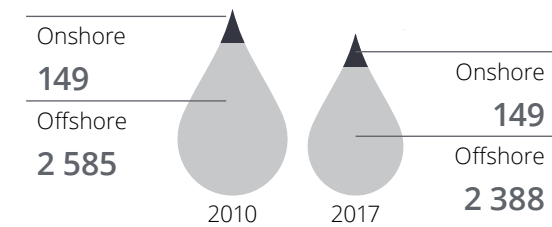
Ghana has approximately 2.5bn barrels of proven oil resources of which 94% are located offshore and the remainder onshore. Between 2010 and 2017, oil resources declined by 7%.

Ghana's crude oil production in 2017 was 57m barrels and was all offshore. Crude oil production has increased 17-fold since 2010 – when oil production started – and is expected to continue growing until 2019 when growth is expected to stabilise. Recent higher production in late 2018 has been on account of the Jubilee Fields, as well as the commencement of production at TEN and Sankofa Gye Nyame.

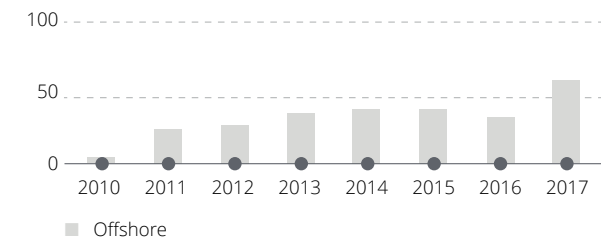
Crude oil exports have grown as domestic production increases. For the first time, for the period January to August 2018, Ghana saw oil export revenues surpass cocoa revenues. Europe and China are Ghana's main markets for crude oil exports. However, limited refinery output keeps Ghana dependent on refined fuel imports.

Domestic consumption has been growing slowly since 2010 and reached 27m barrels in 2017; it is expected to remain constant through to 2023. Ghana's weakening currency, a slowdown in oil-fired electricity generation and fuel price liberalisation will constrain consumption growth whilst an improving macroeconomic outlook and a slow but continued vehicle sales growth will help maintain the levels of consumption.

Oil resources (million bbl)



Oil production (million bbl)



**Macroeconomic Indicators** 2018f-23f

Real GDP growth (avg)	5.5%
Fiscal deficit (avg)	4.4% of GDP
Public gross debt (avg)	65% of GDP

**Comparative Rankings** 2017/18

Ease of doing business (out of 190)	120 ↑
WEF Global Competitiveness (out of 140)	106 ↓
Corruption Perceptions Index (out of 180)	81 ↑
Index of African Governance (out of 54)	8 ↓

**Key Tax Rates**

Income tax – Companies	Rate
Standard corporate rate	25%
Mining/petroleum companies	35%

Withholding Taxes	Non-residents	
	Residents	Non-residents
Dividends	8%	8%
Interest	0/8%	8%
Royalties	15%	15%
Management/ professional fees	7.5%	20%
Rental payments	8/15%	15%

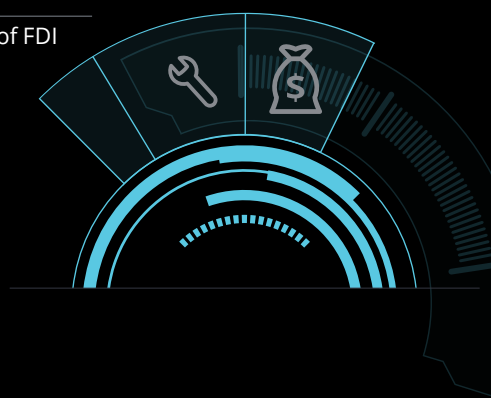
Key foreign investments in Oil

The top investment in 2017 was by Eni, together with Vitol and the Ghana National Petroleum Corporation. The investment was for O&G extraction.

Estimated Total
Capital Investment
US\$9.9bn

Total No of FDI
projects

12

**Oil infrastructure update**

The main oil storage company located in Ghana is the Bulk Oil Storage & Transportation Company. With seven storage facilities, the largest one is the Accra facility with a capacity of 1.3m bbl.

The Kwame Nkrumah MV21 oil trade facility is approximately 1 100 metres away from the Jubilee Field – one of the largest oil field discoveries in the past decade.

Ghana has limited oil pipeline infrastructure. This may affect oil consumption negatively.

Ghana's only oil refinery is the Tema Oil Refinery, which has a capacity of 45 000 b/d. However, the final refined products output is much lower due to operational inefficiencies and disruption in the oil supply. Tema Oil Refinery suffered several closures in the last few years as a result of poor machinery maintenance and financial constraints. The refinery plans to increase its capacity to 60 000 b/d but may well struggle to secure the required investment.

Recent project developments**Upstream**

- Tullow Oil has had four new wells come online during 2018 in its Jubilee and TEN fields, boosting overall production.
- The Offshore Cape Three Points (OCTP) project operated by Eni and Vitol is expected to reach first oil and gas production in 2018.

Mozambique

Why Gas in Mozambique?

As the holder of SSA's largest gas resources, Mozambique has the largest untapped potential in Africa's gas sector. Given its resource potential, the country has seen the largest amount of FDI announced over the past eight years among its O&G peers.



Gas sector developments

The recent gas discoveries in Mozambique, which multiplied already proven reserves, will be a major driver of the country's projected economic recovery in the coming years.

In February 2017, the government approved Eni's development plans for its Coral FLNG development. The development plan is the first to be approved in the Rovuma Basin, where large reservoirs of natural gas have been found. The plan incorporates the drilling and completion of six subsea wells and the construction and installation of the Coral FLNG, securing Mozambique's future as an LNG exporter.

In August 2017, the government granted two concessions to Anadarko Petroleum, allowing the company to design, build and operate the marine facilities for a 12m tonnes per annum LNG project in northern Mozambique.

Given the complexity of the projects, production is not expected until 2022. However, the project development work should support economic growth.

Regulatory update

In 2014, a Decree Law was approved by Mozambique's Council of Ministers. This Decree provides a framework for the development of resources in Areas 1 and 4 in the Rovuma Basin, as well as additional specifications and concessions to the New Petroleum Law and Petroleum Tax Law, which was passed in August 2014.

This new Decree Law clarifies key terms such as royalty rates, details for the process of unitisation, stabilisation clauses, and eases local currency demands on the developers. However, it does not yet provide clarification on key issues such as the fiscal terms for offshore production and the domestic gas reservation policy.

Gas resources, production, exports & consumption

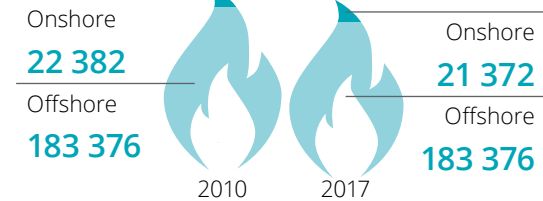
Mozambique has approximately 204 750 bcf of proven gas resources, of which 90% are located offshore and the remainder onshore. Gas resources have remained constant between 2010 and 2017.

With only minimal production to date, the most drastic production growth is set to commence in 2022 as offshore gas fields come online to supply LNG projects. There are currently plans for FLNG plants and an onshore LNG plant. Small onshore gas discoveries could also drive production growth.

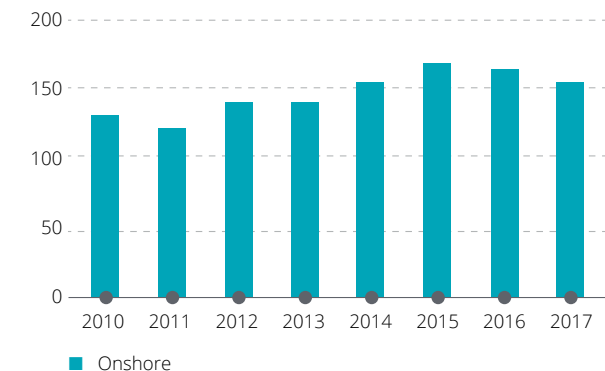
Currently, most of the dry gas produced in Mozambique is exported to South Africa via the Sasol Petroleum International Gas Pipeline as domestic consumption is limited. Exports are set to grow in 2022 when onshore fields and LNG projects such as the Eni FLNG development plan come online. Mozambique is projected to become a major exporter of LNG, with Asia being the most likely target market.

Domestic gas consumption is expected to grow by 23% between 2017 and 2023, driven by a wide range of industrial, power and residential plans.

Gas resources (bcf)



Gas production (bcf)



**Macroeconomic Indicators** 2018f-23f

Real GDP growth (avg)	5.1%
Fiscal deficit (avg)	7.3% of GDP
Public gross debt (avg)	123% of GDP

**Comparative Rankings** 2017/18

Ease of doing business (out of 190)	138 ↑
WEF Global Competitiveness (out of 140)	133 ↓
Corruption Perceptions Index (out of 180)	153 ↓
Index of African Governance (out of 54)	23 ↓

**Key Tax Rates**

Income tax – Companies	Rate
Standard corporate rate	32%

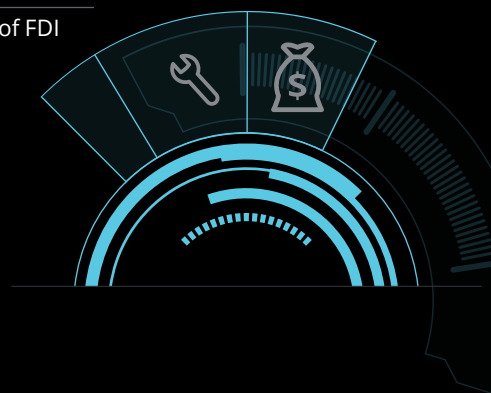
Withholding Taxes	Residents	Non-residents
Dividends	0/10/20%	10/20%
Interest	0/20%	20%
Royalties	20%	20%
Technical services fees	0%	20%
Rent	20%	20%

Key foreign investments in Gas

23 FDI projects were announced in Mozambique between 2010 and 2017. Since 2011, there have been five FDI announcements in manufacturing; four in natural, liquefied and compressed gas, and one in other petroleum products.

Estimated Total
Capital Investment
US\$12.5bn

Total No of FDI
projects
23

**Gas infrastructure update**

The Central Termica de Ressano Garcia gas-fired power plant was completed in 2015 and is the first gas-fired power plant in Mozambique to reach commercial operation. The power plant provides power to Mozambique's national utility, Electricidade de Mozambique.

The Sasol Petroleum International Gas Pipeline was built to export gas produced at the Temane and Pande onshore fields to Secunda, South Africa. There are plans to build a 2 600km gas pipeline to join the Rovuma Basin and South Africa. This pipeline would also enable the transport of gas to other areas of Mozambique.

Recent project developments**Upstream**

- The FID on the Coral LNG project has been made and the project is expected to come online in 2022. Samsung Heavy Industries is building the FLNG facility for an estimated US\$2.5bn.
- Sasol's expansion projects on six wells in Inhambane province are expected to come online by the end of 2018.

**Downstream**

- In March 2018, Shell announced further plans to develop a gas-to-liquid (GTL) plant. However, a moderate oil price recovery in the coming years has eroded the viability of such plants, suggesting that plans may not materialise in the coming years.
- The Maputo gas-fired power plant is expected to come online in 2019.

Nigeria



Why O&G in Nigeria?

Nigeria is SSA's largest producer of oil and gas. Nigeria is also expected to become the largest refiner of petroleum products in Africa by 2022. Domestic gas production is expected to increase substantially in the coming years.

O&G sector developments

Due to militant attacks targeting oil infrastructure in Nigeria, OPEC exempted the country from reducing oil output in 2017. OPEC stated that the cut would not apply to Nigeria until supply stabilised at 1.8m b/d. Although Nigeria agreed to keeping crude oil production to 1.8m b/d, there are no restrictions on condensate output.

However, since January 2017 there have been no new incidents of supply disruption in the Niger Delta, bringing renewed stability to upstream producers. This stability may be compromised in the run-up to the election in early 2019 as militants have threatened attacks if their demands are not met.

Regulatory update

The long-delayed Petroleum Industry Bill (PIB) was split into four sections in order to help pass the bill into law.

In mid-2018 the first of these sections, the Petroleum Industry Governance Bill (PIGB), was passed by the National Assembly; however President Muhammadu Buhari refused to sign it into law.

This development is a major setback to the remaining bills that also aim to empower institutions over individuals.

The other parts of the PIB include the Petroleum Industry Administration Bill (PIAB), Petroleum Industry Fiscal Bill (PIFB) and Petroleum Host and Impacted Communities Bill (PHICB).

The delay in reform of the oil and gas sector further inhibits new investment in Nigeria, specifically to deep-water oil and gas fields.

Existing but outdated legislation governing the sector includes the amended Petroleum Act of 2004, the Deep Offshore and Inland Basin Production Sharing Contracts Act 1999, the Nigerian Oil and Gas Industry Content Development Act 2010, the Nigerian Extractive Industries Transparency Initiative 2007, and the Associated Gas Reinjection Act Cap. A.25 LFN 2004.



Macroeconomic Indicators

2018f-23f

Real GDP growth (avg)	2.4%
Fiscal deficit (avg)	-4.4% of GDP
Public gross debt (avg)	28% of GDP



Comparative Rankings

2017/18

Ease of doing business (out of 190)	145 ↑
WEF Global Competitiveness (out of 140)	115 ↓
Corruption Perceptions Index (out of 180)	148 ↓
Index of African Governance (out of 54)	35 ↑

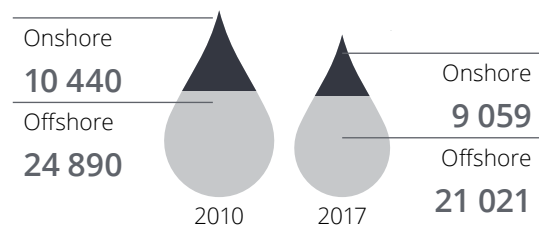


Key Tax Rates

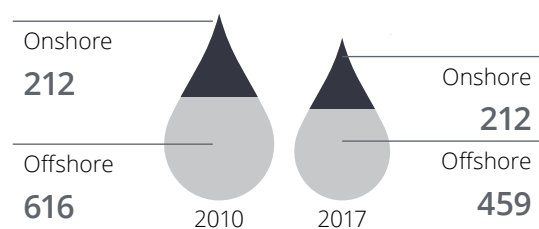
Income tax - Companies	Rate
All companies	30%
Small companies (i.e. those whose turnover does not exceed NGN 1m)	20%

Withholding Taxes	Corporate	
	bodies	Individuals
Dividends	10%	10%
Interest	10%	10%
Royalties	10%	5%
Directors' fees	n/a	10%
Rent (including the hire of equipment)	10%	10%
Construction-related activities	5%	5%
Agency arrangements, including contract for supply	5%	5%
Management consultancy, professional fees and technical service fees	10%	5%

Oil resources (million bbl)



Oil production (million bbl)



Oil resources, production, exports & consumption

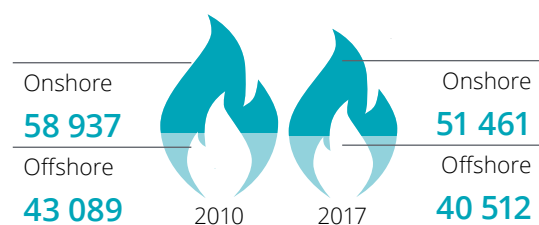
Nigeria has approximately 30.1bn bbl of proven oil resources, of which almost 70% are located offshore. Nigeria's resources have been steadily declining, falling by nearly 15% over the 2010-17 period.

Nigeria's crude oil production was 672m bbl in 2017, of which 68% was offshore and 32% was onshore. This is well below its maximum capacity. Production decreased by 19% between 2010 and 2017 and is expected to grow slowly in the coming years. Projects such as Total's Egina project and the ramp-up at the Gbaran-Ubie field will contribute to this growth. However, a lack of investment in the oil sector since 2014, an uncertain business environment due to legal uncertainty regarding the Petroleum Industry Bill, and security issues such as vandalism, robbery and sabotage may hamper production.

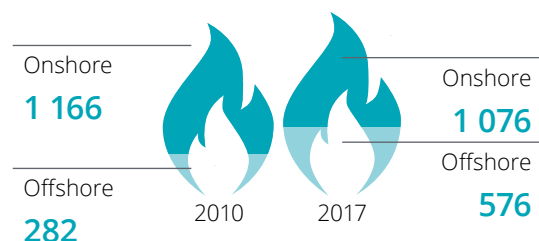
Nigeria's crude exports have recovered, after an insurgency led by the Niger Delta Avengers during 2016 lowered the country's oil production. A stabilisation in oil prices is expected to increase Nigeria's exports to previous levels. However, a lack of investment in new oil projects will adversely affect crude exports over the medium term. The US used to be Nigeria's major market before the shale oil boom; now India is the largest export market for Nigeria.

Domestic consumption decreased by 2% between 2010 and 2017, but is expected to grow by 31% between 2017 and 2023. This growth is set to be driven by better economic conditions and fuel availability. Consumption growth will also be encouraged by the transport sector as Nigeria's vehicle fleet is expected to expand. Gasoline is the most demanded refined product, followed by diesel, kerosene and residual fuel.

Gas resources (bcf)



Gas production (bcf)



Gas resources, production, exports & consumption

Nigeria has approximately 92 000bcf of proven gas resources, of which approximately 44% are offshore and 56% onshore. Gas reserves declined by 10% between 2010 and 2017.

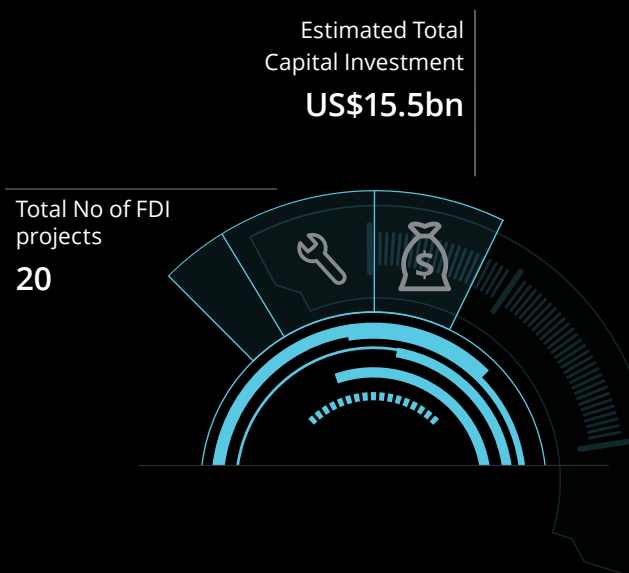
Gas production reached 1 653bcf in 2017, consisting of 35% offshore and 65% onshore. Production is expected to increase substantially in the coming years as new gas projects will start coming online. The government aims to increase gas production and the development of gas infrastructure in order to support the power sector. Around 15% of gas produced is still flared; however, new associated gas capture projects are expected to add an additional 71 bcf of gas from existing resources in the coming years.

More than half of Nigeria's natural gas is exported, almost all of it as LNG. LNG exports are expected to grow as gas production increases. Nigeria is one of the largest LNG exporters in the world. Japan is Nigeria's main market for LNG exports, followed by France, Spain, South Korea and India. Nigeria and Morocco have signed an agreement to build a gas pipeline which will transport natural gas from Nigeria to Morocco.

Domestic consumption is expected to grow 38% between 2017 and 2023. This growth will be driven by the building of new gas pipelines, as well as through agreements with eight oil companies for the supply of natural gas to ten power plants in the country. Increased and consistent gas supply will also be key for consumption growth in the power and industry sectors, while the lack of investment in infrastructure will constrain growth.

Key foreign investments in O&G

Nigeria has had a total of 20 FDI project announcements over the last eight years. The two largest announced investments were in the manufacturing sub-sector of O&G extraction and petroleum refineries.



O&G infrastructure update

Nigeria's oil pipeline network length is 4 441 km and the refined products pipeline network is 3 940 km long. The main threats to the oil operations include oil theft and pipeline sabotage, as well as militant strikes against oil infrastructure.

Currently still under construction, the Dangote oil refinery will have a capacity of 650 000 b/d. In addition, modular refining licences were issued to 65 Nigerian companies in 2015. As many as ten modular refineries are at advanced stages of development. This could add 300 000 b/d of processing capacity. Most of Nigeria's current operational refineries are operating sporadically as infrastructure is aging and there is a lack of regular maintenance.

Qua Iboe (Mobil), Forcados (Shell) and Bonny (Shell) are the largest export terminals with capacities of 8.5m, 6.2m and 5.7m bbl respectively.

The Nigeria LNG facility on Bonny Island is currently supplied from dedicated gas fields; however, it is expected that half the input gas will later consist of flared gas from the Akri/Oguta, Otumara, Utapate, and offshore blocks.

The Egbin Power Station is the largest power-generating station in Nigeria. It is a gas-fired plant with six 220MW, independent, boiler turbine units. The Alaoji VI Power station is the second largest power-generating station in the country and receives gas supply from the Northern Option Pipeline from Obigbo.

The Trans-Saharan Gas Pipeline project will consist of a 4 400 km pipeline that will start in Calabar, Nigeria, pass through Kano, Nigeria, and then continue to Niger, Algeria and Spain. However, the project is running behind schedule. In addition, the Escravos-Lagos Pipeline System is a natural gas pipeline that was built to supply gas from Escravos in the Niger Delta to several consumption utilisation areas in Nigeria. The West African Gas Pipeline links into the Escravos-Lagos Pipeline and continues to Ghana, Benin and Togo. The pipeline transports purified natural gas; 85% is for power generation and the remainder for industrial applications.

Recent project developments



Upstream

- The Egina project led by Total is set to begin production in late 2018, and is expected to produce 200 000 b/d.
- The Nigerian Petroleum Development Company (NPDC) has announced increased exploration spending in the Gongola Basin in the northeast of the country.
- In September, a protest by former workers put output at risk in ExxonMobil's Qua Iboe development, currently producing 550 000 b/d.



Downstream

- The completion of the Dangote refinery is expected to be delayed from 2020 to 2022, but once online will transform Nigeria into the largest exporter of refined petroleum products in Africa.



Tanzania

Why Gas in Tanzania?

Tanzania is home to SSA's second largest gas resources. While gas production is still relatively low, there is large potential in the sector. Tanzania is the fastest-growing economy among SSA's O&G producers.



Gas sector developments

Similarly to Mozambique, the discovery of natural gas fields off the shores of Tanzania could potentially transform the economy. The country has an advantageous geographical location, given its proximity to Asian markets, which require considerable energy resources.

However, the final decision for the planned onshore LNG export facility has been delayed for at least five years. This moves the anticipated date of Tanzania's LNG exports to beyond 2027, putting the potential for expected gas revenues at risk.

Currently only smaller projects are expected to be undertaken in the coming years, all delivering to meet local market demand.

Regulatory update

In July 2017, Parliament passed two pieces of legislation: The Natural Wealth and Resources (Permanent Sovereignty) Act and The Natural Wealth and Resources Contracts (Review and Re-negotiation of Unconscionable Terms) Act, allowing the government to renegotiate or dissolve contracts with mining and energy companies.

Insecure contract terms, the expanded role of the state, and regulatory uncertainty have undermined investor confidence in the country. Uncertainty was cited as a key reason for the delay of the LNG export facility.

Gas resources, production, exports & consumption

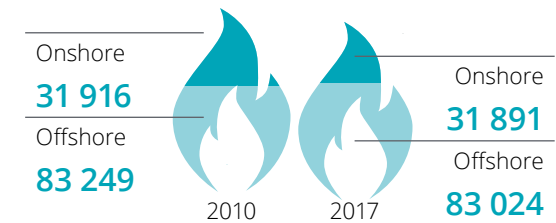
In 2017, Tanzania had approximately 115 000 bcf of gas resources, of which approximately 70% are located offshore.

Production is only expected to increase substantially once the onshore LNG export facility is completed. Growth in production going forward will also be constrained by a lack of suitable midstream infrastructure.

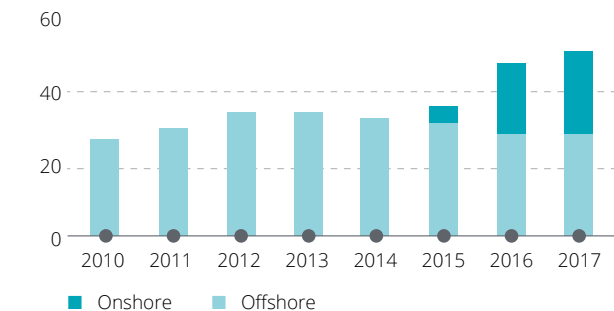
Given the lack of an LNG facility, Tanzania does not yet export any of its natural gas. However, once the onshore LNG facility is operational, the country estimates that it will reap approximately US\$5bn in annual export revenues.

All dry natural gas produced in the country is currently consumed domestically: in 2017 the country consumed 60bcf of gas. This is forecast to grow by 41.2% to 84.7bcf by 2023.

Gas resources (bcf)



Gas production (bcf)



**Macroeconomic Indicators** 2018f-23f

Real GDP growth (avg)	6.4%
Fiscal deficit (avg)	2.9% of GDP
Public gross debt (avg)	38% of GDP

**Comparative Rankings** 2017/18

Ease of doing business (out of 190)	137 ↑
WEF Global Competitiveness (out of 140)	116 ↓
Corruption Perceptions Index (out of 180)	103 ↑
Index of African Governance (out of 54)	19 ↑

**Key Tax Rates**

Income tax – Companies	Rate
Standard corporate rate	30%
Newly listed companies on the Dar es Salaam Stock Exchange	25%
Companies with newly established plants for assembly of vehicles and boats	10%
Alternative minimum tax rate on turnover	0.30%

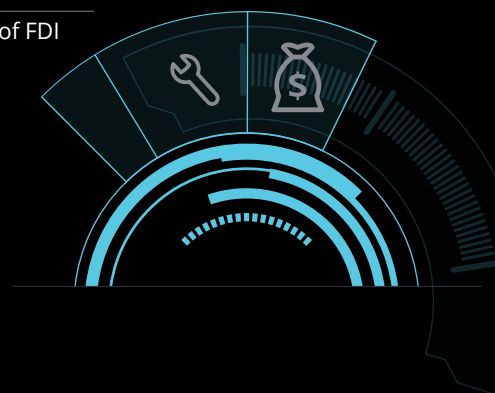
Withholding Taxes	Residents	Non-residents
Dividends		
– Paid by listed company	5%	5%
– Paid by unlisted company	5%/10%	10%
Interest	10%	10%
Royalties	15%	15%
Mining – Management and technical service fees	5%	15%

Key foreign investments in Gas

While Tanzania's gas production is still relatively small, 10 FDI projects have been announced in the last eight years, amounting to US\$3.2bn. These projects are expected to unlock the large gas potential of the country.

Estimated Total
Capital Investment
US\$3.4bn

Total No of FDI
projects
10

**Gas infrastructure update**

The Tanzanian government plans to increase installed power generation capacity from 1 500MW to 10 000MW by 2025, of which 4 000MW will come from gas. In the future, a large proportion of LNG produced at the onshore plant will be used by domestic cement and fertiliser industries.

Recent project developments**Upstream**

- In early 2018, Ocean Rig commenced a one-well drilling programme off the coast of the country.

**Downstream**

- Construction on the 1 450 km oil pipeline from Hoima to Tanga began in early 2018. Operations are expected to commence with the start of Uganda's oil production in 2021.
- In late 2017, Statoil announced that the FID for Tanzania's US\$30bn onshore LNG export facility has been delayed for approximately five years. As construction is expected to take at least another five years, Tanzania will not be exporting gas until at least 2027.

Uganda



Why Oil in Uganda?

Uganda is home to SSA's fifth largest oil resources, with new exploration licences currently being awarded and with oil production to commence in 2021. Uganda is among the best improvers in business environment rankings.

Oil sector developments

Uganda boasts the fifth largest proven oil resources in SSA and recent announcements suggest that the country will begin oil production in 2021.

To further encourage investment in the upstream sector, the government is in the process of awarding new exploration licences for six blocks.

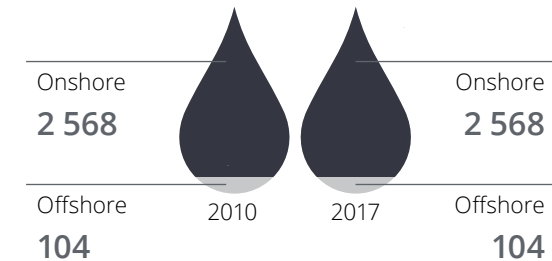
The Ministry of Energy has agreed to "core project terms" with Albertine Graben Refinery Consortium to build and operate a 60 000 b/d oil refinery in Hoima. However, this development is likely to be slow and Uganda is set to remain without oil-refining capacity until at least 2026. The country will remain dependent on refined fuel imports to satisfy its domestic consumption until the refinery is fully developed.

Regulatory update

Two pieces of legislation, the Petroleum (Refining, Conversion, Transmission and Midstream Storage) Bill and the Petroleum (Exploration, Development and Production) Act, which define the duties of the different regulatory bodies and regulate the upstream, midstream and downstream sectors, were passed by Parliament and enacted into law in 2015. These state that the Ministry of Energy and Mineral Development will handle policy aspects regarding oil licensing, developments, production and downstream use. The latter Act also states that the independent Petroleum Authority of Uganda will manage regulatory and commercial aspects of oil exploration and production, in order to minimise political influence over the sector. This Act also established the National Oil Company.

The industry has expressed dissatisfaction with the new laws, stating that they give too much authority to the Energy Ministry and the minister himself.

Oil resources (million bbl)



Oil resources, production, exports & consumption

Oil was discovered in 2006 and new exploration licences have been issued in an attempt to increase proven resources. Uganda has approximately 2 672m bbl of proven oil resources, of which 94% are located onshore and 4% offshore.

There is currently no oil production in Uganda, although developments to start producing are underway. Crude oil production and exports are expected to start in 2021.

Uganda's consumption is low and the main consumers are the transport sector and small diesel generators. However, consumption is expected to increase substantially as soon as domestic oil production begins. Domestic consumption of refined products is expected to grow by 37% between 2017 and 2023. This expected growth is due to Uganda's plan to increase generation and reduce its overdependence on hydroelectric generation.

**Macroeconomic Indicators** 2018f-23f

Real GDP growth (avg)	6.2%
Fiscal deficit (avg)	3.3% of GDP
Public gross debt (avg)	43% of GDP

**Comparative Rankings** 2017/18

Ease of doing business (out of 190)	122 ↑
WEF Global Competitiveness (out of 140)	117 ↑
Corruption Perceptions Index (out of 180)	151 ↑
Index of African Governance (out of 54)	19 ↑

**Key Tax Rates**

Income tax – Companies	Rate
Basic rate	30%

Withholding Taxes	Residents	Non-residents
Dividends	10/15%	15%
Interest	0/15/20%	15%
Royalties	n/a	15%
Management fees	6%	15%
Professional fees	6%	15%
Imported goods	6%	n/a
Goods and services provided to government bodies and other designated persons	6%	n/a
Rents or premiums	n/a	15%
Natural resources	n/a	15%
Non-resident mining or petroleum contractor services	n/a	10%
Uganda-source service contracts	n/a	15%

Key foreign investments in Oil

The major FDI project announcement in the O&G sector during the past eight years was in 2010 by Tullow Oil. The project consists of setting up an oil refinery and an export oil pipeline to the East African coast for a total investment of US\$5bn.

Estimated Total
Capital Investment

US\$7.4bn

Total No of FDI
projects

6

**Oil infrastructure update**

Uganda's only oil storage facility is owned by Total, ConocoPhillips, BP and SemGroup. The facility has a total capacity of 46.3m bbl. The government is also planning to build a new storage facility for refined products with an initial capacity of 377 000 bbl, which can potentially be upgraded to 869 000 bbl if there is enough demand.

The government is looking for investors to build a petroleum terminal in Buloba that will serve both local and neighbouring countries, as well as a 211 km pipeline from Hoima refinery to Buloba terminal.

Recent project developments**Upstream**

- In March 2018, Total and CNOOC reached an agreement on operating the Tullow Oil field divestments, where each will have a shareholding of 37.5% in the fields.

**Downstream**

- In April 2018, a public-private partnership agreement was reached to build a 60 000 b/d refinery in the Hoima district. The government selected Albertine Graben Refinery Consortium to develop the refinery and retain a 60% shareholding, while the Uganda National Oil Company (UNOC) will retain the remaining 40%. The refinery will come online in two phases, initially starting at 30 000 b/d and ramping it to 60 000 b/d in phase two.
- Expected to begin operations in 2022, the Hoima-Tanga pipeline will carry crude oil from two oil fields at Uganda's Lake Albert to Tanzania.

Considerations for Winning in Africa's O&G Sector

While there is no universal recipe for market entry and building successful businesses in Africa (or anywhere else in the world), a combination of various soft and hard skills, paired with the right timing and a solid understanding of the complexity and market-specific conditions will enable companies to win in the O&G sector in Africa.

The approach to market entry needs to include expertise to mitigate against various business risks. This includes the above-noted systemic challenges of insufficient infrastructure, and uncertainty in the regulatory and policy environment, in addition to a more thoughtful and empathetic approach to partnering with local stakeholders. This will contribute to local economic diversification ambitions and the resultant developmental paths of resource-producing economies.

Over the lifecycle of investments and project activity in the O&G sector, eight cross-cutting factors should be considered by multinational O&G companies looking to invest and operate in Africa.

Investing in local partnerships

A key ingredient for winning in Africa's O&G sector is collaboration through partnerships and alliances. Given the complexity and specific local nuances of markets, the right experienced local partnerships are vital for successful market entry. Identifying the right local partners might be time-consuming and resource-intensive; however, it is a crucial investment. These partnerships may range from geographical and technical expertise to access to networks, channels and decision makers in the local market or sector that a new entrant might not yet have established.

Local partners that possess the on-the-ground knowledge and experience are well-positioned to guide market entrants to better understand the local business etiquette and culture. These "softer" elements of doing business are crucial to succeeding in new markets, helping to form relationships with authorities and potential business partners as well as customers. Collaborating with local tax and audit teams in order to provide a centrally co-ordinated and digitally operated tax function across multiple jurisdictions is one example. Partnering with experienced businesses in a new market may assist the market entrant to better navigate the local regulatory environment, overcome distribution challenges and help to avoid costly mistakes.

Added to this, the heterogeneous nature of the O&G sector means players face a wide array of challenges, with diverging goals. Consequently, players within the O&G industry have to find structural solutions in order to develop business models and processes that enable effective collaboration. Collaboration is thus imperative to reduce costs, drive competitiveness and explore new opportunities in the sector.

The complexity associated with finding the right partner should not be taken lightly. Due diligence is a necessity when evaluating potential partnerships, particularly in the context of mitigating the risk of unwittingly becoming complicit in corruption.

Capitalising on local market knowledge

Working together with various entities, specifically across the public and private sector, has, however, proven to be difficult, given the historical trust deficit between governments and

Soft and hard skills, paired with the right timing and a solid understanding of the complexity and market-specific conditions enable companies to win in the O&G sector in Africa.

the private sector. To narrow this deficit, it is increasingly advantageous to make use of trusted local advisors and mediators with a proven track-record that stems from on-the-ground, local knowledge and expertise. While hiring local staff is one option, partnering or acquiring local firms is another as it allows firms to fast-track the access to local expertise, knowledge and networks.

Although a wealth of data, information and insights exists on key African economies and their O&G sectors, investing in primary data collection, on-the-ground insights and expert information is crucial. In-country experience of how a market operates allows companies to gain first-hand knowledge and to build their long-term strategic focus for a chosen African market.



Understanding local customs and business culture

Investing in local partnerships and market knowledge can also go a long way to better understanding local customs and business culture. Companies also need to consider their “style” of entering a new market where business practices differ and where their business approach might come across as overconfident or outright arrogant. The style and type of market entry should be facilitated through intelligent engagements with stakeholders.

Building a winning business in Africa is a long-term play, especially in resource sectors. Similarities in language, culture or operating environment between companies’ host markets and economies for prospective market entry can provide a relatively “softer landing”. A focused approach to investing in and understanding the practices and customs, and thus

paying one’s “school fees” in one market, may be helpful before expanding to other African economies. This can also entail leveraging the brand equity and clout established in one market to other target markets or regions on the continent.

Developing local content and localisation strategies

Multinational O&G companies must embrace the concept of localisation to lower supply chain costs, boost local skills development, reduce risk, and enhance their reputations with governments and local communities in the countries in which they look to operate.

Local legislation is prescriptive or at least encouraged at a base level regarding the minimum procurement of local goods, services, and labour. The consequences of non-compliance can vary from monetary impacts such as penalties, to operational

impacts such as granting or renewing licences only with the condition of compliance to local content regulation. In order for local content to be sustainable, a long-term and end-to-end localisation approach must be followed from exploration through to decommissioning phases in the typical O&G lifecycle.

With a move away from mere local content compliance to developing longer-term and broader-view localisation strategies, O&G companies should engage with local communities, authorities, and stakeholders from an early stage in the project lifecycle to lay the foundation for long-term and meaningful relationships. The real value of localisation strategies, through backward and forward linkages in the industry, appears when these strategies form part of the overall development strategy of the host country. It is then that localisation strategies create true socio-economic value.

Creating value beyond compliance

When navigating the compliance landscape, companies must do so in a manner that moves beyond “tick-box” compliance. The proper industry and technical expertise assists companies with moving beyond compliance and enabling increased socio-economic impacts, improved business and operational efficiencies, and sharing of value within the operating ecosystem. Creating value for surrounding communities and contributing in a meaningful way to the economic diversification agendas and developmental positives of countries by addressing common social challenges requires a new socio-economic framework and new business models.

The principle of Shared Value provides such a framework and aims to address social issues with a business (profit) model to make positive gain and win-win choices where various stakeholders such as multinational O&G companies, their communities and local government share an interdependent future. The key premise of Shared Value is that the competitiveness of a business and the health of the community in which it operates are interwoven.

The proper industry and technical expertise assists companies with moving beyond compliance and enabling increased socio-economic impacts, improved business and operational efficiencies, and sharing of value within the operating ecosystem.

Through business decisions, policies and practices related to products and services, supplier and local economic cluster development, O&G companies are able to advance the economic benefits and social conditions of their communities while simultaneously enhancing their own competitiveness. In order to engage on a long-term basis and to help fulfil potential and manage risks, active stakeholder engagement and communication are required.

Portfolio management and diversification

Companies need to decide on their portfolio at the onset of their operations in Africa's O&G sector. Portfolio diversification beyond core business functions may be necessary to manoeuvre the challenging business environment and to overcome various challenges omnipresent in many African countries. For example, investment in and development of own infrastructure can often be a requirement, augmenting

portfolios beyond core business functions, driven by needs such as investing in power infrastructure for day-to-day business operations.

It can also require becoming functional in adjacent or other industries. Considering acquisitions for securing infrastructure, skills, or distribution networks may be one such approach. Strategic acquisitions may enable firms to diversify their portfolio and move into new sectors. One example of such diversification has been into the renewable energy sector, as firms balance the risk of commodity price fluctuations with investment in alternate energy sources.

As capital intensity, cyclical prices, and long horizons rule the operations of O&G companies, just as R&D and technological advances increase access to resources and create efficiencies, portfolio management focusing on the core business is just as important. Ultimately, innovation is set to play a greater role within the O&G industry. Portfolios are evolving and need to be rebalanced to give greater focus to transformational changes that leverage multiple types of innovations at the same time.

Embracing digitalisation

With the O&G industry making its way to the next level of digital evolution, integrating robotics, digitisation, and the Internet of Things (IoT) into the operational environment, potential benefits of embracing the digital evolution and going digital are clear – increased productivity, safer operations, and cost savings. However, a Deloitte survey of O&G executives found that current innovation initiatives are focused on core innovation with shorter term returns. This conservative approach can be linked to the challenges faced by firms reevaluating projects following the oil price downturn after 2014.²⁰

For O&G players, one of the biggest advantages of adopting digital technology could be the resilience these technologies offer to weather the downturns to which the industry is prone, and the adverse consequences thereof in Africa.

O&G companies can benefit from a coherent framework that helps to achieve near-term business objectives, measures digital progression through stages of evolution, and, above all, offers a pathway to ultimately transforming the core of operations, the real assets and the business model itself. A strategic road-map can help players to assess the digital standing of every operation and identify digital leaps for achieving specific business objectives.

Furthermore, the rapidly changing dynamics of the O&G industry require new technology-driven solutions to respond to disruption in the sector. Disruptors stem from a myriad of avenues, including customers that expect to interact with digitally mature organisations that provide consistent digital experiences across channels and content. The need to provide a consistent digital experience requires collaboration between O&G company partners and distributors.

Identifying risks and planning for uncertainty

Multinational O&G companies need to be aware of and plan for the risks and uncertainties of investing and operating in Africa. This includes a diversity of risks, not only related to regulation and policy, third parties such as partners or suppliers, infrastructure, labour and the environment, but also macro risks such as political, security, governance, economic, structural, country liquidity and currency risks. With the global risk landscape already dominated by technological risks, so too cyber and other digital risks are becoming more prominent in Africa.

There can be tension between short-term and long-term risks. Political tensions are often a short-term risk, associated with elections and with quickly changing perceptions. These risks are given a lot of airtime and firms need to be able to respond to them quickly. Long-term risks like structural issues within a society are often attended to with less urgency and the implementation of mitigation factors is long and costly. However, these are the risks that can prove to be most damaging in the long term.

To help navigate complexities and to chart a path of success across Africa's diverse markets, proven tools to help identify and mitigate these risks in an innovative way go hand-in-hand with investment on the continent. For example, companies can benefit from thinking about the long-term future using tools such as scenario planning. The foundational proposition of scenario planning is that no one can predict the future. However, companies can choose to adopt a disciplined point of view about possible futures by focusing on key interactions among critical uncertainties and how these interactions could reasonably play out. Strategies can then be tested for robustness against each scenario. Choices can be made more confidently with an informed view on how each strategy could play out in different scenarios.²¹

For practical application, there is no "one-size-fits-all" approach. Risk, compliance and controls need to be integrated within one system and need to cut across the firm. Furthermore, companies need to make sense of the local environment and develop local mitigation strategies for individual markets, rather than trying to develop these at a group level.

Understanding the evolving risk landscape is as important as constant organisational introspection, investment in innovation, and embracing disruption and self-disruption within organisations in order to manage risks and opportunities in a way that is both opportunistic and sustainable.

As managing risk is about creating and sustaining value, firms need to identify risks and think critically and innovatively to develop cost-effective solutions. Good corporate governance should be the first safeguard for various external but also internal risks.

These eight cross-cutting factors cannot occur in isolation. A key ingredient is to establish an ecosystem that enhances collaboration between various industry stakeholders. Such ecosystems are fostered through incentives that encourage organisations to participate in your ecosystem, thereby unlocking further collaboration and innovation. Ecosystems are created through varying partnering approaches such as funding, acquisition and collaboration.

Ultimately ecosystems lower costs and encourage innovation through collaboration between players along the supply chain. Trust between suppliers and operators is vital to create long-term partnerships that can reap the benefits of an integrated environment. Nurturing an ecosystem where innovation can truly thrive is essential in Africa by generating significant value for customers, shareholders and employees.

Having an integrated 360-view and functioning as an integral part of such ecosystems will be necessary to invest and operate in SSA's O&G sector in a sustainable manner.

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15. Ibid.
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17. International Energy Agency (2018).
18. Resource attractiveness is based on an index average of “rewards” indicators including Oil Reserves; Gas Reserves; Discovery Rate – last 5 years; Hydrocarbon Production; and Hydrocarbon Production Growth as compiled by Fitch Solutions. Regulatory attractiveness is based on an index average of “risk” indicators including Royalties; Income Tax; Licence Type; Bureaucratic Environment; Legal Environmental Risk. Investment attractiveness is based on the US-dollar-based size of FDI announcements tracked by FDI Markets between 2010 and 2017.
19. Each country snapshot has been compiled based on data and information available from the following subscription-based or publicly-available databases, unless otherwise indicated:
 - Oil resources & production data and gas resources & production data from Rystad Energy (2018)
 - O&G FDI investment announcements data from FDI Markets (2018)
 - Macroeconomic and comparative data from the International Monetary Fund’s World Economic Outlook (October 2018); the Economist Intelligence Unit (2018); the World Economic Forum’s Global Competitiveness Report (2018); Transparency International (2018), and the Ibrahim Index of African Governance (2017)
 - Tax information from Deloitte (2018). Guide to Fiscal Information – Key Economies in Africa 2018. Available [Online]: <https://www2.deloitte.com/za/en/pages/tax/articles/guide-to-fiscal-information-key-economies-africa-2018.html>
 - O&G projects, infrastructure and sector updates data, and exports and consumption data have been sourced from Fitch Solutions (2018).
20. Based on the results of an executive survey of O&G companies conducted by Monitor Deloitte for the presentation entitled: A Perspective on Innovation in the Oil & Gas Industry, delivered at the World Petroleum Congress, Istanbul, July 2017.
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