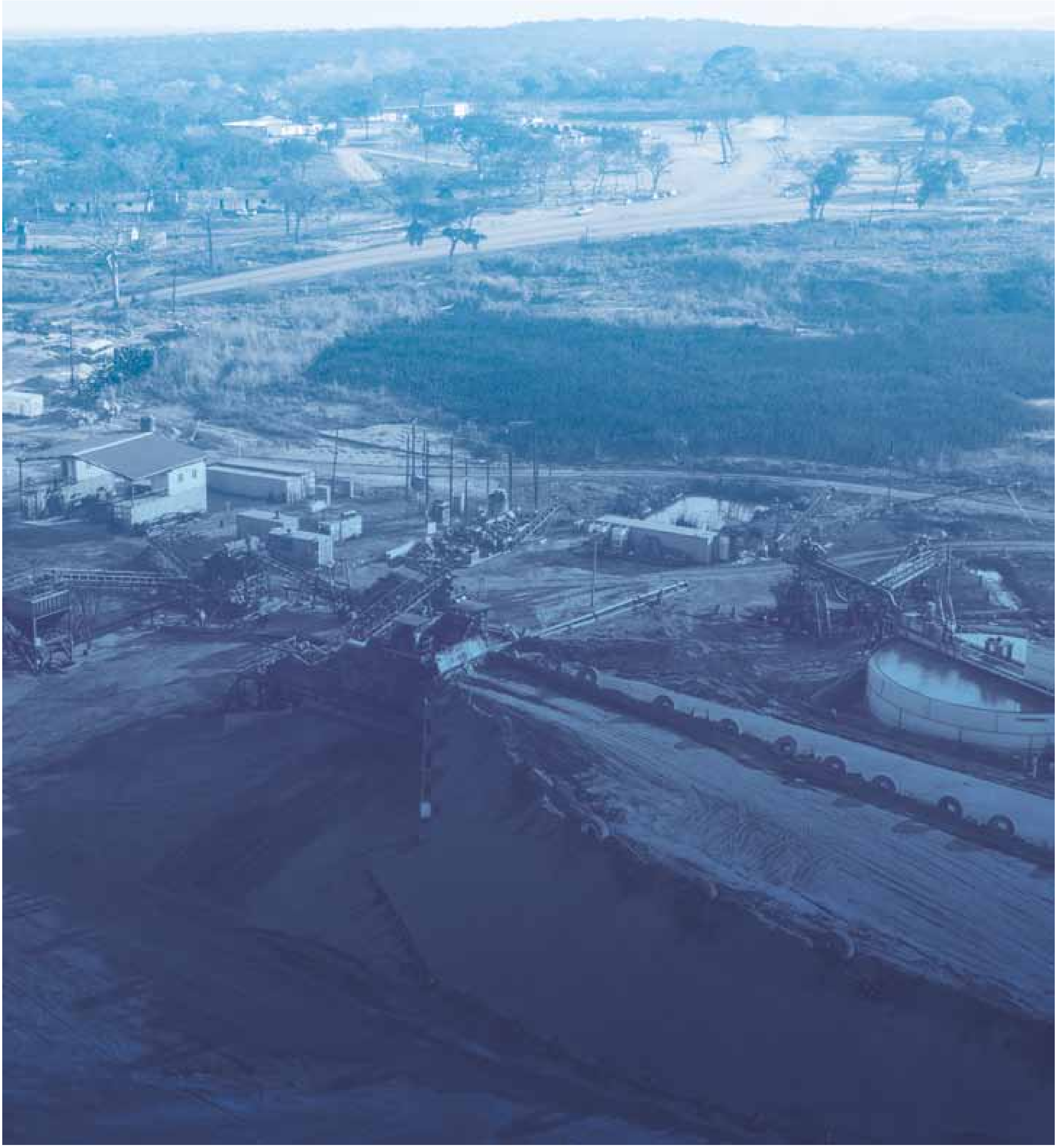

Mining in Africa Country Investment Guide

GLOBAL BUSINESS REPORTS

MACIG 2020

Pre-release Edition (II)

Western and Southern Africa

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Western and Southern Africa Pre-Release

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We welcome your feedback and interest in being interviewed – please feel free to get in touch at ***cjkarlsson@gbreports.com***

www.gbreports.com

Dear Readers,

Africa's mining industry is experiencing the most rapidly changing dynamics in its history. Disruptive technologies, democratization, local empowerment and increased focus on environmental protection are at the top of a long list of factors currently reshaping the landscape of African mining. This year, our teams have traveled to five countries that are, each in its own way, emblematic of these changes.

In the south, Angola leverages its mineral riches to accelerate the recovery from the kleptocratic leadership of José Eduardo dos Santos, while on the east coast, Mozambique emerges from the periphery to assert a more central position in the mining game. The region's long-reigning gold titan, South Africa, scrambles to revive its declining precious metals sector while Ghana, the new continental leader in gold production, loses ground to the freshman jurisdiction of Senegal.

Through on-the-ground research and interviews with industry leaders across the mining value chain, we hope to offer a holistic view of the state of the industry. The West and Southern Africa pre-release is a snapshot of Global Business Report's research for the Mining in Africa Country Investment Guide (MACIG) 2020, that will be published in February 2020 at Mining Indaba in Cape Town.

Sincerely,

Enjoy the read!

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Introduction to Southern Africa

Political dynamics dictate the trajectories of neighboring nations on contrasting paths

The axis of power in African mining has long been centered around South Africa, whose influence has seeped its way throughout the Southern Africa region before reaching East, Central and West Africa due to its mining expertise, manufacturing and relative economic prowess.

However, South Africa's regional dominance is on the wane, as rising inequality, high unemployment rates, economic turbulence and political instability have contributed to the country's decline, perhaps most vividly illustrated by losing the status of Africa's number one gold producer to Ghana – the epicenter of a thriving West African gold rush.

Before the rest of Southern Africa could start to fully take advantage of its abundant mineral wealth, a wave of political change swept the region as seemingly pro-business regimes were implemented. In Angola, João Lourenço's anti-corruption reforms have been followed up by a privatization policy with the aim to attract foreign investment and diversify an economy reliant on oil. On the East coast, Filipe Nyusi has had to overcome the "tuna bonds" scandal which crippled the Mozambican economy followed by devastating cyclones in early 2019, but development of the country's gas and graphite industries form the basis for hope with the IMF predicting double-digit growth by 2023.

The following pages present an overview of the current dynamics impacting the mining industries in Angola, Mozambique and South Africa, three countries inextricably linked through trade and cultural ties that sit on the three extremities of the Southern Africa region.

As the region's titan struggles to maintain its status as a global mining power, the former Portuguese colonies on Southern Africa's Atlantic and Indian Ocean coasts look to the natural resources space to stimulate economies on the path to recovery. While each jurisdiction presents its own set of opportunities and challenges, they all share a rich mineral endowment that offer investors the potential for high risk/reward upside.

Angola

Angola is blessed with significant reserves of diamonds, iron ore, phosphates, copper, gold and manganese. However, since gaining independence in 1975, the country's economic fortunes have been inextricably linked to oil. Under current president João Lourenço, Angola is actively looking to diversify its economy and attract foreign investment.

Population: 30,809,762 (World Bank 2018)

Land Area: 1.247 million km^2

Official Language: Portuguese

GDP (PPP): 161billion (World Economics 2018)

GDP PPP Annual Growth Rate: -2.6 (World Economics 2018)

GDP Per Capita (PPP): 5725.33 (Trading Economics 2019)

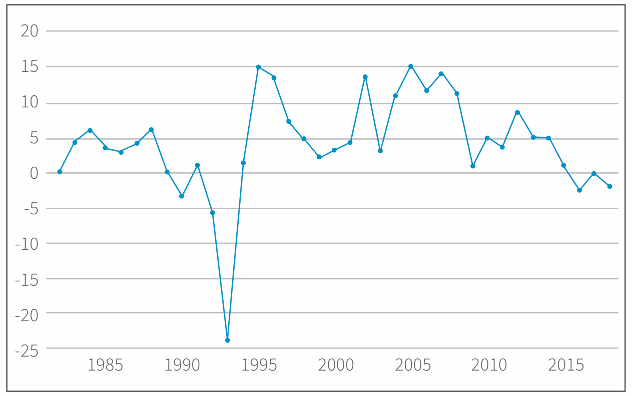
Industry: Petroleum, Diamond, Agriculture and Fishing (World Atlas 2018)

Top Exports: Mineral fuels including oil: US$40.7 billion (96.8% of total exports), gems, precious metals: $972.7 million (2.3%), fish: $132.5 million (0.3%), salt, sulphur, stone, cement: $39.7 million (0.1%), wood: $33.5 million (0.1%), machinery: $31.2 million (0.1%) (World's Top Exports 2018)

Top Imports: refined petroleum ($457M), raw aluminium ($392M), aluminium oxide ($376M), chromium ore ($222M) and copper ore ($175M) (OEC 2017)

Top Export Destinations: China 61%, India 12%, US 7.9%, South Africa 4.4%, Spain 3.2% (OEC 2017)

GDP (annual %)



Source: The World Bank

Diamond production (cts) 2013-2017

2013: 8,601,696
2014: 8,791,340
2015: 9,018,942
2016: 9,021,767
2017: 9,438,802

8.87%

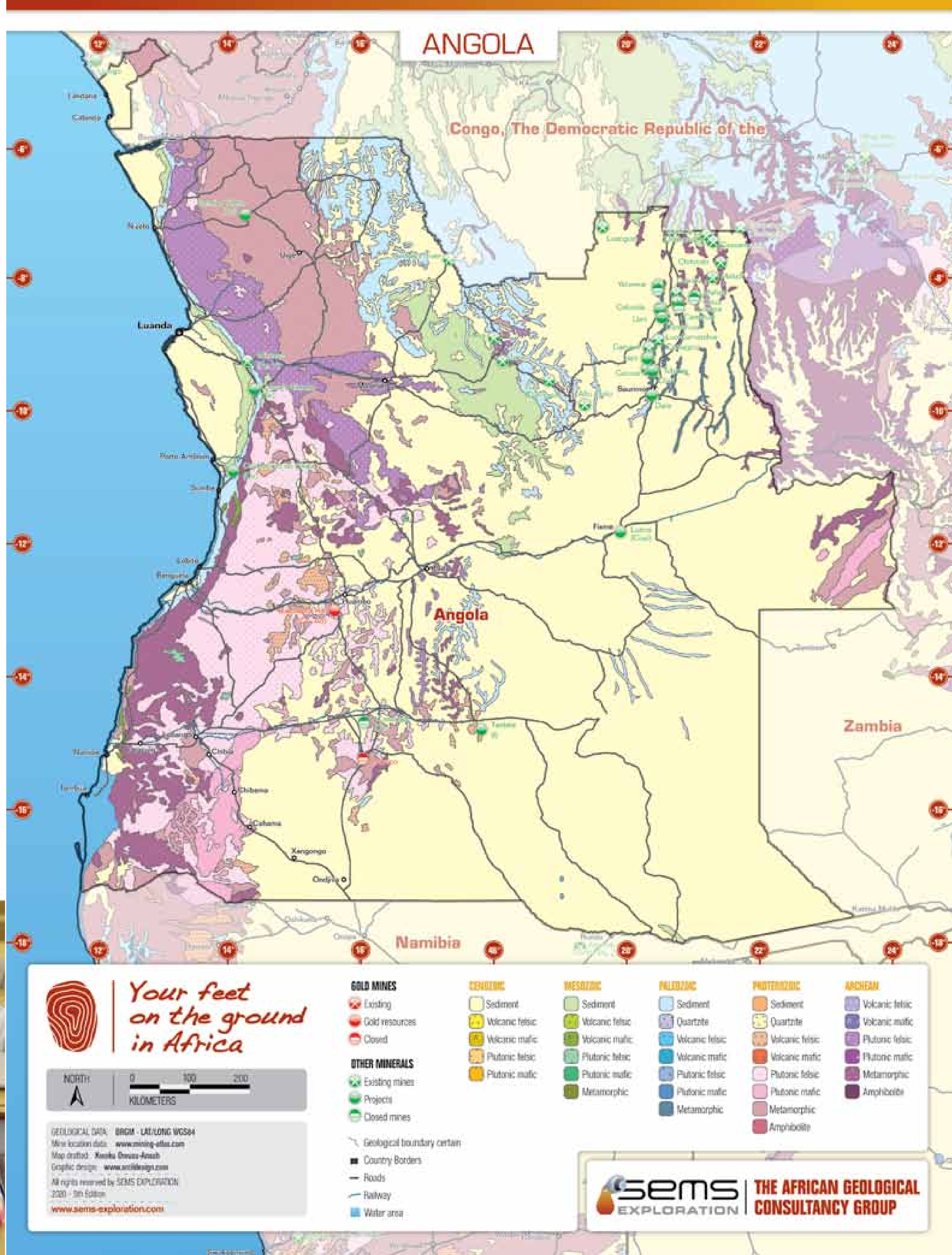
Source: British Geological Survey

Fraser Institute Investment Attractiveness Index Ranking:
NA

The Global Competitiveness Index Ranking:
136/144 (previous 137/140) (World Economic Forum)

Ease of Doing Business Ranking:
173/190 (World Bank)

CATOCA invests heavily in CSR, including an education program. Photo courtesy of CATOCA.



Angola

Reforms open the door for private-sector investment

When João Lourenço, former defense minister in José Eduardo dos Santos' ruling MPLA party, was chosen to succeed Africa's second-longest-serving president after being singled out as the favorite by his predecessor, one would be forgiven for treating promises of reform with a certain skepticism.

Nevertheless, in the two years since being officially sworn into office on 26 September 2017, Lourenço has backed up his rhetoric to an extent most onlookers would scarcely have believed considering the entrenched and endemic corruption that engulfed the previous regime. If 2018 was marked by an anti-corruption campaign and efforts to regain control of the country's dire forex situation, the prevalent themes of 2019 have been a concerted push for transparency and the subsequent opening up of a previously-closed business environment for private investment.

The share capital held wholly or partially by the Angolan state in 195 different companies will be sold between 2019 and 2022 under the privatization program published in the Diário da República official bulletin. The program states that 175 companies will be sold via public tender, 11 by public auction and nine through Initial Public Offering (IPO), with the government expected to launch public tenders in 2019 for 80 companies as well as one IPO. In 2020, 81 companies are due to be sold through public tender, six through auction and three via IPO, and in 2021 and 2022 the remainder will be sold. The most well known companies involved in this process are state oil company Sonangol, airline TAAG and diamond company Endiama.

What will the privatization of Endiama mean for Angola's diamond producers? Endiama is one of the main shareholders of Sociedade Mineira de Catoca (Catoca), the Angolan mining company that produces around 80% of all Angolan diamonds by volume. "Once Endiama is privatized, Catoca will need to realign its regenerated strategy with its new shareholders," explained Benedito Paulo Manuel, Catoca's director general, adding: "In this context, the long-term view of the company (Catoca) will depend to some extent on external factors inherent in Endiama's new path, with which we must necessarily be aligned. However, in terms of operating capacity and growth potential, Catoca is well placed to become the world's largest diamond producer."

Already within the top six diamond producers in the world, Catoca's internal reforms administered since the new management team took charge in August 2018, in addition to governmental reforms to create a more transparent business environment, combine to make an attractive proposition for private sector investment. "Financers can be assured that their investments will be well applied and offer a substantial return," affirmed Paulo Manuel.

While Angola's prowess in diamond production is not in question, its perceived risk as a destination for direct foreign investment remains. This perception, however, may be due for a change. In specialist intelligence firm EXX AFRICA's 2019 Investment Risk Report, Angola ranked second behind Ethiopia in a list of the top five African countries for investment as markets opening up to structural reform and liberalization were favored over governments advocating state interventionism.

To this end, the government is being proactive in its efforts to attract private investment. In July 2019, an Angolan delegation led by the Minister for Mineral Resources and Petroleum, Diamantino Azevedo, went to Lisbon for the seminar "Investment Opportunities in the Mining Sector of Angola." Part of this delegation was Canga Xiaquivuila, director general of the Geological Institute of Angola, whose National Plan of Geology project (Planageo) – a nationwide survey of Angola's geology – is one of the key initiatives in the quest to diversify the country's economy. "The current strategy to attract foreign investment is to promote the opportunities that Angola has, as from an international standpoint our mining sector is low-profile," commented Xiaquivuila. "The Geological Institute of Angola is accumulating information about all mineral resources in the country to showcase the possibilities and make

Inspection of diamonds. Photo courtesy of Endiama.

Benedito Paulo Manuel
Director General
Sociedade Mineira de Catoca (Catoca)

Since you assumed the position of Director General at Catoca in August 2018, what challenges has the new administration had to overcome?

Despite the successes the former management team achieved, the new administration inherited substantial difficulties. The first of these challenges was from a technological standpoint, particularly with Catoca's new mine KT42, which had gone into operation without the requisite due diligence that should have been taken to determine its viability. After further analysis by the new administration, we decided the quality of these diamonds would not be sufficient, and proposed the closure of this mine to Catoca's shareholders.

Another challenge came from the fleet of equipment, as a new line from Belaz had been introduced in 2016, but the material conditions had not been established to support this change. Therefore a dependence on a foreign third party company to assist with this equipment had created a legal issue that we had to overcome.

Furthermore, a lack of skilled human resources with technical labor leaving the industry affected operational quality and forced a restructuring and strengthening of an integrated management system. Fortunately, the measures taken to tackle these issues have produced positive results, resulting in a profit rise, a growth in the company's reserves, and a reduction in costs.

Is Catoca actively looking for partners to advance the exploration and production of diamonds in DRC's copperbelt?

We have been thinking about the DRC copper belt. But today our priority is working on the Luaxe concession. We are looking for partners to fund this venture and have made contact with various financial institutions with this in mind. There is great potential in the region and we are sure that there will be much to be gained for all parties involved in the development of diamond production here, so that in the future we may be able to move forward on the copper belt, about which, at this time, some exploratory talks and research are still in the early stages, not yet configured in any corporate program.

In the context of a growing synthetic market, what would you say regarding the importance of maintaining a robust industry for traditional diamonds?

On one hand, synthetic diamond producers have created an attractive marketing strategy that evokes an activity that is ecologically clean, transparent, void of exploitation and corruption. This, they say, is on the contrary to the vision of traditional diamond production and the image of "blood diamonds". However, if we analyze what each industry gives to their respective beneficiaries, the production of synthetics will never come close to offering the level of benefits that natural production does.

This question transcends the direct beneficiaries of the production, and goes to the root of politics and the direction the world is heading. I say this with respect to employment and how certain technologies are condensing wealth into the hands of a select few. In the east of Angola the diamond industry is the second biggest direct employer in the country, with an average remuneration 13 times higher than the national average. As well as impacting the families of the workers directly involved in mining operations, this wealth has created a vast ecosystem of third party beneficiaries ranging from catering to machinery to logistics.

Do you have a final message from Catoca to the international mining community?

We must continue to defend the production of natural diamonds for the benefit not just of Angola, but of all the countries and communities that rely on the creation of wealth that our industry plays a part in. To achieve this, we must keeping working to collectively eliminate the negative factors that have combined to give the sector a bad image.

More and more, lessons that can be drawn from history that show the business one undertakes will impact not just the life of an individual, but the lives of whole communities and regions. Therefore, the integration and cooperation of all stakeholders in an industry fundamental to the sustainable development of a country is paramount to ensure that future generations are afforded better living conditions than they have today.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We are the fourth largest mine in the world operated in the open.
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Somos a quarta maior mina do mundo explorada a céu aberto.
We reinforce social responsibility with a focus on sustainability.
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the process easier for investors," added Xiaquivuila, noting that further road shows will continue throughout 2019 and 2020.

DIVERSIFYING AN OIL-BASED ECONOMY

Despite pro-business reforms implemented by the Lourenço regime that indicate a brighter future, the scale of the economic recovery that must take place in Angola should not be underestimated. In June 2019, the IMF reported that Angola's public debt stood at 91% of GDP in 2018, in stark contrast to the 26.7% figure in 2012. With over half of Angola's gross domestic product coming from the oil and gas sector, production down from a high of 1.8 million barrels per day (bpd) to 1.2 million bpd, and a global move away from fossil fuel-dependence, the need to diversify an oil-based economy is clear.

In August 2019, at the opening session of the Ministry of Mineral Resources and Petroleum's Third Advisory Council, Minister Azevedo outlined plans for the strategic diversification of Angolan industry under the motto "Restructuring of the mineral and oil resources sector: A commitment to the socio-economic development of the country." Azevedo announced that several companies had acquired prospecting licenses in Angola, including Atabamaik, which plans to explore copper; Chinese General Mining, which is seeking out rare earths; and Vig World, in partnership with Spanish company Tolsa in search of lithium.

Even within Angola's mining sector, greater diversity in the country's portfolio of mining projects in an industry traditionally dominated by diamonds is part of the government's agenda. "Angola is known as a diamond country, but has a wealth of other mineral resources to take advantage of, such as gold and copper," observed Xiaquivuila, giving the example of an Australian junior company currently in the process of completing an evaluation stage study for rare earth elements, which could start production as early as 2021. "The government of Angola is trying to diversify its dependency on oil and diamonds, as the country has vast mineral potential sitting in an extension of the copper belt that runs through DRC and Zambia, for example," he added.

"The temporary reduction in production was due to a lack of available equipment and a shortage of technically qualified man power, which remain serious challenges for the Angolan mining industry. The mining equipment used in Angola is still heavily reliant on imports, principally from South Africa, which can impact turnaround times and availability."

Helder Carlos, President, Sociedade Mineira do Cuango (SM Cuango)

On 27 August, 2019, presentations of the first public tender for granting diamond, iron and phosphate mining rights took place in Luanda, which were followed by presentations in Dubai in September, and later in London and Beijing. The process aims to bring to tender five mining concessions: two for diamonds in the Angolan provinces of Lunda Norte and Lunda Sul, one iron concession in the province of Kwanza Norte, and two for phosphates in the provinces of Cabinda and Zaire. Minister Azevedo related that the launch of the public tender is aligned with the government's strategy to provide greater transparency in the management of Angola's economy.

Success in conveying transparency to the international community will be key in attracting the foreign necessary to stimulate Angola's mining sector.

DIAMONDS AND TRANSPARENCY

In 2018, the government of Angola approved a new trading policy for diamonds, with the aim of making the entire process of selling and buying diamonds more transparent. Companies can now also sell 60% of their production through their own channels, and are no longer obliged to sell their full production below international market price to preferred customers.

Furthermore, "Operation Transparency" was launched by the Angolan government to combat diamond trafficking and illegal immigration, which led to 241 semi-industrial diamond mining companies and cooperatives having their licenses revoked. In Lunda Norte alone, more than 400,000 foreigners were deported, as the Angolan state pushes to formalize an industry that has struggled with illegal "garimpeiro" miners, many of which come from abroad to take advantage of the rich mineral wealth in remote areas of South and Central Africa.

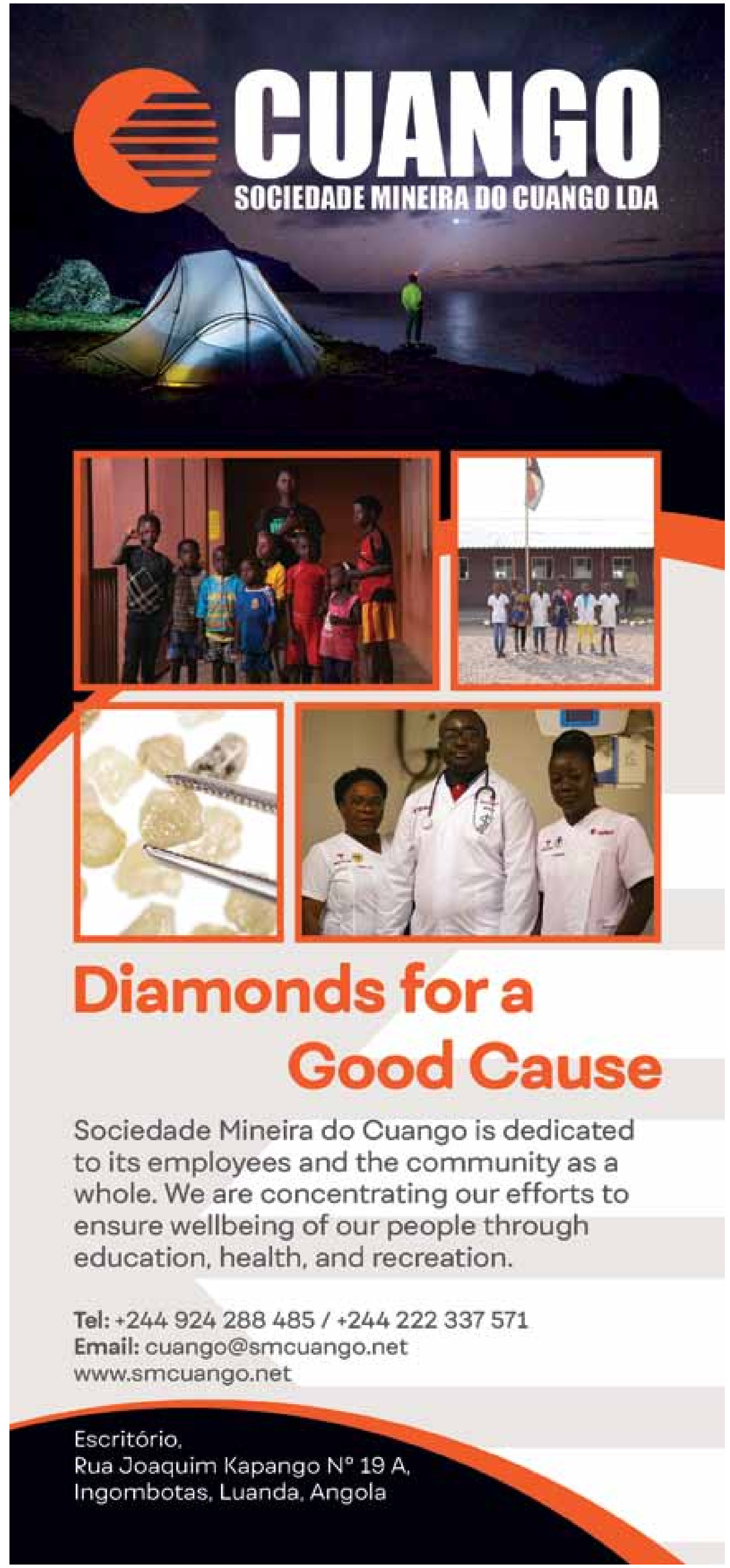
"It is important to educate the population about how illegal mining practices harm Angolan society and, where possible, it is in the country's interest to formalize artisanal miners," reflected Helder Carlos, president of Angolan diamond mining company Sociedade Mineira do Cuango (SM Cuango). "While a formalization process is an important goal that can be achieved over time, a no-tolerance policy towards criminal garimpeiros must be adopted by both the government and private companies to maintain the integrity of our industry and guarantee employee safety," he elaborated.

In July 2019, the national director of Mineral Resources, André Buta, announced the return of licenses to the 241 companies and semi-industrial diamond mining cooperatives in seven provinces of Angola that had previously been revoked. Speaking at the delivery of 31 of the 81 licenses for semi-industrial exploration planned for Lunda Norte, Buta said the aim of re-launching this process in Lunda Sul, Malanje, Kwanza Norte, Kwanza Sul and Uíge provinces was to reduce the youth unemployment rate and to allow the creation of at least 20,000 jobs.

Buta recommended that companies recruiting should focus on the youth of the neighbouring communities, a sentiment echoed by Hugo Silva Teles, executive director of Banco BIC, the private bank with the largest footprint in Angola (230 branches in 96 municipal regions): "We should start focusing on our local content and developing local supply chains to be less dependent on imports," he said, continuing: "The country should also focus on skills development to ensure that there is a workforce to support industrial development. Angola has the commodities and opportunities to stop relying on imports and start being an export country."

THE HR CHALLENGE AND RELIANCE ON IMPORTS

The legacy of industrial neglect and the failure of the previous regime to reinvest boom-time capital to vital areas of the



economy are perhaps most pronounced when one enters a supermarket or restaurant in Luanda. Angola used to be self-sufficient and one of Africa's three biggest producers of food in 1975, but now imports 90% of its food, with prices that would not be out of place in London or New York, even taking into account recent currency devaluation. The sad irony is that Angola has an abundance of water and fertile land, which are scarce commodities in countries that manage to produce considerably more.

A similar juxtaposition can be applied to Angola's mining industry, as the abundance of natural resources is unfortunately in contrast to a dearth of human resources and equipment. SM Cuango, the diamond producer constituting a partnership between Endiama, which holds a 45% stake, ITM Mining with 40% and Lumanhe with 15%, currently employs 729 people, the majority of which operate the company's mine in Cuango, Lunda Norte province. The average monthly production forecast for diamonds from SM Cuango's operations for 2019 was approximately 39,710 carats per month, but due to operational difficulties it was forced to reevaluate the production plan. The new figure was revised to between 28,000 and 29,000 carats per month for the first three months of production and then raised to an average of 34,000 carats per month for the rest of 2019.

"The temporary reduction in production was due to a lack of available equipment and a shortage of technically qualified manpower, which remain serious challenges for the Angolan mining industry," explained Dr. Helder Carlos, SM Cuango's president. "The mining equipment used in Angola is still heavily reliant on imports, principally from South Africa, which can impact turnaround times and availability," he added.

"From an international standpoint our mining sector is low-profile... The Geological Institute of Angola is accumulating information about all mineral resources in the country to showcase the possibilities and make the process easier for investors."

**Canga Xiaquivuila,
Director General,
Geological Institute of Angola**

Even the largest player in Angolan mining, Catoca, has been impacted by the challenging HR situation in the country: "A lack of skilled human resources with technical labor leaving the industry affected operational quality and forced a restructuring and strengthening of an integrated management system," explained Benedito Paulo Manuel, Catoca's director general, before assuring: "Fortunately, the measures taken to tackle these issues have produced positive results, resulting in a profit rise, a growth in the company's reserves, and a reduction in costs."

Due to the difficulty in finding technical workers with the requisite level of qualifications and experience, companies with large workforces often look abroad. However, bureaucratic hurdles and high costs to bring foreign workers to Angola, particularly with regard to the work visa process, continue to cause delays: "In September 2018, SM Cuango initiated a recruitment process for the company's engineering department, which was concluded in June 2019, to give you an idea of the timeline for bringing in a well-qualified worker," related Helder Carlos.

For the mining service providers in Angola, an absence of in-country manufacturing in addition to high import taxes and slow turnaround times further complicate the challenging operational climate. "Importing remains quite expensive and the government requires a letter of credit with imports – a norm which was established by the Central Bank," explained Daniel de Faria, mining manager of Barloworld Equipment Angola, the Caterpillar distributor with an extensive African footprint.

Whilst acknowledging these hurdles, de Faria was positive about both the industry and the business-environment in Angola moving forward, commenting that the mining sector has grown in importance for Barloworld Angola as the pre-2014 construction boom slowed down: "The new government is taking steps in the right direction to formalize industries and business," he stated, concluding: "Mining operations are starting to come online again, with the difference being that everything is now 100% legal, which can only benefit the industry and Barloworld alike."

A SYNTHETIC THREAT: THE IMPORTANCE OF MAINTAINING A TRADITIONAL INDUSTRY

De Beers' Insight Report of 2018 states that two thirds of diamond sales now come from consumers aged 21-39 years old: the Millennial and Generation Z age-brackets. The diamond jewelry market grew in 2017 as demand reached a new record high of US$82 billion on the back of growing popularity from a younger demographic. Having previously shunned the jewelry sector, De Beers, reacting to the evolving demands of the new demographic of clients, decided to launch its own laboratory-grown diamonds through its Lightbox brand.

In the same vein that automated equipment threatens to eliminate the need for workers inside mines, could this new external threat of synthetic diamonds jeopardize demand for the traditional market? For Benedito Paulo Manuel, the importance of maintaining a robust industry for traditional diamonds is clear: "If we analyze what each industry gives to their respective beneficiaries, the production of synthetics will never come close to offering the level of benefits that natural production does," he stated, warning of the danger of certain technologies that condense wealth into the hands of a select few.

"In the east of Angola, the diamond industry is the second largest direct employer, with an average remuneration 13 times higher than the national average," added Paulo Manuel, continuing: "As well as impacting the families of the workers directly involved in mining operations, this wealth has created a vast ecosystem of third party beneficiaries ranging from catering to machinery to logistics."

"We must continue to defend the production of natural diamonds for the benefit not just of Angola, but of all the countries and communities that rely on the creation wealth our industry plays a part in," concluded Paulo Manuel.

As Angola continues to formalize and legalize its industry, the negative connotations that surround traditional diamond production must be dispelled through sustained demonstrations of how mining can benefit all stakeholders.

Mozambique

Mozambique's mining industry has historically been based upon coal and ruby production, and rising exports and sales in both indicate their continued importance. However, a burgeoning graphite market underpinned by the impending electric vehicle boom, as well as robust heavy sands production and recent gold discoveries, point to an increasingly diverse sector.

Population: 29,495,962 (Worldbank 2018)

Land Area: 801,590 km^2

Official Language: Portuguese

GDP (PPP): $14.46 billion (Trading Economics 2018)

GDP (PPP) Annual Growth Rate: 3.8% (World Economics 2018)

GDP Per Capita (PPP): $539.20 (Trading Economics 2018)

Industry: Agriculture, mining and tourism (World Atlas 2019)

Top Exports: Mineral fuels including oil: US$2.4 billion (46.9% of total exports), aluminum: $1.3 billion (25.1%, ores, slag, ash: $263.5 million (5.1%), tobacco, manufactured substitutes: $215.9 million (4.2%), gems, precious metals: $200 million (3.9%), sugar: $191.9 million (3.7%), fish: $69.2 million (1.3%), fruits, nuts: $66.2 million (1.3%) (World´s Top Export 2018)

Top Imports: Refined petroleum ($457M), raw aluminium ($392M), aluminium oxide ($376M), chromium ore ($222M) and copper ore ($175M). (OEC 2017)

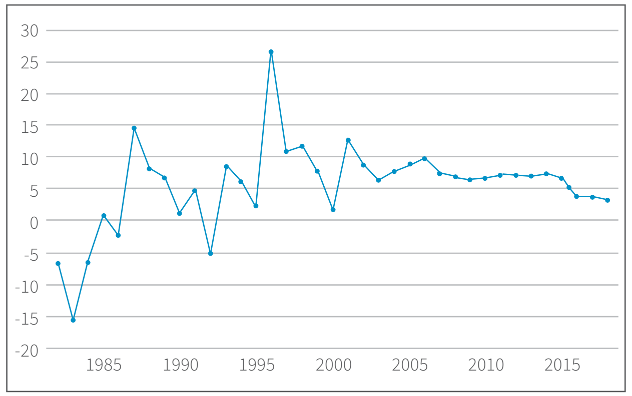
Top Export Destinations: India (35%), South Africa (14%), China (7.5%), Italy (6.5%), Spain (3.7%) (OEC 2017)

Fraser Institute Investment Attractiveness Index Ranking:
2016: 95/104 → 2017: 87/91

The Global Competitiveness Index Ranking:
137/141 (previous 137/140) (World Economic Forum)

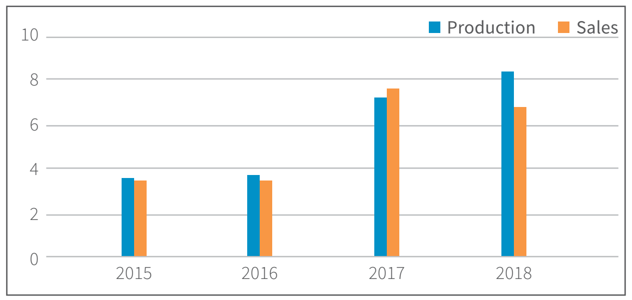
Ease of Doing Business Ranking:
135/190 (World Bank Group)

GDP (annual %)



Source: The World Bank

Coal Production and Sales



Source: The National Directorate of Mines & Geology

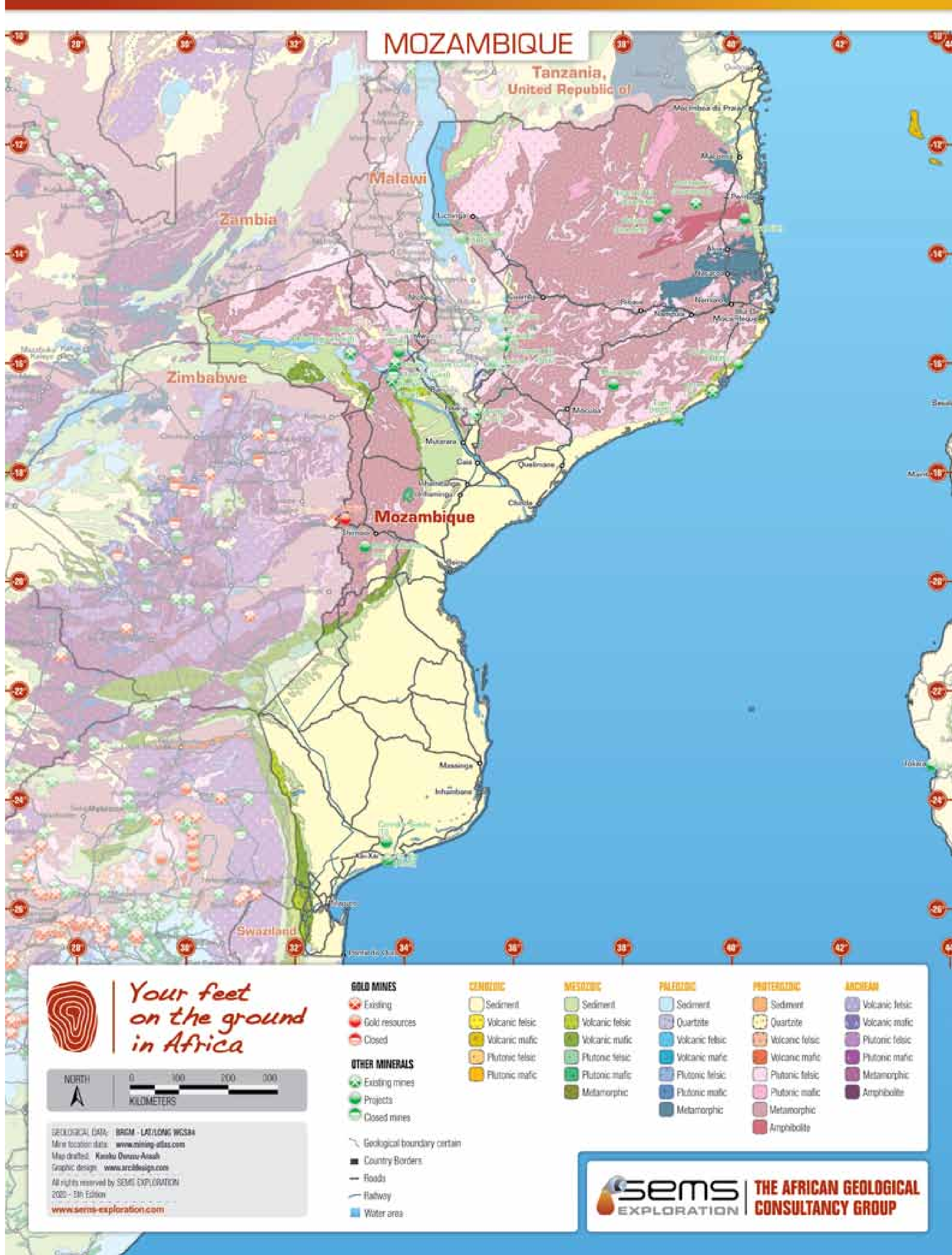
Aluminium Production (mt):

2013: 562,000
2014: 566,900
2015: 558,386
2016: 571,125
2017: 577,495

2013-2017

2.7%

Source: British Geological Survey



Mozambique

After the storms: Mozambique's extractive industries bring renewed hope

Mozambique has attracted international attention for contrasting reasons in 2019. The picturesque southeast African republic hit the headlines when two devastating tropical cyclones – Cyclone Idai in March followed by Cyclone Kenneth in April – ravaged the city of Beira and province of Cabo Delgado respectively, killing over 600 people and displacing over 65,000 more.

Relief efforts in the form of international donations and the provision of aid from less affected areas of the country went some way to mitigate the damage. However, the bleak consequences of the natural disasters were laid out in a UNICEF humanitarian report from July 2019, which estimated that the sobering figure of 1.7 million people facing food insecurity is expected to increase to 2 million during the lean season in October 2019.

On the back of a three-year economic downturn triggered by the US$2 billion "tuna bonds" scandal that plunged the country into its worst financial crisis since independence, many businesses in the worst hit areas were ill-prepared for such an impact. "Approximately 35% of EMOSE's business and client base was affected by the cyclone and consequent flooding. In some cases in and around Beira, there were 100% losses," commented Isaias Chembeze, director at EMOSE, the largest insurance company in Mozambique.

This observation was echoed by Edward Capel, managing director of ICE Seguros, who suggested that insurance premiums are expected to increase across all business sectors due to the losses incurred and heightened risk category that Mozambique now finds itself in. "A large amount of the affected areas and businesses were completely uninsured when the cyclones hit," stated Capel, suggesting that the tragic events could act as a wake-up call to all business sectors in the country.

If natural disasters and economic turmoil do not sound like a recipe for hope, why then, is the IMF predicting double-digit growth for Mozambique by 2023? The catalyst for this turnaround in fortunes lies in the country's vast endowment of natural resources, which include significant reserves of coal, rubies, mineral sands, graphite and gold. However, the real game-changer for the Mozambican economy is the gargantuan deposits of non-associated natural gas in the Rovuma Basin.

While the Rovuma Basin gas fields were discovered back in 2012, tangible evidence of their development eventually arrived on June 18th 2019, as U.S. energy firm Anadarko took the Final Investment Decision (FID) on the construction of a US$20 billion gas liquefaction and export terminal in Mozambique. The Anadarko-led Area 1 Mozambique LNG project is the largest direct foreign investment ever approved in Africa, with further gas-fueled riches expected on the horizon as a consortium led by ENI and ExxonMobil is set to announce the FID for the development of Area 4 of the Rovuma Basin before the end of 2019. The combined investments into Mozambique's gas sector are estimated to reach over US$50 billion, and when put into context with the country's GDP of US$14 billion, indicate transformational potential.

WHAT WILL THE GAS INVESTMENTS MEAN FOR THE MINING INDUSTRY?

The impending foreign investments are undoubtedly positive for Mozambique but have raised some concerns from the mining community that mineral development in the country will become an afterthought with attention and resources drawn to the gas sector. As well as the potential dispersion of talent from mining to oil and gas, there are doubts as to how the Ministry of Natural Resources and Energy will be able to cope with such an expanded portfolio due to the sheer scale of LNG investment.

For Andrew Schnitzer da Silva, CEO of Ascending, the HR service provider with a footprint that covers Mozambique and Angola and supports clients in both the mineral resource and oil and gas industries, the separation of the mineral sector and the energy sector is inevitable due to the magnitude of the impending gas boom. "Once things start moving, everyone will have tremendous difficulty in keeping up," he reflected, continuing: "This is when I think the government will realize that it needs to create a ministry only serving the oil and gas industry."

Guilherme Daniel, partner at Guilherme Daniel & Associates, agreed that it would be worth considering splitting the Ministry into two separate entities. However, the Maputo-based lawyer also sees Mozambique's burgeoning oil and gas sector as having the potential to become a driver for other national industries, including mining: "For this to happen, Mozambique has to learn from the past experiences of countries such as Nigeria and Angola and fiercely attempt to diversify its economy. Such a result can be achieved through the reinvestment of a significant part of the FDI to relevant sectors, such as mineral exploration," he elaborated.

In his interview with Global Business Reports, H.E. Ernesto Max Tonela, the Minister of Mineral Resources and Energy (MIREME), was quick to emphasize the importance of Mozambique's mining industry and its scope to expand. "While the gas sector is currently receiving the

H.E. Ernesto Max Tonela
Minister
Mineral Resources and Energy (MIREME) - Mozambique

How important are the mineral resource and energy industries for Mozambique's economy?

Both industries are hugely influential for the Mozambican economy. Mozambique has a rich mineral endowment that includes significant reserves of coal, rubies, mineral sands, graphite and gold. However, the real game changer for the economy is the country's vast gas reserves.

In the Rovuma Basin, huge oil deposits of non-associated natural gas were discovered, estimated at about 180 trillion cubic feet. The findings are an important milestone not only because of the potential quantities of gas available, but also because of the possibility of developing and implementing various integrated projects, such as LNG, liquid fuels, electricity generation, fertilizers and others that will certainly put Mozambique as a reference country in the production and export of natural gas worldwide.

It is estimated that Mozambique holds between 20 to 40% of global graphite reserves. However, at this moment, China accounts for approximately 90% of global production. How does the country plan to develop these resources?

In order to promote the value chain of domestic primary products, including graphite, we are looking to ensure the integration of local content for its sustainable development. In recent years, significant milestones have been achieved in Mozambique's graphite industry, including the establishment of the granite slab cutting plant in the District of Manica in 2017. In addition to this, the start-up of the Ancuabe Graphite mine (9,000 mt/y production) and the Balama mine (350,000 mt/y) in the Province of Cabo Delgado, have been big successes. The latter being the largest graphite processing infrastructure in the world.

Mozambique's Mining Law was introduced in 2002 and is now on its 4th revision. Has the most recent revision created a favorable framework for mining to prosper?

Mozambique's Mining Law ensures stability for mining producers and explorers. Rather than introducing dramatic changes, the 4th revision is an evolution of the previous editions. Some of the changes aimed at fostering a favorable mining landscape include Article 62, which ensures mining holders of the transferability of mining rights. Article 83 also ensures the respect and stability of the rights acquired by the mining owners.

How can you strike a balance between promoting mining development and community concerns?

Mining activities, particularly the community resettlement process and environmental damage, can cause tensions between companies and communities. In order to ensure that communities are resettled with dignity and with their rights respected, the Government approved, through Decree No. 31/2012, the Resettlement Regulation Resulting from Economic Activities. This regulation seeks to ensure that the exploitation of mineral resources in the country results in transformational socio-economic gains, including benefits directly to the communities affected.

What are the greatest challenges facing the mining industry in Mozambique in 2019, and what is MIREME doing to help overcome them?

One of the great challenges is how to deal with the volatility of mineral raw materials prices, which are known to have severe negative impacts on the economy and the employment rate. The fall in prices of mineral raw materials reinforces our conviction that it is imperative to establish mechanisms that can withstand the volatility of mineral product prices and reduce our vulnerability to external shocks. For this purpose it is crucial to establish economic links between the extractive industry and other industries based on these resources.

An equally important challenge is to ensure the sustainable exploitation of mineral resources and safeguard the benefits expected for future generations with a long-term vision. To this end, we must ensure the improvement of inspection and control of activities in the sector.

Finally, what makes Mozambique an attractive destination for foreign investment?

Mozambique now has tangible evidence of being an attractive destination for foreign investment after the announcement that Anadarko will invest US$25 billion into the country. While the gas sector is currently receiving the most international attention, Mozambique's mineral reserves also have vast, untapped potential. The economy has stabilized and is expected to grow, and companies looking to enter the market can rely on a clear framework that encourages mining activity, whilst promoting sustainable growth and wealth creation for all stakeholders.

most international attention, Mozambique's mineral reserves also have vast, untapped potential," said Minister Max Tonela, suggesting that the government has worked to establish a favorable mining environment: "The economy has stabilized and is expected to grow, and companies looking to enter the market can rely on a clear framework that encourages mining activity."

REGULATORY FRAMEWORK: THE 4TH REVISION OF MOZAMBIQUE'S MINING LAW

The framework mentioned by Minister Max Tonela is rooted in a mining act dating back to 2002, currently on its 4th revision. Some of the changes aimed at fostering a favorable mining landscape include Article 62, which ensures mining holders of the transferability of mining rights. Article 83 also ensures the respect and stability of the rights acquired by the mining owners. "Rather than introducing dramatic changes, the 4th revision is an evolution of the previous editions," affirmed the Minister.

A steady evolution of mining law rather than the sudden overhauls experienced by some of Mozambique's African counterparts, such as the 35% profit-windfall tax brought in by the DRC in 2018, has been praised by mining producers in the country for the long run. One such company is Kenmare Resources, which has enough deposits to keep its Moma Titanium Minerals mine in northern Mozambique operating at current levels for up to 100 years, according to general manager Gareth Clifton. "One of the positive aspects of the updates to the mining act is the inclusion of a clause that recognizes previous agreements. This allows for stability when making agreements with a degree of certainty," explained Clifton.

While the larger mining players in Mozambique's mining sector have been relatively uninterrupted by tweaks to the tax regime, the pertinent question for smaller mining companies is whether they should opt into the new laws or not. The new petroleum and mining tax law implemented in 2015 created a transitory regime where existing companies could choose to opt into the new laws, but if they did not do so they were still treated based on the laws that were enacted at the time that they signed their concession agreements. The mineral resource rent tax was brought in, meaning that as soon as a company shows a positive cash flow, that positive cash flow is taxed at 20%. Because of this clause in the new mining tax law, smaller players in the market may be advised to opt out of the new law.

"Even though there are major players operating in the country, the mining industry in Mozambique still remains a new industry. When we look at the commodities the country has, there is still a significant amount of untapped potential."

Abreu Muhimua, Founder & Executive Director, ENCOM

THE DIVERSIFICATION CHALLENGE: ACCESS TO LAND, ATTRACTING INVESTMENT, AND TACKLING CORRUPTION

A steadily improving economy, a clear mining framework and relative political stability combined with a rich mineral endowment should make Mozambique an attractive destination for mining investment. However, there is still a lack of smaller mining producers and exploration projects, and thus the industry has lacked the vigor and vibrancy of yesteryear. This can partly be attributed to macro-factors such as the global mining downturn and previous economic turmoil, but there are also issues that must be addressed for Mozambique to begin to fulfil its undoubted potential.

"One issue in the mining industry is access to land," noted Leopoldo Amaral, partner & head of natural resource practice at Mozambican law firm Sal & Caldeira. "We have had problems with this in the past, which has created some anxiety amongst certain investors, and we need to rectify this," he commented.

After a concession has been acquired, the next challenge is financing a project. "The financial markets should be more active in providing investment for small to medium sized mining companies," stated Chivambo Mamadhusen, managing director of Grupo Videre, the Maputo-based holding company that identifies suitable investment funds to access land and licenses, and then finds strategic partners to move projects forward. Grupo Videre is currently involved in gold, coal, granite and quartz operations, and intends to expand into the graphite and vanadium, according to Mamadhusen.

This sentiment was echoed by Abreu Muhimua, founder & executive director of ENCOM, a Mozambican EPCM company that has expanded in recent years into Angola and Zimbabwe. Muhimua observed that even though there are major players operating in Mozambique, mining remains a relatively new industry with untapped potential: "We need to diversify our client base and more effort should be put into developing small to medium sized mining companies," he affirmed, concluding: "Mozambique has a lot to offer, and the country needs to change its strategy with regard to attracting mining investors."

According to the mining code, once a concession has been obtained, within a two-year period all environmental studies and resettlement plans must be completed, rights to use and develop the land must be attained and the mine must begin construction. The law then stipulates that production should begin four years after receiving the concession. This process seems clear, but requires careful attention and early engagement with local stakeholders, according to Paul O'Donoghue, Mozambique country manager for Savannah Resources. "It is essential to understand the laws in the country and how the government is structured as there is a very layered structure, starting below district level," stated O'Donoghue, who credited his company's strong relationship with local communities and government in the Inhambane province as key in the ongoing development the Mutamba Mineral Sands project. "If you are not aware of all the levels informing decision making, it is easy to miss some steps and be blindsided. Interestingly, acceptance from a local and provincial level is just as crucial as receiving federal approval," he observed.

A common red flag for investors considering involvement in African projects is a culture of corruption that seeps its way into all aspects of business and takes time to eradicate. Paulo Reis, managing partner at EY Mozambique, acknowledged that corruption is still a relevant issue in Mozambique, but measures are being taken to tackle an issue that brought the country to its knees economically in 2016. "Looking at the wider region, when compared to many other African countries, Mozambique at least has the political will to fight the issue," said Reis, citing the government creation of a cabinet for financial information that deals with anti-money laundering as an important first step on the road to compliance.

The effort to promote transparency and attract investment is being ably supported by the World Bank, whose EITI (Extractive Industries Transparency Initiative) report has been compiled by Deloitte for the past two years. Mozambique is one of the 30 countries selected for the World Bank-driven initiative, which has the principal aim of "generating revenues throughout the entire value chain, rather than focusing only on taxes," according to Mario Fernandes, partner at Deloitte, who spoke of the importance of the systematization of information: "One of the key takeaways of the EITI report is that there is no central database of the mining licenses; the government will need to establish these basic processes to manage and control tax revenues effectively."

COAL REMAINS THE BEDROCK OF MOZAMBICAN MINING

The importance of fostering a diverse mining industry has been stressed by the Mozambican authorities, and the production and development of rubies, zircon, ilmenite, pig-iron and gold are testament to the country's varied mineral riches. The discovery of high-grade gold in northern Mozambique coinciding with the start of a bull market for the precious metal is a particularly promising turn of events. While this diversity should not be overlooked, the bedrock of Mozambican mining is still undoubtedly coal, the country's biggest mineral export, and graphite, for which it is estimated that Mozambique holds between 20% to 40% of global reserves.

A global drive to eliminate fossil fuels, increasingly stringent environmental laws exemplified by the impending IMO 2020 regulations and eye-catching media headlines such as Germany's decision to cease coal production by 2038, all seem to signal a doomsday scenario for the coal mining sector. However, since 2015, the production of coking coal in Mozambique has risen every year, from 3.78 million metric tons per year (mt/y) in 2015 to 8.36 million mt/y in 2018, according to statistics from the National Directorate of Geology & Mines. Despite its demonization by mainstream western media, coal remains one of the cheapest energy sources, as well as being key to the production of steel in developing countries.

India, which overtook Japan in 2019 as the world's second largest steel producer behind China, relies on the importation of coking coal from foreign jurisdictions to support its vast industry. Among the Indian coal producers active in Mozambique is ICVL, which intends to increase its production capacity from 1.3 million mt/y of coking coal to at least 1.6 million mt/y, according to Alok Shrivastava, managing director and CEO of ICVL. Describing the impact of evolving market dynamics, Shrivastava explained: "Our first acquisition was in Mozambique when we acquired shareholding in a mine from Rio Tinto in 2014. Due to the crash of the coking coal market, ICVL had to suspend its operations in Mozambique in 2015, but in 2017, the coal prices increased again and we restarted our operations."

"In my opinion, acceptance alone should not be the end goal for mining companies. Rather, a sustained demonstration of the benefits that a large operation can bring to a region should give tangible evidence that makes local communities want the mining and logistics operations to be present."

**Marco Froes,
Director of Sustainability,
Vale Africa**

Another of the Indian participants in the Mozambican coking coal market is Jindal Africa, part of the Indian multinational conglomerate Jindal Steel and Power Limited (JSPL), which in turn is part of the US$18 billion Jindal Group. In a similar vein to ICVL, Jindal Africa is expanding production at its open-pit Chirodzi mine from its current level of 3 million mt/y to 5 million mt/y by 2020, according to Rajendra Kumar Tiwari, project head of Jindal Africa's Mozambican operations. Beyond this, a 10 million mt/y milestone is also a target for Jindal, along with the creation of Mozambique's first coal slurry pipeline. "Although Mozambique is blessed with significant coal reserves, it faces a challenge in poor infrastructure and logistics," stated Tiwari, explaining the viability of the potential pipeline: "In collaboration with the Mozambican government, we want to establish a long-term infrastructure solution. The pipeline will decrease some logistical challenges and is the lowest-cost transport solution."

Vale, the biggest player in Mozambique's mining industry, has also invested heavily in improving infrastructure, becoming the largest shareholder in a government infrastructure that became a private concession – the Northern Development Corridor (CDN). The CDN has gone through a large rehabilitation process to support the transport of cargo from Vale's Moatiz coking-coal mine in Tete, Northern Mozambique. As well as coal, products and materials such as fertilizers, fuel and tobacco are transported through the CDN between Moatiz, Nacala, Interland, Malawi and Zambia. Infrastructure at the Port of Nacala has also been improved to support the increased flow of cargo. "Vale is CDN's principal and most important client, but there is no exclusivity agreement and we welcome additional business partners that can help develop the economy of Northern Mozambique in a sustainable manner," commented Welington Soares, CEO of CDN.

THE GRAPHITE BOOM EATING INTO CHINA'S MARKET SHARE

In stark contrast to coal, graphite is viewed as a mineral of the future, with a rapidly growing electric vehicle market stoking incremental demand for the crystalline form of carbon whose versatility lends itself to rechargeable batteries.

China remains by far the biggest producer of graphite, accounting for approximately 70% of global production, however, this figure has reduced from a high of 85% thanks in part to increased production from Mozambican projects.

Minister Max Tonela is bullish about the country's rapidly expanding graphite industry, listing milestones that include the establishment of a granite slab cutting plant in the District of Manica in 2017. "In addition to this, the start-up of the Ancuabe graphite mine (9,000 mt/y production) and the Balama mine (350,000 mt/y) in the Province of Cabo Delgado, have been big successes; the latter being the largest graphite processing infrastructure in the world," he added.

Syrah Resources headline a group of Australian mining companies and juniors at the forefront of the Mozambican graphite boom, taking advantage of a high-grade resource that has the ability to upgrade to a premium product through mechanical floatation. "Syrah Resources is producing approximately 95% graphite concentrate through mechanical processing without using any chemicals or acid, compared to a significant number of Chinese producers that obtain grades of 90% by adding chemicals and alkaline treatments to the process," explained Peter Canterbury, managing director of Triton Minerals, another Australian entrant into the Mozambican graphite market, whose company recently announced a transaction with Chinese company Jinan Hi-Tech and aims to start production by early 2021.

"The demand for high purity graphite is expected to grow threefold over the next 10 years, and thus there is a need for high purity large flake graphite deposits to be developed, especially outside of China, as the country's large flake graphite deposits are diminishing," observed Cantebury.

Another company riding the graphite wave is GK Ancuabe, the Mozambican arm of German company AMG Graphit Kropfmuehl, which went into production in June 2017 and has since increased capacity. Summarizing the milestones achieved at the Ancuabe graphite mine in recent years, Geert Klok, GK Ancuabe's general manager, detailed: "Since 2016, GK Ancuabe mine has raised financing and gone through the entire investment phase of bringing in machinery, equipment and rehabilitating the run down plant. We have also expanded the capacity from 6,000 mt/y to 9,000 mt/y. The company managed the entire rehabilitation process itself."

SUSTAINABLE DEVELOPMENT IN NORTHERN MOZAMBIQUE

Balancing the development of mining projects with environmental and community care is a complex matter, especially when the regions in question are some of the poorest and least developed in the world. This is certainly true in Mozambique, where pollution from Vale's Moatize II mine drew protests from locals in Tete in October 2018, temporarily suspending the operation.

Vale has, however, achieved large-scale success in the northern development corridor, with a resettlement project that

"Vale is CDN's principal and most important client, but there is no exclusivity agreement, and we welcome additional business partners that can help develop the economy of Northern Mozambique in a sustainable manner."

**Welington Soares, CEO,
CDN (Corredor de
Desenvolvimento do Norte)**

has successfully relocated over 12,000 families in northern Mozambique and Malawi. The social and environmental management project is Vale's biggest sustainability operation worldwide, according to Marco Froes, head of sustainability for Vale Africa. "In my opinion, acceptance alone should not be the end goal for mining companies. Rather, a sustained demonstration of the benefits that a large operation can bring to a region should give tangible evidence that makes local communities want the mining and logistics operations to be present," reflected Froes,.

Another coal producer with operations in Tete leading a resettlement project is ICVL, which is spending approximately US$23 million on the resettlement of the Capanga community and expects to have constructed 272 houses by October 2020. Alok Shrivastava, ICVL's managing director and CEO, elaborated on the initiative: "A MoU was signed with the Ministry of Labor, Employment and Social Security, under which ICVL´s Training Centre will be used to provide vocational training to Mozambican residents in Tete to build technical skills in order to integrate them in the national workforce."

Further north, Montepuez Ruby Mining (MRM) has ring-fenced 1% of the US$500 million raised by parent company Gemfields from ruby auctions and reinvested it into the local community of Montepuez, constructing a village for the communities that were located in the vicinity of the concession, according to Samora Machel Jr., MRM's managing director.

One of the hurdles MRM has had to overcome is the legacy of illegal artisanal mining in northern Mozambique. Machel Jr. explained how MRM has worked in collaboration with the government to reduce the presence of illegal miners: "The first strategy was to disassemble the presence of illegal immigrants in the village of Montepuez. We also had to educate the communities around our concession which had become involved in the illegal activities by explaining and demonstrating the benefits of legal, sustainable mining and the importance of eradicating illegality."

The government was also keen to emphasize the importance of having measures in place to try to minimize the amount of illegal mining activities through the country's legal framework. Elias Daude, director of the National Directorate of Geology & Mines, elaborated on the government strategy for artisanal and small-scale mining: "There are incentives for the creation of associations for artisanal and small-scale miners. The associations can facilitate support from government in terms of technical and environmental aspects, as well as production. Additionally, being connected to a formal network will allow for the possibility to attain funding from banks."

Daude went on to mention the establishment of designated areas where only Mozambicans can attain licenses for mining activities, as well as the creation of commercial centers where artisanal and small-scale mining associations can sell their products formally.

South Africa

South Africa remains Africa's financial center. With the country's stock exchange in Johannesburg established in 1887, a decade after the first diamonds were discovered on the banks of the Orange River, the economy of modern-day South Africa has been centered on mining activities and their sub-sectors.

Population: 58,558,270 (UN 2019)

Land area: 1.22 million km²

Official Languages: English, Afrikaans, Ndebele, Northern Sotho, Sotho, Swazi, Tswana, Tsonga, Venda, Xhosa, Zulu

GDP (PPP): $675 billion (Trading Economics)

GDP PPP Annual Growth Rate: (2014: 2.2%) (2015: 2.5%) (2016: 1.6%) (2017: 1.2%) (2018:0.4%) (World Economics)

GDP Per Capita (PPP): $12,350 (Trading Economics 2018)

Industry: agriculture and food processing, tourism, financial services, services industry, business process outsourcing, and industrial manufacturing, mining (World Atlas 2018)

Top Exports: precious metals ($8.55 billion), minerals products ($14.6 billion), transportation ($9.99 billion), metals ($8.88 billion) (World Atlas 2018)

Top Imports: Mineral fuels including oil: US$17 billion (18.2%) Machinery including computers: $11.5 billion (12.3%) Electrical machinery, equipment: $8.6 billion (9.2%) Vehicles: $7.1 billion (7.6%) Plastics, plastic articles: $2.8 billion (3%) Pharmaceuticals: $2.5 billion (2.7%) (worldstopexports.com 2018)

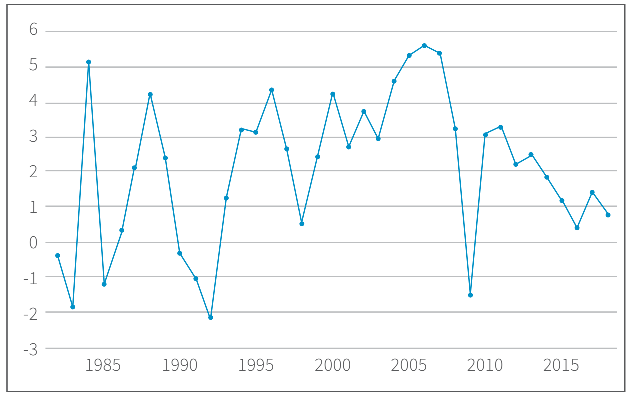
Top Export Destinations: China: $6.81 billion worth of goods imported (, the US ($5.47 billion), Germany ($5.26 billion), Botswana ($3.71 billion), and Namibia ($3.53 billion) (World Atlas 2018)

Fraser Institute Overall Investor Attractiveness Ranking:
2017: 48/92 → 2018: 43/83

Fraser Institute Policy Perception Index Ranking:
2017: 81/91 → 2018: 56/83

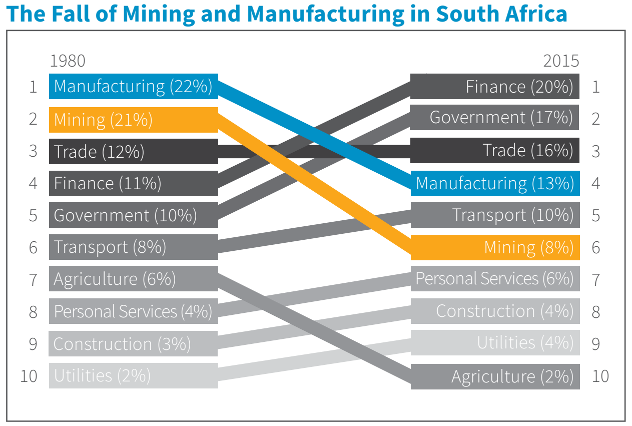
World Bank Ease of Doing Business Ranking:
2017: 82/190 → 2018: 82/190

GDP (annual %)



Source: The World Bank

The Fall of Mining and Manufacturing in South Africa



Source: STATS SA

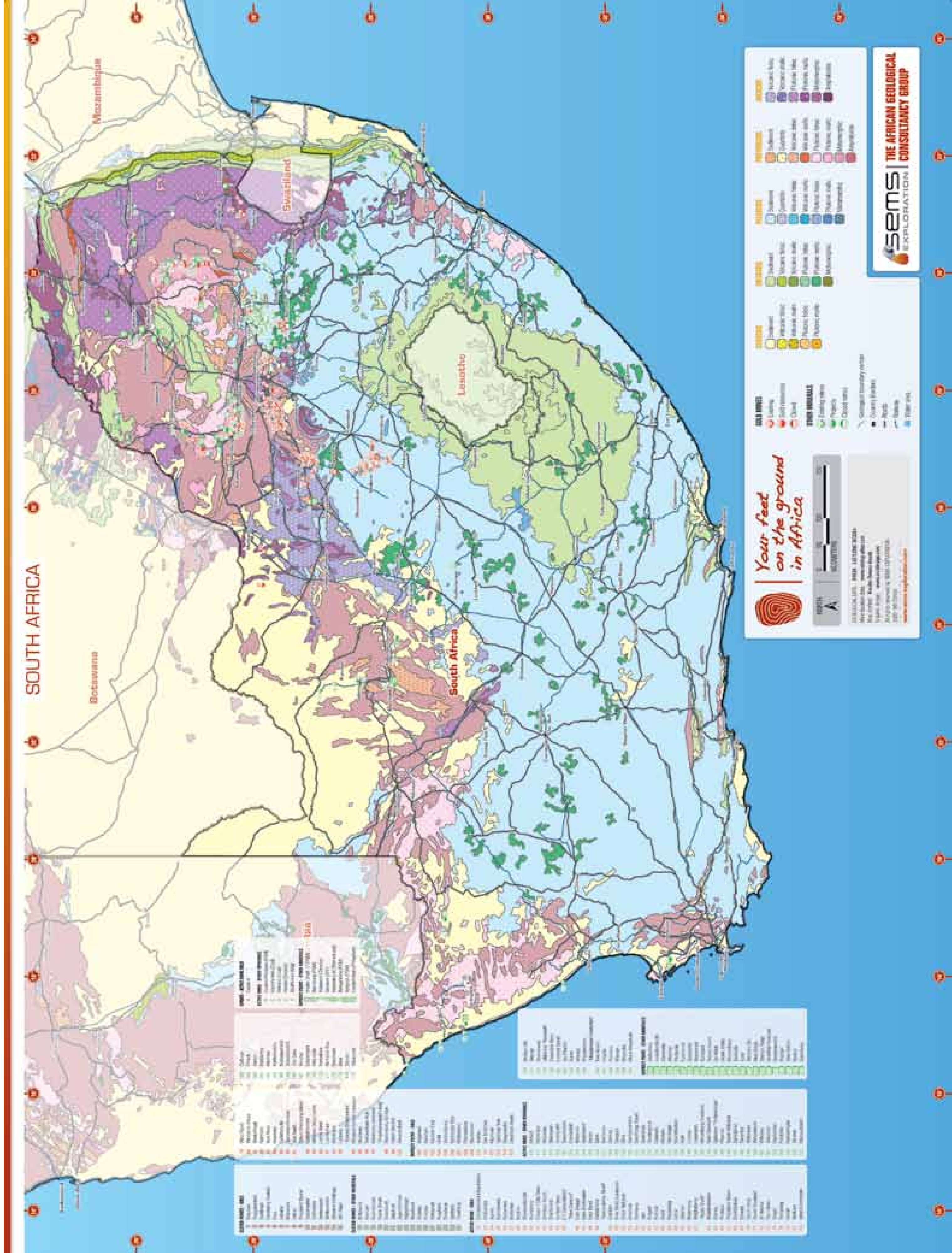
Diamond production (cts):

2013: 8,168,113
2014: 8,060,373
2015: 8,232,627
2016: 8,450,758
2017: 9,685,235

2013-2017

15,7% ↑

Source: British Geological Survey



South Africa: An Industry in Decline

A fraught sociopolitical environment threatens South Africa's once mighty mining industry

More than a quarter-century after the first democratic election, South Africa's political, economic and social landscape is still pitted with the shards of apartheid. What is worse, the current trajectory of the country – which is marked by rising inequality, staggering unemployment rates, economic decline and political instability – is a testament to the reversibility of the nation's hard-earned progress. The ANC, a coalition once unified by the necessity for resistance, today faces the challenge of mending internal fragmentation that has South Africa careening towards destruction.

"The ANC itself has never resolved the fundamental debate between its left wing and its right. On one side is the conservative majority of the urban and rural middle classes; on another is the urban industrial and services working class. On yet another, the intellectual elite, mainly white and communist – mostly a dying remnant that is still influential on a vainglorious and failing industrial policy."

Claude Baissac, CEO, Eunomix

CONSUMER CAPITALISM

The 1960s and the early 1970s were boom years for the South African economy. During the first half of the 1970s, foreign investment averaged 14% of gross domestic investment and peaked at 24.5% in 1975-76, while, from 1961 to 1974, average GDP growth was 5.3%. During this period, the white population enjoyed rapidly increasing standards of living, a benefit denied the black majority. International calls for the end of apartheid had been mounting throughout the 1970s and reached new heights in 1986 when the Comprehensive Anti-Apartheid Act was passed in Washington with enough votes to override a Reagan veto. By 1991, 28 states, 25 counties and 91 cities had taken economic action against corporations with investments in South Africa, at a cost to South Africa of some US$20 billion.

The socially distorting effects of the apartheid system led to calls for reformation to remedy the inequitable situation, and, in 1994, it seemed for a while that a welfare state was underway. Under Nelson Mandela's leadership, the ANC managed to overcome its internal disagreements over key economic policies and opened up the economy. Foreign investment shot up, growth slowly returned and big business was transferred to the majority through black economic empowerment.

"It was, in a way, a grand bargain," said Claude Baissac, CEO of consultancy firm Eunomix. "The ANC would stay clear of a socialist turn in exchange for economic opening, while government invested in education, housing, health and basic social infrastructure for the long-neglected majority."

The year 1994 reflected a recovery for the economy of South Africa, with a real GDP growth of 2.4%. In 1995, the government signed a new General Agreement on Tariffs and Trade (GATT) and joined the World Trade Organization (WTO), committing itself to neoliberal policies. The ANC's policies were successful in numerous areas. It implemented an extensive welfare system with free healthcare for pregnant women and children, a free-meal program for school children and access to health care dramatically improved with the construction of 500 new clinics. In addition, more than 2 million additional homes were connected to the electricity network. The reforms also resulted in a substantial increase in both imports and exports, the budget deficit fell and South Africa embarked on a period of relatively high economic growth.

The economic growth was, however, not enough to reduce the level of unemployment perceptibly. The black middle class was significantly expanded with the implementation of Black Economic Empowerment (BEE). This growth increased the demand for trained professionals, whose numbers were strained by emigration due to violent crime, but failed to address unemployment amongst the unskilled bulk of the population sufficiently. The new economic landscape – characterized by decreased low-skill employment in agriculture, mining and manufacturing and higher employment in the service industry and government – excluded those on the bottom of the social hierarchy. For example, the share of semi-and-unskilled labor in manufacturing employment decreased from 60% in 1980 to 54% in 1990 and 49% in 2009. As confidence in the trickle-down effect of neoliberal policies waned, the prospects of a strong South African welfare state took additional blows throughout the mid-2000s. The leftist faction of the ANC – remnants of the communist party that had been the engine of ideas during

Roger Baxter
CEO
South Africa Minerals Council

Can you give an overview of the SA Minerals Council and the organization's role in the mining industry?

The SA Minerals Council has been in existence for 125 years, but the organization was renamed, rebranded and relaunched in May 2018. We represent approximately 90% of South Africa's minerals production value, and our members include small, mid-size and major players. Our vision is to reposition the mining sector as South Africa's foremost industrial sector. In partnership with key stakeholders, the Minerals Council seeks to create a conducive environment that facilitates doubling real investment in mining by 2030.

Can you elaborate on the SA Minerals Council's relationship with the government?

SA Minerals Council's engagement with the government has improved greatly under the current Minister of Mineral Resources, Mr. Mantashe. For the first time, we have a minister with real mining experience who is passionate about the sector. Minister Mantashe regularly attends meetings with the Minerals Council and has engaged with the board on several occasions, as well as met with every single sector-specific CEO during the Council's leadership forums.

We are also engaging with the government regarding the mining charter. The Minerals Council achieved a very important judgment relating to continuing consequences. The Minister appealed the parts of the judgement that sought to question the validity of the charter, and the court process is still underway. There are also elements in the mining charter that the industry has given the Council a mandate to review as certain clauses are seen as problematic. We seek a process of engagement that we believe will be more effective than a court process.

With regards to the power situation in South Africa, the Minerals Council has also worked very closely with Pravin Gordhan as head of SOEs. During Eskom's latest crisis, there has been a massive outreach from the industry to Pravin Gordhan and his team, and the Minerals Council has allocated engineers and other staff to assist the task force that will review the power stations. We are the largest customer of Eskom, and the price of electricity is a major challenge. The minerals sector, and industry overall, should be allowed and encouraged to generate its own energy supply.

What are some of the key obstacles to reviving South Africa's mining industry?

Investors will want to have clearly outlined tax regimes and be able to predict upcoming regulatory changes. Clarity, certainty and stability are thus important factors that South Africa currently lacks.

Exploration is also a massive issue in the country, and unless we can get the processes in place to encourage juniors and explorers, we are not going to get the pipeline. South Africa spends very little money on exploration: around 1% of total African exploration spending. The country is not attracting new investment because it is an onerous process to apply for mining rights and to attain permits. In addition, it is not necessarily a transparent process, which is a key reason that exploration activities in South Africa are not happening. We need to make it easy and encourage explorers to come to the party so that we can develop a pipeline.

There are top-notch traditional mining skills in South Africa, but not necessarily the innovative technological skills that come with industry 4.0. Is this situation improving?

The Mining Precinct is an excellent example of industry and government working together, and they are doing incredible work on the process of modernization in the mining industry. It is about completely changing the way that we approach mining in an effort to make mining better, more efficient and safer.

From a safety perspective, there has been a massive improvement. Over a 10-year period, up to 2016, there was an 88% drop in fatality rates. We did take a step back in 2017, but in 2018, there was a massive intervention by the Minerals Council that achieved a great deal of success, and we have already seen a 40% improvement in fatality rates from 2018. Technology plays a significant role in safety within the mining industry.

the liberation struggle – seized the opportunity to expand their influence, culminating in a transition of power from Thabo Mbeki to Jacob Zuma.

THE ANC

In the last decade, South Africa has drifted further and further away from Mandela's vision of a modern country at peace with itself. Jacob Zuma's presidency was marked by seemingly endless corruption scandals, overspending, reduced private sector autonomy and plunging investor confidence. Walking backward in its footsteps, with growing inequality (especially amongst the black population), police brutality, rampant infectious diseases and failing education, South African society has reacquired many of the hallmarks of the apartheid era. This regression was not inevitable, but the unity forged by the unlikely figure of Nelson Mandela was fragile and demanded continued growth and the resolution of the stubbornly high unemployment rates. When the live-and-let-live approach to business proved inadequate to resolve these issues, the fault lines along Mandela's long struggle began to show.

"The ANC itself has never resolved the fundamental debate between its left wing and its right," Baissac said. "On one side is the conservative majority of the urban and rural middle classes. On another is the urban industrial and services working class. On yet another is the intellectual elite, mainly white and communist – mostly a dying remnant that is still influential on a vainglorious and failing industrial policy."

The resistance to apartheid was the glue that held together a political party otherwise defined by internal incoherence. While the ANC continues to function as government and opposition all at once, the noble aspirations set out in the Freedom Charter have increasingly been swapped for a political agenda characterized by government attempts to increase its power relative to the people it governs. The commodities super-cycle of 2000s, driven by a combination of strong demand from emerging nations and low

"The reason why governments implement stringent mining regulations and tax policies is to bolster revenue, however, they must not neglect the importance of investment without which it is not possible to generate any money at all. Simply put, no one benefits from mining operations shutting down."

Eric Bruggeman, CEO, The South African Capital Equipment Export Council (SACEEC)

supply growth, was viewed by the ANC as an opportunity to sweeten the deal for its already well-paid political constituency. Jacob Zuma soon earned more than many of his European counterparts, and in 2015, he was the third-highest paid leader on the African continent – right below King Mohammed V of Morocco.

The BEE laws, which had initially worked to expand South Africa's middle class, simultaneously created a wealthy black political elite through corporate co-opting of black former resistance leaders and heads of trade unions. Since 1996, workers employed in the public sector experienced the highest growth in median real monthly wages of all sectors. In addition to this, the public sector was one of the largest proportional contributors to employment growth over the 2001 to 2012 period. Meanwhile, the underclass – the country's largest social class and the bulk of the ANC electorate – was fed crumbs in the form of social welfare grants. The increased welfare grant spending, mounting from roughly US$450 million in 1996 to US$2.9 billion in 2008, combined with higher spending on the state bureaucracy and slashed tariff protection for South African industries, led to a consumption revolution.

The party ended in 2008. Global recession took hold, and South Africa woke up to a reality in which the country's mining industry had shrunk and manufacturing was in steep decline. While the international sanctions during the 1970s and 1980s were a knock to the South African economy, it also resulted in a certain level of self-sufficiency. "We were forced to develop even more local manufacturing capabilities, and this industry became so big that it became one of the major driving forces of the local GDP," related Ossie Carstens, CEO and program manager at manufacturing organization MEMSA. "In the early 1990s, after the release of Nelson Mandela, South Africa was exposed to the global market and the ease of doing business on a global scale. The country was welcomed back into international markets and the protected competitive edge (which was artificially bolstered with sanctions) that local manufacturers had started to disappear, and it signaled the start of the local manufacturing industry's decline."

The decline in manufacturing's share of employment accelerated from 1995 with the implementation of the government trade reform program. By 2009, manufacturing accounted for a mere 12.5% of non-agricultural employment, and by 2016, the manufacturing sector had shed an additional 50,000 jobs. The consumer revolution resulted in the transfer of resources from the production sector to the government and private household consumption – fueling unemployment while creating artificial economic growth. To keep society afloat, a faux capitalism was adopted driven by loans and imports. Furthermore, South Africa's trade liberalization coincided with China's rapid integration into the world economy. With manufacturing capabilities in a nosedive and technology lagging, South Africa has so far been one of globalization's casualties rather

"Generally gold and platinum companies that mine using conventional methods have been running very tight margins. We have experienced a time when approximately 70% of the platinum industry and 60% of the gold industry was under water financially."

Alistair Macfarlane, Co-director, Mandela Mining Precinct

than profiting from cheaper high-quality products. In the last two decades, export growth has failed to keep pace with GDP and import growth, resulting in an increased trade deficit that reached 3.4% of GDP in 2008 and 3.5% in 2018.

THE NEW BATTLE LINES AND THE FUTURE OF SOUTH AFRICA

Through self-defeating policies, corruption and self-enrichment, the South African government has effectively shed its responsibilities while retaining its rights. The ANC's internal fragmentation has rendered the party in gridlock over key issues such as fiscal policies, healthcare and land reform. More broadly, the internal contradictions and deadlocks of the ruling party are reflected in a population divided along redrawn battle lines. The economic elite, which owns the country's productive assets, is vulnerable to state power in forms of asset seizures and control over state-monopolized necessities such as power and infrastructure. Meanwhile, the political elite lacks ownership of productive assets and skills while being heavily dependent on the votes of an increasingly frustrated underclass. The minority blue collar class finds itself sandwiched between the economic and political elite: excluded from the consumption revolution, left out of communication with the state and constantly under the threat of unemployment. The result of the entailing policy congestion is the draining of public confidence, especially on behalf of the nation's most vulnerable.

A clear example of the growing tensions between the country's working class and the state was the 2012 massacre in Marikana where 34 striking mine workers demanding a wage increase were gunned down by police. The scene, which evoked memories of the country's darkest days, was a testimony to the reversibility of democratic progress and an ominous forecast for how the government might react to broader social dissent. The underclass, too, is losing patience. Save from a brief pause between 1994 and 1997, protests have been commonplace in South Africa since the 1970s – especially in townships and shack settlements – and have been rising in the last decade. Violent crime initially decreased after democratization but the downward trajectory has shown a reversal in recent years, climbing from 30 per 100,000 in 2011 to 36 per 100,000 in 2017. According to a UN report, possible drivers of the increase in homicide rates include an increase in public protest and political turmoil stemming from perceptions of state corruption and popular frustration with slow provision of resources. Since 1994, some 500,000 people have been murdered in South Africa – some 130,000 more than those killed during eight years of war in Syria.

The main question today is whether the newly elected Cyril Ramaphosa has inherited a state just broken, or broken beyond repair. The former anti-apartheid activist and businessman has pledged to revamp the economy and restore the sheen of the Mandela and Mbeki eras. The way forward: economic growth. But engineering economic recovery will firstly

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require pushing through policy within a party locked in an internecine zero-sum factional war. Secondly, economic growth will have to translate into reduced inequality. In 2019, unemployment officially reached a 15-year high of 27.6%, but compounding that is another 10% of the population who have stopped looking for jobs. From one end of the telescope, the elite attributes high unemployment rates and inequality to a low-growth economic trajectory, while on the other end, a majority underclass sees it as the result of longstanding systematic exclusion. This former, and widely held viewpoint on behalf of the elite is likely to make them less keen on the economic reforms needed to appease an underclass that is fed up with depending on state philanthropy.

While the hurdles are discouragingly high, South Africa does, however, have some good things going for it. The country's constitution, largely considered sacrosanct by the population, has so far passed all tests of robustness. South Africa also has the most sophisticated economic infrastructure on the continent with mechanisms in place to mobilize capital and drive economic activity. The country is globally integrated, meaning that lowered financial barriers and policy predictability is probably enough to attract substantial foreign investment.

Ramaphosa will not be able to replicate Mandela's miracle of unification, and the era when the ANC can form policy solely for electoral purposes has ended. The way forward is to leverage majority support to drive through viable economic policies. With scarce fiscal resources and dwindling popular trust, resolving inequality and unemployment will have to be a priority – otherwise, the combination of high youth unemployment, poor educational outcomes and rampant inequality will eventually result in large-scale social disorder. The tightrope march between the revolutionary redistributive pressure of the citizens and the counteracting forces of the elite will be tough to manage. But, hopefully, the ill-boding socioeconomic trajectory of South Africa has sent a clear-enough signal that all parties need to compromise for the purpose of self-preservation.

"The mine was not sustainable and transformation was required to set the mine on a path of value. We thus framed a strategy to reconfigure the operating model, reduce the fixed cost base, drive cash-flow and build the foundation to become a modern, efficient and profitable operation."

Sven Lunsche,
VP Corporate Affairs,
Gold Fields

THE MINING INDUSTRY'S THREE 'IFS'

For many years, the mining sector has been the mainstay of the South African economy. The country's mineral riches have been a major contributor to GDP, foreign exchange earnings, employment and fiscal income. But for all its significance, the mining industry has been in decline for decades. Compounding the homegrown problems of political, social and legal struggles, low prices and soaring production costs are threats to the sector's survival. Today, mining makes up less than 7% of South Africa's economic output, a steep fall from 20% in the 1970s. Yet, the government has earmarked mining as a key component in the National Development Plan (NDP) while last year's appointment of Mineral Resources Minister Gwede Mantashe has restored some optimism about the future of the South African mining industry.

ANOTHER MINING CHARTER

Gwede Mantashe's appointment as mineral resources and energy minister has generally been well received by the industry. After his appointment in May 2019, Mantashe has been decisive in addressing corruption and maladministration within his department, as well as taken steps to promote regulatory certainty. These initiatives resulted in South Africa's gaining 27 places under the Policy Perception Index and also considerably improving its stands in the Fraser Institute's Investment Attractiveness Index.

The current regulatory regime, however, still suffers from a number of problematic aspects inherited from the initial post-1994 policy. The Mineral and Petroleum Resources Development Act (MPRDA) that came into effect in 2004 replaced the old common-law principles and ushered in a system of state custodianship of mineral resources. In an attempt at spreading the benefits of the country's mining sector, the state assumed a more intrusive presence in the life of the industry. In accordance with MPRDA requirements, a mining charter was introduced the same year. The charter stipulated that mines must achieve 26% ownership by historically disadvantaged South Africans (HDSA) within 10 years in addition to several mostly aspirational targets such as cooperating in formulating development plans for communities and ensuring greater female participation.

In 2010, new iterations of the Mining Charter were introduced. Since 2004, the racial ownership pattern of mining assets had remained largely unchanged, with only 8.9% black ownership attained by 2009 against the target of 15%. The reviewed charter – far more prescriptive than the original – sought to correct the racial discrepancy, emphasizing 26% of South Africa's mining assets being black economic empowerment (BEE) compliant by 2014. The sector's initial reaction to the new charter was worry over increased regulatory uncertainty. These concerns were amplified in 2017, as yet another mining charter was introduced, imposing new financial, regulatory and compliance obligations on an already fragile South African mining industry.

Mining Charter III stipulates that new mining rights must be held by entities with a minimum 30% shareholding by HDSAs, a hike from the previous charter under which the requirement was 26%. Further, holders of existing rights who have complied with the minimum HDSA ownership thresholds under the 2010 charter will have five years from the effective date of Mining Charter III to increase their HDSA shareholding. The new charter has been a significant source of uncertainty and controversy since a first draft was published in April 2016, including various high court applications and calls for a change in political leadership at the Department of Mineral Resources (DMR). Shortly after the charter was promulgated, the Minerals Council filed an application for a judicial review, pointing out that past deals were not sufficiently recognized.

"The Minerals Council achieved a very important judgment relating to continuing consequences," said Roger Baxter, CEO of South Africa's Minerals Council. "The Minister appealed the parts of the judgement which sought to question the validity of the charter and the court process is still underway. There are also elements in the mining charter that the industry has given the Council a mandate to review as certain clauses are seen as problematic. What we seek is a process of engagement that we believe will be more effective than a court process."

In addition to the onerous re-empowerment obligations for the renewal and transfer of existing mining rights, the industry has voiced concern regarding the procurement requirements.

"Companies are obliged to have 80% of their services provided locally and 60% to 70% local content, which is very challenging to technology providers," commented Sanjay Ahuja, managing director of Epiroc. "I do not believe the charter will be fully implementable in its current format, and we have ongoing discussions with other stakeholders in order to work out what parts of the charter need to be altered."

Perhaps the most damaging aspect of the regulatory development since 2004 is the changes themselves. While an increased equal distribution of mining benefits should be encouraged, continuously moving the goalposts creates an uncertainty that defeats the purpose of empowerment policies as overall activity in the mining sector is undermined.

"While local communities, local manufacturers, local municipalities and the government should all benefit from South African mining operations, there needs to be a balance between these policies and operational feasibility," said Eric Bruggeman, CEO of the South African Capital Equipment Export Council (SACEEC). "The reason why governments implement stringent mining regulations and tax policies is to bolster revenue, however they must not neglect the importance of investment without which it is not possible to generate any money at all. Simply put, no one benefits from mining operations shutting down."

The minister's seemingly unlimited ability to review and revise the obligations imposed under the charter has been called into question by various legal experts. According to attorneys at Webber Wentzel, the MPRDA only empowers the mining minister to "develop a broad-based socio-economic empowerment charter," but does not grant the minister the power to alter, vary and/or revise such a charter. The Minerals Council made the same claim in its application with the high court, stating that the minister acted ultra vires and purported to exercise powers that reside exclusively with parliament.

Mantashe has, however, demonstrated an understanding for the industry during his short tenure. In addition to efforts to stamp out corruption and maladministration, the minister recently announced plans to axe the proposed amendments to the MPRDA. The amendment was taken to parliament in early 2013 and re-emphasized the commitment to beneficiation and expanded the minister's discretion over the mining sector. The bill was referred back to parliament in January 2015 by the president due to lack of public consultation after it was passed. The withdrawal will be welcomed by the industry and has further repaired the relationship between the Minerals Council

and the ministry, which was damaged after the passing of the 2010 charter.

"SA Minerals Council's engagement with the government has improved greatly under the current minister of mineral resources, Mr. Mantashe," commented Baxter. "For the first time, we have a minister with real mining experience who is passionate about the sector. Minister Mantashe regularly attends meetings with the Minerals Council and has engaged with the board on several occasions as well as met with every single sector-specific CEO during the Council's leadership forums."

Creating an environment with less policy and regulatory uncertainty should go a long way towards attracting investment. The scrapping of the MPRDA amendment will be a step in the right direction. But with the original MPRDA still in place, administrative law based on conditional state licenses has essentially replaced the principles of private law, based on rights of ownership. When asked what changes he would make if granted full authority, Peter Leon, partner and co-chair of the Africa practice at Herbert Smith Freehills, offers concrete suggestions: "I would scrap the mining charter in its current form, I would reform the mining code, and I would also make the grant of rights objectively determinable to eliminate back door discretion in the legislation. I would introduce a proper online mining cadaster and take away the licensing function away from the Department of Energy and hand it over to an independent regulator in the form of a minerals or mining commission modeled on that in Brazil and Ghana."

DIGGING DEEP

With vast deposits of gold, diamonds, platinum, coal, chrome, vanadium and titanium, South Africa boasts a bounty of mineral riches. Although gold and platinum group metals "PGMs" productions are well down from their peaks, they continue to dominate the market. Paradoxically, these minerals – especially gold – are those that struggle the most.

"The reason why many predict the demise of the SA gold mining industry – apart from South Deep – is that gold mining is costly due to the underground nature of

"In the 1970's, South Africa was the world's number one gold producer by a large margin but has since dropped to number five on the list. The power costs for deep-level gold mines currently in operation are horrendous, with power costs having risen 523% since 2006."

Roger Dixon,
Corporate Consultant,
SRK Consulting South Africa

mining," said Sven Lunsche, VP corporate affairs of Gold Fields. "Going beyond two kilometers to dig for gold is costly and raises significant safety concerns. If the rand/gold price goes beyond a certain level, it makes it viable to mine, but at its current level, we are not seeing any new gold mines coming into operation."

While bulk commodities such as iron ore, coal, manganese and chrome have been performing fairly well over the last few years – with steel-making ingredients increasing its share of capitalization from 13% in 2017 to 20% in 2018 – the South African mining industry is more exposed to precious metals that have not enjoyed the same price increase. For the gold industry, however, a price hike will not be enough to ensure sustainability. Mainly characterized by deep-level hard-rock mining, inherent technical constraints combined with persistently declining ore grades are pushing the industry towards cost-saving initiatives.

"Generally gold and platinum companies that mine using conventional methods have been running very tight margins," said Alistair Macfarlane, co-director of Mandela Mining Precinct, an industry-government partnership organization aimed at fostering growth, transformation, investment and employment preservation in the mining sector.

"We have experienced a time when approximately 70% of the platinum industry and 60% of the gold industry was under water financially. We are now at a stage where we have to look at how we can modernize hard rock mining operations in South Africa, but there are limited technologies that are appropriate for these environments."

The apartheid system provided cheap labor and minimal safety standards. The result was less incentive to invest in innovation, resulting in today's largely antiquated mining technology with methods harking back to the 1950s. "South Africa has some of the richest ore bodies in the world, which resulted in new mines being built next to the existing ones," said Errol Smart, managing director and CEO at exploration company Orion Minerals. "Following mine closures, the labor forces were moved to the newer sites and, in the process, transferred the sins of their fathers – meaning, they did not build new mines but rather new operations based on superannuated processes."

In a race for survival, miners will have to adopt new technology or fade into the sunset. While the specific technology needed for deep-level, hard-rock mining is limited, solutions are available. Anglo American Platinum Limited and Vedanta Zinc International have successfully mechanized some of their operations to help them exploit the full potential of their assets. Another example is Gold Field's South Deep mine, which has experienced a challenging period in recent years. "The mine was not sustainable, and transformation was required to set the mine on a path of value," said Lunsche. "We thus framed a strategy to reconfigure the operating model, reduce the fixed cost base, drive cash-flow and build the foundation to become a modern, efficient and profitable operation. The restructuring was also aimed at reducing

the workforce and mobile equipment levels in alignment with consolidating mining activity."

While modernization will be imperative for the country's remaining deep-level mines, mechanization needs to be combined with the development of new skills to avoid widespread loss of jobs. Some 110,000 people are employed in the nation's gold mines alone, which means that around one million people are dependent on the subsectors, according to the Minerals Council. New technology translates into a need for new skills, and the transition period that lies ahead will be crucial for avoiding a catastrophic impact on South Africa's socio-economic fabric.

"Operators are still necessary, but need to be retrained for operating modernized equipment," said Macfarlane. "The operators are now doing much more value added work instead of only manual labor. We want to allay the fears of organized labor about modernization and industry 4.0 taking away jobs from the human work force. Once we have communicated with and educated the labor force on what industry 4.0 is, we can start looking at the re-education and retraining initiatives needed to implement modern processes in mines."

THE POWER CRISIS

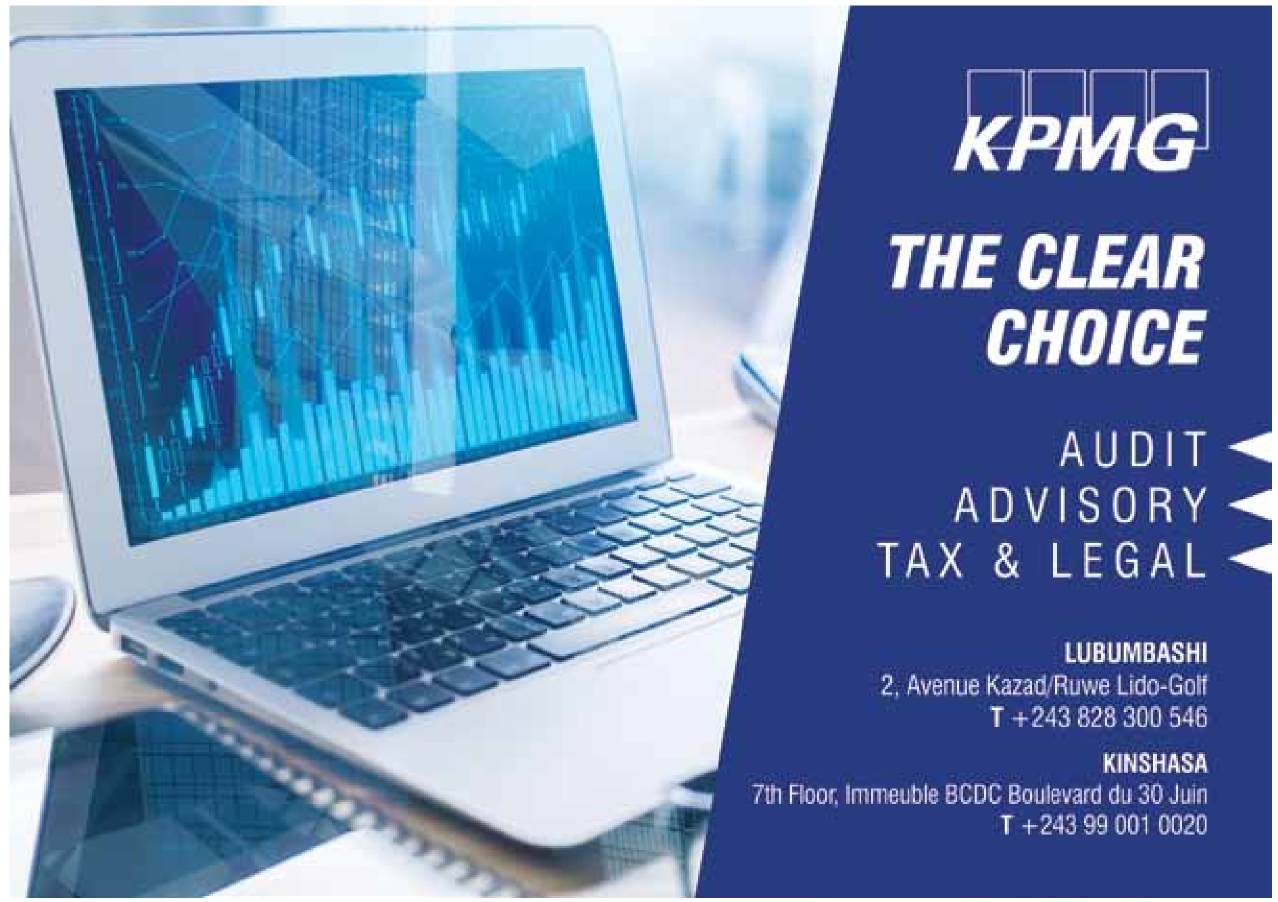
The viability of mechanization will also depend on the government's ability to resolve the ongoing power crisis. Throughout 2019, state electricity company Eskom imposed the worst power cuts in several years, conjuring up memories of the 2008 crisis when the grid nearly collapsed and cost the mining industry billions of rands in lost output. The mining industry currently consumes about 15% of Eskom's annual output. So far, 18,300 jobs have been lost as a direct result of the growing costs of powering operations, of which one third have been cut from gold mines, according to a 2019 statement by the Minerals Council.

"In the 1970s, South Africa was the world's number one gold producer by a large margin but has since dropped to number five on the list," said Roger Dixon, corporate consultant at SRK Consulting South Africa. "The power costs for deep-level gold mines currently in operation are horrendous, with power costs having risen 523% since 2006."

Total energy self-generation is still not an option for any project in South Africa, but mines are increasingly turning to alternative power sources such as solar and hydro to undermine overdependence on Eskom that currently supplies about 90% of power in the country.

"The challenge is that renewable energy sources are still far from being able to accommodate the scale of electricity needed for mining operations," said Henning Opperman, director of audit for energy and natural resources at KPMG. "There are discussions about the power grid becoming more privatized for the benefit of the country, but the challenge is to find the right balance between government control and privatization."

Service providers are also increasingly realizing the necessity to become more energy sustainable. Brelko Conveyor



Products, a Johannesburg-based conveyor-spillage control company, implemented a solar panel project in 2017. “This is a three-phase project with the first phase being installing solar panels on our existing building,” said general manager Jay Pillay.

“After phase one, we were getting approximately 30% of our electricity from solar panels. We then constructed a new factory where we also installed solar panels as phase two and now operate with about 70% of our electricity coming from the solar panels,” he elaborated.

Fortunately, the present ANC policy formulators seem to view renewables as a viable path away from a dated coal-based economy. The question is whether Ramaphosa – in the face of resistance from coal and nuclear lobby groups – has the political will, and space within a fractious ruling party, to blaze a bold new path for Eskom. Meanwhile, regulatory barriers undermine mines’ ability to increase self-sufficiency. “Since the last elections, the Energy Department has been merged with the Minerals Resources Department, and there is still regulatory uncertainty,” said Lunsche. “Gold Fields wants to invest in a 40 MW solar plant at South Deep, which would take care of 65% of our energy needs at the mine, but the regulations stipulate that anything above 10 MW has to be approved by the minister.”

“There is no listed base-metal production project in South Africa and there is currently only one copper producer and one zinc producer in the country. Orion Minerals will be the country’s next copper and zinc producer with the Prieska project being a copper- predominant project.”

Errol Smart, MD and CEO, Orion Minerals

BEYOND GOLD

While mechanized operations are associated with higher power costs, innovative mining techniques can also offset electricity consumption. London-listed Ironveld, which has a high-purity iron, vanadium and titanium project located on the northern limb of the Bushveld Complex in Limpopo Province, South Africa, initially planned to use what is called the “Highveld” process, which separates the vanadium from the ore while producing a titanium slag. While the Highveld process was once at the cutting edge of metallurgical technology, the company reasoned that – 50 years later – there must be more modern options. Based on existing data from a government-sponsored research facility, Ironveld developed what they call the modern Highveld process, which uses more efficient metallurgical technologies and techniques. Yet, the company needed 300 MW of electricity for its targeted 1 million mt/y iron project, and, in 2015, their request was rejected by Eskom, which could only provide 20 MW.

“Fortunately, we realized that the in-situ ore resource was so good and the contaminants so low, that the actual iron we produced ahead of adding carbon matched the product used to make water atomized iron powders that are utilized extensively in the motor industry,” said CEO PJ Cox. “This meant that we suddenly had a viable project at a much smaller scale as these iron powders sell at an excess of US$1,000/mt. We were able to make a titanium slag and a vanadium slag that were marketable and a very high-value iron powder.”

Ironveld has been granted a 30-year mining license for a resource containing sufficient vanadium to supply to 30% of the world’s vanadium requirements for the next three decades.

Meanwhile, ASX and JSE-listed Orion Minerals is advancing its flagship Prieska copper-zinc project in South Africa’s Northern Cape Province. Prieska is one of the world’s top-30 volcanogenic massive sulphide (VMS) base metal deposits, with a recorded historical production of over 430,000 mt of copper and 1 mt of zinc from 46.8 mt of sulphide ore milled.

“There is no listed base-metal production project in South Africa, and there is currently only one copper producer and one zinc producer in the country,” Smart said. “Orion Minerals will be the country’s next copper and zinc producer with the Prieska project being a copper-predominant project.”

The project will require a capital investment of approximately AU$400 million, including contingency to build the mine. Orion’s funding strategy will be majority debt as the company seeks to take advantage of South Africa’s well-developed debt market.

However, South Africa remains highly dependent on its gold, and it is safe to say that the country’s gold sector is down for the count – but not counted out yet. If the government can establish stable and predictable mining regulation and resolve the energy crisis and if the country’s deep-running gold mines can be mechanized without causing grand-scale job losses, then South Africa’s mining industry still stands a chance.

LEVERAGING INDUSTRY 4.0

South Africa’s mining sector faces obstacles more daunting than perhaps that of any other country on the continent. Short-term financial sustainability must be aligned with long-term objectives amid soaring labor and energy costs compounded by growing and often conflicting demands from unions, government and shareholders. While the resolution of the country’s fraught political situation appears out of sight, and the normalization of electricity rates retains its question mark, the modernization of South Africa’s mines must be the priority.

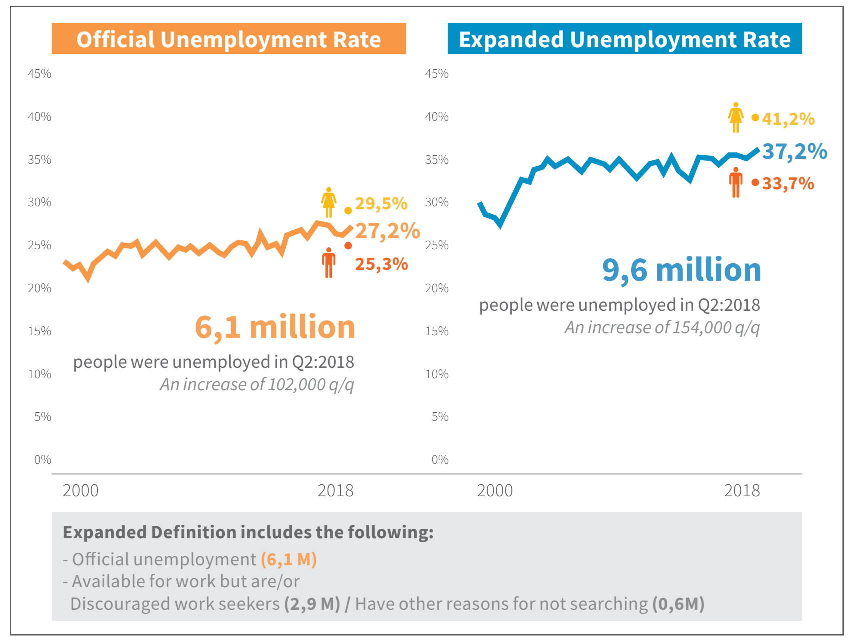
Beyond the practical challenges of successfully optimizing operations, talk of innovation and new technology is always accompanied by the question of job losses. This concern is not unfounded. South Africa’s gold-dominant mining sector has always relied on a cheap and largely low-skilled workforce, and more mechanized operations would replace that demand with one for trained operators. While the optimization/job-loss conundrum is ubiquitous, it has been argued that the urgency of South Africa’s situation – with the predicted death of gold mining scheduled for 2035 if it continues on its current track – would grant decision makers the right to temporarily disregard the human collateral damage of optimization. After all, mine closures will certainly entail job losses, too. However, champions of this argument tend to neglect another one of South Africa’s peculiarities: that economic risk translates to political risk due to the ANC’s fraught relationship with its electorate.

In South Africa, balancing employment retention and mechanization thus remains as important, or even more so, than in mining sectors with more stable economies.

“There is a fear that automation will be a driver for higher unemployment rates, which is not necessarily the case,” said Matimba Mahange, executive head of mining at Caterpillar equipment distributor Barloworld Equipment. “Introducing automated vehicles and equipment into an operation must not be viewed as negative, but rather as a way to free up employees to do something else within the company where they can be upskilled and empowered.”

For modernization to not be a euphemism for job losses, the sector will be forced to accelerate the transfer of skills to local communities.

Unemployment Rate



Source: STATS SA

“Re-education needs will be extensive,” said Macfarlane. “We are having as many conversations as we can with organized labor unions and various government departments to demystify the industrial revolution of industry 4.0. The truth of the matter is that nobody really understands what industry 4.0 means and what it is going to do.”

For this purpose, Mandela Mining Precinct is collaborating with MEMSA and the Minerals Council to establish a dedicated test mine where local manufacturers’ newly developed equipment can be tested and showcased while also providing training to operators. But Macfarlane also stresses the importance of research to develop these technologies.

“We need to reestablish capacity and capability in universities for applied research, which we aim to do through the establishment of centers at the universities that match our programs. The challenge is that the funds that we currently have available are nowhere near the target. Funding has to increase approximately tenfold and increasing investment into research is part of our strategic journey."

R&D will not only increase understanding for the possibilities of Industry 4.0, but also better equip miners to make accurate cost calculations.

"In South Africa, mines are legally required to initially set funds aside for rehabilitation planning," said Dave Capstick, business development manager at global consulting and technology company Deswik. "A study was done on miners' awareness of funds required for rehabilitation, concluding that none of the participants had put away more than 20% of what their liabilities were."

This sentiment was echoed by George Olivier, director at engineering consultancy VBKom: "Approximately a decade ago, the mining industry was very much on its own when competing for capital. Today, the mining industry and projects within the mining industry are competing with all other industries. This puts a significant amount of focus on the financials and returns of the projects. The market has changed, and today techno-economic studies are becoming a focus."

One of the institutions filling the void of university research is national minerals research organization Mintek, which also does research for many private sector funded initiatives.

"Almost all the large mining companies have closed their mining research units," said Leon Krüger, manager for hydrometallurgy. "If someone wants to do metallurgical research, Mintek is about the only place where they can do it. The challenge is that although we have a means to attract talent to our company, the pool of talent is getting smaller."

Despite the lack of research and inadequate skills transfer, there are plenty of service providers and institutions that already offer innovative solutions to the mining industry. These, however, are not always possible to implement within existing operations.

"I do not believe that South Africa lags behind in innovation, and the country has introduced innovations such as electronic ore sorting, resin-in-pulp processes and carbon-in-pulp processes," Krüger said.

Jwaneng Mine. Photo courtesy of Macaferri.

Rather he believes that tech providers "are fighting a battle of the acceptance of new technologies in the mining industry." The mining sector is conservative by nature. For example, spending within the global industry on hi-tech solutions was just 1% of revenue in 2015 – five times less than most industries. Compounding that is an amplified skepticism fueled by already daunting unemployment rates. Another issue is that the development of new technology must be coupled with modernized mine structures.

"In my opinion, the biggest limitation is having the necessary mine infrastructure to support the charging of electric equipment fleets," said Mike Adendorff, CEO of AARD Mining Equipment. "EVs are an exciting development within the mining industry and can produce significant benefits, but the infrastructure to charge EV's has yet to be developed and installed in the African mining industry."

There is no doubt modernized mining techniques can reestablish the profitability of South African gold mining. The country still holds some of the largest reserves in the world. The issue is how to reconcile the necessary changes – including massive investment into research, training and mine infrastructure – against scarce financial resources, pushback from unions and lack of collaboration between the government, mining sector and organizations. If the gold sector's domestic challenges are already discouraging, global factors such as a shift away from coal and China's decreasing steel consumption might deal a future blow to other segments of the mining industry. With each passing day, solutions become less feasible. The way forward is not to dwell on each issue but to realize the urgency of the situation and forcefully drive through change.

Introduction to West Africa

The sun rises over a booming jurisdiction

With the sun thought by many to be setting over South Africa's mining industry, investors are turning their eyes to the continent's West. Shallow deposits and investor-friendly regulation are the main reasons for the attention attributed to countries such as Mali, Burkina Faso, Ghana, Senegal and Côte d'Ivoire. West Africa is now the continental center for gold, bauxite and iron-ore mining, with ongoing and upcoming projects across the region while future metals such as lithium, manganese, vanadium as well as copper and uranium are being widely explored and already produced in a number of countries.

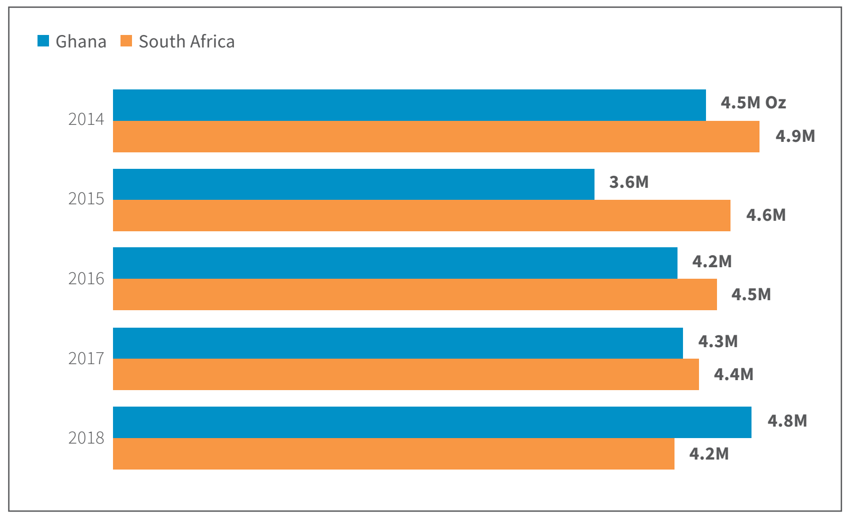
"The precious and base metals markets remain robust, and currently, anything related to batteries such as lithium, copper and nickel are receiving a lot of attention," said Aaron Green, director of Australasian Operations at CSA Global. "Although nickel prices have not increased as much as we expected, a significant number of explorers are again entering this market. The demand for lithium is continuously growing, and we believe that demand will increase for some years to come."

Gold remains the mainstay of the region's mining sector as the boom spreads from more mature jurisdictions such as Ghana and Mali to neighboring countries with similar host geology. With a bullish gold price and diverted investor dollars from the South swelling the sails, West Africa is poised to become one of the top five gold-producing regions in the world.

But a gold boom does not guarantee the longevity of West Africa as a mining hub. The region's long list of challenges, including political and regulatory volatility, terrorism, failing infrastructure and illegal mining are all investor deterrents whose continuance could spell the end of the optimistic consensus. Terrorist attacks claimed by extremist groups such as Al Qaeda, ISIS and Boko Haram have been mounting in Côte d'Ivoire, Mali, Benin, Burkina Faso and Togo in the last year. The prevalence of extremist groups is often a testament to a weak social contract between the state and its citizens and resolving these issues will partly depend on the extent to which the growing wealth of the region is translated to a better life for its people.

The mining sector has the potential to be a primary driver for this transformation, but – paradoxically – the geopolitical risk is what could come to hamper investment.

Gold Supply & Demand



Source: South Africa Minerals Council and Ghana Chamber of Mines

"The biggest challenge Perseus Mining faces in terms of attracting new investors is a combination of geopolitical risk and historic attitudes to the ability of companies to perform in Africa," said Jeff Quartermaine, CEO and managing director.

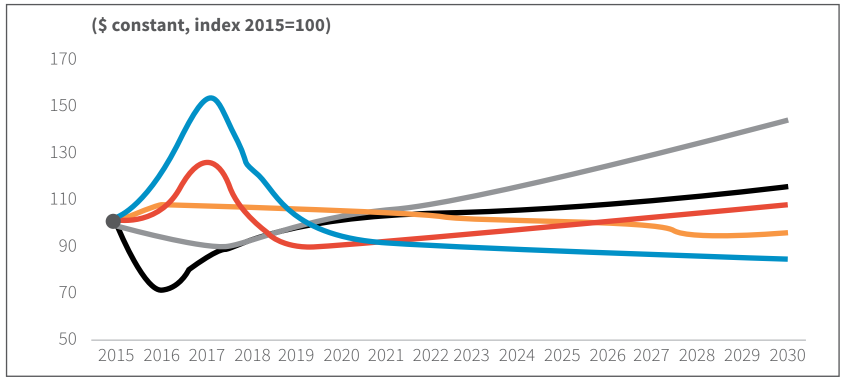
Quartermaine also pointed out that its peer group of Australian companies operating domestically sell their product in local currency, resulting in a substantial Australian-dollar cost margin, while the cost base and revenues of Perseus Mining is USD-denominated.

"As a result, the company has not been perceived to have done as well as some Australian companies have done in recent times. However, when analyzing our metrics relative to Australian operators, ours are just as good – and in some cases better. We have bigger reserves, better organic growth prospects and production as well as cash-flow levels that are comparable with our Australian focused peers."

So far, low-cost reserves and favorable tax regimes have been sufficient to attract substantial foreign investment. West Africa must now take advantage of the momentum to implement legislation that ensures investment predictability, the proper harnessing of mining benefits, environmental sustainability and overall accountability. The region has already benefitted from the migration of expertise from more mature jurisdictions such as Ghana, but to effectively tax large multinational mining companies, revenue and mining administrations must increase collaboration between countries through existing regional platforms such as Economic Community of West African States (ECOWAS) and the West African Economic and Monetary Union (WAEMU).

This year, we feature Ghana and Senegal in our prerelease edition of MACIG. With both countries predicated to experience substantial growth in the upcoming years, Ghana – the regions gold titan – provides a blueprint for emerging jurisdictions in the region but must bolster exploration and diversify its portfolio amid stiff competition from its younger neighbors, while Senegal – that is sprinting to become one of the world's top gold producers – faces the challenge of remedying its skills and infrastructure shortage to support a growing mining sector.

Commodity Price Forecast



Source: World Bank

"The biggest challenge Perseus Mining faces in attracting new investors is a combination of geopolitical risk and historic attitudes to the ability of companies to perform in Africa."

Jeff Quartermaine, CEO and Managing Director, Perseus Mining

Emerging trends in West Africa's natural resources sector

Authors:
Vassie Maharaj, *Director, Partner and Principal Consultant in Social Risk and Stakeholder Relations Management at SRK Consulting South Africa*
Jane Joughin, *Corporate Consultant in Environmental and Social Management at SRK Consulting UK*
Rebecca Getty, *Environment and Mine Closure Senior Consultant at SRK Consulting in Australia*

Countries in West Africa generally have primary environmental and mining legislation that reflects modern sustainable development paradigms. Ghana has relatively well-developed subsidiary legislation to support practical implementation of the law by the mining sector, but in most other countries this is still being developed. The effectiveness of enforcement agencies is variable. Ghana is a progressive example; however, resource and capacity constraints are common among these institutions in many countries. Pressure to comply with legal obligations and incorporate good international industry practice can be expected to increase in West Africa, as is the case in other parts of the world.

Through SRK's multi-disciplinary work in West Africa, it is clear that greater transparency and inclusivity in stakeholder engagement are among the demands that mines will increasingly face. This means more comprehensive management of impacts on communities and sensitive environments, and different approaches to managing key issues like artisanal mining and involuntary physical and economic displacement.

Some countries are developing national frameworks to guide resettlement planning processes, ensuring a strategic and systematic approach. Physical displacement of people has become a central public concern in large infrastructure projects but it is also relevant to the way mining impacts on local communities. The restoration of livelihoods is increasingly a core issue requiring attention by mines.

Another important and developing area of the legislative framework for mining in West Africa is mine closure and social transition. Good international industry practice advocates early and ongoing closure planning – alongside consultation to facilitate the transition of local communities and stakeholders from mining to a sustainable future. However, closure

legislation is not well developed in most West African countries; several mines have highly conceptual closure plans, unrealistic closure cost estimates and are generally not required to provide regular updates. Implementation of the laws is variable due to many challenges – not least the impacts from illegal mining which are pervasive in the region. There are also issues of capacity and corruption. Furthermore, financial dependency on mines results in a reluctance by local communities and mine workers to accept that the mine will close.

Mines will increasingly have to address climate change as part of their environmental and social impacts, as West African governments move to develop and refine their climate change policies, plans and legislation.

Already, climate change issues are addressed in the lending conditions of many international finance institutions – who require project options to reduce pollution and greenhouse gas emission reduction, and to improve resource efficiency to support responsible investment in developing mining projects. They also consider mining companies' governance and corporate policies. Climate change risk assessments will be mandatory for larger projects in the revised Equator Principles 4, currently in draft form.

Fostering this direction has been the 2015 Paris Agreement. West African countries have ratified this and are advancing global warming adaption and mitigation strategies. Each country has set out a range of 'climate actions' – or nationally determined contributions (NDCs). Countries in the region are now refining the NDCs, aligning these with the UN Sustainable Development Goals and establishing processes for climate action monitoring, review and reporting. Support for this process – and implementation – is being provided by international agencies.

Existing and new mining projects will need to consider their climate impacts in the context of the host country's NDCs. Particular attention will need to be focused on deforestation, greenhouse gas emissions and climate change adaptation.

Future revisions to climate change laws are likely to require established mining operations to reduce reliance on fossil fuels for power generation, and to consider more energy efficient and innovative alternatives. This will require capacity building in some sectors, and policy support from government.

New mining projects will also have to pay attention to avoiding climate change and biodiversity impacts at a much earlier stage of development, and demonstrate consideration of numerous project development alternatives in the pre-feasibility stage. Unavoidable impacts will require more detailed justification, with off-setting only accepted as a last resort. Climate change trends such as water shortages and flooding may also exacerbate impacts on sensitive ecosystems and vulnerable communities.

Changes are already visible in the mining sector's strategies. Increasingly, major mining companies are implementing low carbon options such as hydro, solar and wind power generation and electric vehicles. As this technology improves and its cost decreases, it is likely that renewable energy projects will become more widespread in West Africa – as capacity and implementation issues are overcome. Market forces are also likely to render these low-carbon options more readily available as small-scale installations, which may benefit their application in the region.

West Africa's mineral wealth continues to hold significant potential for investors. The focus is now undoubtedly on guarding against social and environmental exploitation – which calls for innovative strategies and specialised skills.

About SRK

SRK is an independent, global network of consulting practices in over 45 countries on six continents. Its experienced engineers and scientists work with clients in multi-disciplinary teams to deliver integrated, sustainable solutions across a range of sectors – mining, water, environment, infrastructure and energy. For more information please visit www.srk.com

Photo courtesy of Congo Equipment.

Ghana

Ghana, known as the Gold Coast before gaining its independence from Britain in 1957, is situated on the coast of the Gulf of Guinea. While gold production remains a key component of the country's GDP and still contributes some 98% of total mineral exports, the government seeks to diversify the country's mineral portfolio.

Population: 30.42 million (worldpopulaitonreview.com 2019)

Land Area: 227,533 km²

Official Language: English

GDP (PPP): $130.2 billion (CIA World Factbook 2017)

GDP PPP Annual Growth Rate: 6.3% (countryeconomy.com 2018)

GDP Per Capita (PPP): $4,211 (Trading Economics 2018)

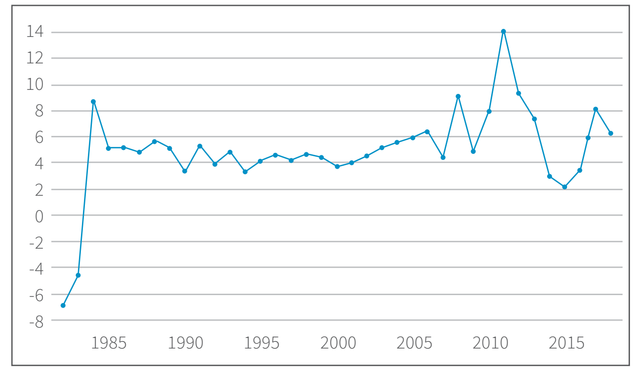
Industry: mining, lumbering, light manufacturing, aluminum smelting, food processing, cement, small commercial ship building, petroleum (CIA Fact Book 2017)

Top Exports: Gems, precious metals (35.6%), Mineral fuels including oil (30.6%), Cocoa (19%), Fruits, nuts (3.5%), Ores, slag, ash (2%) (OEC 2018)

Top Imports: Total $12.68 billion; capital equipment, refined petroleum, foodstuffs (2017)

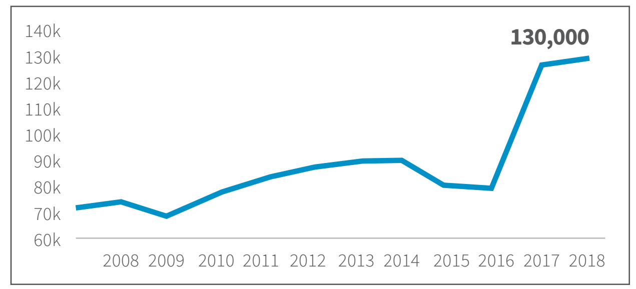
Top Export Destinations: India (21.5%), China (11.9%), South Africa (10.2%), Switzerland (9.5%), Netherlands (7.2%), Malaysia (6.5%), United States (3.6%), United Arab Emirates (3.5%), Spain (3.4%) and United Kingdom (2.9%) (worldstopexport.com 2018)

GDP (annual %)



Source: The World Bank

Gold Production (kg)



Source: United States Geological Survey

Fraser Institute Overall Investor Attractiveness Ranking:
2017: 22/91 → 2018: 68/83

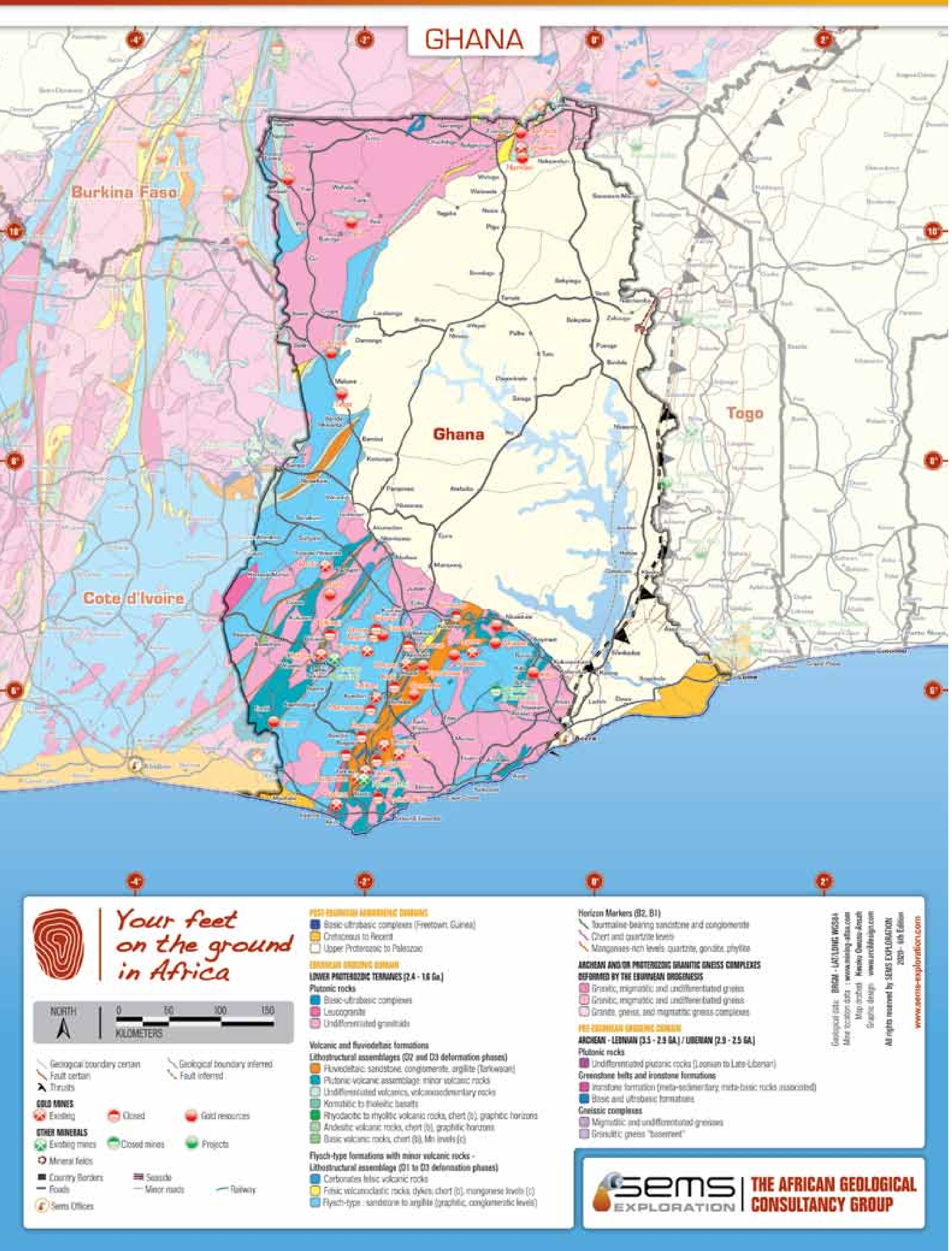
Fraser Institute Policy Perception Index Ranking:
2017: 51/91 → 2018: 60/83

World Bank Ease of Doing Business Ranking:
2017: 120/190 → 2018: 114/190

Gold Production (kg):
2014: 90,754
2015: 80,325
2016: 79,199
2017: 128,000
2018: 130,000

2014-2018
35.6%

Source: United States Geological Survey



Sulemanu Koney
CEO
Ghana Chamber of Mines

Larger companies benefit from the fiscal regime in Ghana due to the US$500 million investment threshold. Does the Chamber favor a change to the law?

The law prescribes a US$500 million minimum investment for companies to enter into a project development agreement. Unfortunately, this law has not been revised. The Chamber has had conversations with authorities and we understand that if the investment is large, the potential impact on the country is also greater. The challenge is that when things are quiet, smaller companies are negatively impacted. We are in discussions with the government, but until the law is changed, it will be difficult for much to be achieved. The authorities need to consider what can be done to ensure that smaller mining companies are able to survive.

Currently, there is almost exclusively brownfield exploration in Ghana and major players dominate the overall industry. Why is this cause for concern?

We need to branch out and have a diverse portfolio of investments in the mining industry. Even if there is a significant amount of brownfield exploration, we should also be looking at the greenfield pipeline of projects potentially coming online in the future. Furthermore, we must look at diversifying into different mineral resources and not only have a focus on precious metals.

Can you elaborate on the minerals currently dominating the mining industry in Ghana?

The essential minerals in Ghana include gold, diamonds, bauxite and manganese with gold being dominant in terms of production. Over the last few years, there has been a lot of talk about leveraging the bauxite resources for infrastructure development. There have also been conversations around manganese to some extent. The Ghana Integrated Aluminum Development Corporation (GIADC) has been tasked with taking charge of the process of developing the aluminum industry. Ghana is set to exploit its vast bauxite and iron ore deposits as part of a larger strategy to establish this integrated aluminum industry, and there are discussions around also establishing the Ghana Integrated Iron and Steel Development Corporation. Currently, Ghana has one bauxite mine and the government essentially sponsors the operation. There is also exploration being done on iron ore deposits. We want to diversify our mineral production in the country as approximately 98% of mineral production comes from gold.

Is there a case for ramping up downstream capacities in Ghana?

Increasing refining capacity is a major priority for the country. The government has revised its policy in terms of value addition prior to exportation. We continue to have conversations within the industry and with government as to what would be the best way to ramp up downstream capacity. We are also engaging with local refineries to identify if there is any appetite for them to become certified as the refineries in country are not certified.

With the country's mines going deeper, how far is the Ghana from a reality where gold mining is no longer economically viable?

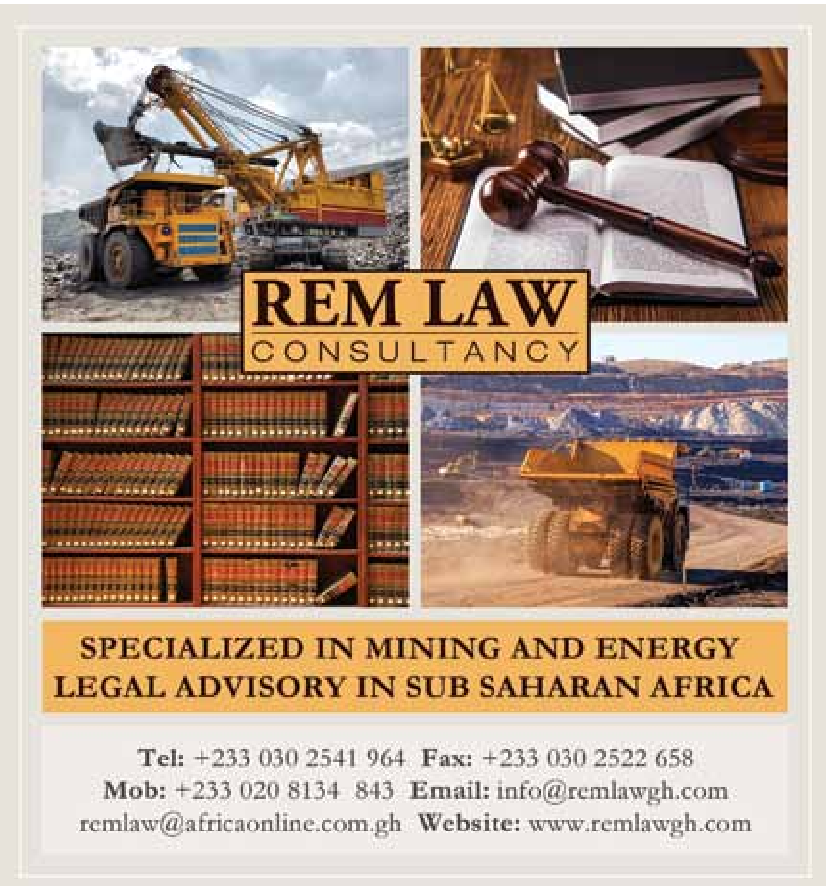
Ghana's gold resources are still relatively shallow compared to the likes of South Africa. Mining houses are starting to move underground, but there is still significant underground potential to extend life of mine. In combination, we are using traditional mining methods and innovative technological solutions to go underground. Mining houses are taking advantage of technologies where it this becomes economically feasible, and we are seeing more digitization and automation within the industry.

We believe that if the gold price keeps increasing as predicted, it will have a positive impact on the greenfield exploration investment in Ghana – it depends on how competitive the country can be in terms of attracting investment. Ghana used to be the star investment destination in West Africa, but today, most of our neighboring countries have learnt from us and are now also attracting investment. Investors will look at legislation, policies and the stability of the country to inform their investment decisions. The government should put in the efforts to optimize as much as possible to become more competitive as an investment destination in West Africa.

Ghana

Newly crowned Africa's top gold producer, Ghana must adapt to maintain its title

Ghana stepping up as Africa's number one gold producer was long coming. The now-former champion, South Africa, left the title vacant after succumbing to an ever-growing list of impediments, including political instability, rampant electricity costs and the geological challenges of tapping the world's deepest mines. A bullish gold price and extensions of Ghana's existing mines are now likely to cement the country as the dominant producer for some time. But as younger jurisdictions in the region gain investor attention, Ghana will have to play its cards right to keep a long-term place on the podium. While the countries' history is vastly different, South Africa offers important lessons for the development of Ghana's gold mining sector.



LESSONS FROM SOUTH AFRICA'S DECLINE

South Africa's gold ore grades are said to have declined steadily for decades. Yet, it was the combination of deep-rooted political issues and industry mismanagement that set the sector on a doomful path, rendering some 70% of the nation's gold mines marginally profitable or loss making in 2018. South Africa's political past does not map on to that of Ghana where the norm for the last decades has been stability and predictability. Rather, it is the long gold-mining tradition and the dependency on the yellow mineral that often has the two countries mentioned in the same breath. Recently crowned the new king of gold, Ghana now has the opportunity to learn from the mistakes of its predecessor, namely a high gold dependence, lack of skills development as well as insufficient technological innovation.

EXPLORATION, DIVERSIFICATION AND DOWNSTREAM BENEFICIATION

98% of Ghana's minerals production is comprised of gold and for the time being, big players like Newmont, Gold Fields, Kinross and AngloGold Ashanti are well positioned to benefit from a bullish consensus on the future gold price. But Ghana has so far failed to exploit its basket of other commodities such as bauxite, iron ore, diamonds and manganese, and it is unlikely that the handful of greenfield exploration projects currently underway will perceptibly impact the sustainability of the sector. Currently, Ghana has 14 large-scale mining operations, of which 12 are gold mines, and the vast majority of ongoing exploration is brownfield projects carried out by major players. The absence of greenfield exploration largely owes to a mining code that was penned with the country's dominating large-scale projects in mind – prescribing a GH¢500-million (US$100 million) minimum investment for companies wishing to enter into a project development agreement. The code stipulates a 15-year stability agreement for all companies, but the opportunity to renegotiate benefits is reserved for those meeting the minimum investment requirements. Adding to this deterrent is an unfavorable exploration tax.

"Most of the mines in Ghana started as small exploration projects that grew into commercial mines," said Innocent Akwayena, managing consultant at Rem Law Consultancy. "These developments lead us to overtake South Africa in gold production. However, the taxes on exploration in Ghana are already high compared to other West African countries, and Ghana may find itself in a hard position when existing mines run out of commercial deposits."

"The government needs to reduce the taxes on exploration, especially the VAT tax. If the exploration projects result in production, then the taxes should be implemented of course. However, if not, then the input costs of explorations are higher, which discourages investors and pushes them to other African countries in the long run."

Eric Asubonteng, Managing Director, AngloGold Ashanti and President of the Ghana Chamber of Mines.

The presence of international mining powerhouses in Ghana makes the comparatively high mining tax rate of 35% a lesser issue than the costs associated with exploration. A 2019-industry assessment by the Chamber of Mines revealed that Ghana is losing potential mining investors to emerging mining destinations in the West African sub-region, particularly Burkina Faso, as a result of the Value Added Tax (VAT) on exploration inputs.

"The government needs to reduce the taxes on exploration, especially the VAT tax," stated Eric Asubonteng, managing director of AngloGold Ashanti and president of the Ghana Chamber of Mines. "If the exploration projects result in production then the taxes should be implemented of course. However, if not, then the input costs of explorations are higher, which discourages investors and pushes them to other African countries in the long run."

Incentivizing greenfield exploration would also bolster indigenous ownership without the implementation of often investor-deterring nationalization laws.

"Ghana has a very long mining tradition, yet not one operational mine is fully owned by a Ghanaian," related Joseph Titus-Glover, managing director at international management form Quantum Group. "In certain mines, mining contractors carry out 60-70% of the work on site, such as drill and blast and haulage of ore and waste, while the mines supervise."

Five decades ago, most Ghanaian mining production was state owned. In 1983, the government implemented the Economic Recovery Program aimed at reversing a protracted period of serious economic decline characterized by lax financial management, inflation rates well over 100% and extensive government involvement in the economy. Ghana has since attracted foreign investments and pushed towards privatization and state divestiture. While the sector is now largely foreign owned, the government still holds a minority 10% free carried interest in most of the main active large-scale mines, and the small-scale mining industry is reserved for Ghanaians. In addition, a concerted effort on behalf of the government, the chamber and the private sector has increased local participation. Current regulation stipulates both preferential treatment for local suppliers in the mining sector as well as training and employment of Ghanaians.

Ghanaian-owned Dutylex Company is one of several examples of recent local entries into the mining market. The company, which provides lubricant solutions to heavy equipment and vehicles, set up shop in early 2019 and has already become a prominent distributor of Mobil products in Ghana. However, director Peter Quarm pointed out the challenge of staying competitive in the face of stiff international competition.

"The competition we face is mainly foreign," Quarm said. "Around 80% of our clients would prefer a more cost-effective solution in lubrication as opposed to a high-quality one. Therefore, we make sure to communicate to our clients the importance and long-term cost saving of choosing quality."

As both the country's energy and mining sectors keep expanding, the need for expats workers will initially increase to fill the knowledge gap. Ghanaian business advisory firm Alfreg Company has experienced considerable growth since its establishment in 2006 due to the increased need for immigration support services.

"Alfreg assists with immigration support, personnel hiring and other human resource services," said managing consultant

Regina Ofori-Twumasi. “Once operations commence we also provide payroll, tax and accountancy support services and other secretarial support services. We also ensure that our clients are compliant with the necessary statutory returns.”

As of June 2019, 26,425 people were directly or indirectly employed by Ghana’s mining sector. In a press conference held in September 2019, Minister Kwaku attributed the increase from last year’s 23,894 employees to local content initiatives. Employment numbers will be further boosted as mining giant AngloGold Ashanti edges closer to resume full-scale operations at its Obuasi mine.

“We made an investment development decision last year, and we aim to pour first gold by the end of 2019 and reach full capacity in 2020,” said managing director Eric Asubonteng. “We will hire 2,000-2,500 workers in total – including our direct employees and those hired via our contractors for production.”

Currently, Obuasi’s mine life is expected to be 21 years, during which time the production will reach a total of 10.8 oz of gold with current reserves sitting at 6.8 oz. “Our reserves account for two-thirds of the life of mine ounces projected,” Asubonteng continued. “That is significant, since the reserves usually only constitute a fraction of the expected total output. We will be conducting drilling activities to further convert the resources into reserves.”

With new projects coming online, international service providers will bring both jobs and new skills to Ghana. Kanu Equipment, one of the largest dealers for Liebherr and Bell equipment in West and Central Africa, has identified Ghana as an area for future growth.

“We want to support local procurement and development in the countries where we have a presence,” said CEO Stephen Smithyman. “Every country is unique however, and changing laws present ongoing challenges. We are always conscious of how we are adding value to local communities through skills training, and a strong focus for us in 2020 will be local talent development. Liebherr and Bell have agreed to send technical trainers to sites every quarter to develop the skills of our local employees.”

Meanwhile, the government seeks to attract explorers to the southeastern Volta region as well as the country’s north, which remains largely unexplored. In the north, Perth-based Azumah Resources has already blazed a trail for future exploration through its Wa Gold project in Ghana’s northwest for which a feasibility study is scheduled before the end of 2019. Another Australian company operating in the far north, Cardinal Resources, is advancing the feasibility study for its flagship Namdini project, which has a proven and probable ore reserve of 5.1 million oz.

The Volta region attracted attention in January 2018 when lithium was discovered during a nationwide exploration exercise. The government has earmarked mining as a potential economic driver of the relatively poor area that is mostly covered by water. Lithium has also been discovered in the Western and Ashanti regions, but national production will most likely start in the Central Region where Australian company IronRidge Resources has an exploration and production license in a concession covering 684 square km. Drilling commenced in 2017, and the company announced in September 2019 that, with approximately a third of the planned RC and diamond program remaining, new pegmatite zones had been discovered along the known Ewoyaa deposit footprint.

Other avenues for diversification include tapping the country’s bauxite, iron ore and manganese deposits. Ghana has substantial deposits of bauxite mainly found in the Awaso and Atewa regions. In 2018, the government signed a memorandum with China to explore Ghana’s deposits of bauxite in exchange for infrastructure. Under the deal, Ghana will cede 5% of its bauxite resources to the Chinese while Beijing will finance US$2 billion worth of projects including rails, roads and bridge networks. The agreement is part of a larger government plan to leverage more of the country’s mineral resources to fund infrastructure development.

“Save from the main cities, the road infrastructure in Ghana is not very good,” said Soraya Anglow, executive director of Greenline Logistics. “It sometimes takes us a significant amount of time to reach a mine site due to the lack of adequate and well-serviced road network.”

As of 2017, Ghana had approximately 72,000 km of roads, out of which 23% were paved, 39% deemed in good condition and 61% classified as fair or poor. In the face of an expanding energy sector, the government has realized the need to refurbish and extend the road network rapidly while also installing new rail capacity.

“Ghana has seen large railway projects underway over the last few years, and there are plans to extend these further. The rail network will help to reduce congestion on the roads and there is a large project underway to connect Tema with Burkina Faso."

Serigne Ndanck Mbaye, CEO, West Africa and Country Head Ghana at DHL

“Ghana has seen large railway projects underway over the last few years, and there are plans to extend these further,” said Serigne Ndanck Mbaye, CEO of West Africa and country head for Ghana at DHL. “The rail network will help to reduce congestion on the roads and there is a large project underway to connect Tema with Burkina Faso.”

But most funds will be allocated towards the road network that is estimated to account for 96% of passenger and freight traffic. The government recently formed the Ghana Integrated Aluminum Corporation (GIADC) to maximize the benefits from the industry. The end-goal is to leverage the country’s bauxite deposits – the mainstay of the aluminum industry – to create a domestic, integrated value chain. The project includes the construction of a refinery for alumina production, as well as raising output of the Volta Aluminium Co. smelter – which currently operates at a fifth of its capacity – from 200,000 mt/y to 350,000 mt/y.

“Increasing refining capacity is a major priority for the country,” said Sulemanu Koney, CEO of Ghana Chamber of Mines. “We are engaging with local refineries to identify if there is any appetite for them to become certified. Otherwise, we will have to turn elsewhere.”

Creating downstream beneficiation will be key to creating job opportunities and generating domestic skills, but such efforts risk being hampered by the country’s power situation. According to the Ghana Investment Promotion Center, the total installed capacity for existing plants in Ghana is 4,420 MW, which is broken down by hydro 36%, thermal 64% and solar less than 1%. In the past decade, Ghana has experienced severe electricity supply challenges costing the nation an average daily production loss of US$2.1 million. The power capacity has, however, increased dramatically from a mere 1,730 MW in 2006. Yet, actual availability usually sits around half of capacity due to obsolete distribution equipment, outstanding payments as well as overdependence on thermal and hydro sources.

Another challenge is balancing ramped-up mineral output with environmental preservation.

“Population growth, the rising standard of living, urbanization, industrialization in emerging markets, increased mobility, global trade and the digital revolution are all generating huge need for power infrastructure, energy and buildings,” said Eric Waldner, CEO of cable manufacturer Nexans Kabelmetal. “Meeting these growing needs with minimal impact on the environment and climate change is a challenge we share with our suppliers and customers.”

The Ghanaian government has invited some international opprobrium through its bauxite deal with China. The resource sits in the scenic Atewa forest, which provides a habitat for a major collection of Ghana’s biodiversity. Ghana has a bad environmental track record, with the persisting issue of illegal mining rendering a majority of water bodies polluted and vast swaths of land destroyed. GIADEC’s CEO, Michael Ansah, has made assurances

Obuasi Mine. Photo courtesy of Anglogold Ashanti.

"Currently, most of the mining in Ghana is on surface, and we are only now starting to transition to underground mining. Compared to a country such as South Africa, Ghana still has a long future in mining. I believe that mining will become more challenging compared to what we are used to, but the technologies to mine underground efficiently are already available. Ghana still holds significant mining opportunity, and there are a lot of areas that have not yet been explored."

Bashir Ahmed, Vicepresident, Production & Development, Asante Gold

that his organization along with partners are dedicated to responsible mining to ensure the preservation of the forest and that mining activities will only take place in a limited portion of the area while leaving the larger reserve intact.

If ramped-up bauxite production can be achieved within the existing environmental framework, establishing an integrated aluminum value chain will lower costs for infrastructure extension while creating job opportunities for Ghanaians currently dependent on the revenue from illegal gold extraction. Minerals deals with China have a mixed performance history in Africa, and Ghana – especially as China increases its dominance in the country's manganese sector – would be wise to compare notes with the DRC where inadequately detailed contracts and a dysfunctional oversight committee drastically warped the balance of an already skewed minerals-for-infrastructure deal. As for overall diversification, a slightly perceptible widening of the minerals portfolio will not be enough to alter Ghana's dependence on gold, and a few scattered gold exploration projects will not guarantee the country's place as the continental leader in production. Rather, the government must ignore the temptation of complacency amid high gold prices and take measures to bolster aggressive exploration. Such measures might include scrapping the GH¢500-million minimum corporate investment requirement, abolishing the VAT on exploration input, minimizing administrative bureaucracies in granting of mining licenses and decreasing the annual licensing holding fees.

GHANA'S PUSH TOWARDS MODERNIZATION AND INNOVATION

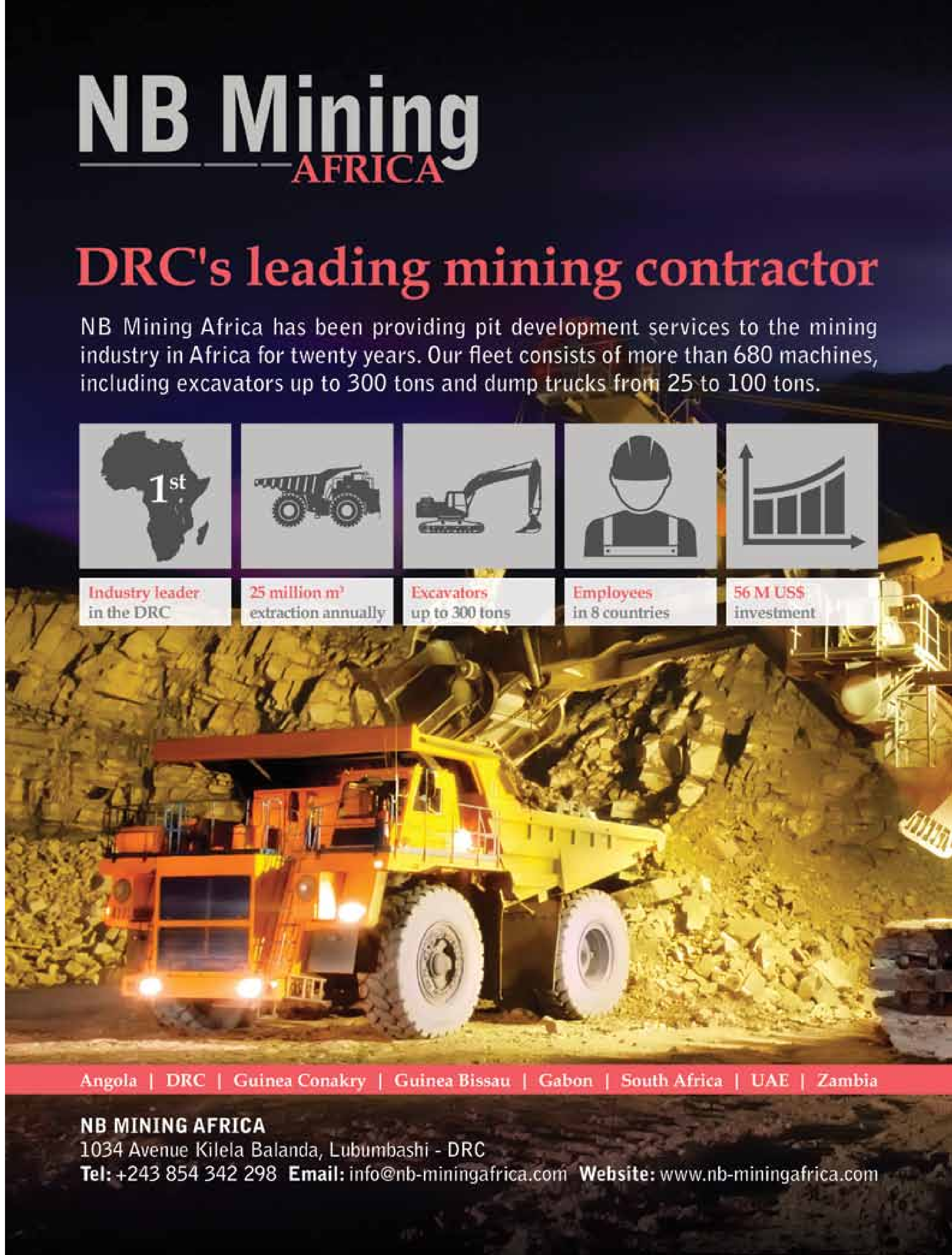
At the 10th WaCA Mining Summit & Expo in Ghana, Mr. Kwaku Asoma-Cheremeh, the Minister for Lands and Natural Resources, urged mining companies and service providers to adopt appropriate technology to improve the performance of the sector, emphasizing how innovation will optimize operations and promote sustainable development for host communities and the country at large.

"Currently, most of the mining in Ghana is on surface, and we are only now starting to transition to underground mining," said Bashir Amed, VP of production and development at Asante Gold. "Compared to a country such as South Africa, Ghana still has a long future in mining. I do believe that mining will become more challenging compared to what we are used to, but the technologies to mine underground efficiently are already available. Ghana still holds significant mining opportunity, and there are a lot of areas that have not yet been explored."

A handful of mines, such as Newmont's Subika mine and AngloGold Ashanti's Obuasi mine, have already gone underground and mechanized part of their operations. However, mining innovation is driven primarily by safety concerns in deep-level operations, and, with some 70% of Ghana's operations comprised of open-pit mining, there has not been a lot of incentive to innovate. Thus, it is easy to imagine a scenario in which innovation is not perceived as a priority until the majority of surface reserves are exhausted. This would likely be a mistake; the short-term benefits of modernization include increased safety and, in some cases, higher profit margins. But Ghana should look beyond the upcoming decade and instead consider the long-term benefits of establishing itself as a hub for innovation. Firstly, early-stage adoption of new technology will facilitate large-scale remodeling of mines in the future. The problem in South Africa is not the unavailability of technology but that the mines' infrastructure often does not allow for the implementation of innovative solutions. Secondly, a more pressing future need for innovation will raise the issue of job losses as multiple mines mechanize and automate concurrently. A 2019 study published in Resources Policy assessed the preparedness of mine stakeholders in Ghana for the adoption of automated mining systems (AMS). The study found that respondents generally had knowledge of the technologies but expressed unwillingness to accept AMS into Ghanaian mines due to fear of increased unemployment. It was also revealed that 48% of undergraduate and 75% of postgraduate mining courses in Ghana were focused on outdated technologies.

Lastly, Ghana has long held the position as the region's hub for knowledge and expats from Ghana are hired as operators and managers all over the continent.

"In my opinion, Ghana is still the country with the most expertise and experience as well as a conducive environment for any investor," said Enoch Kusi-Yeboah, general manager of Metso Minerals, which provides equipment and services for the sustainable processing and flow of natural resources. "Other countries in Africa, such as Senegal and Côte d'Ivoire, are significantly developing expertise within



"In my opinion, Ghana is still the country with the most expertise and experience. Other countries in Africa, such as Senegal, are developing significant expertise within the mining industry, but they have still a long way to go and are looking at Ghana as an example."

Enoch Kusi-Yeboah,
General Manager,
Metso Minerals

the mining industry, but they are not there yet as they look up to Ghana in their quest to build a sustainable industry."

With Ghana as a blueprint, neighboring countries such as Senegal, Burkina Faso and Cote d'Ivoire are rapidly advancing their mining skills. As these competitors offer more competitive taxation regimes, it is crucial for Ghana to retain its reputation as a source of expertise in West Africa.

Thus, an increasingly integrated mining cycle should be accompanied by increased innovation in mines, refineries, smelters and exploration ventures. Ghanaian-owned Asante Gold Corporation sets an example with its green-gold Kubi project as it plans to implement the untested technique, Sustainable Mining by Drilling (SMD), with potential to reduce the extraction costs by 50% compared to conventional mining methods.

"The new SMD mining technique is a two-stage drilling method that enables direct mining of narrow deposits," Amed said. "The SMD method is being developed and commercialized by Anaconda Mining in collaboration with Memorial University of Newfoundland. The proposed SMD method has apparent huge advantages over conventional narrow underground mining techniques and appears well suited to the +5 g/mt Kubi project mineralization."

GALAMSEY

In April 2019, Minister Kwaku Asomah-Kyeremeh announced at a news conference that regular media reports of deaths related to illegal mining or, galamsey, were now a thing of the past. At the time of the conference, the ministry had confiscated 300 excavators nationwide and placed a ban on importation of machinery. The ministry further ensured that those still engaging in illegal mining would be arrested or deported if lacking Ghanaian citizenship.

The taming of its unruly mining landscape has been a long struggle for Ghana's authorities. Following a decade of intensified illegal mining, authorities issued a ban on small-scale mining (ASM) in 2017. At the time, an estimated US$2.3 billion had been lost in government revenue the year prior in addition to the widespread destruction of farmlands, forests and water bodies. The ban was eventually lifted in late 2018, after mounting pressure from the National Association of Small Scale Miners, which pointed to the US$551 million in lost profit during the period of interrupted operations. A long-term ban was never an option as some 30% of gold revenue is estimated to come from the ASM sector, but the president has been adamant in pointing out that the ban still applies to illegal mining.

While the 1,200 arrests recorded in early 2018 have had a temporary effect, the bare-knuckle approach to illegal mining has been tried in numerous other countries, including the DRC and Zimbabwe, and consistently failed. Without a proper plan for large-scale formalization of the sector – meaning the training of and granting of mining rights to small-scale operators – the estimated 200,000 illegal miners in Ghana will recommence activities as soon as the more forceful government efforts cease.

"The ban on small-scale mining was the correct initial approach but not a long-term solution," said Asubonteng. "That is why the government followed up with the training of 4,500 illegal miners at the specialized mining university in Ghana while also launching a community mining program. Nonetheless, the key to the success of any policy is its implementation. If a person is illegally mining in a remote area claiming to have the right to a permit for community mining – the locals would not be able to stop him. Therefore, a monitoring mechanism by the government is crucial to stop this from happening."

The government's attempt at a long-term solution is the implementation of the Multi Sectorial Mining Integrated Project (MMIP). Launched in Tarkwa in February 2018, the legal framework is based on statutory enforcement, social interventions and technological adaptations in the mining industry. Largely, its objective is to regulate and assist ASMs and to improve the efficiency of their operations. The MMIP is a more comprehensive document compared to the more broad-stroked roadmap the Inter-Ministerial Committee Against Illegal Mining initially presented. But critics have raised concerned about the reliance on stakeholder funding – such as the US$50 million donation approved by The World Bank in 2018 – which risks undermining the autonomy of the government. To formulate and implement measures to address the problem effectively, there is a need to understand the scale, scope and locational and operational attributes of illegal mining; whether the MMIP will be sufficient remains to be seen.

Meanwhile, the overall sustainable development of the country's mining sector will inherently work to undermine the need for locals to engage in illegal extraction. Community engagement has become an increasingly integral part of mining operations, and, with the right practices, explorers and miners could constitute a reckonable force in providing lawful employment in local communities.

Senegal

As a member of the Mali Federation, Senegal gained independence from France in 1960, after which the union quickly dissolved. Senegal's key export industries include mining, agriculture and fishing, and the country remains one of the most stable democracies in Africa.

Population: 16,296,364 (UN 2019)

Land Area: 192,530 km^2

Official Language: French

GDP (PPP): $42.21billion (World Economics 2018)

GDP PPP Annual Growth Rate: 7% (2018) (African Development Bank)

GDP Per Capita (PPP): $3356.30 (Trading Economics 2018)

Industry: agricultural and fish processing, phosphate mining, fertilizer production, petroleum refining, zircon, and gold mining, construction materials, ship construction and repair (CIA World Factbook 2017)

Top Exports: Inorganic chemicals: (20.2%), Gems, precious metals (19.6%) Fish (19.3%) Ores, slag, ash (7.3%), Vegetables (3.9%) Fruits, nuts (3.3%), Mineral fuels including oil (3.3%) Salt, sulphur, stone, cement (3.2%) (worldstopexport.com 2018)

Top Imports: Refined Petroleum (11.3%), Crude Petroleum (6.02%), Rice (5.6%), Packed medicaments (2.6%), Cars (2.5%) (OEC 2018)

Top Export Destinations: Mali (19.8%), Switzerland (10.1%), India (5%), Ivory Coast (4.7%), United Arab Emirates (4.5%), China (4.4%), Gambia (3.6%), Spain (3.6%), Guinea (3.5%), United States (3%), Netherlands (2.9%) and Italy (2.6%) (worldstopexport.com 2017)

Gold Production (kg):

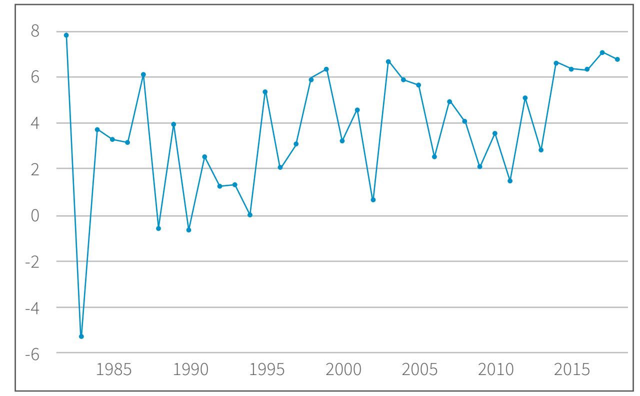
2013: 6,445
2014: 6,588
2015: 5,670
2016: 6,741
2017: 7,255

2013-2017

11.2%

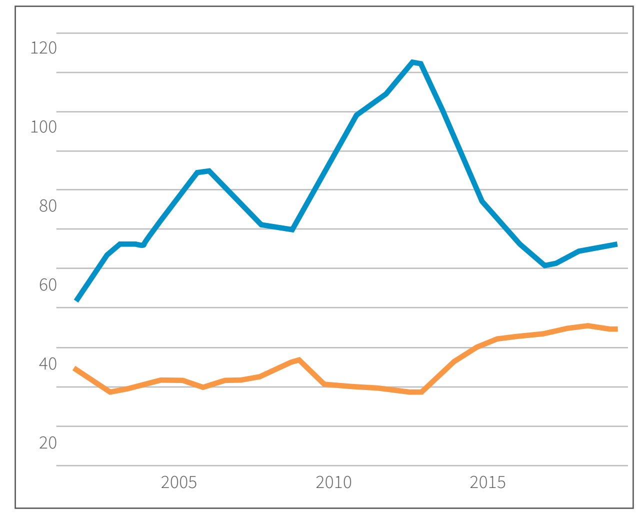
Source: British Geological Survey

GDP (annual %)



Source: The World Bank

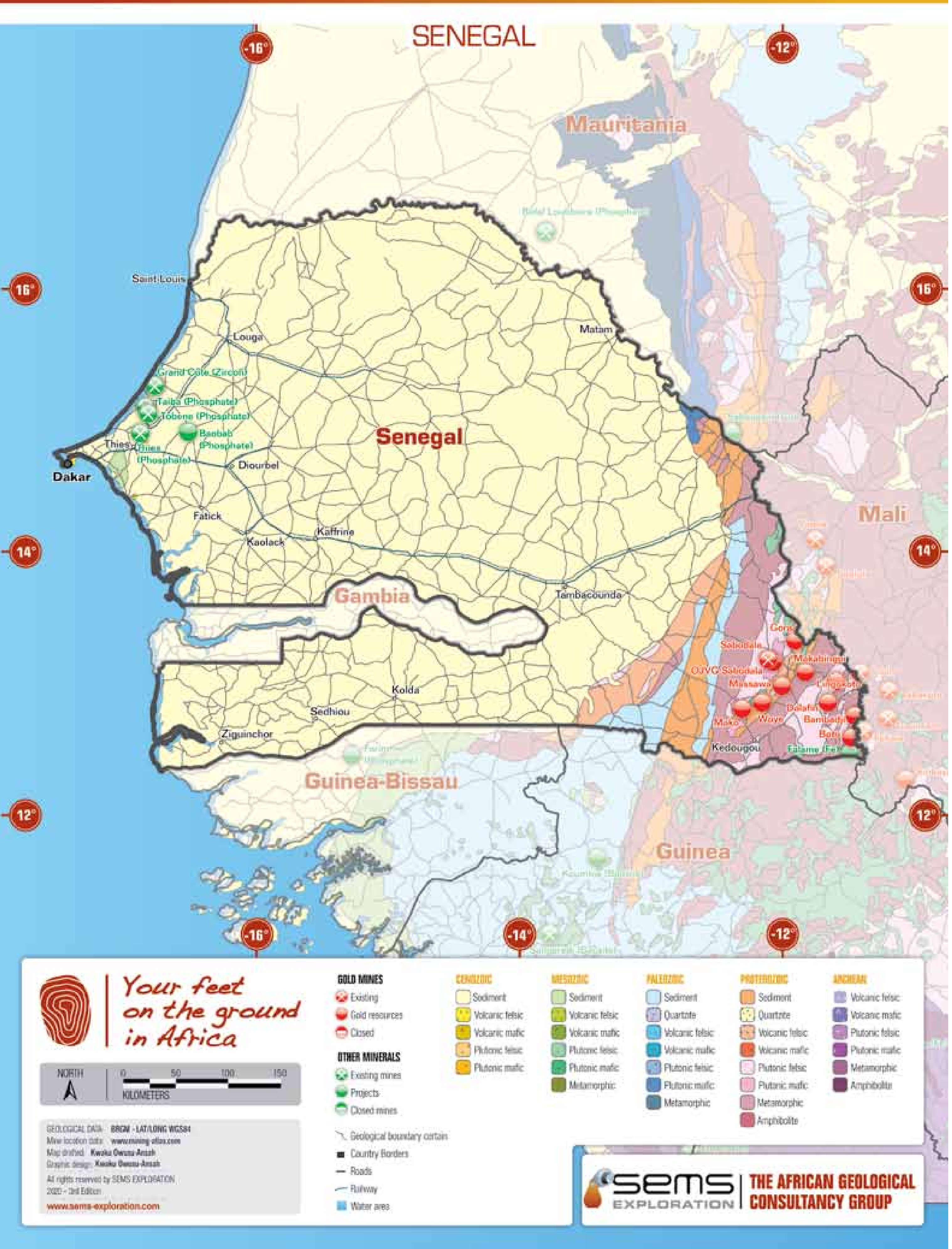
Corruption Perceptions Index



Source: countryeconomy.com

World Bank Ease of Doing Business Ranking:

2017: 140/190 → 2018: 141/190



Senegal

Does this nascent jurisdiction have what it takes to be the region's next great mining hub?

Speaking to Bloomberg TV at the 2014 World Economic Forum in Davos, President Macky Sall earmarked mining as one of the country's "pillars of development." As a key sector in the 2014 Plan for an Emerging Senegal (PES), the mining industry would help drive the economy to an average 7% GDP growth rate during the upcoming decade. Accordingly, in 2018, the estimated real GDP growth was 7%, down slightly from an even more impressive 7.2% in 2017. With this momentum recorded since 2015 expected to continue into 2019 and 2020, Sall's re-election in early 2019 came as no surprise. Election uncertainty now in the rearview, the government is set to continue its mission to join the top seven largest gold exporters in Africa, to diversify its mining portfolio and to become a regional mining hub.

LEVERAGING POLITICAL ACTABILITY TO ATTRACT INVESTMENT

The revision of the mining code in 2017 followed the theme of numerous African mining jurisdictions that have altered regulations in the last few years. Emphasis was on increased government revenue and greater benefits for local communities as well as more stringent environmental requirements. Most of the changes introduced by charter bring Senegal in line with other West African countries, and, despite some predictable pushback from the mining sector, the charter is competitive so that Senegal remains widely perceived as an investor-friendly jurisdiction. Like many of its neighbors, Senegal is endowed with vast mineral resources, ranging from gold, phosphate, zircon and titanium to iron ore and limestone. But what has contributed more to Senegal's status as a rising star in West Africa is the nation's political stability.

"Although there are still some opportunities, safety issues are obstructing the development of countries such as Mali and Burkina Faso," said Cedric Fernandez, country manager at equipment provider Saudequip. "Senegal has a stable and safe environment, and I see this as an opportunity for significant growth for both the company and the country."

With mounting terrorism in countries such as Nigeria, Niger, Burkina Faso, Chad, Cameroon and Benin, Senegal - which is among Africa's most stable countries, with three major peaceful political transitions since independence in 1960 – is likely to keep gaining popularity. Sall comfortably won his second term with 58.27% of the votes and an unusually high voter turnout of 66.23%.

"The advantage of the reelection of President Macky Sall is that it brings stability and reliability, which attracts investment," said Abdourahmane Diop, general director at Labosol – AGTS. "With the emerging oil and gas sector in Senegal, we still hope to see investment into the mining industry."

Since 2015, mining's contribution to GDP has been relatively steady at 2.5%, with the majority of foreign investment directed towards gold and phosphate. Currently, gold represents more than 40% of total mining output, with significant deposits in the southwestern part of the country, while phosphate production represented about 15% of the sector in 2018.

RAMPED-UP GOLD PRODUCTION

The government's plan for Senegal to join the world's top gold producers is far from a pipe dream. Senegal holds almost double Mali's portion of the gold-rich Birimian Greenstone Belt, and the country's gold output has increased steadily in recent decades, with production rising from 0.6 mt/y in 2005 to 4.4 mt/y in 2010 and more than 7 mt/y in 2018. Located in southeast Senegal near the Mali border, Teranga Gold Corporation's Sabodala gold mine is the largest producing gold mine in the country and expected to produce over 1 million oz of gold between 2018 and 2022. Since the IPO in 2010, Sabodala has produced some 1.7 million oz and has, as of December 2018, an estimated gold reserve of 2.4 million oz. Between 2018 and 2022, the mine is expected to proffer a total of US$230 million in free cash flow, which will be used to advance Teranga's project pipeline. In August, the TSX-listed company kicked off production at its Wahgnion gold mine in Burkina Faso ahead of schedule. "Wahgnion is expected to increase Teranga's consolidated annual production by 50% to between 300,000 and 350,000 oz," said president and CEO Richard Young. "Wahgnion's reserve base has already grown by 40% since the initial reserve estimate. With only four deposits included in the current reserves, and a dozen identified targets on the mine license yet to be drilled, we see room to grow."

Close to the Sabodala mine, Toro Gold's Mako mine became Senegal's second gold producer when it commenced production in January 2018. The low-cost, high-margin mine produced 156,926 oz of gold in 2018 and hosts a mineral resource of 1.24 million oz grading 1.89g/mt Au, and an ore reserve of 928,000 oz grading 2.05g/mt Au. In July, Australia-based Resolute Mining announced its acquisition of all the shares of Toro Gold by way of takeover. The US$274 million-deal comprises US$130 million in cash and US$142.5 million Resolute shares. Resolute is targeting annual average production from Mako of 140,000 oz at an all-in sustaining costs of US$780/oz over a seven-year mine life.

Dr. Ousmane Cisse,

Technical Advisor

Senegal Ministry of Mines and Geology

In an era when West Africa is increasingly opening up its mineral industry for international investment, is there also increased collaboration between countries in the region?

During the last decade, the focus in West Africa has been to attract and retain investment in its mineral industry with various incentives such as tax exemptions. However, mineral investment has not translated to a substantial increase in government revenues. It is likely the race to the bottom has touched rock bottom with regards to gold as countries in West Africa all share these concerns. Therefore, the Economic Community of West African States (ECOWAS) urges member states to create a harmonious and regulated environment for the overall sustainability of the region's mining sector. But, I believe the cooperation among countries can be increased further by the creation of dedicated policy and rules for specific minerals to the benefit of the broad spectrum of opportunities derived from mining. It is important to cooperate in areas of innovation and value-chain transformation in mining, which is the Achilles' heel of the region.

How has the 2016 mining code been received by the sector, and are there clauses that are subject to revision?

The 2016 mining code is the result of a four-year process aimed at modernizing the Senegalese mining sector. The law promotes human rights, gender equality, transparency and good governance, introduces competitive tenders for the issuing of mining titles, gives priority to environmental obligations and social responsibility and provides exemption and advantages for investors. It seems too early to introduce changes to the law, but as a matter of living law the practice could positively enrich the mining code.

How is transparency ensured in the Senegalese mining sector?

Senegal has been a member of the Extractive Industry Transparency Initiative (EITI) since 2013. The EITI stipulates international norms for the good governance of oil, gas and mineral resources. Senegal published its 2015, 2016 and 2017 EITI reports, making its EITI reporting the most up-to-date in Africa in 2018. Senegal has made swift progress in the five years that it has adhered to the EITI norms, and the country will continue to build momentum towards greater transparency and accountability in the extractives sector.

While phosphate remains one of the country's biggest export items, gold is becoming more important. What is your prediction for the future of Senegal's gold sector, and are there other minerals you believe will play an increasingly prominent role?

Senegal has a long phosphate and industrial minerals history. During the last decades, the government has encouraged foreign investment in the country's mining industry, enacting an attractive mining code and providing as much geological information as possible. The effort has paid off as new discoveries are being made. Today the exploitable resources are estimated to contain 1.63 million oz of gold, with resources of 3.55 million oz. But policies and regulations still have to be introduced to tackle artisanal and illegal gold mining.

Last year, you mentioned the need for bolstering downstream capacities such as the creation of a phosphate-fertilizer sector. Are there any such initiatives currently underway?

The creation of a phosphate-fertilizer sector is still on the country's agenda. There were challenges that delayed the initiative, but investors have overcome these issues quickly, and projects are on track.

Senegal is becoming increasingly favored by investors in comparison to more mature gold jurisdictions such as Ghana and South Africa. What are the main competitive advantages of Senegal as a mining jurisdiction?

Senegal offers a stable political environment and strong institutions with growing opportunities for foreign investment. The country has a wealth of diverse and unexploited mineral deposits. The mining code is a transparent, predictable, simple, stable and non-discriminatory mineral regime. The code has been designed to reduce administrative formalities and to create a legal environment based on the principles of clarity, flexibility, competitiveness and sustainability.

Do you have a final message for our international readership?

There are a lot of reasons as to why Senegal is fast becoming the new mining investment destination, but there are only three that matter: its geology, friendly investment framework and stable political environment.

With the country's second gold producer up and running, Senegal nudges closer to reaching the government's goal of an annual gold production of 18 mt/y by 2023. Additional projects are also expected to come online shortly. IAMGOLD, which also has a presence in Burkina Faso, Mali and Guinea, carried out a feasibility study on its Boto gold project in October 2018. From its beginning as a grassroots exploration project, Boto now has an indicated resource (including reserves) of 2.2 million oz. In a 2019 report, IAMGOLD announced the completion of approximately 13,500 meters of diamond RC drilling. The drilling program included further resource delineation and evaluation of potential resource expansions adjacent to the Malikoundi design pit, as well as condemnation drilling of proposed infrastructure sites. The company also advanced its application for a mining concession with the government, with approval expected in the second half of 2019.

Meanwhile, ASX-listed Bassari Resources is sprinting to bring its Makabingui gold project into production in 2019. The project currently hosts a mineral resource of 11.9 mt averaging 2.6 g/mt Au for a contained 1 million oz of gold classified into the indicated and inferred resource categories, with 158,000 oz classified as reserves. Bassari Resources received the US$13 million loan approval for the project in January 2019.

"Through the process, we have been working closely with Coris Bank International who has now also set up an office in Senegal," said project manager Andrew Goode. "We have been working with the bankers as much as we have been working with our suppliers. We are now in the process of finalizing the construction of the mine, and we expect to be in production by late 2019 or by the first quarter of 2020."

Bassari sees Makabingui as the gateway to more Birrimian riches and has already conducted drilling in proximity to the existing resource.

"We predict to produce approximately 50,000 oz/y for at least four years," exploration manager Moussa Diba continued. "During the production phase we will reinvest funds into resource drilling to expand our resource and production capabilities."

OPPORTUNITIES IN OTHER METALS

The ministry has also expressed ambitions to improve the iron, zircon and phosphate sectors. At the end of March 2019, l'Agence nationale de la statistique et de la démographie (ANSD) reported an increase in zircon exports from 2.5 billion CFA francs in March 2018 to 3.8 billion a year later. The increase in 1.3 billion CFA francs is equivalent to US$2.3 million and represents a rise of 53.4% in relative value. The ministry has voiced aspirations to become the world's 4th-largest zircon producer by 2023, with an annual output of 90,000 mt.

Senegal is already one of the world's top phosphate producers, with production reaching 2.4 million mt in 2017. Production

will soon increase as ASX-listed Avenira's 80%-owned Baobab project is set for expansion. The Baobab mine started producing phosphate in September 2016, and Avenira completed a feasibility study for expansion in March 2019. After expansion, the high-grade phosphate rock mine will have a concentrate production capacity of 1 mt/y. The final investment decision (FID) is anticipated to be made in the first half of 2020.

Senegal is also rich in iron-ore and limestone. The southeastern part of the country holds an estimated 750 million mt of iron-ore reserves, and the government is actively working on expanding this area of mining. If successful, annual production could be in the realm of 25 million mt, but so far, disputes between the government and companies have hampered production. Abundant reserves of limestone – estimated at 300 million mt – have made Senegal a strategic provider of cement in the region.

"In other West African countries, limestone reserves are limited," said Luk Haelterman, country manager of Dangote Cement Senegal. "Côte d'Ivoire, for example, has a large number of cement mills but no limestone quarry available – this means that clinker must be imported, which results in a higher cement production cost."

Senegal currently has considerable production overcapacity across its three cement factories, sitting at about 200% of national consumption.

"Approximately 75% of our products are delivered to the local market in Senegal and 25% of our products are exported to Mali, Guinea Bissau and Gambia," Haelterman added.

A MINING HUB IN THE MAKING?

While Senegal has received a lot of attention as an up-and-coming jurisdiction, the country still has a lot of digging to do if seeking to compete or surpass more mature mining destinations. Mining represented a mere 2.5% of Senegal's GDP in 2018, and, although the volumes are set to increase, the greater mineral potential of the country would need to be unlocked.

"We are predicting production of approximately 50,000 oz per year for at least four years. During the production phase, we will reinvest funds into resource drilling to expand our resource and production capabilities."

Moussa Diba, Exploration Manager, Bassari Resources

"In 2018, exploration activities in Senegal were abundant and became an important part of Geotec's business," said Jean-Christophe Andre, general manager at consulting firm Geotec Afrique. "The country has, however, seen a decline in greenfield exploration activities and in 2019, we have not had any contracts within this space. It seems as if mining companies have stopped their exploration activities and are now focused on production."

In addition to the abovementioned resources, Senegal has unexploited mineral and metal reserves such as platinum, copper, chromium, nickel and decorative stones. As there are relatively few producing mines in Senegal, greenfield exploration is the way forward to expand the sector. But as juniors struggle to attract investors, a perceptible uptake in exploration will likely depend on commodity prices as well as government initiatives to bolster international entries.

"Senegal has a well-balanced society with both social and political stability," said Mamadou Lamine Gueye, president director general of freight forwarding company CSTT-AO. "This is a considerable competitive advantage as it bolsters investor confidence. If the country continues on this stable path, I am very optimistic about the opportunities for growth."

A possible impediment to the development of the sector is the government's failure in resolving the growing issue of illegal extraction of resources. This issue is not specific to Senegal; Ghana, Zimbabwe and the DRC are just a few out of many countries struggling with territorial conflicts, investor deterrence and environmental destruction as a consequence of illegal mining. In all of these countries, efforts to formalize the sector under legal frameworks and to improve its environmental and health practices have so far largely failed. Often this is due to top-down policy measures that make change complicated and burdensome for low-resource miners.

The mining code has increased transparency and introduced environmental safeguards that will underpin the sustainable development of the sector. The Senegalese government also acted wisely when merely tweaking the existing regulation rather than completely overhauling the existing regime. New mining legislation is always a sound of alarm to investors, but the government included a stability clause providing that provisions of the new code will only apply to mining titles acquired after November 2016. This contrasts sharply with other jurisdictions where, following adaption periods of between one and five years, the new legislation has applied to existing holders of mining titles. In addition, the local content provisions of the new code will hopefully remedy the skills shortage that currently undermine the spread of mining benefits to the population, and companies are increasingly engaging in the transfer of skills voluntarily.

"Finding skilled labor in Senegal is a huge challenge," said Nicolas Turpin, CEO of SMT Senegal. "SMT has many expats working for the company as we sometimes have difficulties to find the required profiles locally. Aware of this reality, and willing to share Volvo's expertise, Volvo does provide proper training to our employees so that we can best serve our customers."

While the practice of empowerment policies yields more cautionary tales than best practices, Senegal has so far avoided the pitfall of unrealistically aggressive local content laws. Yet, Senegal is a young mining jurisdiction, and the existing laws should be regarded as a work in progress where improvements can already be made. "Although local content laws have been better implemented in Senegal compared to otherAfrican countries, the laws and regulations are still burgeoning," said Mouhamed Kebe, partner at law firm Geni & Kebe. "The country also has laws and provisions that indirectly address local content, for instance, in the last mining code, there where provisions addressing the issue of mining shares allocated to local companies. The main challenges are firstly to establish a very efficient local content policy and secondly to implement this policy. The difficulty is that companies are not willing to give away the proportion of shares requested by law, but local companies do not necessarily have the financial capacity to buy the shares."

"Senegal plans to acquire two new ports in Ndayane and Bargny-Sendou to redirect traffic from the autonomous port of Dakar which is currently near its limits and very congested."

Vincent Bayiha Kodock, Country Manager, OMA Group

The government's infrastructure development plans, mainly driven by the need for meeting the requirements of future oil production, will also benefit the mining sector. The president's plan centers on 27 infrastructure projects and 17 structural reforms aimed at attracting foreign investments.

"Senegal plans to acquire two new ports in Ndayane and Bargny-Sendou to redirect traffic from the autonomous port of Dakar which is currently near its limits and very congested," said Vincent Bayiha Kodock, country manager of logistics giant OMA Group. "The Bargny port will be more dedicated towards the mining industry and the Ndanyane port will be geared towards containers. This means that the traffic at the Dakar port will be lightened and this port will then be dedicated towards the oil and gas industry."

Senegal's mining industry is in its infancy and requires a great deal of development. The greater agenda is to leverage the country's political stability to unlock Senegal's vast mineral potential and to increase foreign investment in exploration and production while also upgrading infrastructure and ensure compliance with environmental regulation.

Global Business Reports