GLOBAL BUSINESS REPORTS & MINING INDABA

MACIG

THE OFFICIAL MINING IN AFRICA
COUNTRY INVESTMENT GUIDE

2019

"Our promise is about developing
engaging with our customers a
This is how we deliver

Edwin Ludick, AEL

Intelligent Blasting

smart blasting solutions through
and understanding their needs.
Intelligent Blasting."

Managing Director

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Welcome Note

The 2019 edition of the Mining in Africa Country Investment Guide (MACIG) marks the sixth year of partnership between Global Business Reports and the African Mining Indaba, which this year celebrates its 25th anniversary. The publication will be launched in February 2019 at the event in Cape Town before being further distributed throughout the 2019 year.

Since its inaugural year in 2014, MACIG has endeavored to fill a void in the African mining industry by providing a point of reference for governments, investors, and the wider mining community, and we are pleased to forecast that 2019 will arguably represent the first year in this publication's existence that Africa's mining industry will begin to enjoy a relative degree of stability. Overwhelmingly, our research conducted throughout 2018 suggests an air of cautious optimism heading into 2019. Paradoxically, that stability has been driven by a broad trend across the continent towards diversification away from the mining industry into sectors such as agriculture, power generation and manufacturing. In 2017, FDI to Africa dipped to US$42 billion, representing a 21% decline from the previous year and continuing a downward trend since 2015 in response to weak oil prices. The countries that suffered least were those with diversified economies; indeed, the East Africa region has been the continent's standout performer in terms of economic growth, with investments in mining overshadowed by developments in its technology and construction industries. After years of struggling in the face of poor commodity prices and a drought in mining investment, Africa's miners are finally experiencing this serendipitous collision of continental cohesion and favorable global conditions.

That is not to say that we did not witness challenges in our trek across the continent to produce MACIG 2019; particularly in countries that are still struggling to bolster other segments of their economies, ongoing public debates between mining companies and governments continue to center on how best to balance national development objectives and investor interests. In the Central African Copperbelt, the DRC stole the spotlight and will continue to demand the world's attention in 2019, as skyrocketing cobalt prices and ongoing political chaos ensure the perfect storm. Throughout Southern Africa – from Botswana's depleting diamond reserves to Zimbabwe's well-established chromium deposits and Zambia's deepening copper mines – maturing jurisdictions are more increasingly focused on the task of achieving local content and beneficiation. Conversely, in West Africa, the region's underexplored mineral resource potential makes the area an attractive proposition for investors from across the globe and more nascent jurisdictions like Burkina Faso and Côte d'Ivoire are eager to incentivize foreign investment.

In the pages that follow, we look forward to presenting our readers with updates from some of the continent's most compelling investment destinations – from the tantalizing opportunities in West Africa's Birimian greenstone belts to the more developed prospects in Southern Africa and the high risk, high reward ventures in the DRC. Each country is not without its challenges, and investment risks must be properly weighed against potential return. While underexplored geographies hold greater potential for large discoveries, more developed mining countries have the advantage of a proven track record of projects being brought to production and a more developed local service sector. Consequently, as well as highlighting opportunities, we also seek to elucidate risks and potential challenges. The continent's histories of unrest have deterred some investors over the years, but the impacts of increased stability on investor confidence are immediately apparent in countries like Côte d'Ivoire and Burkina Faso, while a waiting game seems to be in play for jurisdictions like Zimbabwe and Angola, where political tensions are still settling. MACIG 2019 is intended to guide investors through the countries selected this year via insights collected in hundreds of conversations with key industry stakeholders and through our independent analysis, factsheets, expert opinions and geological maps. We invite you to explore this valuable resource to help inform your investment decisions across the continent this year. While not for the faint of heart, Africa's incredible mining potential offers high returns when approached with the right strategy and a bold appetite. •

Alex Grose
Managing Director
Investing in African Mining Indaba

Alice Pascoletti
General Manager
Global Business Reports (GBR)

MINISTERIAL INTERVIEWS

Featured interviews with ministry officials, government voices, and industry representatives from across the continent.

EDITORIAL CONTENT

Updates from the field and analysis on the state of the mining industry in jurisdictions around Africa.

This research has been conducted by Catherine Howe, Lindsay Davis, Lina Jafari, Emma Johannes and Carl-Johan Karlsson

Edited by Mungo Smith
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FACTSHEETS

Quick facts and stats that give a quantitative perspective on some of the most interesting destinations for investment in 2018.

24, 36, 42, 50, 62, 98,
106, 118, 128

COUNTRY MAPS

Updated geological maps, courtesy of SEMS Exploration, that provide a fascinating glimpse into each featured country's mineral potential.

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119, 129 120, 130

The Official Mining in Africa Country Investment Guide, 2019

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While miners may grumble about the consequences that cannabis wrought on investment funds for the junior sector in 2018, on the whole 2019 is shaping up to be a very good year for the industry. Commodity prices have demonstrated sustained recovery, and the 2018 World Economic Outlook (WEO) projects that global economic growth will remain strong for at least another year before decelerating. At the center of this growth is Africa, where real output growth increased from 3.6% in 2017 to 4.1% in 2018, a trend that is expected to continue into 2019. While diversification has been an important theme across the continent, Africa's famed natural resources continue to drive foreign direct investment (FDI) and consequently economic performance.

Heightened geopolitical competition in Africa amongst traditional superpowers including Western Europe and the U.S. and newer investors like India and China is becoming increasingly visible. With China firmly cementing itself as the continent's top trade partner, the world will be watching with particular interest to understand how the Sino-African relationship will evolve in coming years. China's extraordinary volume of investments into the continent has irrevocably changed the trajectory of the mining industry; according to a study done by the German Institute of Global and Area Studies (GIGA), between 2005-2016 approximately half of China's total outbound investments were in the energy and mining sectors of foreign countries, and about one third of this was dedicated to sub-Saharan Africa. In countries like the DRC, where over half of the country's mines are now Chinese-owned, local and multinational service providers alike have been forced to adapt strategies to compete with their Chinese counterparts. Further Chinese investments outside of the mining sector in vital infrastructure-works have laid the groundwork for a scenario where China's political and economic hegemony throughout the continent will be ubiquitous.

Russia has demonstrated a reinvigorated interest in the continent, and 2019 will see the first Africa-Russia summit. Russia will also play a role in the construction of a cross-continental railway line intended to connect East and West Africa, from Dakar to Dijibouti. While publicly it seems that the U.S. has toned down its interest in Africa, the numbers tell a different story. EY's Africa Attractiveness report said that U.S. investors and business entities remain the continent's largest FDI spenders, with a total of 130 projects in 2017, representing a 43% increase. In contrast, Asia-Pacific fell by 13%, and the ongoing trade wars between China and the U.S. could indirectly force China to reduce its imports from Africa as it manages a slowdown in its economy.

While Australia has been preoccupied by a more immediate need to strengthen its economic influence in the Asia-Pacific region, the country's long tradition in mining and reputation for venturing abroad ensures a steady presence of Aussie investors in Africa, particularly in the exploration sector. "Modern exploration techniques such as airborne geophysics and gold processing technology were developed in Australia and subsequently brought to Africa. There were also many in the African diaspora that had left the continent for Australia and began go back to invest in the opportunities in their home-countries," said Bill Witham, CEO, Australia-Africa Minerals and Energy Group (AAMEG).

The U.K. will also bolster its presence in in Africa in 2019, a strategy punctuated by prime minister Theresa May's visit to the

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Australia's involvement in Africa truly began when the gold price took off in the early 1980s and we saw many Australians venturing to countries like Zimbabwe and Zambia, in particular. In the 1990s, there was also a significant influx following the change of many governmental regimes that ushered in an era where state-owned companies and mining giants like AngloAmerican and Gold Fields no longer held a stranglehold over the industry.

**- Bill Witham,
CEO,
AAMEG**

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Your feet
on the ground
in Africa
GEOLOGICAL MAP
Phanerozoic
Proterozoic
Archean
Country Borders
Water area
NORTH
MINES
Precious metals & diamonds
Other metals
Coal, iron ore & bauxite
Other minerals
RESOURCES
Precious metals & diamonds
Other metals
Coal, iron ore & bauxite
Other minerals
SEMS EXPLORATION
THE AFRICAN GEOLOGICAL CONSULTANCY GROUP

The delicate balancing act of developing 'vogue minerals' projects

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AVZ


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MW


MN


KL


MP

The project potential for 'vogue minerals' such as lithium, graphite, cobalt and vanadium in the context of fast-developing battery technology has lit up the eyes of many investors. The opportunities, however, need to be approached with a strategic grasp of market uncertainties and a firm technical focus that will mitigate the potential risks.

Africa is an important current source and hunting ground for vogue mineral prospects. The continent holds potential for lithium in evaporite and pegmatite deposits, found in places like Southern and Western Africa's Proterozoic belts, and in the Rift Valley in Kenya and Tanzania. Pegmatite-hosted lithium deposits are found in the Democratic Republic of Congo, which are geologically similar to those found in Australia. All of this suggests excellent lithium exploration opportunities.

Extensive resources and reserves of cobalt are well-known within the Central African Copper Belt, mainly in the DRC, with some cobalt production also coming from South Africa as a by-product from nickel and platinum mines, as well as from Madagascar's nickel laterite deposits. One of the world's few primary cobalt deposits occurs in Morocco.

In terms of graphite – contained in metamorphic sedimentary rocks – over 50 deposits are recorded in Africa; the largest accumulation of resources are reported from Mozambique, Tanzania, Malawi, Madagascar, Ghana, Ethiopia and Namibia.

Africa's vanadium resources – potentially significant in new technologies to store renewable energy in large stationary batteries – occur mainly in magmatic layered intrusions such as the Bushveld Complex, Mozambique's Tete Complex, and high grade vanadate deposits in karst cavities in Damara age dolomite in countries such as Namibia, Angola and the Republic of Congo.

A powerful motivator driving interest in these minerals is first mover's advantage and an assumption that market conditions will remain favourable. Market demand for vogue minerals is, however, almost by definition less predictable than for the established suite of globally traded commodities – which places an extra burden of technical marketing risk upon the developer.

The impact of research and technological innovation to allow substitution of raw materials can be a significant source of uncertainty when forecasting demand and pricing for vogue minerals. For example, a new technique claims to lower cobalt content in battery cathodes from 20% to 4%, while another claims to boost nickel content as a substantial replacement for cobalt.

Where the potential source of these minerals is large – as for lithium – the supply-demand balance can be easily tipped by low-cost new entrants into the market, moving prices to potentially unsustainable levels. Price uncertainty has been recently demonstrated by expansion ramp-up delays at a leading Chilean lithium producer contributing to higher prices in the short term and significant possible declines in the medium term.

Inevitably, we see some step changes in demand arising from advances in technology; this impacts the approach taken to strategic planning, study management and technical design. It makes the exploration strategy, scoping and pre-feasibility stage particularly important to the project's future success, as scenario-based project responses to market changes can be modelled to allow an informed opinion on investment to be made.

In our advice to clients, we prioritise

being low on the cost-curve, requiring a focus on efficiency, sustainability and a meticulous attention to detailed and quality technical studies. With vogue minerals, the question of flexibility gains a special prominence; achieving optimal net present value for a project needs to be balanced to give operational flexibility to ride the rough seas of market vagaries.

Flexible methodologies at mine level may initially be more expensive but may underpin operational survival in a price trough. Surface mining methods may be preferable to underground operations, as they more readily allow for 'switching off the taps' during drastic price dips. On the process side, hydro-metallurgical processes may be more advantageous to flexibility than smelting technologies; and a modular plant with higher operating costs may provide more operational flexibility.

In terms of marketing, producers could look for downstream investment or joint venture agreements with end-users such as refinery builders and battery suppliers. This 'vertical integration' allows the design process and mine plan to be tailored to suit the end-user through early and appropriate technical marketing, rather than sourcing an end-user to match an approved mine plan.

Collaborating in research and development is valuable; for example, commercialisation of large-scale vanadium storage batteries for solar and wind power allows previously stranded assets to generate their own power. Win-win relationships could include trade agreements for raw materials supply to battery manufacturers and longer term off-take agreements lower the technical risk and enhance the sustainability of the project.

SRK believes that studies should assess a range of options for optimal project economics, an approach with special relevance for the opportunities and challenges of vogue minerals. •

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continent in August 2018, the first from a sitting PM since 2013. Despite ongoing Brexit issues, the country intends to be a top G7 investor, will host an Africa investment summit in 2019, and plans to invest £50 million in support of diplomatic missions and the reopening of several embassies across the continent, according to Chatham House. Canada, as a global mining leader and home to roughly half of the world's publicly listed mining and exploration companies, also remains important to Africa's mining industry. However, 2016 saw the overall value of the country's mining assets in Africa decline by 5.5%, suggesting a withdrawal of its presence.

African investors are also playing an increasing role in the development of their own countries, particularly as national governments strive to better provision for local content in mining legislation. Fears that this sort of thinking inevitably leads to resource nationalism are not unfounded, but they are perhaps exaggerated; the capital required for large-scale mining investments remains widely prohibitive for local investors, and international partners will continue to play an important role in extracting the continent's natural resources for years to come. The delicate dance between government and international investors thus remains a fundamental theme of this publication, and with that in mind, in the next section we present some of the key issues considered among the investment community in contemplating a mining investment in Africa.

Key Factors When Assessing Investment Potential

Asset Quality

Recovering prices suggest that now is the time to invest in commodities, but when compared to developed jurisdictions such as Canada and Australia, for some investors Africa is simply too high-risk for an already uncertain industry. However, the only thing an investor hates more than losing money is missing out. The geological prospects in Africa glisten too brightly to be ignored, and thus quality of the asset will always remain the critical component in evaluating an African mining investment prospect. "Tembo Capital's main investment criteria focus on quality. We will look at attributes of the project and investment that are likely to lead to low-cost mining: aspects such as the mine being near-surface and open pittable, high grade, and/or with good metallurgy. We thus focus on the resource itself and the quality of it," said Peter Ruxton, principal at Tembo Capital, a private equity mining fund with a focus on Africa.

In countries with longer legacies in mining such as South Africa or Zambia, mines are increasingly going underground, providing contrast to assets in nascent jurisdictions that still offer near-surface opportunities. "Mining in South Africa typically involves deep level mining – an environment perceived to be complex and dangerous and requiring very specific technologies and practices to avoid accidents," said Niel Pretorius, CEO of DRDGOLD, the oldest, continuously listed company on the JSE.

DRDGOLD completed an acquisition of the West Rand Tailings Retreatment project (WRTRP) assets from Sibanye-Stillwater in 2018, and is finding opportunity in the legacies left by aging projects: "By avoiding deep level mining, we avoid this issue because we mine where the sun shines, which, while not risk free, avoids the dilemmas associated with underground mining," he added.

The opportunities in the reprocessing and recovery of metals and minerals from historical mine wastes are increasingly being looked at in Africa, showing that even as mines age across the continent, ample opportunity exists for the creative investor. "When the mining economy is closing mines as is the situation in South Africa, moving into residual mining is a better opportunity. Surface re-mining is a growing part of our business," said Keith Scott, CEO of Fraser Alexander.

Particularly in Africa, the quality of an asset is intimately tied to the quality of the team behind it. High-risk jurisdictions require management with the know-how to navigate what are often complex oper-

ating environments, and individuals that recognize the continent is not a single country. “To develop projects from an early stage, you need to have the right management team, and in private equity, it is sometimes necessary to adapt the team, to bring in the required skills and experience for the specific stage of the project,” Ruxton added.

Enabling Framework:
Regulation and Governance

After geological potential, the tax regime is one of the most highly-considered factors when assessing the economic viability of a project. Governments are often at odds with companies over the balance between incentives for the company to operate and economic return for the country of operation. Because the viability of a mining project relies on its economics, a stringent tax regime can quickly render the development of a mine unfeasible. Equally, juniors are less likely to enter a country where they are expected to pay high taxes before making a return themselves.

On the other hand, negative public perception – generally a source of pressure on the government to secure greater economic return from companies – is often due to a lack of apparent increase in local and national development and wealth alongside the seemingly huge investments made by mining companies. While in some instances this is due to inefficiency in reinvestment of funds received through royalties and other taxes, the perception generally leads to efforts on the government’s part to tax more heavily for greater economic benefit. “There appears to be a large gap in the understanding of mineral economics between mining companies and governments,” commented Jeff Quartermaine, CEO and managing director at Perseus Mining, which operates the Sissingué mine in Côte d’Ivoire and the Edikan mine in Ghana and will soon move into construction of its third mine, Yaouré, also in Côte d’Ivoire. “Everybody is under pressure to find funds and, when governments approach traditional lenders, like the World Bank or OECD, the advice they seem to receive is to extract more value from the country’s existing resources. There seems to be a belief amongst some politicians, not shared I should say by the companies, that the mining industry is not sufficiently contributing to their host countries’ economic welfare.”

Meanwhile, the industry perspective emphasizes indirect economic benefit, including local employment, and urges consideration for “hidden” taxes such as import duties on equipment and VAT. “We firmly believe that Zambia has every prospect of reclaiming its place as the number one copper producer in Africa,” said John Gladston, government affairs manager at First Quantum Minerals (FQM). “The principles that will underpin this are stability and competitiveness, but not just in terms of the mining tax regime. Things like electricity tariffs, the ability to issue employment permits to limited numbers of critical expat workers, and access to a competitive market for consumables such as low-sulphur gas-oil - of which we consume around 500,000 liters a day - are of great influence to Zambia’s attractiveness. All these are expensive overheads and we need assurances that we can source those critical commodities at a competitive price.”

In countries where exploration activity is not accompanied by tax breaks, juniors are at a disadvantage and investors may be deterred altogether. On the flip side, governments that try to revise tax systems once companies have established themselves in the country are also at risk of dispute. For example, in the DRC where a new mining code was promulgated in mid-2018, there are concerns over whether stabilization clauses will be respected by the country’s several prominent investors including Barrick Gold, Glencore, and Ivanhoe. On the topic of the recent uptick in arbitration cases, Mouhamed Kébé, managing partner at the Senegalese law firm Geni & Kébé, commented: “One of the reasons is that more African countries have new mining regulations and taxes. In many cases, these reforms have impacted existing mining contracts. We are developing more programs in arbitration, and there is a provision under the OHADA system. The OHADA Arbitration Act applies to 17 countries and the Common Court of Justice and Arbitration in Abidjan is seen more and more as the major arbitration center in Africa."

The knock-on effect is that investors will tend to stay away from countries with track records of unstable tax regimes or attempts to renegotiate contracts. As enabling frameworks backed by stable governmental structures stabilize in developing mining jurisdictions, investors will gain more confidence that what they see now is what they will be experiencing over the long term.

Security

Security can be a major challenge in Africa and, as has been seen in many countries, security profiles can change rapidly with unexpected incidents or, at a broader level, with a change in political regime. Countries that have become more attractive in this regard include Côte d'Ivoire and Guinea, while investors are proceeding with greater trepidation in countries like Burkina Faso, DRC and Mali. Commenting on the situation in West Africa, Philip Whitehead, regional security manager for West Africa at British company MS Risk, noted: "It is worth noting that there are many established smuggling routes in West Africa, of which one branch goes through Burkina Faso and up through Agadez, Niger. A lot of the violence we are seeing is a mixture of straightforward Islamic fundamentalism and violence surrounding the trafficking of drugs, people and consumer goods in one direction and weapons in the other direction."

Due to the often-vast expanses of uninhabited land and lack of surveillance capability, it is impossible for governments and companies alike to keep abreast of unrest in certain areas and activity at the borders in real-time. Since mining operations tend to be in remote locations, keeping track of potential security threats can therefore be extremely difficult. At the mine sites companies often have to take major precautions to mitigate security risks, but the underlying problem goes unsolved. Companies like MS Risk are trying to address this challenge through intelligence-gathering efforts. MS Risk's new mobile phone application, D-Risk, allows companies to view the region, with the option to filter by country, with pinpoints for any incident overlaid onto Google maps.

Social License to Operate

Community engagement has become an increasingly integral part of mining operations and, with the right type of practices, explorers and miners could potentially constitute a reckonable force in driving economic development outside of the country's main cities. Through local employment, training and development of locally-driven industries such as agriculture, the potential indirect economic impact is huge, and companies across the mining value chain are increasingly incorporating local content and finding mutual benefit.

Since mining operations are finite, developing sustainable local activity is crucial in supporting long-term economic development across the continent. In Ghana, locally-owned Atlantic Catering and Logistics is incorporating local agricultural activity into its supply to mine sites. "We are very keen on developing the local communities and have policies in place to support that," pronounced Maud Lindsay-Garmat, the company's CEO. "When we move to remote locations, we try to identify local farmers and bring them up to speed and train them to ensure that they are employing good practices. If not, we guide them and let them know which products we need so that they can concentrate their farming efforts where there is high demand."

Mining companies also increasingly understand the importance of building on local competencies. Providing a school may seem worthwhile, but without a trained teacher the benefit of the investment will be lost. Over time, training and employing a local workforce will also provide opportunities for local companies. There are many instances now whereby a previous employee at a major mining company or service provider branched out to open his own business. Similarly, local companies working with international players are able to learn best practice, benefit from knowledge transfer and raise themselves to an internationally competitive level. It is important for governments to support the development of local companies to international standards, rather than simply impose and enforce local content laws when it comes to service providers. If the local companies can operate to the same level as the international ones, they are naturally competitive and often have advantages such as a simplified in-country supply chain and greater in-country focus.

Local transformation through increased

> **"The mining industry is one of the main drivers of Africa's economic development. Providing energy requires mineral resources. Feeding Africa requires fertilizers, which are produced from the extractives sector. Addressing the challenge of low employment can only be possible with industrialization, which relies on minerals among other resources. The African population is growing very fast and will require processed products. This is necessary to satisfy local markets before exports. This will improve the quality of life for the people of Africa using their natural resources."**
>
> **- Fred Kabanda, Division Manager, Extractives, The African Natural Resources Center (ANRC), African Development Bank**

value addition is one of the best opportunities going forward and currently where the greatest potential value is lost for many African countries. Most of what is produced locally is exported before much value addition occurs. In more mature mining countries, such as Ghana, there are some plans afoot to develop downstream activity in-country, including a planned refinery at the site of the Precious Minerals Marketing Corporation in the next few years, or Botswana, which now has around 20 cutting and polishing firms in its diamond sector.

Power Generation

Also tying in heavily to the economic feasibility of projects is power, which accounts for a significant portion of the cost structure and is particularly pronounced in gold extraction. However, while investment seems to be flowing, projects are still hitting road bumps when it comes to transmission. Andrew Herscowitz, coordinator at Power Africa, an arm of the United States Agency for International Development (USAID), stated: "Some of the biggest challenges for power projects when they reach the point of bankability is the purchaser or off-taker. A recent study indicated that only two of 37 utilities in sub-Saharan Africa were actually financially solvent… The question is not whether there is enough deal flow across the continent – they are pretty much on par with anticipated demand for power in most countries. The power will simply not reach industry or the local population if we cannot improve the financial viability of utilities, build out the distribution network and set up transmission lines."

Renewable energy sources are considered the future for power generation across the continent and have a place in the mining sector too. However, for now, mines will generally require a hybrid solution with the occasional exception of light-load operations. "One of the main challenges regarding energy for mines is availability," underlined Mamadou Goumble, vice president for Africa at Wärtsilä, a Finnish corporation with a vast global presence and a broad reach in Africa. "Mines cannot operate on intermittent power supply and require a more stable and reliable source of power. If the mine implements a hybrid solution, it is very important to have the right capacity installed to handle their consumption needs. At this stage, mining companies cannot afford to rely on the weather for their power supply and thus hybrid solutions are currently the best option."

Service providers in the power space are hurrying to meet demand for products that satisfy the industry's embrace of solutions beyond the traditional diesel approach. "The newest of our business segments, the Electrified Power Segment, brings together all of Cummins' electrification resources to increase the visibility of and accountability for the company's investments and performance in this growing market," said Meshach Kwegyir-Aggrey, general manager for Cummins Zambia. "It is positioned to provide fully electric and hybrid powertrain solutions along with technology leading components and subsystems to serve all our markets as they adopt electrification. Currently in development are the Cummins Electric Power Battery (EPB) and the Cummins Power Hybrid Plug-In (HPP) systems for urban bus, which are expected to launch in 2019 and 2020 respectively."

However, there are significant challenges surrounding the implementation of renewable power sources in the mining sector. Dalil Paraiso, general manager at Schneider Electric West Africa, commented: "Large-scale renewable energy plants will need to be established to meet high demand at some mining sites, which can be expensive and time consuming to build. We also need to look at the impact of renewable energy on the local population. We would like to see more micro grid systems implemented, ranging from less than one megawatt-to several megawatts production capacity. The most important consideration for both renewable and non-renewable energy sources is optimization of supply and implementation of the best-suited option for every application. We also need a system to monitor and manage the cost effectiveness of the various power sources while taking the safety of the system into consideration, as different power sources have different safety requirements."

Nevertheless, as confidence grows and commodities continue along a positive trajectory, mining companies will take a longer-term view to return on investment, shedding a more favorable light on the significant upfront capital required to develop on-site renewable energy capacity. IAMGOLD's recently-inaugurated solar facility at its Essakane mine in Burkina Faso is a prime example and is synchronized with Wärtsilä's 55 MW oil-driven power plant. The 15 MW hybrid PV plant will reduce CO2 output by about 18,500 mt and save around six million liters of

"Transmission lines are important both domestically and regionally because it does not make sense for a country to develop its own power at 25 or 30 cents/kWh if it could pay a minimal amount and import from a neighboring country at eight or ten cents. As we look at different countries and deal flow, we are trying to figure out how countries could do a better job of trading power, which will bring down the cost and in turn benefit industry.

- Andrew Herscowitz, Coordinator, Power Africa, United States Agency for International Development

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> **In the next few years things such as non-explosive printable delays will become a reality, whereby customers print their own delay on initiators only once on-site, removing the risk of control during transportation from manufacturer to site.**
>
> **- Edwin Ludick, Managing Director, AEL Intelligent Blasting**

fuel per year. These kinds of results tie in well with the increasing emphasis on sustainability of most mining companies. Christophe Fleurence, vice president of business development in Africa for Total Eren, the company responsible for its construction, commented: "The plant has been in operation since the second quarter of 2018. It performs exactly as we planned; it reduces the mine's fuel consumption by roughly 500 tons per month and today it is the largest hybrid plant in the world. It has been designed, built and realized through a fully private scheme, without subsidiaries of any sort. The project was initially funded by us, but the bankable quality of the development enabled us to refinance part of the project with local bank BICIAB in Burkina Faso."

The Mining Value Chain: Spotlight on Service Providers

The overarching trends in the service segment pivot on complete turnkey solutions and reactivity. Many service providers are expanding their capabilities, if they have not already done so, to become a 'one-stop-shop' for their clients, responding to the longstanding preference of companies at the end of the supply chain to work with fewer suppliers. When available, international mining and exploration companies look to local service providers, as long as they can compete at the same standards as the international alternatives. Many companies are responding to demand for fast responses through greater proximity to the client, whether by setting up bases in the main mining regions or at the mine sites themselves.

For many international suppliers, these demands will mean working with local distributors rather than necessarily setting up shop in-country themselves. Across the continent, a large number of local distributors hold consignment stock for international suppliers and carry out aftersales services on their behalf. Holding stock domestically is key, particularly with the added delay of lead times at customs on top of shipping.

Demonstrative of how important the services that go along with equipment supply are is the emphasis placed on aftersales by these suppliers and their distributors. "In 2008, we asked the customer how we could improve, and they told us, 'You're great at supplying a product, but you don't ask us why we're buying the product.' Subsequently, we changed the whole business to center around understanding things like: application, maintenance requirements and longevity to provide proactive support, rather than just delivering product," said Gavin Pelser, managing director of Bearing Man Group (BMG) and CEO of Engineering Solutions Group (ESG), both divisions of Invicta Holdings.

While there are clear advantages to working with local distributors, some international companies face challenges in ensuring the highest quality of service is extended. Vigorous attention to training schemes and knowledge transfer in satellite facilities has seen an uptick given the high costs associated with expatriate labor. "The company uses in-country labor, where possible, and provides the necessary training for the use of MAXAM's products and technology. The skills in Africa are quite advanced. A good example is our team in Angola, which consist of local talent. This localization model gives MAXAM an unique edge over our competitors because we have strong local teams to support our customers in the countries where they have their operations," said Brett Wheatcroft, regional director of Southern Africa for MAXAM, which provides blasting solutions to 20 countries in Africa.

There is still some way to go before companies involved in exploration and production can rely solely on local service providers to establish, execute and maintain their projects, but a growing number of examples can be seen across the region with positive results and mutual benefit. Going forward, partnerships between local and international service providers will likely be the most attractive model; international companies will benefit from the local physical presence and knowledge of the local business environment and logistical networks plus the added benefit of fulfilling local content guidelines, while local companies are able to get a foot in the door at the major mining companies and learn to operate in line with their would-be competitors.

Tech, Innovation, and Building Human Capacity

The major drivers for product development and innovation are safety and efficiency. Remote control systems at sites and autonomous vehicles are at the forefront of these technologies, and oftentimes these innovations are arriving to the African continent nearly simultaneously or even before competing jurisdictions around the globe. However, globally speaking, mining has been one of the slowest industries to embrace the benefits afforded by digitization and advancements in artificial intelligence (AI). Some attribute the slow uptake to conservative mentalities, but the practicalities of installing what is often high-cost equipment also pose an obstacle. "The biggest challenge relates to the client changing from a manual system to an autonomous system. The infrastructure for autonomous operations at the mine must be installed, which can be a challenge," explained Tal Zarum, head of programs automation for Sandvik, which has partnered with Resolute Mining to introduce full electrification of its mining and development fleet at the Syama underground gold mine in Mali.

Nonetheless, even the most fundamental areas of the industry are pushing ahead with research and development (R&D) initiatives to revolutionize the industry, and at the cutting edge is the explosives sector. "Electronic initiation systems and centralized blasting remain a key focus area for us," said Edwin Ludick, managing director of AEL Intelligent Blasting. "The inherent safety features of these systems, coupled with precision flexible timing and self-diagnostic capabilities have contributed significantly towards improving safety standards at mines, before, during and after blasting takes place. Further development is underway to make these offerings even safer and more user-friendly in the future whilst increasing their capability in terms of predictability of blast outcomes and monitoring."

As well as driving higher productivity, advancement centered on the reduction of human error is highly beneficial, particularly where skill levels and training may pose a challenge. When it comes to the implementation of new technologies, however, it is important for companies to consider the resources at hand, the project requirements and the potential impact of these technologies on the workforce. "Mining companies need to take into account what the best fit for their project will be," emphasized Edwin Obiri, CEO at DRA Global. "There is an international pressure for efficiency and optimization through technology. It is possible to 100% mechanize a mine, but the socio-economic impact needs to be considered. Job creation remains important, and there is a need to retain value and develop skills locally."

Training has become a major preoccupation for many companies, even without factoring in the introduction of new technologies. Particularly in countries with less-developed mining sectors, sourcing skills can be very challenging. "An interesting characteristic of Africa is that the skillsets are totally different in neighboring countries, which is a factor to be considered when taking training into account," highlighted Grant Palmer, country director for Geotech Drilling Africa in Burkina Faso. "Standards are also often different across borders. The training we offer at Geotech is always ongoing and the company's standards are higher than most, even in North America and Europe."

With differing skillsets to contend with and often building on no prior experience, manpower alone will not lead to efficient execution. Nonetheless, expatriate labor is expensive and there has been a concerted effort to engage more local talent as both an ends to achieving the social license to operate and as a bottom-line imperative. Beau Nicholls, CEO at Sahara Natural Resources, elaborated on his company's strategy: "We are constantly training our people so we can work efficiently and deliver a high-quality international service. The few expats we have are West African expats moving around the region to transfer their knowledge and expertise as we establish activities in new countries."

> **I believe that whoever owns the information in the future will own the customer, and we are preparing for that future. We will ensure that we're able to tell our customers throughout the African continent when they are going to experience a system failure before it happens and anticipate the requirement for a product on-site before it is actually needed. This initiative will minimize downtime and significantly improve operating efficiencies.**
>
> **- Gavin Pelser, Managing Director, BMG**

Predictive maintenance through monitoring and analytics is also gaining momentum to maximize operational output. "With a big data and analytics solution, the company can predict and prevent problems by applying predictive analytics to a vast volume and variety of near-real-time and historical production variables," noted Babacar Kane, general manager at IBM. "It can detect and alert facility managers on impending machine malfunctions, allowing them to change production conditions or implement preventive maintenance to avoid machine failure. The solution can also determine the root cause of quality issues, helping the company manage conditions to avoid costly product defects."

The amount of data collected by the mining industry is, to say the least, overwhelming, and Accenture estimates that only around US$11 billion serves to be gained from applying advanced analytics to that data. Nonetheless, the total value estimated to be at stake is some US$321 billion if the industry can learn to effectively adopt more robotics and automated processes into its practices suggesting that technology has a role to play in the industry's near future, and service providers will lead the way in driving miners forward.

In the meantime the successful suppliers to the mining industry will continue to be those with a focus on offering high quality products and services. With time and a supportive attitude to the development of local companies, the playing field will even out so national and international companies alike can compete side by side to derive value from mutually beneficial partnerships. With 2019 looking as though it will provide the stability the industry has desperately needed, the stage is set for both miners and their providers to experience a very successful year. •

INVESTING IN AFRICAN MINING INDABA

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The judges, who are made up of high-profile investors decide who wins each category and goes on to battle it out in the semi-finals and later the final.

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2018 WINNER

Thor Explorations
(TSXV:THX)

Segun Lawson
CEO, President & Director

Thor is currently advancing two high value gold projects in West Africa. Thor's most advanced project is the Segilola project, which is considered Nigeria's most advanced gold project with an indicated resource of 556,000 oz grading at 4.2g/t, an inferred resource of 306,000 oz grading at 4.7g/t and a probable reserve of 448,000 oz grading at 4.2 g/t. Thor also holds a 70% interest in the Douta gold project located in within the Kénéiba Inlier in Senegal.

Thor is currently advancing the Makosa discovery in its Douta licence following a successful RC drilling campaign in 2017. Thor also holds a 49% interest in the Central Houndé Project, Burkina Faso. This project consists of three contiguous licences: Ouéré, Bongui and Legue gold permits located in the prospective Houndé greenstone belt that are being advanced through an earn-in agreement with Acacia Mining.

2018 RUNNER-UP

Algold Resources
(TSXV:ALG)

Benoit La Salle
Chairman and CEO

Algold is building Mauritania's second large-scale gold mine. It is developing the high-grade Tijirit project, where the phase IV drilling campaign was completed in 2018. The most recent results from Algold's flagship Eleonore and Salma gold deposits confirm the high-grade nature of the shear-hosted mineralization. Eleonore is an NI 43-101 compliant resource of 648,790 oz including 94,250 oz at 4.1 g/t Au of indicated resources and 394,690 oz at 4.1 g/t Au of inferred resources.

An additional 50,000 m of drilling is needed to further delineate the resource in 2019. Moreover, high-grade and mineralized samples from the 2018 drill campaign will be re-analyzed using accelerated cyanide leach methods. The downhole televiewer logging on selected holes will be carried out and the data will be incorporated into the updated resource model.

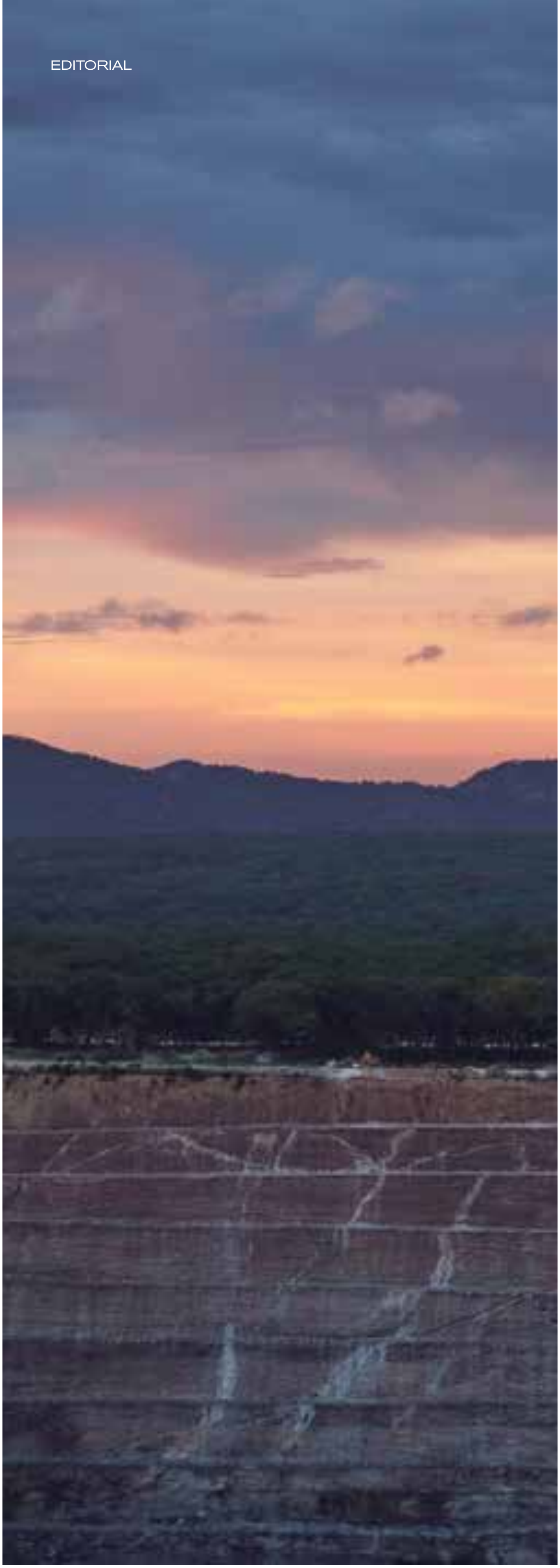
"We need a level playing field in Southern Africa and a serious focus on regional integration to eliminate non-tariff barriers and short-term thinking."

**- Olivier Terra,
MD,
Bolloré Zambia**

MACIG 2019 / Image courtesy of Botswana Chamber of Mines

ANGOLA --- BOTSWANA --- ZAMBIA --- ZIMBABWE

SOUTHERN AFRICA



The Kagem mine in Zambia is the world's largest emerald mine.
Image courtesy of Gemfields.

Southern Africa

Blessed with abundant mineral wealth, Southern Africa has promised to become a future mining hub, but civil war, regressive economic policies and poor infrastructure have kept its countries from rising up to the status of the area's titan, South Africa. As political change sweeps across the region, investors are now watching with keen interest.

After 37 years of totalitarian rule, Zimbabwe is finally free from Robert Mugabe's ironclad grip, and the new president, Emmerson Mnangagwa, has promised a rebirth of the nation under the slogan "Zimbabwe is open for business." On the western flank, in Angola recently crowned President João Lourenço has efficiently washed away some of the dirt of his predecessor through a wide-ranging anti-corruption campaign. Meanwhile in the central maturing jurisdictions of Botswana and Zambia, their governments are making moves to diversify away from dependence on diamonds and copper respectively, potentially lessening the taxation strain on mining companies that have long felt the pressures of driving these fledgling economies.

While the rise of these countries will entail a race for deals and investors, it will also increase interconnectedness and collaboration. Poor infrastructure is one of the biggest challenges facing the region as crumbling roads, energy outages and inaccessibility have long hampered industry. Angola is a key logistical puzzle piece in the corridor linking Tripoli to Cape Town, and will become increasingly important as a gateway nation for its landlocked neighbors. In March 2018, the railway line connecting the Port of Lobito to the DRC border was used for the first time in 34 years and the rail line connecting Zambia and Angola is currently being renovated and linked to the Benguela line. In 2018, Angola was granted a credit line from the Chinese Development Bank of US$2 billion that will be used towards improving infrastructure. Zimbabwe also enjoyed an infrastructure boost after becoming the 19th member state of the Africa Finance Corporation in 2018 — the continent's leading infrastructure development finance institution. Botswana and Zambia are opening up a transport corridor between the countries though the construction of the Kazungula bridge that is projected to reduce transit time from thirty to six hours.

> As the world moves towards electric vehicles, all the associated materials are trending, these being lithium, graphite, nickel, PGMs, and copper. 80% of the world's lithium is solution-based and comes from Bolivia, but more and more discoveries are being made in Africa of hard-rock type lithium. Thermal coal is still interesting for South Africa, because of our ongoing reliance on coal and the need to replace the depleting coalfields with higher quality coal. Additionally, 80% of Africa's manganese is found in South Africa and it is of good quality.

- Denver Dreyer,
CEO,
WorleyParsons RSA

Perhaps most central for the region's development is the quest for economic diversification. Weary of commodity super cycles – maybe with Angola's catastrophic oil crash in mind – each government has pledged to move away from overdependence on a single commodity as well as to use their mineral wealth towards developing other sectors in the economy. In light of impending resource depletion, Botswana is pursuing strategies to diversify into other minerals, such as coal, uranium and soda ash; increase efficiency as existing mines go deeper; and lastly, to create diamond beneficiation through cutting and polishing with the aim of becoming a diamond hub. "Botswana has a very central location within SADC and the country hosts the SADC headquarters," said Keletsositse Olebile, CEO of Botswana Investment and Trade Center. "Investors can use Botswana as an access point to all the surrounding African countries. Botswana also has a framework of the international financial service center and we want investors to see the country as a financial hub for the entire region."

Angola has earmarked mining as the path away from oil dependence, and one of Lourenço's first moves was to merge the Ministry of Petroleum and the Ministry of Mines and Geology, with Diamantino Pedro Azevedo, former president of state-owned iron company Ferrangol, appointed as minister. One of the ministry's main initiatives is a nationwide survey of Angola's geology that will facilitate the exploration of the nation's vast reserves of diamonds, manganese, copper, gold, and uranium, to name a few. "The Planageo project can attract foreign investment to Angola as investors no longer have to embark on exploration activities blindly," commented Canga Xiaquivuila, general director of the Geological Institute of Angola.

Similarly, Zimbabwe, one of the resource-richest nations on the planet and once referred to as "the jewel of Africa" is famous for its diamonds and platinum but also boasts vast resources of coal, copper, nickel and — maybe most importantly for its near future — lithium. Lastly, following the downturn in copper prices, Zambia has decided to diversify into other commodities, most notably emeralds, manganese, and nickel. With copper demand expected to grow in coming years, Zambia's generous share of the Central

Giyani Metals is developing battery-grade manganese projects in the Kanye Basin, Botswana. Image courtesy of Giyani Metals.

African Copperbelt will also remain on investor's radars as a more stable investment alternative to the country's volatile twin to the north, the DRC.

Despite the overall well-established mining tradition in many Southern African nations, lack of skilled labor remains a major challenge in certain jurisdictions. However, as the region stabilizes, workers who have been upskilled abroad will return to their countries with new knowledge and many South Africa, Canada and Australia-based companies are already extending their reach by establishing new satellite offices and reparation facilities in the region. "The biggest challenges we face are the social-license to operate, logistical access to site and sovereign risk," said Denver Dreyer, CEO of Australia-based engineering company WorleyParsons RSA. "This is often the case in land-locked countries and, unfortunately, these factors limit where we can work. However, we have on-site presence in many locations on the African continent, and being close to our customers enables WorleyParsons to understand their challenges at a local level, and respond to their needs using our global expertise."

In addition, both Angola and Zimbabwe have made long-overdue amendments to their indigenization laws which will likely bolster in-country hiring in the long term as more companies enter the market.

While Southern Africa has tremendous mining potential, investors – especially in regards to Zimbabwe and Angola – are playing a waiting game. Zimbabwe faces the challenge of remedying its chronic cash shortage and Angola still has plenty of work ahead in its quest to stamp out corruption. Nonetheless, the coinciding rise of these southern countries will entail common benefits as they become increasingly dependent on each other's infrastructure, resources and skills. While it may be too early to hand over the prize for the world's next mining region, Southern Africa definitely deserves an honorable mention. In the publication this year, we have chosen to profile both Zimbabwe and Angola to explore the future of these two promising jurisdictions, in contrast to Botswana and Zambia, two well-established mining countries that are making moves to strengthen their positions as regional leaders. •

Culture Eats Strategy for Breakfast

Author:
Jeff Elliott,
Managing Director,
CSA Global

Exploration and mining involve many different activities that are often undertaken across huge geographical extents from cities to rural and remote parts of the world. The timeframes to go through the cycle from target generation, to exploration, discovery, evaluation, financing, construction, operations and closure are long, often across investment cycles and sometimes even generational. It is therefore not surprising that with multiple disparate groups working in various parts of the world there is potential for corporate memory loss and disconnected thought processes. These are the ones we often deem to be the "silos" within the company. Based on my experience in the mining industry and 20 years consulting with CSA Global, lack of interconnectivity during the exploration and mining cycle has had a massive impact on decision-making, productivity and performance.

Leaders driving culture

What can we do to reduce the problem? Well, there is a lot we can do, and it is not that hard. It comes down to promoting behaviours that should be valued in any organisation e.g. care, respect, teamwork, etc. It should be the focus of every leader to encourage the actions that drive a culture of inclusiveness and integration to achieve success. Behaviours are leading indicators of future performance and are more likely to impact a business than costs or other physical measurements, which are more likely to be lagging indicators of past performance.

The benefits of working in a truly integrated and collaborative business are wide-ranging. For a start, there is generally a positive company culture, with higher levels of staff satisfaction and engagement, and a can-do approach to problem-solving. Rather than data being locked down, there is proactive sharing of information, transfer of knowledge and building of know-how and intellectual property, resulting in more informed decision-making, forward and abstract thinking, promotion of environments that foster innovation, and generally better outcomes for the business. Additional benefits are reduced errors and wasted money, increased professional development and mentoring opportunities, better succession planning and building of greater business resilience.

Reducing the noise

We have all been bombarded with stories about the need for digital transformation, applications of big data, augmented and virtual reality, machine learning, artificial intelligence, autonomous machinery and "the mine of the future", etc. This is all wonderful stuff and we need to be aware of developments in equipment, technology and services (not only those that are currently affecting the mining industry, but across all sectors and life generally). We need to continually evaluate if there are commercial and pragmatic applications of new technologies or equipment to each mineral project. But let's not forget, it is the human element that is the most important thing in everything we do.

By investing in our people, solving by involving, and creating a shared vision, not only for our employees and shareholders, but for all stakeholders including our suppliers, community and government, we may be more likely to have higher engagement and more of the team vested in achieving success. And technological progress is helping us. We no longer need to be in the same office, or even the same country to share and work on massive data sets or complex studies. Collaboration is no longer linear. With the digital age, it is a cyclical process, involving many and diverse stakeholders from around the world and across the clock.

Early adopters driving invention

I don't buy into the commonly reported view that our industry has been slow to adapt to technological change. In fact, I believe the opposite is true, with the exception of some of the major mining houses. The junior and mid-tier sector are often better early adopters, as necessity regularly drives their need for invention and application of new technology and equipment.

Ours is a relatively small industry, with high levels of social connectivity between participants. What is needed is greater emphasis on leveraging the connectivity that already exists at an industry level and to focus this on value-adding collaboration at project and mine site levels. I also think we need reminding not to allow our strategic or business plan to be consumed by industry clichés and jargon. We need to keep it simple and go back to the behaviours that are more likely to deliver a culture of high performance and success. What's that old saying? "Culture eats strategy for breakfast." •

Angola

Population: 29,79 million
Land Area: 1.247 million km²
Main Official Language(s): Portuguese, Bantu
Capital: Luanda
Chief of State: João Lourenço
GDP: $124,21 billion
Growth Rate: 1.67%
GDP per Capita: 4,170.31

Exports: crude oil, diamonds, refined petroleum products, coffee, sisal, fish and fish products, timber, cotton
Export Partners: China 53.7%, India 7.6%, US 5.6%, South Africa 5.3%, France 4.4% (2016)
Imports: machinery and electrical equipment, vehicles and spare parts; medicines, food, textiles, military goods
Import Partners: Portugal 15.9%, US 12.5%, China 12.2%, South Africa 6.8%, Belgium 6.3%, Brazil 5.5%, UK 4.3% (2016)
Public Debt: 87.8% of GDP (2017)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank

45/54

2017 Score

38.3/100

Safety & Rule of Law

45.6/100

Participation & Human Rights

39.9/100

Sustainable Economic Opportunity

28.8/100

Human Development

39.5/100

TAXATION RATES

SOURCE: ICLG

Mining Operations Income Tax

25%

Royalties

5%

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017

167/180

Score

19/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business

173

Starting a business

139

Dealing with construction permits

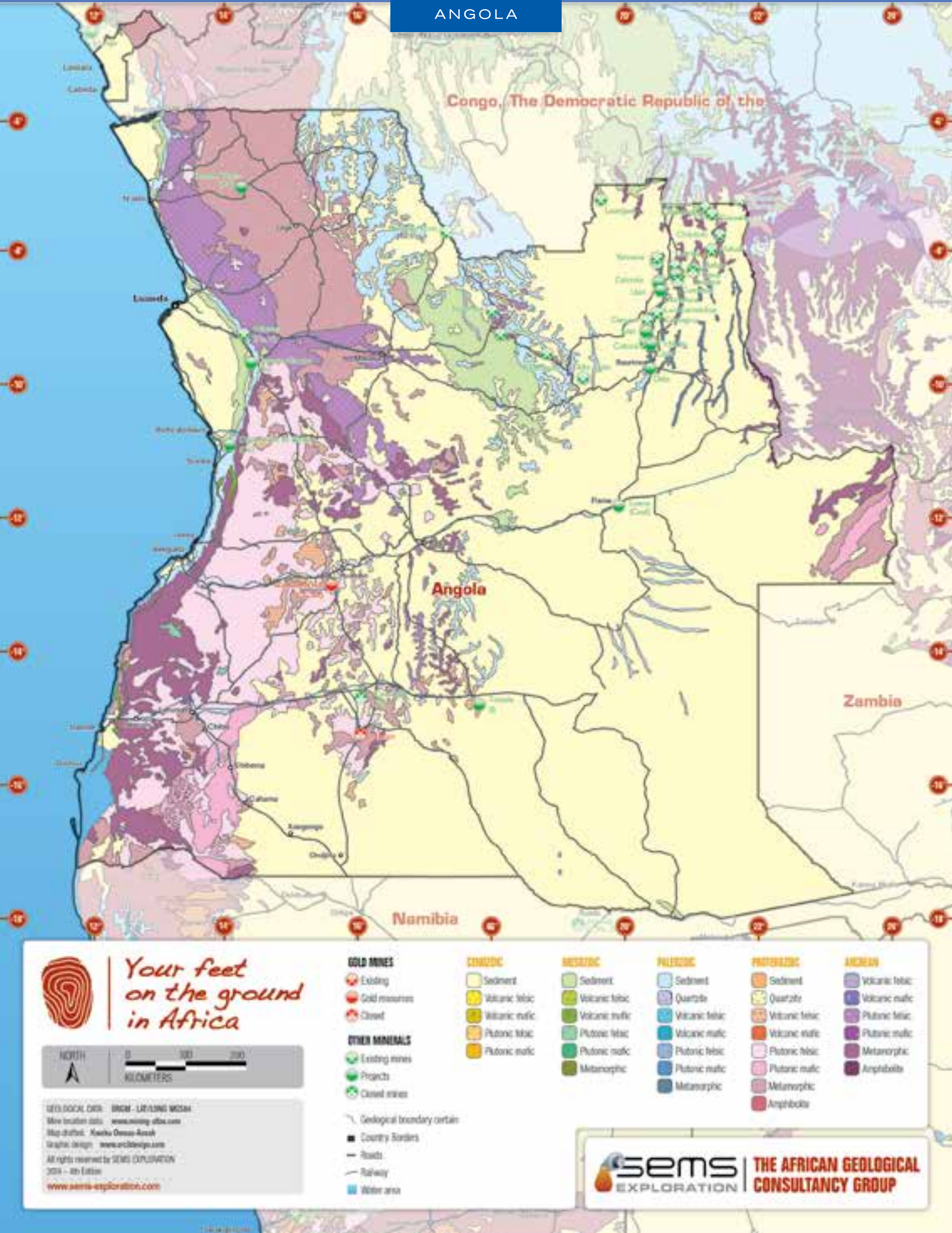
87

Getting Electricity

152

Registering Property

170


Congo, The Democratic Republic of the
Angola
Zambia
Namibia
Luanda
Your feet on the ground in Africa
GOLD MINES
Existing
Gold resources
Closed
OTHER MINERALS
Existing mines
Projects
Closed mines
Geological boundary certain
Country Borders
Roads
Railway
Water area
NORTH
0
100
200
KILOMETERS
Sediment
Volcanic felsic
Volcanic mafic
Plutonic felsic
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THE AFRICAN GEOLOGICAL CONSULTANCY GROUP

Canga Xiaquivuila

Director General,
Geological Institute of Angola

Can you provide a brief overview of Angola's National Geology Plan (Planageo)?

Planageo was approved by the Angolan government in September 2009 and consists of five sub-programs. One sub-program is an airborne geophysical survey and to date, 97% of the entire country has been covered. We are also in the process of completing the geological surveying program, after which geo-chemical and hydro-geological surveying programs will follow. The implementation of the Planageo program also includes the training of human resources and the construction of critical infrastructure in support of geological research.

We have built three new facilities for the treatment of samples collected and are establishing a database containing this information. The Planageo project aims to produce credible, processed and mapped information of the mineral resources in Angola, which would be available to state agencies, potential investors, academics and other interested parties.

Who are the key partners and contractors involved in the implementation of Planageo?

To simplify the Planageo project, the country was strategically divided into three regions, with each region having an operator. The Chinese company, CITIC, is responsible for the north-western region; Costa Negócios, a Brazilian company, is responsible for the eastern region; and the Spanish-Portuguese consortium UTE PLANAGEO is responsible for the southern region.

The three operators did not perform the airborne geophysical surveys themselves, but have subcontracted specialized firms in the field - CGG and Xcalibur. CGG and Xcalibur only collect and process the data. The interpretation and quality control of the data is also subcontracted to other companies. The data gathered from the airborne surveys is analyzed by Geosondas to see if it is correct, of high quality, and if the sub-contractors are fulfilling the requirements.

What are the biggest challenges facing the development of the mining industry in Angola?

Angola has a very attractive mining code, friendly mining regulations, a favorable tax regime, and very low royalties. Industrial taxes have also decreased from 35% to 25%. The challenges within the mining industry relate mostly to operational costs, but the government is investing heavily in infrastructure development to reduce these costs for mining companies as well. Mines mostly operate on generators, and thus their diesel consumption can become very expensive. Developments such as the Lauca hydro-power station can help in decreasing operational costs at mines.

Can you elaborate on the state of Angola's infrastructure and the accessibility of areas with mining potential?

In any mining operation, logistics are a critical aspect and the Angolan government has invested in making potential mining areas more accessible. There is a mining port in Lobito that is linked to neighboring countries, such as Zambia and DRC, through railway lines. The government is also in the process of further developing the railway infrastructure in Angola, which will also be linked to the mining port in Namibia.

The Angolan government has also upgraded road and power infrastructure. In 2017, the Lauca hydro-power station was put into operation and is now the largest power plant in the country, with a current installed power of over 1,000 MW. Only three generation groups are currently in operation, and it is predicted that once all six generation groups are in operation, Lauca will reach installed capacity of 2,070 MW, becoming one of the largest hydropower plants in Southern Africa. The government's strategy is to create an increased synergy between the private and public sectors.

How would you describe the availability of in-country skills to support the mining industry?

One of the benefits of the Planageo project is the training of human resources and technical staff. We are building a skilled local workforce through knowledge transfer from experienced expatriates, and we have also created a database of local geoscientists to create awareness about the skilled staff we have available in-country to support investors.

What is the Geological Institute of Angola's vision for the upcoming five years?

The Geological Institute of Angola is restructuring and we are waiting for approval of a new organizational policy. We are also in the process of moving the institute's offices. We have three laboratories in production, with the idea to treat all samples collected in Angola, in an attempt to reduce the cost of exploration for mining companies. We aim to put Angola on the map as an attractive mining destination. •

Angola: Political shifts signal a new day

With João Lourenço sworn in as Angola's first new president in 38 years, a country famed for its oil and diamond reserves seeks to become a major African mining hub.

Under the leadership of the former president, José Eduardo dos Santos, Angola's economy rose in tandem with soaring oil prices between 2004 and 2008, leading the country to become the third richest in sub-Saharan Africa by 2014. But with roughly half of Angola's gross domestic product coming from the oil and gas sector, the country nosedived when oil prices plummeted in 2014, leaving stacks of half-finished high-risers abandoned in Luanda as investors pulled out and the government suddenly needed billions of dollars in foreign loans. In addition, much of the garnered wealth was concentrated in the hands of a small (primarily political) elite, and the crash left the country's poor in a devastating situation.

The inauguration of Lourenço did not entail a change of ruling party, but rather the former minister of defense was singled out as the favorite by his predecessor. Consequently, citizens and investors alike have observed the new leader with prudence as he has made promises of swift and thorough reforms. Yet, Lourenço has already brought about changes that would have seemed unfathomable a year ago. The soft-spoken leader has launched an anti-corruption campaign and swept away numerous allegedly corrupt officials formerly under dos Santos' protection; he has rolled back regulation requiring local ownership of private companies; unpegged the Kwanza from the U.S. dollar, causing a swift 10% weakening; and lastly, while oil prices have started to rebound, Lourenço has pledged to move away from over-dependence on oil and diamonds by diversifying the economy – and he has earmarked mining as the prime driver.

Diversification and Legislation

In addition to diamonds, Angola has known reserves of gold, copper, iron ore, bauxite, uranium, manganese, zinc and gypsum, to mention a few. However, a 27-year civil war, widespread corruption and an unpalatable regulatory framework have rendered these untapped resources largely inaccessible. "During recent years when the mining sector was in a downswing, Angola became a tough jurisdiction for investors as the country did not introduce any initiatives to facilitate business in the country," said Stephen Wetherall, managing director of Lucapa Diamond Company, an exploration and mining company with a 3,000 km² concession in the Lunda Norte diamond heartland. "However, the recently elected president, João Lourenço, has acted forcefully to stamp out corruption and attract investors. The government is paying greater attention to the pro-investment measures carried out by neighboring countries to insure Angola offers equally attractive opportunities. Specific for the diamond industry, the government has changed the marketing policy, allowing us to accrete additional value to our product which we believe will have a great impact on investments."

Under the new policy, companies are no longer obliged to sell their full production below international market price to preferred customers (imposed by state-owned diamond trading company Sodiam), but can freely sell up to 60% to buyers of their choosing. In addition, Lourenço passed a law in 2018 scrapping regulation that requires foreign investors to partner with local firms. The new law also ends a minimum investment level of US$230,000 – opening up the door for micro investments in the country.

These changes are crucial to the future of Angolan mining as the country has so far operated under a quasi-contractual mineral framework. The Angolan mining code – approved by the government in 2011 – streamlined the judicial framework by repealing most of the existing industry-specific statutes and gathering all regulation in one document. The new Angolan mining code is competitive, with an industry-specific tax rate of 25% (down 5% from the general rate of 30%), deductible cost benefits and production royalties of between 2% and 5%. However, the most significant operational and economic terms and conditions remained outside the established regime and were subject to the specific provisions set out in the contractual instruments of mineral rights. With a number of these provisions eliminated, Angola now offers a comprehensive mineral regime to investors.

Putting Mining First

One of Lourenço's first initiatives as acting head of state was to merge the Ministry of Petroleum and the Ministry of Mines and Geology in order to maximize productivity. The move underlines the government's emphasis on diversification and, more specifically, on the mining sector as a vital part of the national economy, with Diamantino Pedro Azevedo, former president of state-owned iron company Ferrangol, appointed as minister. One of the new ministry's key initiatives in its quest to diversify the economy is the National Plan of Geology project (Planageo) – a nationwide survey of Angola's geology. "The Planageo project aims to produce credible processed and mapped information of mineral resources in Angola, which would be available to state agencies, potential investors, academics and other interested parties," said Canga Xiaquivuila, general director of the Geological Institute of Angola. "The Planageo project can attract foreign investment to Angola as investors no longer have to embark on exploration activities blindly."
Since the project was launched in 2009, 97% of the country has been covered by an airborne geophysical survey. The government is now in the process of completing the geological surveying program, after which geochemical and hydrogeological surveying programs will follow. "We have definitely seen an increase in investor interest since the announcement of the Planageo project, and another driver of investment interest is the political stability of the country," Xiaquivuila added.
While the Planageo project can identify anomalies in a certain area, more detailed exploration is required to establish the commodity potential. However, the Ministry aims to assemble the garnered information in a digital database that will facilitate usage of the information, and has already established three new facilities where the collected samples will be treated and analyzed.

Exploration

While Angola is one of the world's leading diamond producers, an estimated 60% of the country's diamond-rich territory remains unexplored. The national diamond company, Endiama, suspended its exploration activities in the Central African Republic and Venezuela in July 2018 to instead focus on the Angolan diamond market. The easing of deterring regulations coupled with the availability of geological data is certain to attract new players to the Angolan market and Endiama will assist in facilitating operations as well as attracting investment. "We have observed that investors have a more positive attitude toward Angola and now feel safer to invest in the country," said Pedro Benedito, business development manager at the Angolan division of the international certification agency Bureau Veritas. "The government opening up Angola and the stable political environment is beneficial with regards to attracting foreign investment."
London-listed Anglo American, which operates diamond, copper and platinum mines around the world, has already applied for exploration concessions from the Angolan government to explore areas for base metals. "We believe there is geological potential in Angola and have noted with interest the recent changes, including the release of a new Mining Code and the availability of the new country-wide geophysical data," James Wyatt-Tilby, head of corporate communications, confirmed in an email to *The Northern Miner*.
However, while diversification efforts are underway, gems and precious metals – diamonds in particular – continue to dominate the mining landscape. These represent the country's second-largest export and will likely pave the way out of the crisis caused by dropping oil prices. Angolan mining company Sociedade Mineira de Catoca (Catoca), the largest producer of diamonds in the country and fourth largest in the world, will be the main driver of the diamond economy and currently produces around 80% of all Angolan diamonds by volume. Catoca turned Angola into a benchmark country for opencast diamond exploration after commencing operations in 2003, and the company expects the Catoca concession in Lunda Sul to remain a lucrative asset for decades to come. "Since we began operations in 2003, we have been implementing a strategic prospecting plan in order to increase company reserves," said CEO Benedito Paulo Manuel. "Until 2036, we have more than 140 million tons of reserves to explore up to 600 meters in depth. But surveys indicate we have plenty more reserves at 600-1200 meters. In summary, we currently have resources that could sustain operations for another 50 years."
In addition, Catoca has a majority stake in concessions such as the ones at Gango, Luemba, Quitúbia, Luangue, Tcháfua, Vulege, and Luaxe. The Luaxe mine is considered bigger than the Catoca mine and is expected to double the country's diamond output – currently eight million carats per year – over a five-year period. "My vision is that in 10 years, Catoca will

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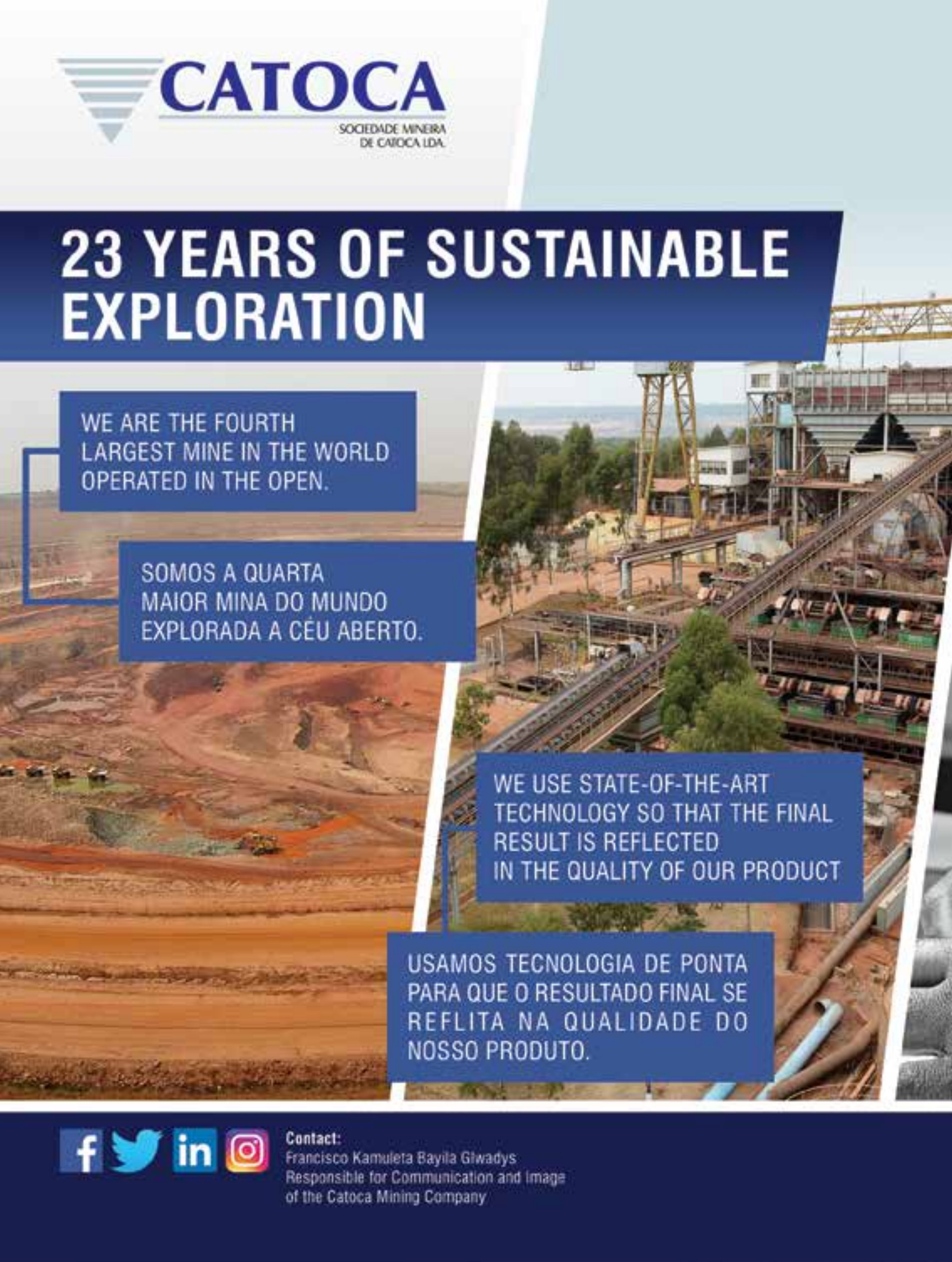
CATOCA
SOCIEDADE MINEIRA DE CATOCA LDA.
23 YEARS OF SUSTAINABLE EXPLORATION
WE ARE THE FOURTH LARGEST MINE IN THE WORLD OPERATED IN THE OPEN.
SOMOS A QUARTA MAIOR MINA DO MUNDO EXPLORADA A CÉU ABERTO.
WE USE STATE-OF-THE-ART TECHNOLOGY SO THAT THE FINAL RESULT IS REFLECTED IN THE QUALITY OF OUR PRODUCT
USAMOS TECNOLOGIA DE PONTA PARA QUE O RESULTADO FINAL SE REFLITA NA QUALIDADE DO NOSSO PRODUTO.
Contact:
Francisco Kamuleta Bayila Giwadys
Responsible for Communication and Image
of the Catoca Mining Company

MINING IS NEEDED, PRESERVING IS POSSIBLE!

Image courtesy of Lucapa.

Diamonds from the Lucapa Diamond Company's alluvial Lulo mine, pictured, will be sold at Angola's first diamond auction in January 2019, including a 114 carat stone.

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be the world's leading diamond producer," Manuel said. "Considering the size of our reserves and the improved political and economic conditions of the country, we have all the prospects of reaching that goal. In order to get there, we are making considerable investments in human capital as well as technology."

Meanwhile, some 150km away from the Catoca concession, ASX-listed Lucapa Diamond Corporation has established its 3,000 km2 Lulo diamond project, which Lucapa operates in partnership with Endiama and private enterprise Rosas & Pétalas producing large and premium value diamonds. "We have been conducting alluvial and kimberlite exploration activities continuously at Lulo since 2008," said managing director Stephen Wetherall. "This early exploration work enabled commercial alluvial diamond production to commence in January 2015, establishing Lulo as the world's highest US$ per carat alluvial diamond mine. There is simply no other concession in the world where diamonds of this size and quality are recovered at this frequency."

Lulo has also produced Angola's two largest recorded diamonds weighing 404 carats and 227 carats.

Transportation Hub

Two major trans-African corridors run through Angola. The first stretches from east to west, linking Beira in Mozambique with Lobito in Angola; and the second from north to south, linking Tripoli in Libya with Cape Town in South Africa. The relatively poor state of Angola's infrastructure has long undermined trade with surrounding nations and discouraged neighbors to take advantage of Angola's strategic position. As part of its initiative to open up the country to trade, the Angolan government has invested heavily in infrastructure and plans to make vital improvements to road, rail and air. A key part of the funding strategy has been to strengthen relations with allies, especially China, that has historically been a reliable investor in the country's infrastructure. In 2018, the Chinese Development Bank granted Angola a US$2 billion credit line that

Image courtesy of CATOCA.
The Catoca mine is the fourth largest producer of diamonds in the world, producing over 86% of Angola's diamonds in terms of volume.

will be used towards improving infrastructure. However, such efforts long precede the new administration, and the issue in the past has rather been an inadequate institutional framework than shortage of funds. During the oil boom, Angola invested its abundant oil money and foreign (mainly Chinese) investments into infrastructure, but corruption, lack of government oversight and untenable feasibility predictions rendered the investments largely ineffectual. The over-reliance on oil prices resulted in a growing public debt that remains one of Angola's main financial concerns. The government expects a public debt of US$77.3 billion – equivalent to 70.8% of the GDP – by the end of 2018.

But efforts have been made to improve transparency, oversight and control of infrastructure projects. As ministries have been reorganized and new bodies formed, one of the key improvements is the transition of the responsibly for the Public Investment Program to the Ministry of Finance, which will increase oversight and facilitate spending projections. Under a more efficient government, Angola could become a major transportation hub in the region, both as a key puzzle piece in the north-south corridor and also by more efficiently connecting its landlocked neighbors to its Atlantic ports. Most important for the latter purpose will be to refurnish and extend the national railways.

The Angolan government operates three separate railroad lines: Luanda, Benguela, and Moçamedes – designed to connect the DRC and Zambia to the Angolan Atlantic ports which serve as the nation's main conduit for international trade. In March 2018, the line connecting Lobito to the DRC border was used for the first time in 34 years as a manganese train crossed the border that closed during the 27-year civil war. In addition, the African Development Bank is currently funding PFS to renovate the rail line connecting Zambia and Angola and link to the Benguela line. "The aim is to connect all the railway lines in the country to DRC, Zambia and Namibia, as the future of Angola will not only be the production capabilities within the country, but also the selling and exporting of goods to other countries," said Francisco Fran-

"

One of Geosondas' most recent milestones is its role in the discovery of the Luaxe mine. We are still in the process of completing the prospective studies, but from what we have seen, this mine showcases the great potential in Angola. All the indicators are there that the Luaxe mine can be one of the largest mines ever to be discovered in this country. We calculate the the scoping study will be finished in 2019.

- Judsi de Sousa Calado,
Administrator,
Geosondas

"

ca, CEO of Mota-Engil Angola, a Portuguese group in the sectors of civil construction, public works, port operations, waste, water and logistics. "The country has significant potential and the opening of the corridor is a great advantage in terms of connecting to the world and exporting goods to other countries. With the opening of the corridor, the government also aims to reduce the country's dependency on imported goods."

Another major infrastructure project that will strengthen Angola's role as a logistical key state in Africa is the construction of a second airport. The new international airport, located 40km southeast of the city center and under construction since 2004, is currently 60% finished and the government has increased efforts to have it operational by 2020. The construction is in the hands of a consortium of Chinese companies and Brazilian company Odebrecht. Envisioned as a major transportation hub – and potentially a sub-Saharan alternative to rival Johannesburg – the airport will accommodate 13 million passengers annually with 12 aircraft docks. Plans are also underway to establish a new rail link to the new airport from Luanda.

The project is one of several ongoing endeavors during which the new government has demonstrated a commitment to increased transparency and cooperation with the private sector. "Only in the last few years we have witnessed a drastically increased communication and collaboration between the government and the private sector, maybe especially with logistics companies like DHL where the government has seen the potential for improvement of national logistics and infrastructure," said Juvenal Coque, country manager of DHL Angola that has opened a new facility for the purpose of the airport project. "DHL cooperates with the government and contributes with expert advice for large projects – like the airport construction, but also for major industries like the oil and gas sector. Much has already been achieved by having private companies outline the challenges and possibilities of major projects and it has also increased the overall interconnectedness of the national industries. For example, we have been in frequent contact with the mining sector to discuss logistics in hard-to-reach areas."

While the development of the diamond and oil sector has provided an infrastructural backbone in Angola, electricity supply has been a perennial issue. Angola's power sector is one of the continents least efficient with an electrification rate of about 30% (43% in cities and less than 10% in rural areas), leaving about 3.4 million households without power and causing frequent power outages across the country. Recognizing this as a crucial component for the country's future, the government has set targets of 9.9 GW of installed generation capacity and a 60% electrification rate by 2025. The current installed capacity is estimated at 4.1 GW, but the Ministry of Energy and Water has set the aspirational bar at 6.3 GW by the end of 2018. The generation will consist of 64% hydropower, 12% natural gas and 24% other fossil fuels. Several projects are still waiting to come online or reach full capacity in 2018: Soyo (gas) combined cycle plant (750 MW), Cambambe hydroelectric phase 2 (700 MW), and – most importantly – the Laúca hydroelectric project (2.1 GW). "In 2017, the Lauca hydro-power station was put into operation and is now the largest power plant in the country, with a current installed capacity of over 1,000 MW, "said Xiaquivuila. "Only three generation groups are currently in operation, and it is predicted that once all six generation groups are operational, Laúca will reach an installed capacity of 2,070 MW, becoming one of the largest hydropower plants in Southern Africa, alongside the Cahora Bassa hydropower plant in Mozambique."

There are plenty of obstacles on the road to prosperity, but with reliable and empowered institutions Angola is in a good position to realize its potential. The government is busy repairing the nation's tattered infrastructure, a more open economy will bring expats to bridge and ultimately remedy the knowledge gap, and, although Angola's mineral wealth mainly consists of vast unlocked resources, the government's choice to put strategic focus on diamonds is likely to be the best way to revitalize the economy while other commodities are explored. •

Botswana

Population: 2,292 million (2017)
Land Area: 581,730 km2
Main Official Language(s): English, Tswana/Setswana
Capital: Gabarone
Chief of State: Mokgweetsi Masisi (Since 2018)
GDP: $17,407 billion (2017)
Growth Rate: 3.046% (2017)

GDP per Capita (PPP): $18,100 (2017)
Exports: diamonds, copper, nickel, soda ash, beef, textiles
Export Partners: Belgium 18.9%, India 15.1%, South Africa 13.6%, Namibia 11.6%, UAE 9.7%, Israel 6.1%, Singapore 5.6%, Canada 5% (2016)
Imports: foodstuffs, machinery, electrical goods, transport equipment, textiles, fuel and petroleum products, wood and paper products, metal and metal products
Import Partners: South Africa 64.5%, Namibia 10.5%, Canada 5.6% (2016)
Public Debt: 18.5% of GDP (2017)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank

5/54

2017 Score

68.5/100

Safety & Rule of Law

69.6/100

Participation & Human Rights

63.3/100

Sustainable Economic Opportunity

68.8/100

Human Development

72.5/100

TAXATION RATES

SOURCE: ICLG

Mining Operations Income Tax

Annual tax rate = 70 minus (1,500/x), where x is taxable income as a percentage of gross income. The tax rate shall not be less than the flat CIT rate of 22%. (Diamond mining is usually taxed in terms of an agreement with the government of Botswana.)

Royalties

Precious stones: 10%
Precious metals: 5%
Other minerals or mining products: 3%

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017

34/180

Score

61/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business

86

Starting a business

157

Dealing with construction permits

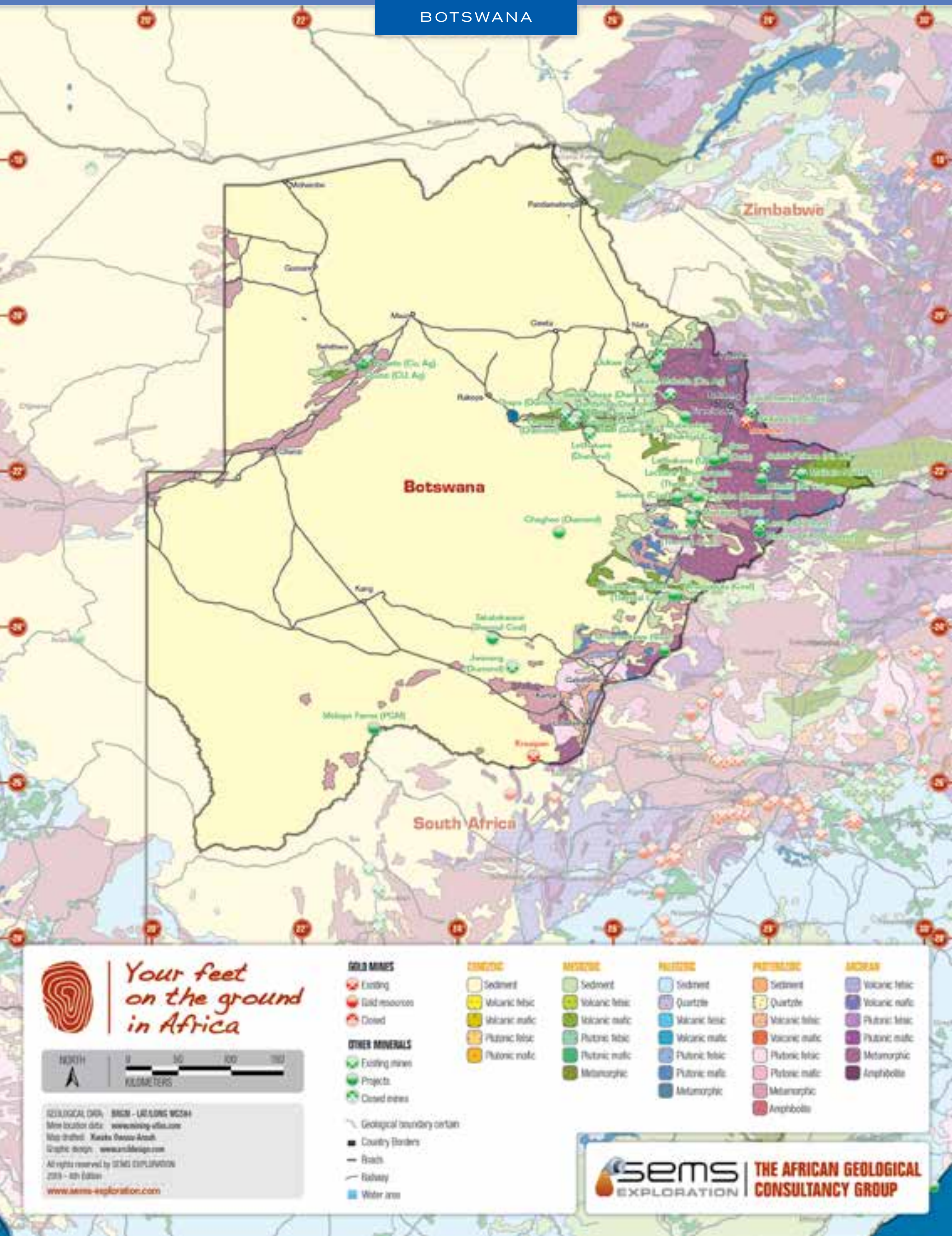
31

Getting Electricity

133

Registering Property

80


Zimbabwe
Botswana
South Africa
Pandamatenga
Maun
Nata
Rakops
Ghanzi
Kang
Chapter (Diamond)
Jwaneng (Diamond)
Mokopa Farms (PGM)
Your feet on the ground in Africa
GOLD MINES
Existing
Gold resources
Closed
OTHER MINERALS
Existing mines
Projects
Closed mines
Geological boundary certain
Country Borders
Roads
Railway
Water area
NORTH
KILOMETERS
Sediment
Volcanic felsic
Volcanic mafic
Plutonic felsic
Plutonic mafic
Metamorphic
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THE AFRICAN GEOLOGICAL CONSULTANCY GROUP

Dr. Themba R. Mmusi

Acting Permanent Secretary,
Botswana Ministry of Mineral Resources Green Technology and Energy Security

How important is mining to the socio-economic fabric of Botswana?
Mining is very important to Botswana because it accounts for 18.1% of the GDP, 29 % of government revenue and 90% of exports by value for 2017. The revenue realized from Mining contributes significantly to the annual national budget. Even though mining itself contributes 5% of employment, the services and goods provided to the mines create economic activities resulting in other indirect employment such as construction, maintenance, hospitality, vending etc.

As shallow diamond deposits deplete, companies will increasingly take their operations underground. How do you predict this will affect the profitability of the national diamond industry?
The profitability will certainly be decreased as mining costs rise due to deepening diamond mines. However, since this is planned in advance, the government is facilitating the creation of other industries to complement the declining mineral revenues. Diversification and beneficiation are very critical to generation of other revenue sources.

The new administration has pledged to diversify the commodity portfolio. What can the government do to bolster this process?
The environment for exploration continues to be improved by providing quality preliminary data to companies that do exploration. That is the very reason why we established the Botswana Geoscience Institute (BGI) so that we can improve on our efficiencies.
Diversification of the mineral sector is being pursued by promoting exploration of earth minerals such as lithium and platinum. Government continues to do grassroots exploration for all the different minerals, including rare earth minerals.

What is the Ministry's strategy when it comes to attracting green-field investment to ensure the sector is sustained in the longer-term?
Our prospecting license issuance process is streamlined and easy to follow, and license fees are among the most competitive in the world. Exploration companies are not charged tax when they are still exploring. When mineral deposits are discovered and evaluated, and the company wishes to progress to mining, the exploration costs are capitalized and written off together with other capital expenditure for the project.

How central do you predict coal will be to the government's strategy for continued development of the mining sector, and what opportunities beyond coal would you promote to potential investors?
Coal plays a very crucial role as a source of energy, especially for power generation. The mines need this power to carry out their operations. We are also hoping to export our thermal coal regionally and to the seaborne market. For that to happen, we need to upgrade the rail infrastructure and secure space at the seaports. In this regard, infrastructure development is one area that potential investors can look at as an opportunity. Further, we wish to improve our energy mix by increasing the component of renewable energy sources including solar, bioenergy and others, and these are areas that investors may look at as opportunities for investment.
Opportunities exist in the country for setting up processing or manufacturing plants for downstream activities. Government has done a pre-feasibility study on setting up a copper refinery to process copper concentrate from our base metals mines and this study is available for investors who may be interested to advance the beneficiation project. Soda ash provides an opportunity for manufacturing of chemical products that are needed by the market.

How will the government continue to promote local service and equipment providers, as well as ensure that skills are being transferred from expats to local resources?
The Ministry is working collaboratively with the Chamber of Mines to see that goods and services that can be produced locally for the mining industry are sourced locally. Mining companies are expected to comply with Section 12 of the Mines and Minerals Act, which requires that local companies should be given preference in procurement in cases where they are able to provide goods and services. The foreign companies that set up in Botswana are required to submit training and localization plans to the Ministry of Employment, Labour Productivity and Skills Development. These plans detail how skills are going to be transferred to locals.

What are some key factors in ensuring the environmental sustainability of mining in Botswana, and what role can the government play?
There are pieces of legislation in place to ensure that exploration and mining are done in an environmentally friendly manner. What is key is to continue to build capacity and capability in government to enforce these laws meant to assure sustainability. •

Botswana: New opportunities in an established mining jurisdiction

Once one of the poorest countries on the continent, Botswana is one of few sub-Saharan African countries that has truly benefited from its resource wealth. The mineral industry has dominated the Botswanan economy for four decades, with diamonds constituting the leading commodity since large-scale production began in the early 1970s. The country produces over 30 million carats of diamonds per annum with a value of about US$3 billion, which has made it the third richest country in Africa calculated in per capita income. Peace, stability and sound economic policies have further advanced the country as an attractive investor destination.
However, the prominent position of the mineral industry – accounting for about a third of national revenue – has come at a price. The government has predicted that mineral revenues will decrease in the next decade due to depleting resources. “Open pit mining allows for large quantities of materials to be mined at a time, but there comes a point where open pit mining costs exceed revenue and you then must consider underground mining,” said Charles Siwawa, CEO of Botswana Chamber of Mines. “Therefore, in a few more decades, there will be less diamonds being produced in Botswana as the mines will have moved from open pit to underground mining.”
So far, Botswana’s considerable buffers and cautious spending policies have kept the economy afloat amidst the drop in commodity prices and more specifically a prolonged downward trend in diamond prices that started in 2011. Yet, the government has realized the necessity to utilize its diamond revenue to foster sustainable economic through diversification. “The Botswana government is putting forward diversification on two fronts,” said Siwawa. “Firstly, it wants to diversify within the mineral space by investing in innovative technologies to develop other mineral markets. Secondly, it wants to diversify away from minerals and use the revenues from the minerals industry to develop other sectors in the country, such as tourism, education etc.”
While forecasts of diamond depletion have sent shivers across the country, Botswana is in a good position to manage the situation; emerging technology in both the exploration and extraction will contribute to maximized economic benefits from mines; the country is currently developing downstream competencies in the cutting and polishing industry, adding value to diamonds beyond the mining gate; and lastly, Botswana boasts vast resources of nickel, copper, soda ash, gold, silver, semi-precious stones, granite and coal as well as untapped deposits of uranium, lead and zinc. Especially coal is expected to be a significant driver of the economy, with large untapped resources of semi-bituminous coal estimated at 212,868 mt of which 50 to 60% is in the reserve category.

During the transitional period that lies ahead, Botswana will be heavily dependent on continued revenues from its mineral sector, meaning large investments in its diamond mines to increase production as well as an uptake in overall exploration activity.

Diamonds and New Technology

Botswana is the world’s leading producer of diamonds by value, and home to the two of the world’s richest mines diamond mines, Orapa and Jwaneng. “We have been mining at our Jwaneng operation since the early 1980’s,” said Len Dimbungu, head of technical services at Debswana. “We are currently mining cut 8, which will be the main source of ore in 2018 and the project will run until 2029. We are also busy with cut 9 design and this project is now at a feasibility study stage and the project will extend the life of mine until 2035.”
Debswana — a 50-50 joint venture between the Botswana government and De Beers — operates three additional diamond mines in Botswana, including the world’s biggest open pit mine, Orapa.
While a significant amount of exploration licenses have been issued in recent years, only a handful of players are active in diamonds, and brownfield exploration and deepening of existing mines will most likely dominate the diamond landscape for now. Implementing new technologies will play an important role in sustaining profitability of deepening operations and many companies are already pursuing innovative mining solutions. Canada-listed Lucara Diamonds operates the Karowe mine in Letlhakane, and has pioneered the use of XRT machines for large stone recoveries. The technology is designed to handle high-tonnage feeds and recognizes and separates material based on its specific atomic density. The company also uses an autogenous mill, which is the first of its kind in Africa for diamond mining. “The mill breaks rock on rock, and there is thus very little breakage to the stone, as opposed to the generic crushing that occurs during the mining process,” said managing direc-

tor Naseem Lahri. "We also use X-ray machines to pick up diamonds, and this technology pings a diamond based on its luminescence." Shortly after implementing the XRT technology in the Karowe mine, Lucara discovered the Lesedi La Rona, which is the world's second largest gem-quality diamond ever found.

Another company putting emphasis on innovation is Botswana Diamonds (BOD) that runs two joint venture operations: the Maibwe joint venture with BCL, which is currently in liquidation and in the process of concluding a Prospectus where the liquidator of BCL is looking to sell its share in the project, and the Sunland Minerals exploration projects, that were until recently operated in partnership with Russian mining company Alrosa. Following changes in leadership at Alrosa, BOD anticipates a new partner to step in. The potential new investor, itself a large diamond producer, is close to acquiring 50% of Sunland. "The new partner has a strong exploration team in place and will bring new thinking and technology to the table which will compliment BOD's significant in-house knowledge," said managing director James Campbell.

While the deepening of mines will dominate the diamond space for the foreseeable future, predictions of impending depletion rest on the assumption that Botswana does not discover another significant diamond deposit. "We believe that there are at least another 100 kimberlites to be found all over the country, so the real question is whether they will be economically viable," said Leon Daniels, CEO of Pangolin Diamonds. Also called "The Diamond Hunter," Daniels and his team discovered the kimberlite that produced Lucara's massive diamond, Lesedi La Rona.

Exploration and Diversification

As part of the initiative to diversify the country's economy, the government has approved legislation to create a lucrative business environment by rationalized parastatals, relaxed restrictions on work permits and visas as well as through privatizations. Emblematic of the country's novel financial openness is also the Botswana Stock Exchange's (BSE) decision to demutualize in 2018. The move is part of an overarching strategy to grow the number of listings as well as to internationalize the BSE and become a major player among Africa's most prominent stock exchanges. "With regards to mining investment, Botswana has matured substantially over the last 10 years and BSE has the second highest number of listed mining companies after JSE," said CEO Thapelo Tsheole.

Two of the most central commodities in the diversification strategy will be coal and soda ash. In 2016, Botswana soda ash exports constituted 1.4% of global exports. Soda ash in Botswana is produced from naturally occurring brine reserves by the country's only extractor, BotAsh, which is a 50/50 partnership between the Government of Botswana and South African company Chlor Alkali Holdings (CAH) Group. The government is currently promoting diversification into the sector, which could potentially create a "significant amount of downstream opportunities," comments Keletsositse Olebile, CEO of Botswana Investment and Trade Center (BITC). Glass productions accounts for 50% of global soda ash demand, which could open doors to in-country beneficiation.

Botswana contains Africa's second-largest coal reserves after South Africa. The eastern parts of the country possess shallow reserves suitable for open-pit mining, while the western side has deep seams with CBM potential. Despite having an estimated resource of 212 billion mt, Botswana has only two operating coal mines; Morupule, that produces 3.5 million my/y; and the Masama coal project. In August, BSE-listed Minergy Limited was granted a mining license for its wholly-owned Masama mine in the Mmamabula coalfield in south west Botswana. The 390 million mt resource is an open-pit, low-strip ratio mine expected to produce 2.4 million mt/y and the first sellable coal is expected by February 2019. "The quality of coal in Botswana is reminiscent of that in South Africa 25 years ago. Today, the consistency of quality is higher in Botswana," said executive director of operations, Martin Bartle.

Two mines are targeted to come into production in 2020 and 2021 on Botswana's Kalahari Copperbelt – a 1,000km strip of sediment-hosted copper/silver mineralization. T3 or "Motheo," as is its local Setswana name, is a 12-year pit project and the flagship asset of ASX-listed MOD Resources. In July 2018, MOD announced a major resource upgrade to 60 million mt, which includes an indicated resource of 36.6 million mt at 1.14 Cu and 16 g/mt Ag. From having discovered the resource in 2016, a feasibility study is already underway and will be completed in early 2019, after which a decision to mine is expected in March the same year. US-based Cupric Canyon Capital expects its high-grade copper project, Khoemacau, to commence production in Q1, 2021, and has announced that the project will produce in excess of 100,000 mt/y of copper.

Less explored resources such as battery metals and gas could potentially play a role in the diversification process. Critical metals explorer Giyani Metals recently released a maiden mineral resource estimate for the company's K.Hill manganese deposit in Botswana. Manganese is used for two entirely different products: approximately 90% of manganese goes to the steel mills, while electrolytic manganese metal (EMM) is used to produce batteries. Robin Birchall, CEO and director of Giyani Metals, explains: "Our results show that we will be able to produce EMM at US$1,000 per mt, which is a very cost effective model with a much higher profit margin compared to selling DSO."

Lastly, Southern Africa is presumed to sit on massive natural gas reserves of more than 600 trillion cubic feet (Tcf) and Botswana has independently proven deposits. The country's coal bed methane reserves could come to play an important role in national energy security, especially as Botswana has well-developed energy infrastructure. "Botswana imports its LPG gas, diesel resources and sometimes power when they cannot generate enough power from their coal fired plants," said Tim Hoops, president and CEO of Strata-X Energy, which acquired two new prospecting licenses for its Serowe coal seam gas project in Botswana in 2018.

The move towards a more open economy and diversification will also provide new opportunities for service providers. While heavy machinery has traditionally been imported, mainly from South Africa, there is space for local distributors to provide light industrial equipment. In addition, a growing demand for timely service supply will lead to the establishment of more local repair and factory facilities, which will have a positive impact on national skill levels. U.S.-based Franklin Electric, a company focused on the movement and management of water and fuel, has established a service center in Botswana as a way of utilizing the local labor force. "There are local resources – such as highly competent engineers – that the government have sent overseas to be upskilled and trained," said general manager Lean Du Rand. "As a major industry player, we consider ourselves to have a responsibility to train local resources and give back to the country to our best ability."

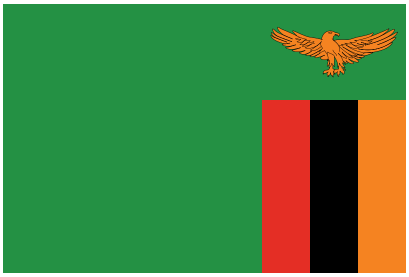
Beneficiation

The government's diversification strategy also includes creating downstream competencies in the mining space as well as adding value to products beyond the mining gate. Diamond cutting and polishing firms have generated some 3,700 jobs since 2014, but the sector has struggled with insufficient skill levels, high production costs and limited access to credit facilities. The government has taken steps to improve access to credit, most recently by the signing of a US$125 million loan guaranty with Stanbic Bank Botswana, a member of Standard Bank Group and the Overseas Private Investment Corporation (OPIC), the U.S. Government's development finance institution. Botswana as a potential future diamond hub has also attracted foreign companies, such as Indian diamond processing and retail firm M Suresh Group, which opened its new diamond cutting and polishing center in Botswana in 2018.

Cryptographic technology will also play a role in diamond beneficiation as more companies adopt blockchain computing for the certification of luxury goods. With blockchain, the diamond is immediately weighed, photographed and barcoded. The unique identity means that the diamond can never be stolen or switched with a diamond of lesser value or a counterfeit.

The blockchain produces a tamper-proof ledger in which each block contains a cryptographic hash of the previous block, transaction data and a timestamp. As blockchain certification demonstrates the stone's journey from blasting to extraction and eventually the polished product, the technology can also be used as an effective beneficiation tool – separating real diamonds from the increasingly common synthetic products.

The Botswana government has since long voiced concerns over diamond dependency but has previously demonstrated little resoluteness in its quest for diversification. While complete diamond depletion is unlikely, the future of Botswana still hangs in the balance, as even a modest decrease in diamond production will send ripples throughout the economy. However, the current administration has taken vital steps in the right direction to foster economic growth in the private sector, move into new mineral commodities as well as to create downstream competencies in the beneficiation space. For investors, this means a great opportunity to move into a politically stable country where all the vital business components are already in place. •



Zambia

Population: 17,09 million
Land Area: 752,618 km²
Main Official Language(s): English, Bemba, Nyanja
Capital: Lusaka
Chief of State: Edgar Lungu (since 2015)
GDP: $25,80 billion
Growth Rate: 4.1%
GDP per Capita: $1,509.80

Exports: copper/cobalt, cobalt, electricity; tobacco, flowers, cotton
Export Partners: Switzerland 39.4%, China 18%, Democratic Republic of the Congo 6.7%, South Africa 6.4%, UAE 6%, Singapore 5.6% (2016)
Imports: machinery, transportation equipment, petroleum products, electricity, fertilizer, foodstuffs, clothing
Import Partners: South Africa 31.2%, Democratic Republic of the Congo 12.3%, Kuwait 8.1%, China 7.6%, Mauritius 4.4%, UAE 4.2%, India 4% (2016)
Public Debt: 62.8% of GDP (2017)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank

18/54

2017 Score

56.2/100

Safety & Rule of Law

64.9/100

Participation & Human Rights

57.5/100

Sustainable Economic Opportunity

48.0/100

Human Development

54.5/100

TAXATION RATES

SOURCE: ICLG

Mining Operations Income Tax

30%

Royalties
Cobalt: 8%
Copper: 5.5%-7.5%;
10% when the price of copper exceeds $7,500 per ton

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017

96/180

Score

37/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business

87

Starting a business

102

Dealing with construction permits

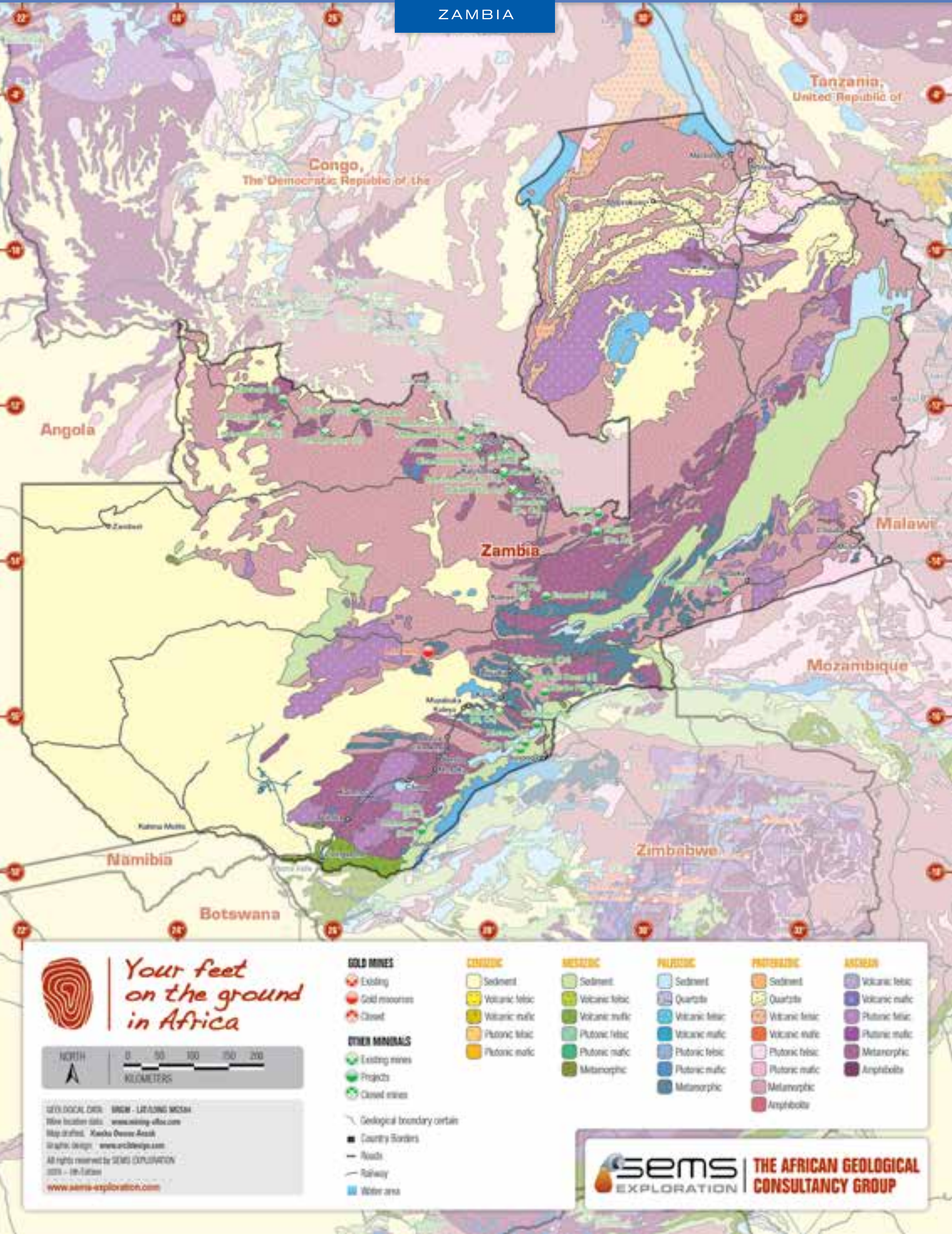
70

Getting Electricity

128

Registering Property

150


Tanzania, United Republic of
Congo, The Democratic Republic of the
Angola
Zambia
Malawi
Mozambique
Namibia
Zimbabwe
Botswana
Your feet on the ground in Africa
NORTH
0 50 100 150 200
KILOMETERS
Map drafted: Kaeko Owusu-Ansah
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GOLD MINES
Existing
Gold resources
Closed
OTHER MINERALS
Existing mines
Projects
Closed mines
Geological boundary certain
Country Borders
Roads
Railway
Water area
CENOZOIC
Sediment
Volcanic felsic
Volcanic mafic
Plutonic felsic
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Sediment
Volcanic felsic
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Metamorphic
Amphibolite
ARCHEAN
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Amphibolite
SEMS EXPLORATION
THE AFRICAN GEOLOGICAL CONSULTANCY GROUP

Hon. Richard Musukwa

Minister of Mines and Minerals Development, Republic of Zambia

Can you provide a brief overview of the Ministry's near-term priorities for Zambia's mining sector and what should be expected from you as a new leader?

The Ministry's focus, as outlined in the Seventh National Development Plan (SNDP), is a diversified and export oriented mining sector. Therefore, the emphasis under the plan will be to broaden the range of minerals exploited in Zambia to include gemstones, gold and industrial minerals. Secondly, we will look to promote value addition to mining products and include energy and material efficiency strategies to increase productivity and reduce environmental pollution. We will also work to transform artisanal small-scale mining into viable businesses and enhance their contribution to wealth and job creation, and finally, we will also promote petroleum and gas exploration. My role as Minister is to ensure creation of the appropriate policy environment, availability of resources and buy-in by all stakeholders to undertake necessary interventions to achieve the stated objectives.

Can you elaborate on the mineral potential available in the country and what opportunities the Ministry would like to promote to international investors?

Zambia is endowed with a variety of minerals. Mineral deposits in Zambia are classified into Base metals, Energy minerals, Precious metals, Industrial minerals and Gemstones. There are several base metal deposits in Zambia, out of which copper is currently the most important export commodity. There are also several known deposits of nickel in Zambia but only two have so far been studied in detail up to the stage of production of an economic feasibility report. These are Munali nickel and the Kalumbila nickel deposits. Manganese is mined in Mansa, Luapula Province and in some other parts of the country, and Zambia has substantial resources of iron ore. Energy minerals of Zambia include coal, uranium and hydrocarbons and the precious metals produced in Zambia include gold, silver and selenium. Industrial minerals are mined in Zambia and these include feldspar, silica sand, talc, barite, phosphate, limestone, dimension stone and clays. The major gemstones of Zambia are emerald, amethyst, aquamarine, tourmaline, garnets and rose quartz. Other colored stones of some value include malachite, amazonite, agate and smokey quartz. The distribution of gemstones is country wide, with potential that could make it the next foreign exchange earner after base metals.

The government is pushing to diversify the Zambian economy away from reliance on mining. How important will mining remain to the country and what will this strategy mean for the mining industry?

Mining has been and will continue to be one of Zambia's growth sectors for a long time owing to the mineral resources that the country is endowed with. Currently, the mining industry in Zambia is synonymous with copper mining, although there other minerals exploited in the country at different scales. Therefore, mining will play a key role in achieving the economic diversification and job creation through diversification within the mining sector and creation of linkages with other sectors. Mining will always play a role in supporting government as a key source of revenue. Whilst promoting diversification to other minerals, measures to ensure maximum collection of revenue from the sector (copper and cobalt) will continue. The Ministry is implementing the Mineral Production Monitoring Support Project whose aim is to improve monitoring of mining operations for purposes of ensuring payment of correct taxes by mining companies to government. It will also mean promotion of exploitation of other minerals, particularly industrial minerals and gemstones. The development of local content will also be vital because the developments that have been taking place in the mining sector since the commodity boom have not benefited the country much due to weak or non-existence of local content.

Following the tragic accident that occurred at Black Mountain in Kitwe in June 2018, how is the Ministry intending to support artisanal and small-scale miners in Zambia?

The Ministry intends to continue supporting artisanal and small-scale miners through a few key initiatives, including development of market linkages and implementation of projects aimed at empowering of miners through small grants and training that fosters knowledge transfer. We will also seek to provide technical assistance to the miners and promote the empowerment of small-scale miners by ensuring access to finance.

Can you share your vision for the mining industry in Zambia and a final message to intentional investors interested in Zambia?

The future for mining in Zambia lies in efficient and responsible exploitation and diversification to other minerals. This will be achieved if Zambia attracts investors who will come to make profits taking into account the need to ensure a fair share of benefits accrue to the host community. •

Zambia: Diversification will drive success

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Zambia has long been considered one of the most attractive destinations for mining investment in Africa given its association with peace, relative political stability and a long tradition in mining. However, Zambia's mining industry is aging and insufficient exploration suggests that new opportunities are limited. The downturn in the copper price hit contractors hard and, despite the recent upswing, all boats are not rising and cash flow remains tight. Notably, and in a scenario reminiscent of Tanzania's dispute with Acacia Mining, First Quantum Minerals (FQM), which produces over half of the country's total copper, was slapped with a US$7.9 billion tax bill when the Zambian government claimed the company was incorrectly reporting exports in March 2018. The Vancouver-based company has staunchly refuted the charges and, although negotiations are ongoing, it has been rumored FQM will pay around US$1 billion to settle the matter.

Zambia's worrying level of debt, which could rise to as high as US$13 billion in 2019, could also signal to some investors a potential change in the tax regime given residual mistrust brought on by unpredictable changes in recent years in the typically predictable nation. In early 2019, it is expected that the government will introduce a tax hike ranging from 86% to 105%, including an increase on royalties for copper and cobalt. It is believed that the changes will bring in US$1.3 billion, compared to US$800 million in 2018. However, the country's key players have warned that such a move will make mining an unprofitable business in Zambia, and FQM announced in December 2018 that it would have to lay off 2,500 workers at its Sentinel and Kansanshi mines should the taxes come to pass.

Yet, there are many reasons to remain deeply interested in Zambia's mining industry. The country produced 800,000 mt/y of copper in 2017, and copper output in 2018 between January and October reached 696,526 mt, suggesting that it will be close its 1 million mt/y target. The North-West province is being hailed as the "new Copperbelt" and, although still sluggish, exploration initiatives in and around the region show promise. Zambia is also proving that its strengths are not just in copper; an array of other minerals and notably its emeralds are contributing to the development of a more resilient industry that does not live and die by the price of copper.

The entire industry previously suffered from severe power shortages that crippled the mines' ability to produce in 2015 and 2016, but Zambia is now on track to become a net exporter of power — though the debate around energy tariffs will undoubtedly persist. Finally, despite evidence of tension between the public and private sector, the country remains a relative safe haven for investment dollars. "Over the past year, we have definitely witnessed positive trends and the order intake picked up significantly last year. We have been hearing from our customers that the projects that were on standby and in care and maintenance are coming back into production," said Patrick Chanda, country manager of Epiroc Zambia. "Everyone is ramping up and there is a very optimistic feeling, even taking into consideration challenging external factors. We expect this to continue in the coming years."

Production and Exploration

Production of copper is largely driven by four standout players: FQM, Mopani Copper Mines (MCM), Konkola Copper Mines (KCM), and Barrick's Lumwana. FQM, despite its troubles with the government and a "pivot" towards Latin America, where the company's Cobra project in Panama will come online in 2019, insists it remains committed to Zambia. "We firmly believe that Zambia has every prospect of reclaiming its place as the number one copper producer in Africa," said John Gladston, government affairs manager for the company. "The principles that will underpin this are stability and competitiveness, but not just in terms of the mining tax regime. Things like electricity tariffs, the ability to issue employment permits to limited numbers of critical expat workers, and access to a competitive market for consumables such as low-sulfur gas-oil — of which we consume around 500,000 liters a day — are of great influence to Zambia's attractiveness," continued Gladston.

MCM invested US$1.5 billion in an aggressive expansion project that involved sinking several new shafts to produce 175,000 mt in 2018. KCM experienced a recent shuffling in leadership, and the Vedanta-owned company's new CEO, Deshnee Naidoo, has recently announced an initiative to push production up to 400 mt/d, with production in June sitting at 350 mt/d. However, in early 2019 the company stopped operations at its Nchanga mine over the introduction of a 5% import duty on acid concentrates needed for its smelter, hinting at difficult times ahead as the tax increases promised by government see implementation.

The Lubambe mine, which previously formed part of the historical Konkola copper mining complex, was purchased by EMR in December 2017. "In the past six months that we have been here, we have identified that the mine is not particularly productive firstly because it has insufficient infrastructure to handle the volumes of water in the area and secondly because the mining method used has not been the best one for the type of ore body," said Nick Bowen, CEO of Lubambe.

Nickel production is expected to restart at the Munali nickel mine in early 2019. British firm Consolidated Nickel Mines (CNM) obtained financing from a Chinese investor in June 2018 that will enable the restart of operations and purchase of new equipment to facilitate the various changes. In 2011, Munali was placed under care and maintenance due to an unattractive nickel price and poor performance. CNM took the project over, determining that the geology of the deposit lent itself to a dense-media separation plant, after identifying a series of intrusions including a gabbro intrusion and a few sulphide intrusions in the host rock that permit good SG difference between the barren gabbro and the massive sulphides. "We are still considering whether we are going to invest in phase two – taking the concentrate through to nickel metal or nickel sulphide. Investors do not like political uncertainty and instability and the continual changes in the tax laws, such as is the case in Zambia right now. This is making investment decisions much more difficult," said managing director Simon Purkiss.

In terms of exploration, the global deficiency in exploration capital has made no exception for Zambia. Particularly in the recent downturn, large mining houses have been hesitant to take part in endeavors that do not deliver a return to anxious shareholders, but, as resources deplete, there is a risk that the global pipeline for projects will reach a crisis. That being said, there is significant opportunity for those that can demonstrate a successful venture. Midnight Sun, which is focused on discovering copper and cobalt in Zambia, has a land package of over 500 square kilometers near FQM's Kansanshi mining complex that it has been exploring since 2015. "There are so few new discoveries these days that to have a potential deposit that can illustrate the size and scale of a large scale operation is quite exceptional," said the company's CEO, Brett Richards.

So far, Midnight Sun has drilled in excess of 40,000 m and made a discovery on the Mitu target of 4.23% Cu eq, including cobalt credits, at over 11.6 m, at 120 m depth, and on its northern target known as 22 Zone, where the company hit intercepts of 5.71% Cu. over 11.2 m, within 120 m of surface, trending over a distance of 1,000 m. "The exploration program for 2018 was to isolate the key target of Mitu and try to drill (air core and diamond) the near surface mineralization (250 m depth) to better understand the geological complexities of a target that extends over 17 km in strike. We also conducted a Versatile Time Domain Electromagnetic ("VTEM") geophysical survey over the property on 200 m centers, but 100 m centers over the targets, and expect the results of this work will illustrate the size and scale of a multi-faceted deposition that will potentially host a large mining operation," said Richards.

AIM-listed Arc Minerals is proceeding with metallurgical test work at its Kalaba copper-cobalt project. The company's license covers 1,000 square kilometers, including a small mining license and a large prospecting license. The company has a small plant that it expects will produce a few thousand mt of copper and cobalt each year, and 2019 will be dedicated to developing the company's exploration program in the region.

The new mining method that we will be implementing is a cut-and-fill method. We will develop the decline down another two levels and start mining upwards with a cut-and-fill technique. This allows for full extraction of the ore body at a lower cost.

- Simon Purkiss, Managing Director, CNM

Notwithstanding its potential to further understand its copper and cobalt potential, to push Zambia's mining industry forward diversification into other minerals will be key. While prices have not been attractive enough to warrant intense exploration, GoviEx's Mutanga project, which consists of five main deposits, suggests the country's potential in uranium, and increased activity in small-scale mining of manganese has also been garnering attention. "Manganese is a key commodity at the moment," confirmed Seamus McKenna, operations manager at Paul McKenna & Sons, a diversified mining company that provides mineral and materials processing as well as transport services. "We have invested approximately US$1 million into our manganese project and we expect we will need to put in more capital to achieve our desired production rate of 3,500 mt/d," he added.

Interestingly, whispers of lithium potential have also recently begun to spread. "We are seeing particular interest in lithium, driven by Europe's demand to move away from a reliance on traditional fuel and power solutions and more into batteries. The potential is particularly high in the southern part of Mozambique and Zambia, and we are expecting a significant increase in the development of lithium mines within the next one to two years," said Patrick Kampenegele, managing director of Knight Piésold Zambia. "This translates into a lot of opportunities for us, because developing these mines is essentially the equivalent of building the infrastructure of a new town, with requirements like roads and ensuring water accessibility."

Zambia's copper credentials suggest that the country would also offer opportunities in gold given that the two metals often occur in the same mineral deposits. However, the challenge of gold mining in the country is a technical one related to its topography: "The problem with finding gold in Zambia is the lack of relief. The more mountainous or hilly a country is, the easier it is to find gold because it ends up in stream networks where it concentrates and it can be sifted out," explained Mark Shaw, consultant geologist at GeoQuest. "Because Zambia has a very flat landscape and a lack of small streams and rivers, gold exploration is much more difficult. The alternative solution, which would be soil sampling, is not always very effective because there is a very thick overburden cover which has accumulated for the last six million years when the last major change in climate occurred in Southern Africa."

Precious and semiprecious gemstones are also an area where Zambia has excellent prospects that have strengthened in recent years. In particular, the country's emeralds have gained traction on international markets, sought after for their characteristic blue undertones. London-based Gemfields operates the Kagem mine, which represents the world's single largest producer of emeralds, accounting for about 25% of global production. The company's CEO, Sean Gilbertson, highlights the role that consistent supply plays in establishing the value of a gemstone. "We have built Gemfields around the idea that the colored gemstone business had been overlooked and was very fragmented. We saw an opportunity to professionalize the industry similar to what De Beers did with diamonds. Emeralds, rubies and sapphires never made it into the mainstream in the same way as diamonds because of a lack of consistent or reliable supply," he said. "Because these types of deposits are very pocketed, there is an uncertainty to what extent they can provide resources, making it difficult for the industry to run properly. Our strategy centers around finding solutions that enable us to deliver a consistent supply of these gemstones."

Gemfelds also holds a 50% interest in the Kariba amethyst mine in the southern part of Zambia that the company is looking to sell in order to focus exclusively on emeralds, rubies and sapphires. While Gemfields has operations worldwide, Gilbertson expects the African continent will be a key area of emphasis for the company going forward.

Near the Kagem mine, the Gemcanton emerald mine is also ramping up its production capacity. "Our future strategy involves acquiring more machines and excavators to help unlock the potential in certain mining areas that reach depths of around 120 meters. We are also engaged in further drilling and exploration activities throughout the country in both emeralds and copper. We are also looking to invest in scanning technology that provides information about what the ground contains 100 m below the surface to better understand the potential in our ground," said Abdoulaye Ndiaye, CEO of Gemcanton.

Land-linked: Opportunities in Transport

Around the globe the mining industry is experiencing a lift, and Zambia is no different. If the country can attract a fresh round of investment to boost existing projects and unearth new ones, the boundless opportunities in this overall stable environment will inevitably drive the country back to its rightful place as a leader among Africa's top mining destinations. However, Zambia is notable not just for its mineral opportunities, but its strategic position connecting the Southern Africa region. The transport sector often quips the country is not landlocked, but rather land-linked, highlighting the fact that Zambia's borders with eight different African countries allows it to facilitate vital trade. Furthermore, the country's participation in both the Southern African Development Community (SADC) and the Common Market for East and Southern Africa (COMESA) means that goods can be imported and exported between member countries without paying duties.

Critically, the country must improve its transportation infrastructure if it is to recognize the full extent of this opportunity, especially as its neighbor to the north also ramps up copper production and looks to utilize the existing corridors to the south. While the Southern Africa region overall boasts a much stronger transport network relative to other regions around the continent, railway is the essential next step to alleviate its overworked road system. "The Ministry of Transport launched a good initiative to encourage more bulk cargo movement by rail to lighten the burden of heavy trucks on our roads," said Olivier Terra, managing director of Bolloré Zambia. "This is interesting but it would have required broader consultation with stakeholders, logistic providers and importers to identify gaps in terms of capabilities and to explain the practical modalities of the act. The critical question is whether the rail operators have the capabilities to provide the required service and whether the kilometer rail will be more competitive than the kilometer road."

If a railway option can be implemented and better synergies can be achieved between the region's free trade areas such as COMESA, Zambia is well-positioned to service not just its own strengthening mining industry, but those around it as well. In terms of its own natural resources, diversification into other minerals will create a more sustainable industry overall, and the country's push to decrease its dependency on mining for tax revenue will prove vital in helping to alleviate the tension between private investors and the state. •

Zimbabwe

Population: 16,53 million (2017)
Land Area: 390,757 km²
Main Official Language(s): English, Shona, Ndebele
Capital: Harare
Chief of State: Emmerson Mnangagwa (Since 2017)
GDP: $17,85 billion (2017)
Growth Rate: 3.4% (2017) (Many other sources say 2.9%)
GDP per Capita: $1,079,61 (2017)

Exports: platinum, cotton, tobacco, gold, ferroalloys, textiles/clothing
Export Partners: South Africa 79.5%, Mozambique 9.5%, UAE 4.1% (2016)
Imports: machinery and transport equipment, other manufactures, chemicals, fuels, food products
Import Partners: South Africa 46.6%, Zambia 24% (2016)
Public Sector Contribution to GDP: 50% (2016)
External Debt: $10.97 billion (31 December 2017 est.)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank
39/54

2017 Score
44.7/100

Safety & Rule of Law
46.7/100

Participation & Human Rights
42.3/100

Sustainable Economic Opportunity
37.0/100

Human Development
52.7/100

TAXATION RATES

SOURCE: ICLG

Mining Operations Income Tax
15% (Special Lease Operations)
25% (No Special Lease)

Royalties
Diamonds: 15%
Platinum: 2.5% (Special Lease Agreement)
Gold: 5% (Exceeding 500g)

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017
157/180

Score
22/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

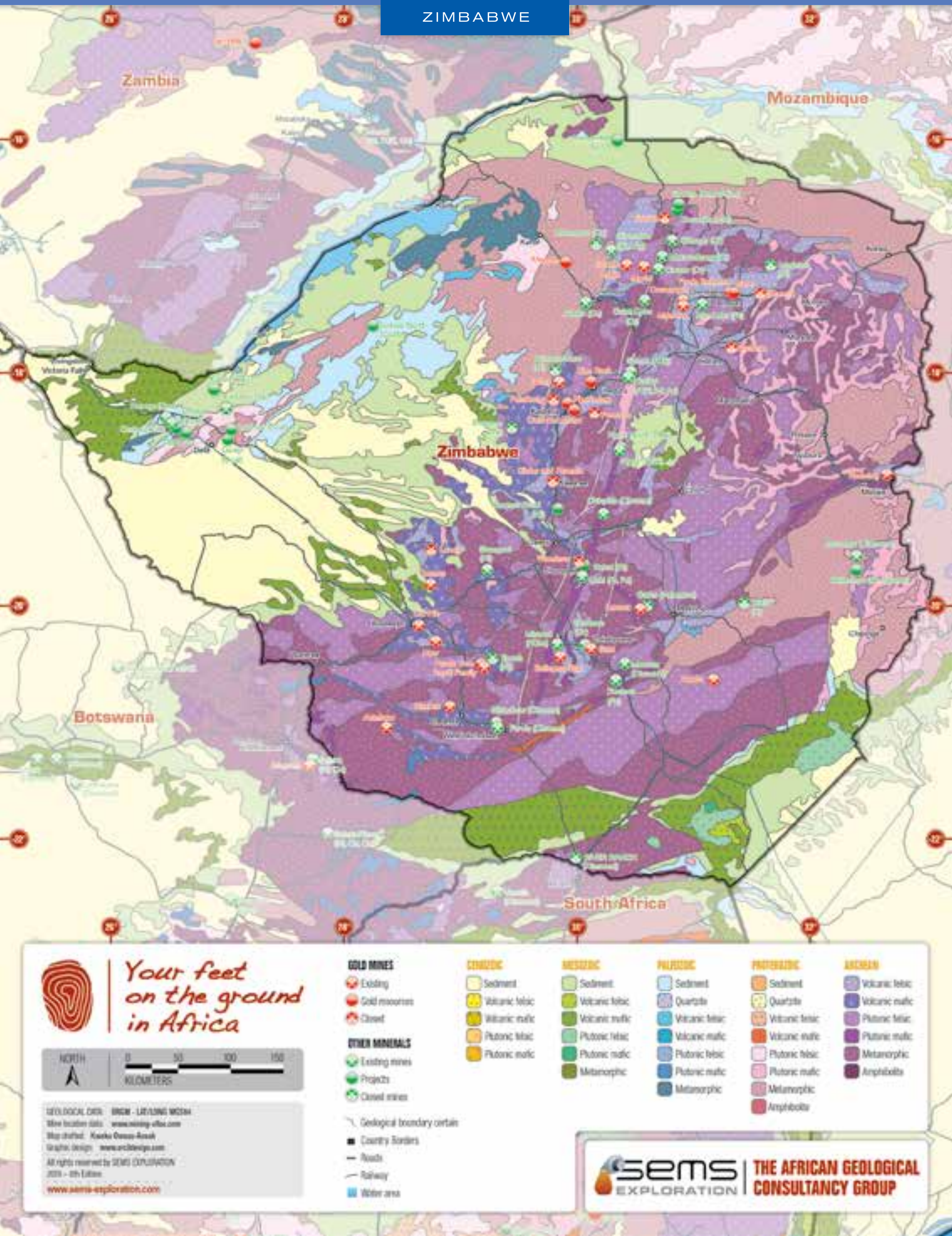
Ease of Doing Business
155

Starting a business
176

Dealing with construction permits
176

Getting Electricity
166

Registering Property
109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Hon. Winston Chitando

Minister of Mines and Mining Development, Republic of Zimbabwe

Can you outline the current government initiatives to attract investment?
The president has drafted a long-term vision for the country in which Zimbabwe will be a middle-income economy by 2030. Mining in particular will play a critical role in achieving this goal. So far, one of the most crucial government-implemented changes is the amendment made to Zimbabwe's indigenization laws, which, up until now, have compelled national ownership of businesses. The Economic Empowerment Act previously required that at least 51% of all companies to be owned by indigenous Zimbabweans. Any stipulated restriction will from now on only apply to the diamond and platinum industry. Any other person is free to invest in, form, or own any business without restriction. This is one example of government efforts to attract investors by laying the groundwork for a more attractive investor climate. We hope these changes demonstrate our determination to promote the mining industry to investors. So far, the regulatory changes have been very well received and we are witnessing a significant increase in investment.

Gold, diamonds and platinum have so far dominated Zimbabwe's mining landscape. Are there any other commodities you see playing a role in the country's future?
A lot of interest has been shown in chrome, nickel, CBM, lithium as well as ambitious plans to develop the coal mining industry. In addition, government recently signed a Memorandum of Understanding with a company that wants to explore the establishment of a stainless-steel plant in Zimbabwe. The establishment of such a plant would have a very positive effect on downstream minerals such as chrome and nickel. Despite its huge potential, Zimbabwe's resources remain largely unexplored so we also expect new opportunities to arise as the economy is revitalized.

What is Zimbabwe's response to growing global concern over the mining of fossil fuels such as coal?
Some of the biggest, most developed economies in the world like Russia and China are still mining fossil fuels. Zimbabwe is still a developing economy, and for the time being coal is necessary to bridge the energy gap.

Can you elaborate on the increased collaboration between the mining ministry, chamber of mines and the mining industry?
We have established what we call "ease of doing business" reforms. Every fortnight, the Ministry and the Chamber of Mines meet to discuss strategic issues, what government demands should be in relation to the mining industry and the necessary actions for facilitating investment in Zimbabwe. In order to attract more foreign capital and industry, investors and companies need to know that we are communicating and that the concerns of investors are also our concerns.

How does Zimbabwe perceive national as well as private interest and capacity relating to investment in the mining sector?
In the mining industry, we have exploration projects, greenfield and brownfield projects as well as expansion projects. Zimbabwe is largely underexplored and most of the projects requiring funding are in the greenfield exploration category. Currently, there is not a lot of capital available in Zimbabwe and as greenfield exploration requires long-term investment, there is an especially meager appetite for these types of projects.

What are the strengths Zimbabwe has as a mining destination?
Zimbabwe is peaceful country with functioning systems. For example, importing and exporting equipment is easy, and international money transfers run smoothly. The mining sector is framed by supportive structures like geological surveys, a dedicated Reserve Bank and a plethora of mining-oriented companies along the value chain. Another strength is our skilled and hard-working labor force. We have a long and well-established mining tradition where people have been upskilled both from working abroad and domestically. As Zimbabwe becomes an increasingly attractive investment destination, people who have been working abroad will also return home. Lastly, there is the political will and determination to ensure the mining industry is prosperous and receives all possible support.

What is the strategic vision for Zimbabwe's mining industry moving forward?
Central to our vision of Zimbabwe's future is a drastic increase in revenue and we believe that with all the commitments of the new government, we will be in a very different situation in five years. The aim is to achieve a five-fold increase in revenue by 2023. Last year, our revenue was around US$2.6 billion and we expect to reach revenue of US$12 billion in five years. •

Zimbabwe: Investors exercise caution as a new era dawns

Zimbabwe's decades of steep economic downturn followed the repetitious theme of despots nationalizing private investment and redistributing land. The country's shallow reserves of platinum, diamonds, gold, coal, copper, nickel and tin had at the time of independence made the economy one of the strongest in the world. Three decades later, it was the indigenization of the mining sector in 2010 that gave the equalizing blow to an economy already down for a count. Today, for the first time in four decades, the prospect of an invigorated mining sector has sparked cautious optimism among companies and investors.

On July 31, 2018, Zimbabwe experienced its first leadership transition since 1980, ending 38 years of authoritarian rule. During his decades in power, Robert Mugabe – the freedom fighter turned dictator – presided over unrestrained corruption, human rights abuses and a mismanagement of the economy that brought the nation to the brink of financial ruin. After the 92-year-old head of state was dethroned through a palace coup within his own ZANU-PF party in November 2017, former Vice President Emmerson Mnangagwa seized power and won a disputed election the following year. While Mnangagwa has attempted to woo international investors, human rights groups reported widespread voter intimidation during the election and military repression of street protest in its wake, earning the new head of state the opprobrium of the West. Meanwhile, Mnangagwa has taken steady steps away from the regressive economic policies of his predecessor – mostly disjointed applications of Marxist ideas – towards more investor-friendly regulation. International companies are now playing a waiting game, and the future of Zimbabwe's economy will depend on whether the government is moving towards real democratic reform and political stability, or simply laying the groundwork for continued repression.

The Business Environment

Restoring popular confidence will require the government to revitalize an economy that has been gasping for air throughout the last decades. Under Mugabe's rule, Zimbabwe, a nation of almost unmatched natural resources, was turned into a financial basket case with periods of hyperinflation, resource whole sale – mainly diamonds to China – and an exodus of economic refugees. "The lack of financial stability is detrimental to all types of investment but even more so in the mining space as the nature of the industry requires long-term funding," said Mark Oxley, private consultant and member of the American Business Association of Zimbabwe. "But I believe we are in a more optimistic place now than we have been for a long time. The appointment of Professor Mthuli Ncube as the Minister of Finance – with his background in the African Development Bank – and George Guvamatanga – the former CEO of Barclays Bank – as permanent secretary in the Ministry of Finance, has given both our people and the international community confidence in Zimbabwe."

As part of the strides to roll back Mugabe's financial policies, the government is currently processing the "Investment and Business Facilitation Bill," designed to provide judicial underpinning to the leadership's pledge to open up the economy. The bill is expected to cut much of the red tape surrounding investment proposals, a strategy modeled on the Rwandese market that has an investment processing turnover of 24 hours – a considerable step up from the current 90 days it can take to set up a business in Zimbabwe. Still, the most convincing testament to Mnangagwa's determination to open up the economy is the long-overdue amendments to the country's controversial indigenization laws. The Indigenization and Economic Empowerment Act 14 of 2007 was promulgated to remedy imbalances in economic advancement by compelling firms to cede 51% ownership to indigenous previously disadvantaged groups. The act, rendered effective in 2010, drove the country deeper into the hyperinflation. The new amendments declare the right for any person to invest in, operate and acquire the ownership or control of businesses. While the old policy still applies to certain natural-resource based investments – specifically diamonds and platinum – foreign investors can still be allowed to operate if fulfilling certain requirements: "A new provision allows companies to achieve economic empowerment status by backing and engaging in strategic projects that benefit the country," said Alexander Mhembere, CEO of the country's leading mining company, Zimplats, that specializes in platinum group metals. "For example, as a contribution to the community, we have started local enterprise development programs to assist entrepreneurs."

Another celebrated government move is the appointment of Winston Chitando, former executive chairman of Mimosa Mining, as the new Minister of mines. Chitando played a key role in the signing of a US$4.2 billion landmark mining deal with Cypriot investor Karo Resources in March 2018, which involves the establishment of a platinum mine and refinery in the Mhondoro-Ngezi platinum belt. "Until recently, there were two major inhibiting factors [for investors]: the previous government administration and the indigenization laws," said Victor Gapare, CEO of Bilboes Holdings, a gold-focused mining and exploration company with four gold mines in the Bubi Greenstone Belt of Zimbabwe. "Now that the election is over and there is new leadership, I believe investor risk has decreased substantially."

The instatement of ministers with a background in their appointments has also led to an increased collaboration between key entities. "Rather than engaging in a multiparty war between the parliament, the chamber and the industry, we are experiencing an increased cooperation and the realization that we are all working towards a common end," said Isaac Kwesu, CEO of the Chamber of Mines of Zimbabwe, a parliament-mandated advocacy and advancement group for the mining sector. "Cabinet meetings have become increasingly transparent which enables entities like us to partake in the decision-making process, and we have even been asked on several occasions to provide the government with advice on policy. Overall, it's a more synchronized effort on behalf of major stakeholders."

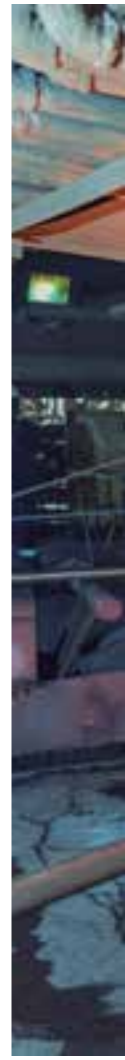
While the new administration has taken vital steps in the right direction, Zimbabwe has so far seen few indicators of financial convalescence. In October, consumer prices skyrocketed to reach their highest since the hyperinflation a decade ago; petrol shortage has people queueing for hours outside gas stations; shops are closing while shortage of vitals like bread, medicine and cooking oil worsens. In addition, Zimbabwe has suffered from lack of hard currency for the last two years, a hangover from the hyperinflation a decade ago when the Reserve bank printed 100-trillion-Zimbabwean-dollar notes with a real value of about US$300. In 2009, Zimbabwe eventually adopted U.S. dollars but the lack of foreign investment led to a scarce influx of the currency. Ultimately, the government introduced a fiat currency known as "bond notes" without real value outside the country's borders.

Without substantial foreign investments in the near future, Zimbabwe will need loans to repair its broken economy. But raising funds will likely require the country to clear at least part of its arrears of a total US$16.9 billion, and the government will have to demonstrate an ethical commitment for the international community to consider granting financial aid. As for now, the U.S. has declared that its targeted sanctions against Zimbabwe will remain in place.

Production and Exploration

Zimbabwe's strikingly diverse landscape — lush green mountains in the Eastern Highlands lead into rolling plateaus before giving way to the fertile plains of the Zambezi Valley — is perhaps an apt metaphor for the rich and varied mineral wealth found beneath its topography. Many of the country's vast array of minerals — and particularly its chrome and platinum deposits — can be found in the Great Dyke, a geological formation that extends for 550km across the center of Zimbabwe and ranges in width from 3 to 12km. While Zimbabwe boasts endowments of over 40 different types of minerals, the Chamber of Mines found in its 2017 State of the Mining Industry Survey Report that six key categories contributed 97% of the value generated in 2017: gold, Platinum Group Metals (PGMs), diamonds, nickel, chrome and coal.

The report elaborated that gold accounted for 40% of mineral exports in 2017, and nearly half of production comes from the country's small-scale and artisanal mining sector. With the combined efforts of both small and large-scale operations, 2018 represented a record-breaking year in production, achieving over 30mt of gold, suggesting that if the necessary capital can be obtained, Zimbabwe could look to regain its former glory as a top African gold producer. "People forget that before the year 2000, Zimbabwe was the third-largest gold producer on the continent, even larger than Tanzania," said Maurice Mason, VP corporate development & investor relations for Caledonia Mining Corporation.



Caledonia, which operates the country's Blanket gold mine, aims for the asset to reach a production target of 80,000oz by 2021. The company will invest in a new shaft to explore deeper into the mine with the objective of extending its life to 2031, and will also explore the possibility of satellite projects. Mason highlighted that at least in the short term for Caledonia, brownfields exploration remains a more palatable option within Zimbabwe's gold sector: "For the last 18 years, Zimbabwe has not received much investment, but there is an entire greenstone trend here and there are projects that simply have not captured the investment they need to survive. We would look at greenfield exploration as an option in the long term, but there are plenty of existing mines with plentiful resource that do not have the required capital, and we are interested to look at acquiring and developing an existing mine."

The country has no shortage of existing projects. Emblematic of this potential investment avenue is Kwekwe, a dusty town in central Zimbabwe that is littered with historic gold mines awaiting the required capital to revitalize. Home to the Globe and Phoenix Mine, which once produced the world's richest ore in its heyday that begun at the turn of the 20th century, Kwekwe's gold deposits have largely been left in the care of artisanal miners.

In addition to gold, Kwekwe is the site of Zimbabwe's most advanced chrome processing plants, which were launched in 2018 and operated by the country's largest chrome miner, African Chrome Fields (ACF), at their Chinyika site. The sector promises to grow, evidenced by a jump in capital expenditure from around US$5 million in 2017 to in excess of US$20 million in 2018, with similar figures reported for project expansion spending. However, the chromium sector is highly energy intensive, consuming approximately 400,000MWh of electricity in 2018, and depressed prices of the metal as well as challenges around Zimbabwe's neglected rail system will continue to hinder cost-efficient mining.

Zimbabwe is also home to the world's second-largest platinum reserves after the Bushveld Complex in South Africa. Only in South Africa and Zimbabwe are PGMs mined as primary metals rather than as a byproduct. Mhembere explained why Zimbabwe's potential for PGMs remains an attractive investment over neighboring countries with similar geology: "Zimbabwe's resources are very shallow and we also have a large envelope which allows for mechanization. In comparison to South Africa, where a lot of the mining is carried out in conventional fashion, Zimbabwe is highly mechanized which translates into increased cost efficiency as well as a safer environment."

Zimplats is currently focused on two objectives: redevelopment of the Bimha mine that collapsed in 2014, and completing work on the Mupani mine, which will function as a replacement for the Rukodzi and Ngwarati mines that are expected to deplete by 2020 and 2021, respectively. Diversified global mining company Eurasian Resources Group (ERG)'s Africa-focused arm has taken an interest in Zimbabwe's platinum potential to further enhance its own portfolio. "In Zimbabwe, we own the fourth largest platinum mine in-country, with an estimated 4.3 million mt of platinum metal and additional significant chrome outcrops," said Dzingira Matenga, managing director of development assets for ERG Africa, adding that the company will seek around US$150 million to develop a plant for downstream processing and the concentrator.

The government is keen to extract greater value from its PGMs through industrialization, hence the introduction of a 15% penalty tax to encourage greater levels of in-country beneficiation. To avoid the tax, platinum producers are compelled to build refining facilities, although one option that has been proposed is the construction of a single joint facility, funded through equity from participating parties and the government.

While there are indications that both the platinum and diamond sectors may soon open further to the international community, foreign ownership of platinum and diamond mining assets is still limited in Zimbabwe. Currently, the nation's largest diamond producer is the state-owned Zimbabwe Consolidated Diamond Company, which increased its production from 2.5 million in 2017 to 3.5 million carats in 2018. However, the government has previously suggested that it would consider removing the 51% local ownership requirement on per-case basis.

While the future remains unclear, there are several private companies engaged in exploration activities in the country's Marange diamond fields. Vast Resources, which also holds a 25% interest in the Pickstone-Peerless gold mine in Zimbabwe, as well as a 23.75% interest in the Eureka gold mine that is slated to being production mid-2019, has engaged in a joint venture with Heritage Concession to examine opportunities for the development of alluvial diamond mining activities. Vast is also engaged in a joint venture with AIM-listed Botswana Diamonds, whose managing director James Campbell explained: "The original discoveries at Marange, which is producing approximately 100 million carats of diamonds, were from the African Consolidated Resources, but their claims were taken by the previous government. There has been a long outstanding court case and as negotiations furthered to settle, Vast Resources became the holder of many of

Image courtesy of Zimplats.
Zimplats operates the smelting plant in Selous, which is currently the only PGM smelter in Zimbabwe.

> Zimbabwe has a wealth of diversified mineral resources and skills. The concerted effort to improve the mining regulatory environment will not only enable attracting further foreign direct investment, but will help the Zimbabwean mining industry to flourish in the long term.
>
> **- Candice Subramany, Project Manager, Development Assets, ERG Africa**

these resources. We have a 13% stake in the Marange project and a 50/50 joint venture in all the other diamond deposits outside of Marange."

Though the country has long been renowned for its credentials in PGMs, gold, and diamonds, the potential for lithium has recently garnered significant international interest. In 2018, Zimbabwe was the top African lithium producer and the world's 5th largest with an output of 1,000mt. However, government officials believe that lithium may come to play an even greater role in the country's mining economy. At present, Zimbabwe has only one active producer, Bikita Minerals, but the country's combined reserves could allow it to contribute around 20% of global demand as the battery and electric vehicle revolution continues to drive interest in the metal.

ASX-listed Prospect Resources stands out as one of the darlings of the global lithium race. The company's Arcadia lithium mine, which sits just 35km outside Harare, has already pre-sold 70% of the phase-one offtake to founding partner and shareholder, Sinomine Group. "Our concentrates produce 99.5-99.6% pure lithium carbonate with almost no impurities and we are confident in our capacity to reach 99.9% purity of lithium carbonate and technical grade lithium hydroxide, if the future market demands it," said Harry Greaves, executive director, adding, "The resource is some 72mt of which 26mt is in the reserve category. It is a standard processing plant, with crushing, DMS, flotation, spirals, drying and bagging. Currently, the plan is to produce 240,000mt/y of petalite and spodumene concentrates per year and at the moment the cut is about 50-50 between the two minerals."

Prospect also has a number of strategic exploration tenements, and several other players have lithium projects worth keeping an eye on. Mining Weekly reported that Zimbabwe Lithium Company (ZLC) — a JV between Canadian-listed miner Chimata Gold Corp and Zimbabwe's state mining company — expects to begin production of lithium concentrates in Q2 of 2019 following the completion of a pilot plant.

Notwithstanding many positive developments in terms of regulation and an overall uptick in its production and exploration, Zimbabwe has a long way to go if it is to regain its position as a top player in Africa's mining scene. In the near term, stability in the monetary regime will be crucial in fostering confidence in the investment community, and relaxing regulation around foreign ownership will encourage much-needed capital investments in the country's abundant resources. •

"Our country is the heart of Africa and once we get on track, the result will benefit the entire continent. Currently, the DRC is focused on its relationship with the southern region, and not putting enough emphasis on engaging with countries to the north, west and east."

- Costas Coursaris,
Founder,
Katanga Business Meeting

MACIG 2019 / Image courtesy of Barrick Gold

DEMOCRATIC REPUBLIC OF CONGO

CENTRAL & EAST AFRICA

Alphamin's high-grade tin project is located in the North Kivu region of the DRC.
Image courtesy of Alphamin

Central and East Africa

Economic growth in East Africa persists as the highest on the continent at 6.3% in 2018, a trend that is expected to continue despite a slight dip from 6.8% in 2017. While agriculture and industry remain the main drivers of the economy, the prominence of the mineral sector steadily increases. The rebound in commodity prices played a part in advancing the role of mining, and national governments in a number of the region's countries have taken steps towards taking greater advantage of natural resources.

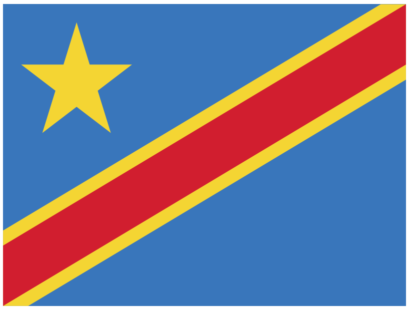
However, the advances of the mining sector have simultaneously been thwarted by political instability, national disputes and important legislative changes. Kenya's intended revision of its 2016 mining act has created an uncertain business environment. While the country is rich in gold and is also believed to have deposits of base metal such as copper, rare earth minerals and coal, the mining industry remains underdeveloped with little growth since 2016. Tanzania's nationalization laws, signed into effect in January 2018, are likely to have an equally detrimental effect on long-term investments as the legislative changes aim to limit foreign ownership of mining-related activities. Consistently ranked among Africa's top five producers of gold, Tanzania seeks a greater share of the gains from its mineral wealth by making it compulsory for foreign entities to offer shares to local companies and the government. The new laws also work retroactively, granting the government the right to renegotiate or dissolve contracts as well as to remove the right to international arbitration. Minerals Minister Angellah Kairuki stated: "We aim for a larger piece of pie, at least 10% of its contribution to the country's GDP by 2025." Numbers are already up from 3.5% to 4.8%. While this uptick has been attributed to the new regulations, undermining the sanctity of contractual agreements will likely hamper investor interest. In addition, the Tanzanian government has been in an ongoing dispute with Acacia Mining – the country's largest gold miner – over royalties it allegedly owes on undeclared exports. The company's operations have been sapped since March 2017, when the government slapped Acacia with an incredible US$190 billion tax bill. In Central Africa as well, legislative moves have rocked the mining sector, with the DRC signing a new mining code in 2018 that principally introduced a hike in royalties and taxes – leading to threats of legal action from some of the country's major miners, including Glencore, Randgold and Ivanhoe.

However, increased stability and overall growth in the region is likely to override individual roadblocks in the country's economies in the long term, and from a vantage point, countries in East and Central Africa are taking giant leaps towards becoming major trade hubs. East Africa is one of the world's fastest growing economic regions and, over the last decade, has stolen some of the shine from the continent's largest economies such as Nigeria and South Africa. Major cities such as Nairobi, Dar es Salaam and Addis Ababa are quickly emerging as hotspots for investment activities with new international trade routes being established.

While infrastructure remains underdeveloped in Central and East Africa, governments in the region have allocated about a third of their budgets in the new financial year towards financing infrastructure development. In the three largest East African markets – Kenya, Tanzania and Ethiopia – infrastructure construction spending is expected to skyrocket from US$25.9 billion in 2017 to US$98.8 billion in 2022. This development will hugely benefit the whole region, as Kenya and Tanzania constitute vital gateways to its landlocked neighbors of the Lake Victoria Basin region, namely Uganda, Rwanda, Ethiopia, Burundi, South Sudan and the DRC. China, in its ongoing effort to fulfill its One Belt One Road initiative, has taken a strategic interest in the region as a major trade route and the gateway into the continent, and thus is investing heavily in the region's infrastructure developments. Western companies looking to tap into the opportunity to support development initiatives are often hard-pressed to compete with the Chinese business model. Colin Kubank, non-executive director for ASX-listed engineering and project delivery group Lycopodium ADP, explained how the company is navigating this challenge: "Like us, Chinese companies are able to bring engineering design and project management services and equipment, but they also have the capability to provide funding. This added financial advantage is one of the reasons why Canadian and Australian companies are attracted to Chinese providers. We try to differentiate ourselves by providing innovative technical and project delivery solutions that are not yet developed or even unavailable to the Chinese - we can compete by being at the forefront of project execution, reliability and delivery."

In addition to challenges concerning infrastructure, outbreaks of violence related to longstanding international disputes and ethnic feuding have long plagued the region. The peace agreement between Eritrea and Ethiopia – two countries that have spent the last two decades in mired conflict – will strengthen security and stability in the Horn of Africa. Eritrea is already reaping the benefits of the reconciliation, with Canadian resource conglomerate Lundin announcing in June 2018 that it would make an immediate cash offer for Eritrea's only commercial mining operation, the Bisha gold-and-copper mine. Eritrea sits on an array of other natural resources such as oil, zinc and potash, as well as precious metals found in the greenstone belt that covers some 70% of the country. Similarly, Ethiopia has vast indicated resources of untapped gold and graphite in its relatively unexplored Asosa zone, and as the country creaks the door open for investors, mining could come to play a much more central role in the national economy.

Central and East Africa lead the world in terms of financial growth rates, yet remain some of the least competitive on various levels. Poor physical and institutional infrastructure constitute the main impediments to a market with enormous potential. But as scars from past conflicts heal and political stability increasingly becomes the norm, growing regional collaboration, sound economic policies, privatization and formalization of small-scale industry is only a matter of time. •



Democratic Republic of Congo

Population: 81,339,998 million
Land Area: 2.345 million km²
Main Official Language(s): French, Kikongo, Kituba, Lingala, Swahili, Tshiluba
Capital: Kinshasa
Head of Government: TBD (election in progress)
GDP: $37.24 billion
GDP per Capita: $457.85
Growth Rate: 3.7%

Exports: diamonds, copper, gold, cobalt, wood products, crude oil, coffee
Export Partners: China 35.3%, Zambia 15.8%, South Korea 8.7%, Saudi Arabia 8%, Belgium 5.2% (2016)
Imports: foodstuffs, mining and other machinery, transport equipment, fuels
Import Partners: China 20.2%, South Africa 15.7%, Zambia 8.6%, Belgium 7.6%, Tanzania 5.8%, France 5.2%, India 4.6%, Kenya 4.2% (2016)
Public Debt: 14.6% of GDP (2017 est.)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank
47/54

2017 Score
32.1/100

Safety & Rule of Law
19.4/100

Participation & Human Rights
31.1/100

Sustainable Economic Opportunity
33.6/100

Human Development
44.3/100

TAXATION RATES

SOURCE: ICLG

Mining Operations Income Tax
30%

Notable: new 'super profits' tax introduces 50% tax on profits exceeding 25% of those forecast in the mine feasibility study

Royalties
Non-ferrous metals: 3.5%
Precious metals: : 3.5%
Precious stones: : 6%

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017
161/180

Score
21/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business
184

Starting a business
62

Dealing with construction permits
165

Getting Electricity
174

Registering Property
156

Hon. Pande Kapopo Celestin

Governor of
Haut-Katanga

What is the Haut-Katanga provincial government's stance on the new mining code?
The new mining code is heavily focused on promoting greater participation of the Congolese people within the industry, because previously our citizens were disadvantaged. International investors must understand that we are a developing country and the DRC should benefit more from the exploitation of our own resources. It been a while since the new mining code was modified, and it is time that the legislation be updated to support our evolved development objectives.

Can you highlight the extent that energy is a challenge to mining companies in Haut-Katanga?
It is important to address the energy deficit in Haut-Katanga and we are searching for partners to revive different energy projects in the province. SNEL is producing electricity, but it is not able to fully support our province, especially because of the population increase from 4 to 5 million. We are also seeking to utilize solar energy as a source of public electricity because some portions of Lubumbashi, for example, do not have access to electricity. We have two electric power plants at Mwadingusha and Koni, but these dams do not offer sufficient power to support the mining industry. Several investors have expressed interest in investing in different energy projects, including a site about 59 km outside of Lubumbashi and Karavia lake, which could produce up to 10 MW. We have also discussed the potential to launch an electric dam on Luapula river in the Kasenga territory by 2019 where the central government in collaboration with Zambia would like to build a site with a production capacity of 800MW to be used in the Haut-Katanga and Lualaba provinces. •

Hon. Richard Muyej Mangez Mans

Governor of
Lualaba

How can the mining sector support the Lualaba province's objective to diversify?
All mining companies are obliged to contribute a portion of their revenue to development projects. We are working to provide better information about the array of projects in which mining companies can be involved, as well as different financing structures. Our ultimate objective is to work with mining companies to fight against poverty and benefit more from the wealth in our country. The Lualaba province is an excellent place to invest in that respect, because there is plenty of prosperity to be shared by all. By contributing to worthwhile projects like education or activities that promote a stronger economic ecosystem in the country, we can work together to ensure peace, security, safety and unity within our province.

How are you working to promote the interests of the province's many artisanal miners?
Artisanal mining is a vocation for many people living in our province, but there are many challenges that need to be addressed. We need to raise awareness for how dangerous it is to live near artisanal mining sites. Radiation caused by uranium can have severe consequences on health, and accidents involving children and landslides can be better avoided through education. To counter this problem, we have implemented relocation and compensation packages in partnership with SDM, a Chinese company that is financing and constructing sustainable housing. To combat accidents, we have created a fence and gate to prohibit access on the site in accordance with international law. This also creates greater formalization of artisanal mining by promoting a 8 AM to 5 PM work day when they are allowed to enter the site, collect minerals, and receive payment when they leave. Five months after implementing this procedure and we have not registered any accidents, and we hope to replicate this success at other sites. •


Equatorial Guinea
Gabon
Congo
The Democratic
Your feet on the ground in Africa
GOLD MINES
Existing
Gold resources
Closed
OTHER MINERALS
Existing mines
Projects
Closed mines
Geological boundary certain
Country Borders
Roads
Railway
Water area
CENOZOIC
Sediment
Volcanic felsic
Volcanic mafic
Plutonic felsic
Plutonic mafic
MESOZOIC
Sediment
Volcanic felsic
Volcanic mafic
Plutonic felsic
Plutonic mafic
Metamorphic
PALEOZOIC
Sediment
Quartzite
Volcanic felsic
Volcanic mafic
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Plutonic mafic
Metamorphic
PROTEROZOIC
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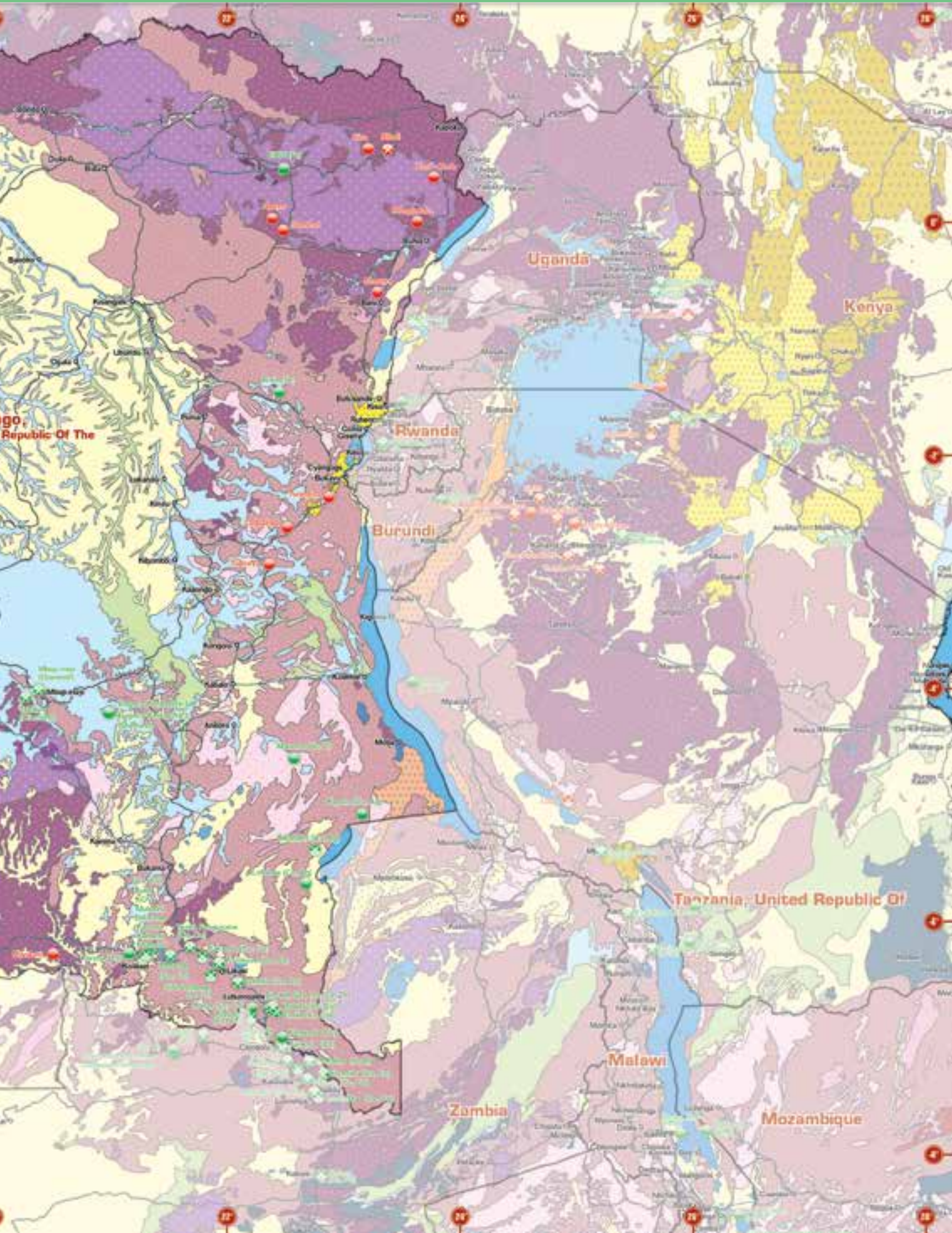
Uganda
Kenya
Rwanda
Burundi
Republic Of The
Tanzania, United Republic Of
Malawi
Zambia
Mozambique

DRC: Risk – and opportunity – grows

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An election in any African nation is met with trepidation by international investors, but particularly so in the DRC, where political upheaval and chaos are essentially institutionalized strategies for state control. Eight days after the assassination of his father Laurent Kabila in 2001, current President Joseph Kabila took the reigns of the country and has remained in power despite his two-term limit expiring in December 2016. Elections have been repeatedly postponed, but an energized civil society pushed continuously for democratic due process, often encountering deadly force in response. In December 2018, the vote did take place, but delays in revealing the results have been criticized by opposition leaders as a ploy to allow President Kabila's chosen successor, Emmanuel Ramazani Shadary, an edge over the competition. The DRC has never seen a peaceful transition of power, and many believe that Shadary will serve as a seat-warmer until President Kabila may run again in 2023.

Contributing to the uncertain climate is the recent promulgation of a new mining code, which was heavily opposed by some of the country's most important investors. Nonetheless, even as the industry adjusts for new layers of regulation and grapples with incorporating increased taxation into their cost profiles, production is ramping up and new exploration across a host of resources suggests that new investment has not been entirely deterred. Copper and cobalt remain the standout performers in the region, but the country's impressive credentials in other minerals and precious metals ranging from diamonds to lithium are capturing the imagination of the international investment community with projects like AVZ's lithium deposit in Manono, which was recently declared the largest deposit globally, garnering significant interest abroad. Increasingly, mines are going underground in the DRC. The Glencore-owned Kamoto operation was the first, but giant deposits such as Ivanhoe's Kamoa, as well as several others looking at underground options, presents an opportunity for the country's services and equipment sector. Heavier flows of imports and exports have created a particular buzz for logistics operators which must cope with the country's poor infrastructure to facilitate the activity generated by the mining upswing.

At the end of the day, business as usual continues in the DRC, albeit punctuated by heightened tension incited by the recent election. While the political situation is complicated and shifts in the regulatory environment have brought about much criticism, key partners within government remain committed to supporting private investors. In the Lualaba province, the Governor Richard Muyej Mangez Mans has gained significant praise for his initiatives to promote opportunities to invest in his jurisdiction and his willingness to work closely with the private sector, including hosting an event in September 2018 to bring together key stakeholders in dialogue about the state of the mining industry. Despite the attractive commodity prices, it is likely that several potential investors are lurking in the wings, awaiting the outcome of an uncertain 2018 before taking the plunge. Perhaps this is prudent, but there are indications that the country has made substantial progress in reaching a relative degree of stability in the last decade. The DRC officially implemented the OHADA principles in 2012, which, although still unclear, established a stronger accounting and auditing legal framework. The country also began participating in the Extractive Industries Transparency Initiative (EITI) in 2014, meaning that now information on the revenues gained from the country's mineral resources are regularly reported. Large multinational companies like Epiroc and AEL Intelligent Blasting are investing in developing in-country assets, serving as a testament to their faith in the nation's potential, and, despite the undeniable challenges, many of the world's top mining companies persist in their operations in the country. With commodity prices picking up and the country's established mining community doubling down to wait out any disruption, only time will tell if 2019 will be the year that Congo takes off, or takes two steps backwards into chaos. •

The opening of Azambi marked the third hydropower station commissioned to service the Kibali gold mine. Image courtesy of Barrick Gold.

Doing Business in the DRC

Politics

When the DRC won its independence from Belgium in 1960, the country quickly fell into chaos as different political parties and internationally-backed proxies attempted to destabilize the new government. The nation's first elected prime minister, Patrice Lumumba, had been a leading figure in the DRC's path to independence, and his relations with the Soviet Union and strong commitment to pan-Africanism and Marxist-inspired principles marked out the Congolese politician as a threat to Western powers. Shortly after being forced out of office, Lumumba was assassinated. The American and Belgium governments, after years of both nations exercising control over the DRC's vast resource wealth, were suspected of involvement and, in the era of the Cold War, the country's mineral assets — and particularly its high grade uranium — were too vital to fall under the control of what was feared could become a radical regime.

Less than two weeks after the DRC state had been born and supported by a force of western-supported mercenaries, Congolese national Moise Tshombe declared the southern Katanga province and part of the Kasai region independent from the rest of the country. This region contains the majority of the nation's mining activities in which Belgian, French and British actors had a vested interest. U.S. and UN military forces brought the secession attempt to an end in 1963, when Tshombe stepped down from his declared role as President of the State of Katanga.

While the actors may have shuffled, nearly 60 years on and following one of the deadliest wars in modern history, the DRC's complicated geopolitics still cripple the country's ability to achieve sustainable economic progress — the exception being the wider Katanga region, which, in recent years, has seen relative growth and stability compared to neighboring provinces. Particularly under the leadership of former governor Moïse Katumbi, the province saw an economic revival through initiatives such as a ban on the export of raw

BCDC: THE BENCHMARK FOR BANKING

IN THE DEMOCRATIC REPUBLIC OF CONGO

BANQUE COMMERCIALE DU CONGO

Building the future

BCDC has been supporting the Congolese economy and people since 1909. Stable and reliable in a highly challenging market, with its deep understanding of the Congolese economy and its exacting standards of management, BCDC has always known how to take advantage of its structural strengths and of cyclical opportunities. Its profitability, the best in the market, tells its own success story.

Like the elephant that stamps its logo, BCDC is a robust institution. With a 100-year track record, it inspires respect in the DRC and beyond. The long-term banking partner of all the major players in the Congolese economy, public and private (including mining and energy), BCDC has, over time, been successful in adding three other lines of business. Over the years, the Financial Institutions & Banks (FIB) line has carved out a reputation for quality with national and international institutions operating in the DRC. The SME market has been expanding for several years, while the Retail and Private Banking line has focused on the retail market, ranging from VIPs to employees, the self-employed and professionals.

UNFAILING CORPORATE BANKING EXPERTISE

Across and in addition to these lines of business, what sets the trading room apart is its professionalism and its unique, innovative position in the Congolese banking sector, primarily for corporate and institutional customers.

The rollout of these additional activities combines with the bank's comprehensive network across the DRC to deliver a service made all the more effective by the bank's governing principle of optimisation of resources, both human and financial.

HIGH-QUALITY FINANCIAL INFORMATION, PRODUCED IN ACCORDANCE WITH INTERNATIONAL FINANCIAL REPORTING STANDARDS (IFRS)

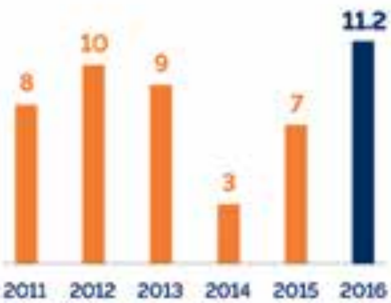
As part of this requirement of good governance, BCDC has published its financial statements in accordance with IFRS Standards since 2014. One of the first to do so in the DRC, this has enabled the bank to achieve a level of accuracy and integrity without equal, in particular for loans, provisions, the long-term benefits granted to staff, and for fixed assets, which are assessed at their appraised value and not on historical cost.

IN 2016, DESPITE A 30% DEVALUATION OF THE CONGOLESE FRANC, NET PROFIT REACHED RECORD LEVELS

This combination of best practice and expertise is reflected in levels of profitability all the more exceptional that they have been on target for the last ten years, despite the fact that regulatory constraints and economic situations can vary greatly. In 2016, despite the devaluation of the Congolese franc by more than 30% against the dollar, net profits hit a record \$11.2 million. And these profits have never been achieved at the expense of fixed capital, which stood at \$81.9 million in 2016 (compared to \$73.2 million in 2015) after distribution of dividends amounting to \$5.7 million. The same goes for net banking income, which was \$80.2 million in 2015, rising to \$93.6 million in 2016.

EVOLUTION OF THE NET RESULT

Net profit in USD millions



In short, BCDC is the bank that inspires confidence, the bank in which investors and major corporations place their trust.

"BCDC: THE BANK YOU CAN TRUST IN THE DEMOCRATIC REPUBLIC OF CONGO"

www.bcdc.cd

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With the implementation of the new mining code and the new taxes measures associated with the reintroduction of the VAT on imports, the amount to pre-finance might be too high regarding the size of Congolese banks. This will need to be taken into account in the next discussions between clearing companies and the mining industry.

- Michael Demey,
Regional Manager of South Region,
BCDC

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minerals that increased tax revenue gathered in the region from US$80 million in 2007 to over US$3 billion by 2014. Given Katumbi's mounting power and perennial fears that the region may still one day attempt secession, the businessman-turned-politician was forced into exile and, in 2015, Katanga was split into four separate provinces in a move that effectively decentralizes the region's power.

In January 2018, Katumbi put forth his candidacy for the 2018 presidential election, which had been rescheduled from its original 2016 date following apparent delays to updating the voter registry, a move widely viewed as a play by President Kabila to circumvent his constitutional obligation to step down following the expiration of his two-term limit. Nevertheless, in 2018 the election proceeded, though Katumbi was effectively pushed out of the race when he was threatened with arrest should he re-enter the country to formally register his bid. International powers also quietly took sides, with rumors circulating that China and Russia have been courting President Kabila to maintain his position. China has benefited immensely under the President Kabila's regime, taking control of well over half of the country's mines. However, speculation that the United States stepped in with incentives to encourage the President to step down suggests that, while overt American influence has largely exited the county, the United States remains interested in the DRC's fate.

Ultimately, three key figures dominated the campaign trail: Emmanuel Ramazani Shadary, backed by President Kabila, and the two main opposition candidates – Martin Fayulu and Felix Tshisekedi. The DRC has historically suffered immensely under the strain of too many interested parties vying for power. Often used as the quintessential example of the Resource Curse, the country's extreme natural wealth has fueled this political feuding, and – regardless of the outcome of the recent presidential election – the past demonstrates that investors worldwide will remain vulnerable to the DRC's propensity for political instability for years to come.

The New Mining Code

The DRC's controversial new mining code was ultimately signed into law in May 2018, following a dramatic public battle between government and some of the world's largest mining companies, including Glencore and Ivanhoe. The previous code, promulgated in 2002, was thought to be one of the more investor-friendly regulatory frameworks in Africa. While the revised version is still fairly standard when compared to mining legislation across the continent, several key amendments have put-off particularly those investors that already have operations in the country. The new code reduces the stability period in which changes to taxes and customs cannot be modified from 10 to five years, and it is not yet clear how existing contracts containing stability clauses will be treated.

Mining royalties on non-ferrous metals have increased from 2% to 3.5%, for precious metals from 2.5% to 3.5%, for precious stones from 4% to 6% and notably a new "strategic substance" designation could require companies to pay

"We propose that a sliding royalty system would benefit the industry and the country immensely. It has already proved beneficial in Côte d'Ivoire, Senegal and Burkina Faso. Our sliding scale proposal, given the current price, would give the government an immediate step up in revenue. It would also be beneficial in terms of industry sustainability; under the current system, the average grade of a copper mine is the DRC is 3%, not because that is the typical grade of the resources, but because that is what you need in order to mine profitably and competitively.

- Dr. Mark Bristow, CEO and President, Barrick Gold"

a royalty as high as 10% on metals such as cobalt, which could eventually produce a worldwide ripple effect given that the DRC contains nearly two thirds of global cobalt reserves. "Cobalt will play a globally significant role in the rapidly growing green industries such as batteries and electric vehicles. This means there will need to be dialogue between the mining community and the DRC to create a win-win dynamic that respects the development needs of the local population, while continuing to attract mining investors from around the world to promote sustainable growth," said Michael Demey, regional manager of the Katanga region for BCDC, a leading Congolese bank that has been operating for more than 100 years.

While corporate income tax for miners remains at a reduced rate of 30%, the introduction of a new 'super profits' tax could mean a rate as high as 50% on profits that exceed 25% of the expectations outlined in a mining feasibility study. Generally, the updated code puts more emphasis on generating revenue for the local economy, but mining companies have argued that some of the new requirements are not feasible given the significant challenges of operating in the DRC and their associated costs. For example, the new mining code also requires the total export earnings repatriated into the country to increase from 40% to 60%, and that those funds be utilized in the DRC. Serge Bilambo, mining and metals head for Standard Bank in the DRC, explained the concerns over this obligation: "The challenge is to ensure that companies can find subcontractors capable of delivering the specific services that they need to the standards that they require. Many companies already struggle to use the 40%," he said. "However, putting the new law in perspective, in a country like Zambia there is no requirement to repatriate export proceeds, whereas some places in West Africa require 100% of export proceeds be repatriated. The challenge is to find the appropriate balance and promoting initiatives to lift up the standards of local subcontractors so that they can compete," he continued.

The import and export process in the DRC is already notoriously complex and reintroduction of VAT on imports provides another layer of red tape. To keep track of this complicated and ever changing regime, mining companies typically enlist the services of local banks that can support them through the process through intimate knowledge of the many nuances in the system. "BCDC is particularly adept in assisting import and export processes," said Demey. "From the importation of goods in support of production to the exportation of the ore, licenses must be opened by the Congolese banks in order to validate the process. This could be seen as easy, but it comes with considerable paperwork to deal with and a close follow-up by the bank of the various obligations associated with repatriation."

Dr. Mark Bristow, who recently assumed his new role as CEO and President of Barrick Gold, raised the issue of the new windfall tax, which he believes will have disastrous consequences. He explained: "Essentially, the tax rate is determined by the commodity price when the mine starts operating, rather than by the grade of the deposits. Mines in Katanga that were developed at different times will be affected differently: for example, if a company is mining two ore bodies at the same time, but started mining one when the copper price was US$3 and the other when the price was US$2, one is penalized and will become a loss-making exercise because of the windfall tax. It is worth pointing out that in 2013 mines closed in Katanga because the copper price collapsed."

Dr. Bristow, one of the key voices among investors opposed to the changes in the new mining code, explained how the debates had led to a falling-out between some of the country's most prominent investors and the nation's key industry association, Federation of Congo Enterprises (FEC). "When we were discussing the mining code with the President, the mining industry sat on one side of the table, and the government sat on the other side of the table with FEC. This presented a huge conflict of interest that we were uncomfortable with. We approached the Minister of Mines and said that we would like to represent ourselves," he said.

If the increased revenue generated by these changes is re-invested into critical development projects, the financial effects felt by the mining community could theoretically be offset by improving the country's overall economic well-being. "The new mining code certainly has financial implications for us, including new taxes to pay on imports and exports. However, as long as commodity prices continue to remain strong, we do not expect much impact. If the government will contribute more support to the mining industry through this added revenue by strengthening key infrastructure like transport and power, then I believe we will ultimately see a positive impact," said Chetan Chug, CEO of SOMIKA, a diversified mining company operating in the DRC since 2001.

The key question going forward will be how existing investors are treated under the new code. Mining companies operating under international investment agreements can use the stabilization clause in the 2002 code to engage the government in costly arbitrations over a protracted time period — a lose-lose situation for all stakeholders. "For new investors, these are the new rules and the new status quo. For existing investors, discussions are ongoing to reach a compromise that benefits all stakeholders. Existing investors have made significant investments at a time when the environment was more complicated. They should then benefit from their early commitment as they invested in a difficult period for the country," said Yannick Mbiya Ngandu, director for Trust Merchant Bank (TMB).

Ultimately, the objective of the changes is to bring increased benefit from the country's natural wealth to its population. Whether or not the new code will achieve this amid a state apparatus riddled with corruption remains to be seen.

Economy and Finance

While the splitting up of the Katanga province may underpin an undercurrent of geopolitical strategy, it also aims to concentrate more energy into the development of smaller territories. The country depends heavily on mining as the largest single contributor to GDP, followed by the telecommunications sector, and when commodity prices crash, as they did in 2015, the entire economy suffers. To counter this effect, provincial governments are promoting alternative investment opportunities in their regions, with agriculture and tourism identified as the industries with the most potential within the Copperbelt region. Governor Richard Muyej of the Lualaba province, which hold's the largest share of the country's mining assets, is leading an energized campaign touting his jurisdictions touristic potential. Highlighting everything from the dramatic waterfalls of Kayo in the Lubudi territory to the construction of a new fountain plated with malachite in the capital city of Kolwezi, Governor Muyej is determined to change the face of the Lualaba province through diversification.

While opening investment to new sectors to decrease reliance on mining will help, the financial impact of the new mining code and the political risk remain deterrents. The government has begun to make use of other fiscal tools to design a more favorable environment for investment. For example, the recent liberalization of the insurance sector, which was formerly monopolized by a state-owned company, could soon help to lessen interest rates for loans in the DRC. To secure sufficient capital for projects, companies are largely obliged to seek financing from international lenders, but local alternatives should bring the cost of interest down. "In the current situation, we are not able to give loans based on the real value of an asset given the potential additional charges associated, but we are rather forced to consider the applicant's cash flow and financial track record," said Didier Tilman, deputy CEO of Rawbank, the country's largest bank in terms of equity, deposits, loan portfolio and total balance sheet. "The liberalization of the insurance market will enable us to grant more loans without excessive risk to local actors that will be insured through a local insurance company. We now have all the vital components in place and are waiting for the license to be issued."

Another new development from the Central Bank attempts to incentivize companies to make use of the SME sector by making leasing activities more attractive. "Leasing fees are now tax deductible," explained Mbiya. "Rather than buying equipment, companies can take advantage of this opportunity to lease equipment, utilizing borrowing structures provided by banks like TMB."

Overall, the palatability of the high-risk, high-reward paradigm of the DRC will not come down to small gains in leasing or lower interest rates. Though the country's vast potential as the mining uptick surges forward continues to tantalize investors from around the world, the turmoil following the December 2018 election implies that the country still has a long way to travel before establishing the fundamental governance and stability needed to ensure a reliable business environment. •

Production and Exploration: Geological and geographical opportunities abound

Highlights in Copper + Cobalt

Despite fierce backlash towards the new mining code and apprehension over the election, copper and cobalt production ramped up in the DRC as both new and old operations pick up pace, sparking a flurry of activity throughout the entire mining ecosystem. Reuters reported that in the first half of 2018, the country produced 597,249 metric tonnes (mt) representing an increase of 7.9% compared with the same period in the previous year, while cobalt output increased by an even greater margin of 37.6% to 52,491 mt. With cobalt prices soaring to a record high of US$90,000/mt and a general improvement in the price of copper, companies are incentivized to push forward with their operations.

Glencore, which is the largest copper producer in the country and contributes over 25% of the world's cobalt output, has been entangled in a series of legal battles. The company was slapped with sanctions by the U.S. in December 2017 because of its affiliations with Israeli diamond mogul Dan Gertler, and faces an impending investigation conducted by the U.S. Department of Justice. One year later in December 2018, the Ontario Securities Commission found that the company's TSX-listed DRC unit Katanga Mining misstated results and inaccurately represented its relationship with Gertler. Nonetheless, Glencore's subsidiaries in the DRC have continued operations and, in Q4 of 2017, Mutanda's sourced production reached historic highs of 51,500 mt of copper and 23,900 mt of cobalt. The Kamoto Copper Company (KCC), which is operated by Glencore's Katanga Mining subsidiary in a joint venture with Gécamines, has commissioned a new acid plant to be completed in 2019 in order to reduce its dependency on import of sulfuric acid, which had held production back.

Ivanhoe's Kamoa-Kakula project, considered to be the world's largest undeveloped high-grade copper discovery, is hotly anticipated by local subcontractors that see significant opportunity once the project begins operations. However beyond its copper credentials, the company also recently updated the indicated mineral resource at its Kipushi zinc project to 11.8 million mt at 35.34% zinc, containing 9.2 billion pounds of zinc, 8.7 million ounces (oz) of silver and 24.4 million oz of germanium.

Within the Lualaba province, several Chinese companies are operating alongside Ivanhoe and Glencore; notably, China Railway in a joint venture with Sinohydro operates the Sicomines copper-cobalt mine, which exported 115,000 mt of copper concentrate and 20,000 mt of copper cathodes in the first half of 2017, according to Bloomberg. Sicomines is a compelling case study of a model being pursued around the continent, whereby mining rights are exchanged for the construction of key infrastructure projects.

Several recent transactions have granted Chinese companies control of some of the country's most notable assets, such as the Tenke Fungurume mine (TFM), which is one of the world's largest copper-cobalt deposits and spreads over an area of 1,500 square km on two concessions. TFM recently changed hands from American-based miner Freeport McMoRan when the company sold its 70% share in the asset for US$2.65 billion to China Molybdenum (CMOC). Over the next two years the company retains a contingent consideration to earn US$60 million if the copper price breaches US$2.5/lb and an additional US$60 million if cobalt exceeds US$20/lb. China Nonferrous Metal Mining (CNMC) recently began construction of a smelter in the Lualaba province that is expected to produce 120,000 mt/y of copper blister by 2020, representing an investment of US$440 million. These two large Chinese companies seem likely candidates to potentially purchase the Frontier mine, currently owned by Kazakistan-based mining conglomerate Eurasian Resources Group (ERG). ERG also operates copper-cobalt operations Boss Mining and Comide, and is attempting to put its Frontier mine on the market once more after failing to sell it several years prior.

SOMIKA, a fully integrated mine-to-metal company with ties to India, started 2018 by taking 100% control of its concession Luputo 2590, where previously its Iverland subsidiary held 80%. These plans align with the company's ambitious vision to increase its copper production to 70,000 mt/y and its cobalt production to 7,000 mt/y by 2020. Rubamin, another Indian company, expects its 2018 copper production to reach 2,000 mt/y and cobalt production to reach 2,000 mt/y. The company's current capacity is 25,000 mt/y of copper, and some facilities have been

"This movement towards structured mining and processing operations will continue, which is a positive development, but artisanal mining is a livelihood and if you take that away without providing an alternative option, problems will arise. As a mining company, we are searching for other options for artisanal workers to see how we can help."

- Chetan Chug,
Managing Director,
SOMIKA

diverted take advantage of the attractive trajectory of cobalt. By 2020, Rubamin aims to increase its copper output to 20,000 mt/y and cobalt to 4,000 mt/y. "Our seventh furnace will be commissioned by the end of June 2018, which will allow us to restart production of cobalt concentrate and we are also constructing a plant to make cobalt hydroxide," said Navin Dalmia, MD and CEO of Rubamin.

Artisanal miners and the associated problem of illegal mining are not unique to the DRC, but the country may soon serve as an example for how to resolve the issue. Most estimations suggest that artisanal miners contribute roughly 15% of the DRC's annual cobalt production, which makes them a significant source of global supply. However, in a region often associated with problems such as funding conflict and child labor, cobalt obtained through artisanal mining is often seen as taboo, with the likes of Apple cracking down on their supply chain management. A Toronto based company called COBC, leveraging experience sourcing conflict-free metals in the region, is hoping to tap into this sector by using a blockchain platform to certify mineral traceability in compliance with OECD due diligence procedures. "Think of a permission-based platform that automates trust between supply chain participants with each actor building a trust score over time," explained Yves Kabongo, DRC managing director of the company. "A blockchain or distributed ledger is a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, or institutions. Such a system would have advantages over the incumbent paper-based systems or a centralized database in terms of transparency, security and immutability of the data, which are essential concerns in an environment such as that encountered in post conflict zones like the DRC."

COBC, which currently has supply agreements in place with the Lualaba province's leading cooperatives, intends to work with artisanal miners to provide much-needed modern infrastructure and technical training. If successful, the implications of such a system could be huge for global artisanal mining operations by helping to enhance safety and productivity.

Diamonds: An Old Frontier With New Prospects

The DRC has long been known for its diamonds, and its industrial diamond production falls second only to Russia, with 75% of the world's crushing bout —the lowest grade diamond used in steel mortars — coming from Congo, according to Britannica. However, when the price of copper and cobalt became more attractive than the labor intensive process of diamond extraction, exports dropped to just 17.1 million carats in 2015, compared to 33 million carats

exported 10 years prior. Part of the DRC's recent failure to recognize its full diamond potential can be attributed to a lack of investment into adequate infrastructure and exploration activities. Societé Minière de Bakwanga (MIBA), the state-owned diamond mining company, is largely a dormant entity that suffers from a debt crisis. Instead, the task has been largely left to illegal miners scouring riverbeds and sifting through gravel in search of the valuable stones. Furthermore, the sectors' reputation has been tainted by shadowy associations with funding armed conflict in the DRC and Angola, as well as the scandal following Israeli billionaire Dan Gertler, who is said to have made billions from corrupt dealings that gave him a monopoly over the DRC diamond industry.

There are indications that things may be changing. "More recently, we have diversified into the middle of the country to assist diamond mining companies. Exploitation of diamonds has been slower to develop in the DRC, but the fact that [our clients in the region] have started consuming our products tells us that production has begun," said Maximilien Emedi Madjani, financial director of AEL Intelligent Blasting in the DRC.

As the first entrant into the DRC blasting sector after its privatization, the company is leveraging its in-country experience and historical expertise with diamonds to tap into the opportunity. "Our clients are looking to exploit kimberlite rock in the DRC, and that technology and know-how has been in the AEL family for years because of our long experience working with large diamond producers in South Africa such as De Beers, where AEL Intelligent Blasting has been instrumental in the development of the Venetia mine," explained Madjani.

The DRC's Kasai-Oriental and Kasai Occidental provinces hold much of the country's diamond reserves, which are thought to be the second largest globally and occur mostly in kimberlite and alluvial deposits. Although it suffers from periodic outbreaks of violence and severe poverty, a few players have ventured into the region. Société Anhui Congo d'Investissement Minier (SACIM), a 50-50 joint venture between the China-based Anhui Foreign Economic Construction Group and the DRC government, has a mining presence in the region. In the southeast of the country near its border with Angola, Sweden-based Africa Resources AB has declared an inferred resource of more that 2.4 million carats at its concessions on the Tshikapa river, a historic site for diamond mining.

3TG: New Developments Pave the Way for Further Success

Tin, tantalum, tungsten and gold, (3TG), while controversial as designated conflict minerals, nonetheless offer interesting investment potential in the DRC if they can be sourced in a responsible manner.

Alphamin's high-grade tin deposit, located in the North Kivu province, is slated to come online in 2019 and reach steady production by the end of that year. The company expects to be one of the lowest cost tin mines in the world, producing 9,642 mt/y tin at a cash cost of US$8,837/mt produced, and to experience a payback period of just two years. "We will begin production in 2019 at approximately 10,000 mt/y, and in time we expect to ramp up to 30,000 mt/y. At the moment, the market would not absorb that quantity of tin, which suits us fine because we have not yet defined the full extent of our resource or designed the plants around it," said Boris Kamstra, CEO of Alphamin.

Once Alphamin successfully implements its CAPEX budget and development timeline, the company will look to ex-

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Historically, due to a number of circumstances, Banro has alienated its host communities over the past several years. This has led to disruptions, work stoppages, security issues and other social problems that have affected the mines' ability to be a high performing, low cost producer. We need to re-establish that trust and those relationships by acting / executing and delivering on our obligations and promises made in the past.

- Brett Richards, CEO, Banro

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pand its understanding of the area's exploration potential through a drilling program. SOMIKA, which is currently the country's largest tin producer, is exploring the wider Katanga region while also looking into opportunities in the Maniema province for tin as well as tantalite, despite the logistical challenges presented by the region.

Barrick Gold's US$18.3 billion takeover of Randgold brought about little or no disruption to its newly inherited 45% stake in the Kibali gold mine, which it now operates with co-owners AngloGold Ashanti (45%) and state-owned entity SOMIKO (10%). Kibali, which is one of Africa's largest and most profitable gold mines, beat its 2017 production of 596,225 oz to generate over 700,000 oz of gold in 2018. In an ongoing quest to fully optimize its mining operation, in July 2018, Kibali transitioned to a Congolese led underground mining operation without any mining contractors. "We are committed to developing the Congolese industry so we never use international service providers that do not use a local representative. We have the same attitude towards our own staff. The best underground miners in the world are Australians; we have been bringing them over to Africa and paying them to teach our workers so that we can transfer that skill and technology to our own workforce. We will always have professional experts to help guide us, but our main workforce, both on the sites and in management, will always be Congolese," said Dr. Bristow, CEO.

The other large gold operator in the eastern region of the country, Toronto-based Banro, has suffered from acute security issues at its Namoya and Twangiza mines, which have been repeatedly targeted by the Mai Mai Malaika militia group. The company has brought in a new CEO, Brett Richards, to stabilize the company and turn its fortunes around. In addition to stabilizing and optimizing the company's two mines, Banro will also work towards the development of its Lugushwa and Kamituga gold projects with the vision of eventually bringing four operational mines to the region. "Given the historical issues that Banro has had within our host communities, I am making it a prime imperative to begin by rehabilitating those relationships through a focus on community engagement and interactive development work," said Richards. "We will be diligently working to rectify all of these technical and social issues, through putting the "right people, in the right places, doing

The Manono project was confirmed as the world's largest lithium deposit in 2018 and comprises one main exploration permit covering 242.25 square kilometers. Image courtesy of AVZ.

the right things, all of the time. This mantra will return Banro to operational performance levels that will generate positive cash flow, and start to shape a revitalized growth story with its two operating mines, two study ready exploration projects, and strong commitment with all of its stakeholders."

Exploration

Despite claims that the new mining code will deter new investment into the country, exploration has picked up as appetite increases with rising commodity prices. "This year we are seeing many new faces, especially out of Australia and Canada, looking for exploration prospects in copper and especially cobalt, as well as other battery minerals such as lithium and nickel," said Tobias Posel, director of GeoQuest, a consultancy and contracting business focused on exploration, environmental services, hydrogeology, geo-technical services, GIS and related services. "The demand began last November and picked up through the festive seasons, when it was possible to visit sites, draft reports, verify projects and propose the deals to new clients," he added, noting that much of the new greenfield projects and advanced brownfield exploration is taking place within the wider Katanga region.

African Battery Metals, seeing an opportunity to take advantage of the trend towards renewable energies, has recently acquired copper-cobalt concessions in the DRC that will now take priority over its Ferensola iron/gold/coltan project located in the north of Sierra Leone. In April 2018, ASX-listed Nzuri Copper released an updated DFS for its flagship 85%-owned Kalongwe copper-cobalt project showing strong economic viability for developing a stand-alone, low CAPEX, open pit mining operation. The updated ore reserve in comparison to its maiden resource revealed in 2017 demonstrates an 11% increase. "The DFS indicates an ore reserve of 7.99 million mt at 2.94% copper and 0.34% cobalt for 234,868 mt of contained copper and 27,102 mt of contained cobalt," confirmed Adam Smits, the company's executive director and COO.

However, while copper and cobalt remain the favorites, the DRC has impressive credentials in other minerals that should not be overlooked. Ivanhoe's Kipushi project hints at the country's potential for zinc, and limestone, iron ore and coal are all present, albeit less attractive when weighing the risk factor. A high-grade uranium trend south of Kolwezi that runs to Shinkolobwe remains an untapped resource because of restrictive policies that allow the president to maintain the right to reject applications.

Notably, ASX-listed AVZ Minerals' discovery of what is thought to be the world's largest untapped lithium deposit in the Tanganyika province sparked a race to better understand the DRC's lithium potential in the concessions surrounding the discovery. Companies have seen their market capitalization rocket upwards through "near-ology" arguments, but AVZ remains the clear frontrunner for investment. The company completely a 15,000 meter diamond core drilling campaign and announced its maiden mineral resource at 259.9 million mt grading OF 1.63% lithium for 4.25 mt of contained lithium oxide, confirming that it is the world's largest lithium deposit with the second highest grade globally.

Overall, and despite the sense of heightened risk due to a new mining code and the upcoming election, exploration does not seem to have suffered and is, in fact, drawing more investment. "We have seen our price increase on the back of expectations of the resource being confirmed," confirmed Nigel Ferguson, managing director of AVZ. "In fact, we have not seen any slow down in investment other than a short period during the transition from the old code to the new one." •

Service Providers:

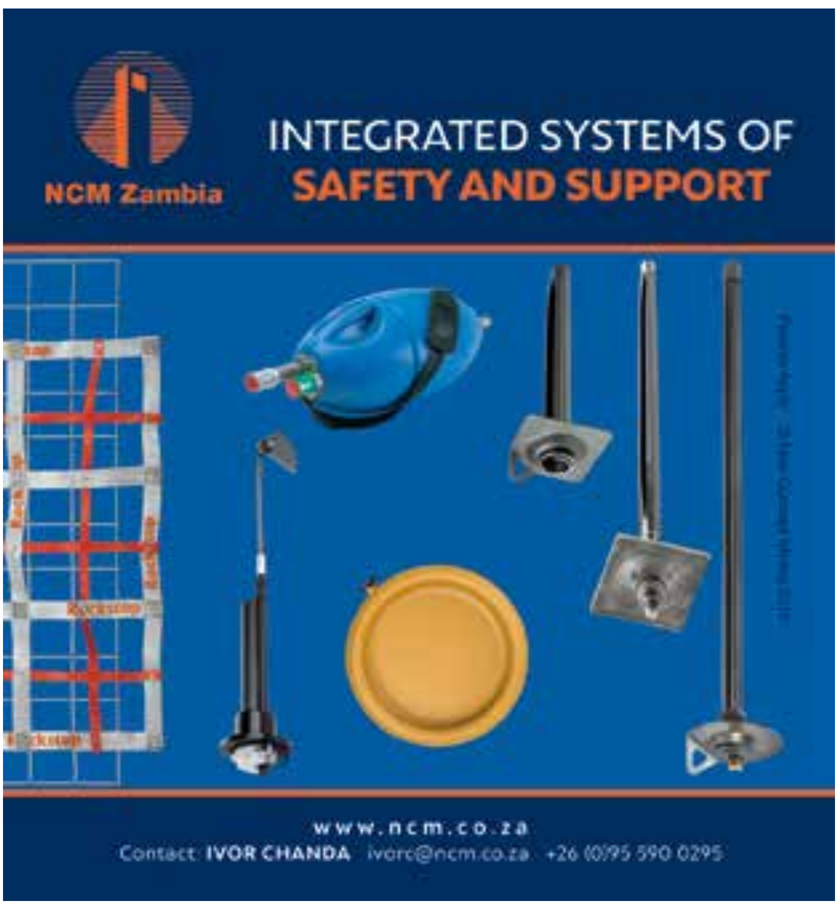
Taking Advantage of New Opportunities

A well-established community of distributors, OEMs and mining contract services are based between Lubumbashi and Kolwezi. A push towards underground mining and geographic and geological diversification, as well as new opportunities in other industries, has allowed service providers in DRC to remain afloat despite tough conditions in recent years. As the DRC's mining landscape increasingly picks up pace, new entrants are venturing into the fray. Leveraging its experience providing underground roof support systems in Zambia and in South Africa, New Concept Mining (NCM) sees an opportunity to enter the DRC market. "DRC represents a growing opportunity for us because a number of underground mines that were closed before have since been reopened, thus availing us a chance to put our products into this market," said Ivor Chanda, sales director for Africa at NCM.

For companies with an established presence in the country, the DRC nonetheless remains a critical focus for growth given healthy production projections. Furthermore, after years of hosting several mature mining operations, clients in the DRC are beginning to search beyond the essentials for support to optimize their activities. Axis House, a supplier and distributor of chemicals to the industry, started its operations in the DRC in 2001 with only one client. The company has since grown into a pan-African presence, yet the DRC is still a key market. "Our growth area for 2019 in the DRC is to maximize our service offerings in what is now a fairly developed market. We will introduce new products that emphasize increasing recoveries and grades for our clients, as well as novel chemistry that makes it simpler and safer for operators to handle their day-to-day activities," said Justine Stubbs, group general manager.

Diversification into other sectors has allowed for some relief when unattractive commodity prices dry up the available capital to spend on subcontractors or new equipment. "Mining represents around 90% of our Congolese business, while construction and transport are growing every year," said said Mamadou Sow, country manager for BIA DRC. "There is a significant market for construction and transport because, where there is mining, there is a need for large power and transport solutions," he added.

With claims that the gold-rich eastern region of the country could become "the new Katanga," many service providers and equipment companies are exploring the possibility of expanding to this region with the aim of supporting projects like Banro's two gold mines, as well as tapping into the opportunities in agriculture throughout the country. DEM Group, the official distributor of John Deere, is a prime example of this two-pronged approach to both geographic and industry diversification. The company is looking to open an office in Goma, and relocated its country headquarters to Kinshasa in order to support its activity in the agriculture sector. "Previously, we were depending on the mining sector and the Katanga region, but the decision to develop agriculture allowed us to survive the impact of unattractive commodity prices. Diversifying into different sectors is an important part of our core strategy because the downturn in mining will inevitably happen again," explained Gaëtan Falesse, GM for DEM Group DRC.



DEM is also expecting to see new demand for its line of GHH products given a recent trend towards underground mining in the DRC. Ivanhoe's massive Kamoa project is an underground operation, and Glencore's Mutanda operation is also looking at opportunities deeper below the surface. Reliant Congo, an underground subcontractor with its roots in Peru, opened its DRC operations in 2009 to service KCC. The company has grown to include a presence in Kolwezi in addition to its Lubumbashi office, and has also found work in the east with Alphamin. Using professionals from experienced underground mining nations Peru and South Africa, the company is able to pass savings to its clients by training locals to work in underground environments. "Reliant eventually plans to start a mining school to provide technical training," said Joseph Sandon, director. "We will bring Simulators because underground machines are very expensive and a bad operator can easily destroy a machine."

Within the equipment sector, increased demand for automation suggests that the DRC mining industry is maturing. Large mining companies in particular are looking for mechanisms to enhance efficiency and increase productivity to take optimal advantage of rising commodity prices. Automated processes cut labor costs and use advanced technology to identify even the smallest gains in efficiency. Epiroc, a global leader in innovation, has recently experienced interest for the first time in automated features such as auto drill leveling and GPS control navigation. "Within our range of products, we have the more basic equipment as well as the high-end, fully automated and fully navigation and information controlled designs. The large global mining companies that are already using these tools elsewhere in the world are now starting to look at this option for their DRC operations," said Stephane Goupil, country manager for Epiroc DRC, adding that because automated equipment is easier to use, the burden of finding highly specialized laborers in the DRC is also lessened.

Automation has also gained traction because of its ability to predict malfunction in the machinery before it arises, cutting the costs of maintenance significantly. "The CAT Connect Suite represents a range of products that are linked to machine monitoring, payload technology and safety systems. These systems connect to a control center where they can monitor machine and operator performance simultaneously, providing real-time tracking of machine parameters and operator efficiency," said Deon Heyns, CEO of Congo Equipment, the official distributor for CAT in the Katanga region. "The purpose is to detect problems before they arise because preventative maintenance is much more cost-effective, as well as to ensure equipment is being used optimally, which also allows for significant cost savings," he confirmed.

On the other end of the spectrum, some in the field of equipment believe there are huge opportunities in providing more low-cost equipment to the market. Founded just recently, Rex provides mining support services with the objective of demonstrating that a quality result can be achieved with less expensive equipment as long as good maintenance and support comes along with it. "We predict that, as the market becomes more competitive in a volatile economy, more clients will look to mitigate risk by paying for an asset over one year versus two or three years. Our services will become more invaluable as we provide maintenance services that create the same life expectancy as a premium product," said Paul Cuyler, chairman at Rex. "We believe that through using a combination of historic machine data, oil sampling results, and satellite tracking to inform maintenance we can lower operating costs and extend the longevity of any type of equipment," he added.

Along with the increased presence of Chinese mining companies, several Chinese equipment providers have begun to set up shop and are fighting against the notion that lower cost represents poor quality. Group Thema, the official distributor of Sinotruk, argues that its trucks benefit from the influence of German design, but come at a third of the price of premium European counterparts. "The country's infrastructure challenges are an area where we see potential to assist, and the investment in the necessary construction work can be reduced if DRC leverages access to the less expensive construction equipment available from China. We also see potential to assist in government-led projects through the provision of reasonably priced trucks," said Patrick Thema, director general of the company.•

Infrastructure: Focus on Transport and Telecommunications

With production ramping up, the poor state of the DRC's transportation network gives reason for concern. Increased volumes of both imports and exports with limited numbers of transporters available has put pressure on the country's already worn roadways. However, dealing with the congestion on the roads represents an opportunity for logistics companies present in the region that can provide innovative solutions to the challenges at hand. George Ioannou, head of Africa, for the Polytra Group, which recently joined forces with Swiss-based freight-forwarding company Fracht AG, elaborated on the company's intent to invest in assets in order to better serve clients: "In the next two years, there will be a shortfall in the capacity of road and, although many are talking about rail, we see little action. The main focus for Polytra is therefore to position ourselves strategically on the five main corridors by taking control of the means to facilitate greater volumes," he said.

Exploring alternative corridors, as well as alternative methods of transportation, are vital exercises that will require capital investment. Roadworks in the Luapula province will support cargo heading to and from ports in the east; Dar es Salaam remains a popular course, and the Tanzania International Container Terminal Services (TICTS) reported a 35.5% increase in the containers handled at port in 2017 following the removal of VAT on transit cargo enacted in 2016. However, many of the country's main operators are located in Lualaba, and the Lobito corridor may be a viable solution as developments in the railway better connect the DRC and Angola.

Nonetheless, the corridor leading south through Zambia remains a critical passage that must be better de-

> Capacity is a significant problem that will continue to grow and the company that will make an impact in the logistics space in DRC will be one that is asset based and makes an investment into infrastructure projects, specifically road and rail.
>
> **- George Ioannou, Head of Africa, Polytra Group**

veloped. "There is a significant need for more exit ports like Dilolo or the Kolwezi-Solwezi route. It is very challenging to explain to people outside of the country how the massive volume we deal with is being forced through a single border post. The situation has created a real bottleneck and more exit points must be developed," said Jeroen Braet, key account manager at Bolloré.

Even if more exit points can be developed, inadequate management at border posts means that the customs clearings process, already a complicated endeavor, becomes even more tedious — and expensive. "The poor transportation network creates significant impact on the cost of doing business. The mining region in DRC is landlocked, and if a truck has to wait for hours at the border, the DRC loses its competitive advantages to countries like Chile, where the distance from mine to port is a much more manageable," pointed out Eric Kalala, general director for Bolloré DRC.

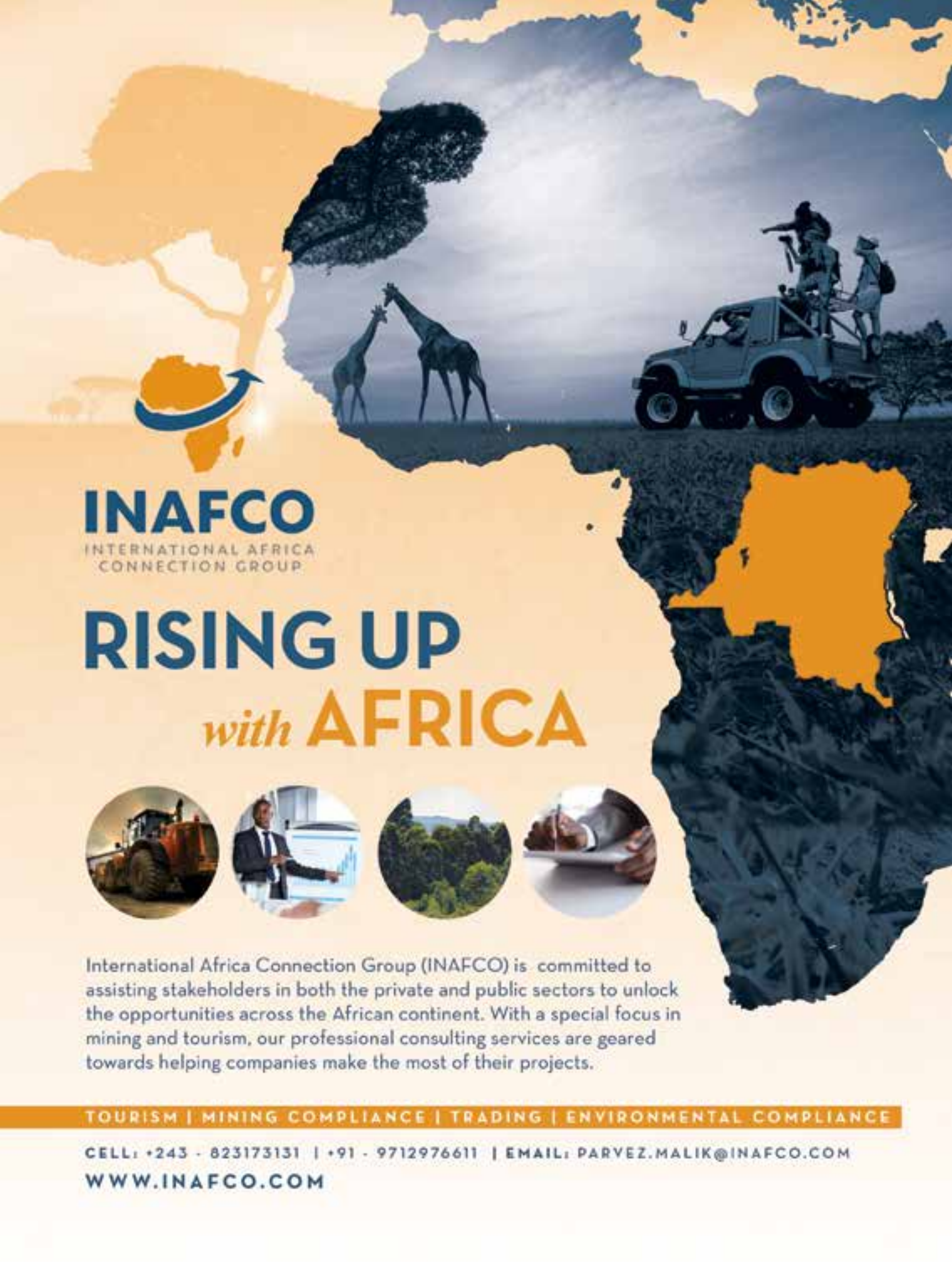
Players in the logistics space can also bring added value to their mining clients by providing a more systematic approach to the inevitable imbalance in the import-export dynamic. This is increasingly a challenge in the DRC, where there is a growing deficiency in qualified transporters available – and likewise an opportunity for transport companies willing to undertake the daunting task of traversing the country's roadways amidst increasing volumes.

While transport remains an obvious point in a discussion on infrastructure, the relationship between telecommunications and mining is less examined, but it is one of increasing importance. Particularly as mines in the DRC begin to embrace the benefits of automation, strong telecommunication infrastructure to establish access to secure and reliable networks will be vital. "Whether operating underground or on the surface, as long the client has access to a strong network, up to three machines can be operated by a single person from a remote bench and there has been a lot of interest in the resulting efficiencies," noted Stephane Goupil, country manager for Epiroc DRC.

Additionally, with many investors coming from all around the globe, it is vital to establish reliable communication channels with outside stakeholders. The vast size of the DRC means that, particularly in the exploration sector, connection can be a challenge. Vodacom, the leading mobile operator in the DRC, earlier this year became the first in the DRC to launch 4G connectivity, and the company also provides an array of corporate services to address the needs of the entire mining value chain. "At all levels of the production channel and, particularly at the research, extraction and processing levels, the industry is highly dependent on connectivity and optimal data management. We offer services and products that improve the connectivity of the mines, however, our capability is beyond fix and mobile services. For example, 'Vodacom Business Solutions' is a platform dedicated to supporting the mining sector's ICT needs through a portfolio of technologies to achieve better productivity and safety, as well as reduce the operational costs for mine sites," said Anaiah Bewa, executive head of corporate affairs for Vodacom Congo. •

"The client has a responsibility to hold the minimum of around three to four weeks worth of stock on site, otherwise a stressful situation can arise. We have always been fond of railing cargo to take pressure off the road infrastructure in Africa. We already do about 3,000 to 4,000 mt per month via rail, and we would like to see that increasing."

- Justine Stubbs, Group General Manager, Axis House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Power: The Congo's Great Irony

Power typically comprises anywhere from 10-25% of operating costs for a mining operation, and bears particular relevance in the DRC, which suffers from a severe power deficit. As production ramps up, the energy challenges for many miners will only become more acute. For example, the Kinsevere mine's oxide ore is reaching its end-of-life and, while the option to exploit a sulfide option exists, the current plant is incompatible. To construct a new one will be a capital and energy intensive project, requiring a roaster capable of heating over 1,000 degrees to drive out the sulfide. The MMG-owned mine, which expects to produce 80,000 mt of copper cathode in 2018, already imports some of its power supply from Zambia and will undoubtedly need more in the near future.

Ironically, the DRC's power potential is so great that it is often said the country could power the entire continent through hydroelectric generation. The Congo river, which is the second longest river in Africa, is the second most powerful river in the world in terms of volume, with an average flow of 40,000 m/minute. It is also the world's deepest river, reaching depths of 220 m, and yet its prospects as a source for electricity have been widely underutilized. The mining province of Lualaba alone boasts hydroelectric potential of around 800 MW, but the dismal state of the country's power infrastructure, coupled with too few generation projects, has resulted in an energy deficit that will only become more pronounced as mines in the region seek to consume more power. "As more mines open in DRC in the coming years, electricity will become even more difficult to source. Additionally, mining is going underground in DRC, and large power plants are required to supply air, water and gas," said Axel Chasme, sales manage for BIA Africa.

The 2014 liberalization of the power sector in DRC is a first step towards providing an alternative to SNEL, the country's state power company, and the rules of play will be better understood once the the Autorité de Régulation de l'Electricité (ARE) is firmly established. However, the Grand Inga Dam, a multi-phase project that could eventually deliver as much as 40,000 MW, has served as a deterrent for those that might consider investing into the DRC's power potential because once Phase III becomes operational in 5-6 years, it will be impossible to beat the economies of scale achieved by this mega project. "The electricity generated by small hydroelectric dams will be slightly more expensive than that generated by Inga…. [which] will sell at four or five US cents/kWh, while all the small generation plants will be between 12 and 15 US cents/kWh," said Vincent Noel Vika di Panzu, director general of Katanga Energy. "However, to ensure system stability, we also need a power plant

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Solar is an expensive option, but we believe the most important thing is education. We are trying to communicate to clients that within 5-10 years, the investment made into a solar project will be earned back allowing the benefit of producing free energy.

- Jean Baptiste Kasokota Kibambo, Technical and Commercial Director, PANACO

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in Katanga because, if Inga's power supply fails, we will need the support. Therefore, projects like Busanga, Sombue, Lubudi and Lwapula are very welcome to stabilize the system. We cannot rely only on Inga, especially as it is 2,000 km from Katanga."

John Kanyoni, COO of Tembo Power in the DRC, elaborated further on the reasons that investment into power-related projects has been sluggish: "The addition of power generation capacity in DRC is challenging because of the governments' budgetary constraints, the lack of transmission infrastructures, the accessibility of viable sites, and the difficulty to finance projects, whether on a corporate or project finance basis. Power demand is closely related to the mining sector and the reason for lack of investment is the volatility of the commodity prices. During the downturn, caused by a fall in demand from China, people were more pessimistic about the soundness of our initiative, but today opinions are much more favorable."

Out of necessity, many mining companies have been active in investing into the rehabilitation of existing infrastructure, either through internal departments like Ivanhoe's Kamoa Energy, or with the support of companies like Congo Energy, a member of the Forrest Group. "Some parties like Tenke Fungurume (TFM) will need huge amounts of power to take advantage of the rising copper price — the company will need 400 MW to produce their desired 300,000 to 400,000 mt/y of copper. They have the resources but not the power, so they were looking at the Luapula valley at the Zambian border to the east where there is potential for hydro-stations on the DRC side of the valley," said Tobias Posel, director at GeoQuest.

Zambia-based Copperbelt Energy Corporation (CEC) operates the interconnector between the DRC and Zambia, and has been selling power to companies including MMG and TFM. Katanga Energy, which is also working to rehabilitate substations in support of the mines, is importing power from Pointe-Noire in Congo-Brazzaville. The Italian oil company ENI operates a gas power plant with a capacity of 300 MW with an excess of 120 MW, which Katanga Energy is re-selling to mining companies. Additionally, several new generation projects have begun to move forward in the small-to-medium size range. Tembo Power, which has an 80 MW project in Kenya, is also conducting feasibility studies for a project on the Kalule river with an installed capacity of around 70 MW. Kipay Energy, whose CEO Eric Monga is also the provincial president of FEC, is working

"We are not strong advocates of solar, being an erratic source of power unable to meet customer's demand on an utility scale basis, even if capacity factors have improved with the use of batteries for storage. We allow ourselves to consider solar only when it can be efficiently combined with hydropower and supply electricity during dry seasons, and are still assessing the merits of such a solution in DRC."

- John Kanyoni,
COO,
Tembo Power DRC

on the Sombwe and Kawa hydroelectric projects which have combined potential to generate around 160 MW.

There is also a growing interest for the benefits afforded by investing in solar-powered solutions. While no solar projects in the country currently achieve the scale to power a large-scale mining operation, the technology is being used to power offices such as the new Luano City complex in Lubumbashi, which serves as the headquarters for several prominent companies such as CNCM and TFM. Jean Baptiste Kasokota Kibambo, technical and commercial director of PANACO, elaborated on the opportunity to support mines in other ways such as their CSR projects: "The distribution of electricity by the state power company SNEL is insufficient, and in places like hospitals, schools, workers' camp, and villages we see significant opportunity for mines to step in through investments in solar energy. We have developed a solar energy package for the mines with this in mind, with the objective of helping mines achieve their social responsibility obligations," he said.

Dev Solaire, another local provider of solar solutions, is looking to extend its offerings in renewables by exploring opportunities in biofuel. "In DRC and particularly Lubumbashi, solar and biomass are the two most viable ways to produce electricity when compared to wind or other sources. These options are more cost effective, and the region's abundance of sunshine makes it an excellent candidate for solar solutions. Biofuel essentially uses waste to produce electricity, and we are working with Haier, a world leader in this space, to explore the potential," said Divesh Hassamal, managing director of the company.

Using solar and other sources of energy can help reduce consumption from the grid, but there are efficiencies to be gained in daily operations that can also help considerably. Minequip, a distributor in the region for several brands including Atlas Copco, also installs automatic lubrication systems for equipment. "Our systems allow companies to reduce that deficit by saving power, but we must emphasize to the end users how every kilowatt saved is important. For instance, our lubrication systems for open gears and crushers reduce the friction between the components, which is turn reduces power consumption because when there is less friction, there is less waste," said Adry Nzonzimbu, director of the company.

Ultimately, optimization of operations will not be sufficient to account for the coming drought in power if success in new generation and rehabilitation of aging infrastructure do not occur. One way or another, capital invested by the mines themselves will likely prove necessary to move the country forward. •

What we are now seeing, particularly in gold in West Africa following the retreat of gold from its US$1800 highs, is fewer development projects due to decreased exploration activity in that period. However, although depressed commodity prices, tightening valuations and lack of equity available generally results in a drop in exploration activity, this is also a great time to build a portfolio since projects are easier to secure.

- Martin Horgan,
CEO, Toro Gold

MACIG 2019 / Image courtesy of Endeavour Mining

COTE D'IVOIRE --- SENEGAL --- BURKINA FASO --- GHANA

WEST AFRICA

West Africa

Long recognized for its geological potential, West Africa continues to edge into center focus from the peripheral vision of many mining investors. Within the region, investment dynamics continue to shift, with many rising stars gaining momentum alongside the more established mining countries. Perceived attractiveness largely comes down to geological potential, economics and perceived risk, with each of these factors continuously oscillating in importance. The current emphasis, seemingly, is on geological risk, with investor attention moving from the historic producer nations to less-explored countries with greater potential for big discoveries. Larger companies are continuing to increase their land positions and acquire properties across the region and a number of projects have found success in 2018. The most notable deal, however, is the announced Barrick Gold and Randgold merger – a share-for-share deal valued at US$6.5 billion. Having been approved in Q4 of 2018, the new Barrick is set to be an industry leader in gold and listed on both the New York and Toronto exchanges, trading as GOLD in New York and continuing to trade as ABX in Toronto.

While each country is characterized by its own policies and operating environment, the common vein among many attractive mining investment destinations in West Africa is their shared position along the Birimian Greenstone Belt. This geological formation underpins Ghana, Côte d'Ivoire, Guinea, Mali and Burkina Faso; it is a major source of gold, with approximately 52 million oz of gold resources discovered to date. Geologically, Côte d'Ivoire is considered the most prospective country by many because, covering about 35% of the belt, it is home to the most significant portion.

In West Africa, Ghana has led the way in gold mining and still holds first place in the region for gold production – second on the continent only to South Africa. Ghana produced 101.7 mt of gold in 2017 versus South Africa's 139.9 mt. Among the country's producers are Newmont, Gold Fields, Kinross and AngloGold Ashanti. However, the country's high tax burden has stalled many exploration projects and deterred new investors, leading to a lack of greenfield exploration. The country's skew towards large companies with underground mines and brownfield exploration focus goes

> While world gold production is expected to decline in the coming years, West Africa continues to be one of the fastest growing regions for gold production in the world. There are few regions with this much activity. West Africa produces half of the continent's gold and is closing in on North America production levels. This remarkable progress over the past 25 years is due to the mining-friendly governments and prospective, underexplored geology in the region. There have been about a dozen projects built over the last five years and, with one exception, they are coming in on time and on budget. They are bitesize but profitable.
>
> **- Richard Young, CEO, Teranga Gold**

hand-in-hand with a mining code that favors companies with larger investment power.

Also a center for gold production, Mali's 2017 figures came to 49.6 mt. Major investors supporting Mali's position amongst the continent's top gold producers include AngloGold Ashanti, Resolute Mining and IAMGOLD. Output last year was also boosted by the initiation of production at B2Gold's Fekola project. Meanwhile, Burkina Faso has stolen fourth place on the continent, overtaking Tanzania, with 45.5 mt of production in 2017 and 2018 set to be a record year with a projection of 55 mt.

After geological potential, investment incentives and stability play a significant role in attracting investment, as demonstrated in Côte d'Ivoire. "Côte d'Ivoire is currently the most attractive country for exploration and mining investment, but Guinea and Senegal have also entered the race and are looking like good competitors," underscored Beau Nicholls, CEO at Sahara Natural Resources, which provides exploration services across West Africa. "Mali and Burkina Faso have always been attractive countries from a geological perspective, but their attractiveness to foreign investors has been reduced due to the security risks which continue to increase."

However, just as international investors seek solid ground, governments continue to find their footing when it comes to balancing investment incentives with ensuring economic benefit for their respective countries, with several tipping the scales towards the latter. Countries with increasingly stable economic and political environments are garnering most investor attention, whilst security risks and uncertainty in others are causing companies to delicately tread the line as they enter "wait-and-see" mode.

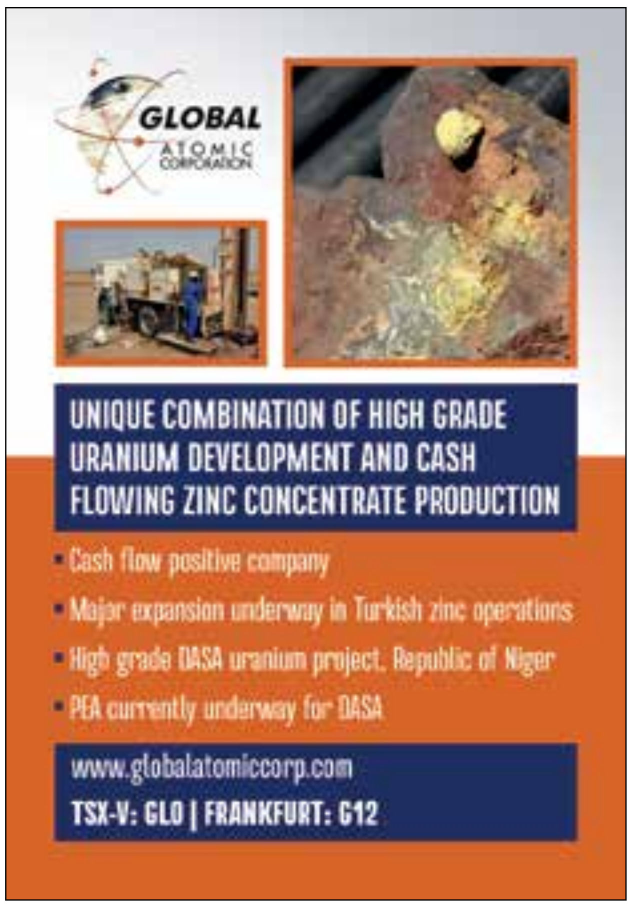
Attracting Exploration

After a slump in activity, exploration is on the rise again worldwide, with an increase in spending of about 15% in 2017 versus the previous year, according to S&P Global Market Intelligence. Accounting for more than 70% of this year-on-year increase, gold led the way, followed by base metals. In West Africa, gold's share of exploration spending sat at 61% in 2017, up from 51% in 2016. However, investor appetite is still a long way off the highs of six or seven years ago. "Most of the lower investment appetite for gold and gold stocks is simply that the value of gold has fallen from US$1,800 in 2011/2012 to just US$1,200 today," commented Douglas MacQuarrie, CEO at Ghana-focused junior Asante Gold Corporation. "The junior gold market is highly leveraged to the gold price and, while investment leverage is great when the underlying asset is increasing, the converse is painful. The stock charts say it's a great time to pick up your favorite gold shares cheap, but be prepared to hold them for an extended time."

The impacts of reduced activity have been felt across the value chain, with service companies tied to the sector also suffering a great deal. "The last four years have been tough for all companies involved in exploration, particularly service companies, but we are optimistic about the future," affirmed Simon Meadows Smith, managing director at SEMS Exploration Services, a Ghana-based full-service provider to the mining industry. "For the first time since 2013, we can plan with confidence due to the return of the junior explorers to West Africa. We have witnessed a couple of IPOs this year where companies have raised US$4 million to US$6 million on the ASX for early-stage mineral exploration projects in West Africa, which would have been extremely difficult just 12 or 18 months ago. We are confident that this trend will continue for a while. On the back of this upward trend, we are now back in a position where we can expand our field of operation and we are looking to grow the company again."

Optimistic that this strong growth trajectory will continue, SEMS is keen to focus more attention on Guinea and Côte d'Ivoire and is hoping to replicate its West Africa service offering in the Central African region.

Nevertheless, since investment dollars are in tighter supply than they once were, governments are recognizing the importance of competitiveness beyond the naturally-occurring resources held within their territories. Referencing the increasing openness of governments in West African countries to investment, David Awram, senior executive vice president and director at Sandstorm, a Vancouver-headquartered gold royalty company with a portfolio of over 185 royalties, highlighted: "In many cases, the expectations of investors have been met. Local professionals are also becoming more active and are giving crucial advice as to what needs to be done to be a successful mine. Our recent projects are the Karma and



Houndé projects, and we have other assets in exploration with Progress Minerals. There still is room to complete larger transactions in West Africa, along with East, Southern and Central Africa. We will continue to focus on gold and silver, as they are more prolific, less restricted and there are many deals available."

Whilst investors may turn to countries with a proven track record of successful discoveries focusing on the same geological trends, after some time, the general perception is that the potential for big discoveries is much lower. In more mature mining countries, as seen in Ghana, juniors begin to pursue smaller ounce numbers, playing to their strengths in exploration and taking advantage of leaner cost structures, and on discovery are often quickly taken over by large companies with greater capability and experience in development and production. Nevertheless, while the juniors may pursue smaller ounce numbers, the project's economic viability sets a limit. "In this part of the world, we believe that we need close to 1.5 million oz of inferred resource before it is worthwhile to look at more advanced studies," underlined Don Dudek, CEO at Savary Gold, which is focused on two properties in Burkina Faso in a joint-venture agreement with Sarama Resources. "The theory is that a 1.5 million ounce-inferred pit-constrained resource could translate to around a million-ounce reserve which could support mining production of approximately 100,000 oz over 10 years."

Other Golden Opportunities

Although gold has historically been West Africa's most sought-after and most heavily-exploited resource, market volatility has driven a diversification of interest, both from investors and governments alike. From the government perspective, having an economy so tied to one commodity is a huge risk. Investors, seeking high returns and stability, will follow opportunities with minimal perceived risk, and gold is currently somewhat out of favor with the junior investor community. Battery metals, on the other hand, are receiving a great deal of attention due to projected demand in end-use segments. There has been notable attention on resources such as cobalt and lithium, for example, although share prices are not necessarily reflective of current interest. "Although many lithium companies have dropped significantly in market capitalization, there is a clear disconnect between share prices and the deals that are actually being hunted down in the marketplace," noted Vincent Mascolo, CEO at IronRidge Resources, an AIM-listed exploration company with advanced lithium projects in Ghana, amongst a portfolio of gold, bauxite, titanium and iron ore projects in West Africa and Australia. "There is a lot of activity and everyone is talking about electric vehicles. However, IronRidge is a bit different as we focus on the stored energy space. Many countries in Africa lack electrification, which is due to transmission costs rather than the source of the generation. The technological development in solar panels and stored energy, combined with LED lighting, has made it much more efficient and it will have a great impact on Africa. We have started a Lights of Africa initiative in Chad for this purpose."

Underscoring the likely trajectory of the market, Darryl Butcher, project manager at Mali-focused Birimian Limited, commented: "My outlook for the lithium market is very positive, but it is important to understand the market consensus. I believe lithium will go through a period of oversupply between 2019 to 2021, followed by a period of sustained under-supply, based on the assumption that the electric vehicle market expands as expected. While the outlook for other metals involved in the battery design is less certain, lithium will be involved in most batteries regardless. The consensus is that the next step will likely be a solid-state lithium battery that will not involve other metals such as cobalt."

Other alternative energy resources also

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We are present in Burkina Faso, Mali and Senegal, and recently acquired exploration rights in Guinea. About 50% of our production comes from West Africa, with Essakane, one of our flagship operations, still playing a major role. We are currently looking at a brownfield expansion at Essakane with a heap leaching project currently under study, which will take the site from a production of over 400,000 oz/y to close to 500,000 oz/y. In Mali, we still hope to bring the Sadiola sulfide project into production and in Senegal we are currently doing a feasibility study on the Boto gold project.

- Oumar Toguyeni,
Regional VP West Africa,
IAMGOLD

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have high demand projections. Uranium, for example, while yet to recover from the impact of the Fukushima disaster, is broadly considered to have a positive outlook. "Uranium has always been a challenging commodity, but there are currently approximately 450 reactors in the world with many more being built," highlighted Stephen Roman, president and CEO at Global Atomic, which is developing a high-grade uranium project in Niger. "The Americans have the largest reactor fleet, but soon the Chinese will match them, followed closely by India. Nuclear provides a very clean and efficient base-load power… People must understand that new reactors are much safer than they were in the past. Some designs cannot melt down given the new technology and cooling systems… There is a powerful effort by many to shut down nuclear, but common sense has to prevail. Countries need to fulfill their power requirements. China will have 150 to 180 reactors in the next 20 years; every few months they turn on a new one."

While uranium producers are certainly going through a difficult period, the market outlook is considered positive and, with significant capacity having come offline due to oversupply, juniors should be well positioned to capture demand increases by the time they move through to production.

Local Expertise, International Standards

When available, international mining and exploration companies look to local service providers, as long as they can compete at the same standards as the international alternatives. Whilst cost is certainly a factor, companies will generally not compromise on quality. "High quality products are the preferred choice in the region and, although the importance of quality may have decreased slightly during the downturn in favor of lower-cost products, it has generally been the predominant aspect over pricing," commented Martin van Gemert, managing director at Mincon West Africa, which primarily supplies DTH products to West Africa and has its local base in Senegal. "Whilst price can be a consideration, our customers generally recognize that higher quality means increased longevity and efficiency, leading to overall cost savings. Therefore, while the initial CAPEX investment may be higher, cost per meter will be lower."

Mincon is currently looking for distributors that can comply with its standards. Training has become a major preoccupation for many companies, particularly as new technologies come into play. The major drivers for innovation are safety and efficiency, and many new technologies seek to simplify processes and reduce potential for human error. "We are also seeing a lot of technical development with machinery; automation for example, that is making our drill rigs safer and helps reduce human error," commented Vincent Gonthier, director of development at Forage FTE Drilling. "Interestingly, these new technologies are entering West Africa at the same time they are arriving in North America and Europe since many companies and distributors are doing business globally now."

Predictive maintenance is also gaining momentum to maximize operational output. "Downtime is key in mining operations," stated Andrew Sarsons, mining director at Burkina Equipements, part of the JA Delmas network of Caterpillar dealers. "A lot of methods used by mines today were not in place 20 years ago. Today the focus is more around driving productivity and efficiency while being cost effective… If a machine goes down and we do not have the part in our inventory, that machine could stand idle for three weeks. The mining philosophy is "repair before failure." We work with our customers more and more on planning engine or component change-outs before they fail. With scheduled downtime, we can work with our customers and plan effectively to ensure production targets are achieved."

The overarching trends in the service segment pivot on complete turn-key solutions and reactivity. Many service providers are expanding their capabilities, if they have not already done so, to become a "one-stop-shop" for their clients, responding to the longstanding preference of companies at the end of

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Global investors have choices. The gold game in West Africa has become quite competitive now, especially in Côte d'Ivoire, as a new address for people to explore. Burkina Faso and Mali are big competitors, and even Guinea is starting to get involved.

- Jeff Quartermaine,
CEO,
Perseus Mining

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the supply chain to work with fewer suppliers. In terms of reactivity, fast response times are key in maintaining competitiveness. For many international companies, this means building out warehouse capacity and holding greater inventory in country. Many other companies are responding to demand for fast responses through greater proximity to the client, whether by setting up bases in the main mining regions or at the mine sites themselves.

However, organic growth and market penetration can be a challenge for local companies. Lack of local financing solutions is a major constraint, particularly felt by those without investment power from overseas to expand capacity and penetrate new markets. "Acquiring equipment can be a problem – funding investments can be a challenge since banks want a guarantee and often take some time to react," commented Adama Ouedraogo, CEO at Satel, a Burkinabé company focusing on conventional energy and telecommunications infrastructure. "It would be highly beneficial if the government could make provisions for local service providers to build their capacity more easily."

While there are some feasible financing options emerging, there is still a long way to go. Scania, which provides vehicles and solutions to the mining industry and established a base in Ghana four years ago, is seeking to ease its customers' financial burden. "We see ourselves as a partner to the mining industry, not just a vehicle manufacturer and supplier," emphasized Fredrik Morsing, managing director at Scania West Africa. "We provide solutions for in-fleet management, as well as in-house financing for our customers. Finding financing locally can be very expensive; we provide financing at a very competitive rate. Roughly 90% of our customers take advantage of these financing solutions, and we find that our credit losses are very low."

There are many local companies operating successfully in West Africa, but many more face hurdles and market entry barriers. Through support from both governments and the private sector, there is great potential for sustainable growth of the local services segment across the region, but a degree of facilitation is required to allow companies to build capacity and flourish. •

Côte d'Ivoire

Population: 24,184,810
Land area: 318,003 sq km
Official Language: French (official), 60 native dialects of which Dioula is the most widely spoken
Capital: Yamusukro
Chief of State: President Alassane Dramane OUATTARA (since 4 December 2010); Vice President Daniel Kablan DUNCAN (since 16 January 2017)
GDP (PPP): $96.92 billion (2017 est.)
Growth Rate: 1.84% (2017 est.)
GDP per Capita (PPP): $3,900 (2017 est.)

Exports: $11.08 billion (2017 est.); cocoa, coffee, timber, petroleum, cotton, bananas, pineapples, palm oil, fish
Exports Partners: Netherlands 11.8%, US 7.9%, France 6.4%, Belgium 6.4%, Germany 5.8%, Burkina Faso 4.5%, India 4.4%, Mali 4.2% (2017)
Imports: $8.789 billion (2017 est.); fuel, capital equipment, foodstuffs
Imports Partners: Nigeria 15%, France 13.4%, China 11.3%, US 4.3% (2017)
Inflation rate (Consumer price): 0.8% (2017 est.)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank
22/54

2017 Score
54.5/100

Safety & Rule of Law
59.4/100

Participation & Human Rights
55.8/100

Sustainable Economic Opportunity
49.0/100

Human Development
53.8/100

TAXATION RATES

SOURCE: ICLG

Corporate Income Tax Rate
25%

Royalties
Precious Metals: 4%
Base Metals: 3.5%
Gold: 3-6%

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017
103/180

Score
36/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business
122

Starting a business
26

Dealing with construction permits
142

Getting Electricity
143

Registering Property
112


Mali
Burkina Faso
Guinea
Ghana
Cote d'Ivoire
Liberia
Your feet on the ground in Africa
NORTH
0 50 100 150
KILOMETERS
Geological boundary certain
Fault certain
Thrusts
GOLD MINES
Existing
Closed
Gold resources/ projects
OTHER MINERALS
Existing mines
Closed mines
Projects
Mineral fields
Country Borders
Roads
Railway
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Ibrahima Danso

President, Groupement Professionnel des Miniers de Côte d'Ivoire

What role has the Groupement Professionnel des Miniers de Côte d'Ivoire (GPMCI) played in the development of the mining industry in Côte d'Ivoire?
GPMCI is the minerals industry association that represents the collective interests of companies involved in mining exploration and production. The association was founded in 2008, so it has represented the interests of the industry for over a decade with significant achievements so far, including the successful negotiation of the 2014 mining code reform with the government.
The mining industry is in its infancy in Côte d'Ivoire and, with the arrival of the newly appointed government, we are here to ensure the smooth development of the mining industry. While economic development has previously focused on the agriculture sector, there is a current push from the government that has placed the mining sector as the main driver.

What were some of the major changes heralded by the mining code implemented in 2014?
The 2014 Mining Code set a goal to develop the most attractive mining code in West Africa. The government's extensive consultation with the sector resulted in a well-balanced mining code that provides fiscal stability and ensures profitability of the sector as well as ensuring the needs of the communities affected by mining are taken into consideration through financial provisions for the development of these communities. For example, the code contained a provision of 0.5% of the turnover of operating mines to be invested into community development. Holding time for exploration permits was also increased from nine to twelve years. Côte d'Ivoire is a stable and business-friendly country with a sustainable debt level, low inflation and a stable currency. Among the key aspects for development are the credibility of the government, a well-developed, educated workforce and well-developed infrastructure.

As the sector develops, what challenges have arisen that must be ironed out?
The industry has attracted a lot of international attention, but the most important message given to government is not to make adjustments for greater benefit of the country. For example, the government recently intended to change the income tax exemption for operating mines from five years to one year. This amendment was not recommended by GPMCI. Illegal artisanal mining is also a big challenge. The government is trying to control the situation but the plan is still a work-in-progress. One idea is to allocate areas for illegal artisanal mining while ensuring they are properly equipped and licensed. This will reduce environmental impact and risks to health and safety of the participating individuals.

How developed is Côte d'Ivoire's local services segment and how can it be better supported?
Understandably, the current local service capacity is low due to the infancy of the sector. There is great potential to develop local services as the industry grows thanks mainly to the quality of the infrastructure, workforce and the mining code. Local SMEs are crucial and we are committing to developing these sectors by providing opportunities by upskilling and training, particularly with regard to safety. We have to ensure that these companies are raised to an internationally competitive level rather than simply enforcing local content requirements for international companies. Government and international companies need to work together to provide adequate training facilities.

What are the focus areas for GPMCI in continuing to support the mining industry?
We are currently planning on meeting with all current and future members to find out what their needs and requirements are and what they would like the chamber to focus on. From there, an activity plan to ensure a prosperous partnership with all parties with the relevant resources required will be carried out. One of our objectives is continuous improvement of the attractiveness of the country through improved infrastructure, effective legal environment, stable fiscal framework and improved production factors cost. Another challenge facing the industry is strengthening the social license to operate. The mining industry is finite, and our main objective is to develop the capacity of local communities and to promote an investment-conducive environment for all businesses, not only those in mining. We would also like to avoid mistakes made by other African countries in the development of their mining sectors, particularly regarding the resource nationalism and the creation of mining-dependent communities. Finally, we will prioritize controlling illegal mining, which we see as the single biggest threat to the mining sector. In many countries, we see a lot of talk about illegal mining, but in Côte d'Ivoire we are taking action and making progress. •

Gold production at Sissingué commenced in January 2018.

Image courtesy of Lycopodium / Perseus Mining.

Côte d'Ivoire: The mining sector makes strides

Although not new on the radar for investors, Côte d'Ivoire's mining sector has seen a pronounced uptick in the last couple of years. While the country's geological potential has been recognized for some time, other factors have curbed the sectors growth, including political instability and the more widely-impactful unfavorable gold prices. Now, however, Côte d'Ivoire's political scenario has seemingly stabilized and the mining sector has been pinpointed as a key economic driver.

If the sector's growth is properly sustained, this focus on mining will bring great value to the country's economy, which experienced a setback in 2017 with a 35% drop in cocoa prices. In order to spearhead growth and attract investment into mining exploration as the necessary first step to a flourishing sector, the government introduced a new mining code in 2014 and the results speak for themselves. "The 2014 Mining Code set a goal to develop the most attractive mining code in West Africa," highlighted Ibrahim Danso, president at the Groupement Professionnel des Miniers de Côte d'Ivoire (GPMCI), the national minerals industry association representing companies involved in mining exploration and production. "The current mining code has brought huge benefits if we look at production levels. From 2014 to 2018, manganese production doubled from 300,000 mt/y to 600,000 mt/y and nickel production grew from zero to 800,000 mt/y. Gold mining grew from 630,000 oz/y to 900,000 oz/y – an increase of 40%.

"A significant point of difference is that we are generally approached by third parties with opportunities rather than sourcing them, but any decision will always be in the best interest of all shareholders. We do not need to raise money whenever we find a project, which is how we managed to secure seven joint ventures in Côte d'Ivoire in ten days. Today, we have 11 province scale projects across five jurisdictions and in Africa you need this type of diversity to maintain project development and shareholder growth."

- Vincent Mascolo, CEO, IronRidge Resources

Currently, the mining industry accounts for 2% of Côte d'Ivoire's GDP growth but the goal is to hit 10% in the next five years. In addition, we expect to see the development of one new mine per year in the country for the next ten years."

Echoing the importance of Côte d'Ivoire's updated mining code in catalyzing the sector's development, Christian Mion, mining sector leader - French speaking Sub-Saharan African countries at Ernst & Young, commented: "Côte d'Ivoire is in a position where the Minister of Mines has worked very hard to attract investment and has been successful in doing so. Happily, the trend worldwide is towards companies wanting to be present for the long-term and thus agreements will only be made if they are favorable to a nation's people, too."

Among the country's producers are Randgold, Endeavour Mining and Perseus Mining. Perseus is Côte d'Ivoire's most recent success story, pouring its first gold at the Sissingué gold mine in January 2018. This is the company's second gold mine after the Edikan mine in Ghana, from which it has produced about 200,000 oz/y since 2012. Perseus is also hoping to begin construction of its third mine, Yaouré, in late 2018 or early 2019. "We completed the feasibility stage last year and have now completed approximately 50% to 60% of the front-end engineering and design," commented Jeff Quartermaine, Perseus' CEO. "We believe the government in Côte d'Ivoire will grant the exploitation license fairly shortly; my understanding is that all of our applications have been reviewed and approved by the Minerals Commission and the proposal is on its way to the Inter-Ministerial Committee for approval prior to being signed by the President. At the moment, we are also implementing our financing plan. We will not need to go back to the equity market as on current projections we can comfortably finance the project through internally generated cash and an amount of bank debt. We estimate that Yaouré will cost around US$260 million to build."

A longer-established producer, Endeavour Mining, achieved commercial production at its Agbaou gold mine in January 2014, which produced 177,191 oz in 2017. Meanwhile, the Ity mine has the longest operating history of any gold mine in Côte d'Ivoire, with first modern gold production reported in 1991. In over 25 years of operation, Ity has produced more than 1.2 million oz of gold, and produced 59,026 oz in 2017. Following completion of Endeavour's US$412-million construction project at Ity, mine life is expected to extend by 14 years, and production is expected to rise to approximately 204,000 oz/y for the first ten years, at a low AISC of $549/oz.

Further north and in proximity to both Mali's and Burkina Faso's borders, the Tongon mine comprises two open pit operations and produced 288,680 oz of gold in 2017, a 9.7% increase year on year, driven by an 11.6% improvement in mt processed, a small improvement

"

When we first looked at Côte d'Ivoire, numerous factors contributed to our decision to invest in the country over others in the region. Firstly, it was clear to us that the government was very supportive of exploration and the mining sector in general. This has been demonstrated by the fact that there have been five gold mines developed in the last ten years. Secondly, the new mining code that was put into place in 2014 is fair and workable for mining companies operating in the country. Lastly, the infrastructure in the country in conducive to the development of mining operations and exploration.

- Justin Tremain, Managing Director, Exore Resources

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The African continent has some specificities and special soil characteristics different from American and European soils. Yet, American and European standards are currently in use in Africa in the absence of local geotechnical standards, which begins to emerge as a major issue for geotechnicians on the African continent. In parallel, an increasing number of geotechnical engineering companies from Europe and other continents are actually settling on the African continent, thus helping to promote the profession, to raise the awareness of stakeholders in the field of building and to reduce the number of claims on constructions leading to damages that are often detrimental, especially for the population undergoing these events.

- Ilija Petkovski, General Manager, AGTS Côte d'Ivoire

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in recovery and a slightly higher head grade. Whilst the strategy following Randgold's merger with Barrick Gold is unclear as yet, the company is one of Côte d'Ivoire's prominent producers for the time being.

Other strong gold producers exploring the country that are yet to develop a mine include Newcrest, Centamin and Teranga Gold. Shining a spotlight on the diversity of Côte d'Ivoire's resource potential is IronRidge Resources. While IronRidge also has gold exploration projects underway, the ASX-listed company is also pursuing lithium.

Often cited as one of the country's strengths is Côte d'Ivoire's port access, but there is still room for improvement. "Côte d'Ivoire has come a long way with regard to infrastructure development, but we also recognize the opportunity to continue introducing efficiencies and clearer processes – which are enablers of trade and economic growth," underlined Glenn MacArtney, managing director at Maersk. "For example, the average container in the port takes 12 to 13 days to be released – this indicates that there is still a need for further optimization and improvement of administrative processes to facilitate the movement of cargo and goods, enable faster delivery to market and reduce costs for local businesses."

Construction of Abidjan's new container terminal is well underway, however, and should be completed by 2020. Attention now also must be directed at Côte d'Ivoire's in-

Image courtesy of JA Delmas

land infrastructure, particularly as the higher number of cars on the roads takes its toll on the road networks, and more emphasis is placed on connecting major cities and their businesses to the global market. This represents an opportunity for companies that are prepared to invest in the region. Bolloré has been operating across the region for many years and plays a part in developing transport infrastructure. Jean-Michel Maheut, regional manager of Bolloré based in Abidjan, explained: "We are investing in consolidating and improving our infrastructures at our container ports in the region, here in Abidjan as well as in Sierra Leone and Guinee. We are also involved in renovating the rail link between Abidjan and Burkina Faso, all of which will benefit the mining industry."

Growing Pains

While Côte d'Ivoire's government has positioned itself as very receptive to mining activity and put forward an attractive mining code, it is natural that challenges must be addressed as greenfield exploration projects move through to construction and operation. Notably, however, it is the permitting process itself that is causing the biggest headaches for the juniors. Delays make it difficult to plan budgets and run the risk of companies allocating funds elsewhere in the meantime. Commenting on the importance of keeping the country's geological database updated, Nouho Kone, general manager at NF Consult, shared: "In collaboration with the mining department, we have started to build a database of the available geoscientific maps, enabling access for the mining industry at any stage. This improvement can help in attracting investment as the available opportunities in the country will be more visible."

Côte d'Ivoire will continue to take center stage as the brightest opportunity for new mining investment in West Africa as long as the country remains stable. With many examples to learn from in the region, Côte d'Ivoire holds high potential for developing its mining industry sustainably and with maximum economic impact, both direct and indirect. •

"In Côte d'Ivoire the infrastructure is marked by a high standard and we have a local population that has high skills. Going forward, the port quays need to be developed to better service the extractive industries, particularly at the port of San Pedro."

- Jean-Michel Maheut,
Regional Manager,
Bolloré Transport and Logistics


EXPÉRIENCE
EXCEPTIONNELLE
How to make your travel dreams come true

Senegal

Population: 14,668,522 (July 2017 est.)
Land area: 192,530 sq km
Official Language: French
Capital: Dakar
Chief of State: President Macky SALL (since 2 April 2012)
GDP (PPP): $43.24 billion (2017 est.)
Growth Rate: 7.2% (2017 est.)
GDP per Capita (PPP): $2,700 (2017 est.)

Exports: fish, groundnuts (peanuts), petroleum products, phosphates, cotton
Exports Partners: Mali 14.8%, Switzerland 11.4%, India 6%, Cote d'Ivoire 5.3%, UAE 5.1%, Gambia, The 4.2%, Spain 4.1% (2017)
Imports: food and beverages, capital goods, fuels
Imports Partners: France 16.3%, China 10.4%, Nigeria 8%, India 7.2%, Netherlands 4.8%, Spain 4.2% (2017)
Inflation rate (Consumer price): 1.4% (2017 est.)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank

10/54

2017 Score

63.3/100

Safety & Rule of Law

67.1/100

Participation & Human Rights

67.8/100

Sustainable Economic Opportunity

58.9/100

Human Development

59.5/100

TAXATION RATES

SOURCE: ICLG

Corporate Income Tax Rate

30%

Royalties

Gold refined in-country: 3.5%
Gold refined out of country : 5%

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017

66/180

Score

45/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business

141

Starting a business

64

Dealing with construction permits

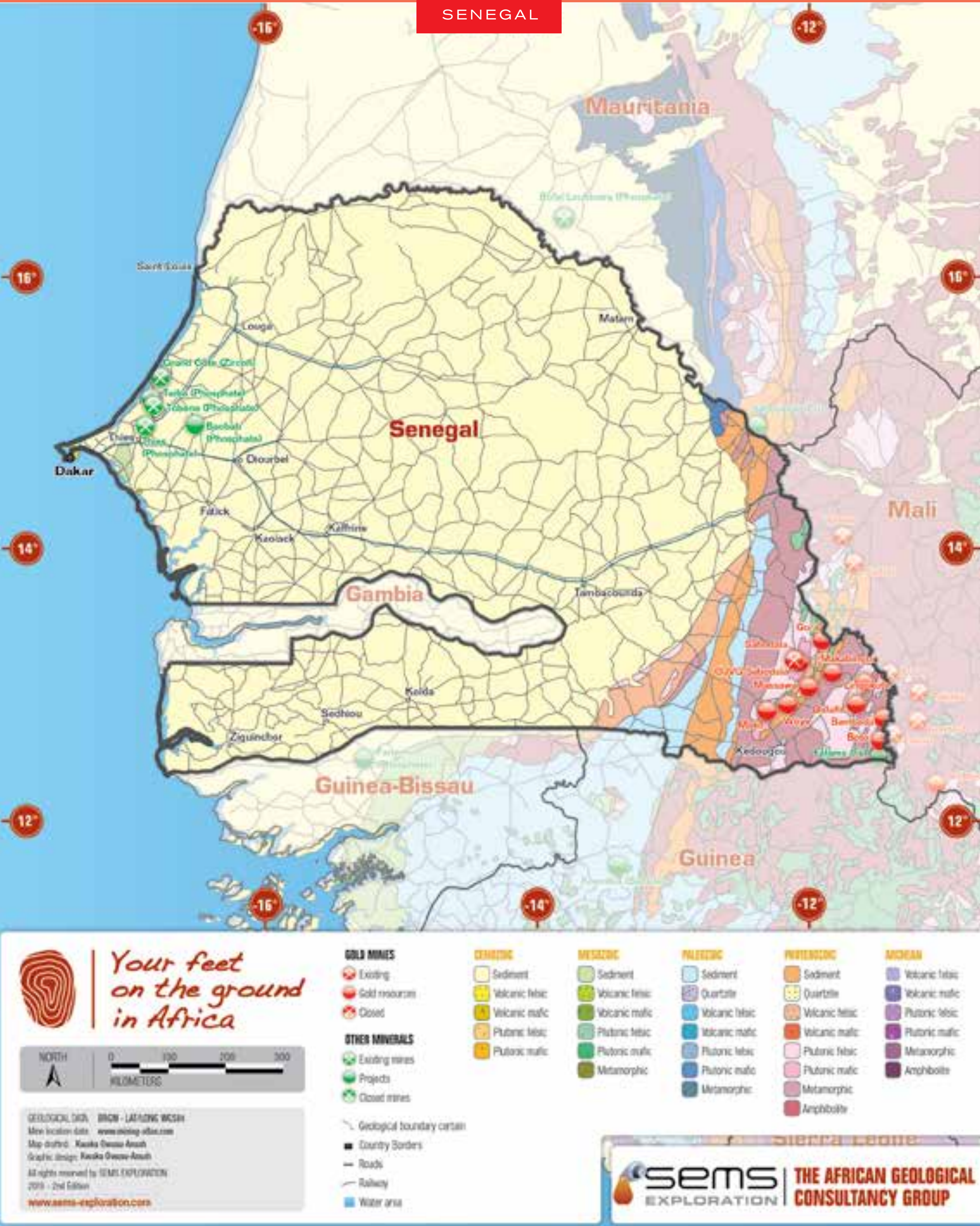
140

Getting Electricity

127

Registering Property

118


Mauritania
Senegal
Gambia
Guinea-Bissau
Guinea
Mali
Dakar
Saint Louis
Louga
Matam
Diourbel
Thies
Fatick
Kaolack
Kaffrine
Tambacounda
Kolda
Sedhiou
Ziguinchor
Kedougou
-16°
-14°
-12°
16°
14°
12°
Your feet on the ground in Africa
NORTH
0
100
200
300
KILOMETERS
GOLD MINES
Existing
Gold resources
Closed
OTHER MINERALS
Existing mines
Projects
Closed mines
Geological boundary certain
Country Borders
Roads
Railway
Water area
Sediment
Volcanic felsic
Volcanic mafic
Plutonic felsic
Plutonic mafic
Metamorphic
Quartzite
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Ousmane Cisse

Director of Geology & Mining, Ministry of Mines

How has Senegal's mining sector developed over the years since the first phosphate mines?
Until 2008, mineral production was mainly phosphates - locally processed into phosphoric acid and derived products, cements, produced from limestone and clay, attapulgite and salts. However, the sustained mining promotion efforts subsequently deployed, including the adoption of an incentivizing legislative and regulatory framework, have helped to attract a significant investment. Since 2009, new mineral resources have been progressively developed, with the exploitation of the gold deposits of Sabodala placing Senegal among the gold-producing countries of Africa. The exploitation of the heavy mineral deposits of the Grande Côte from 2014 ranks Senegal among the world's producers, with 8% of production and 25% of the European market. The Matam phosphate lime project also started its production activities in the second half of 2014.

Neighboring countries have received greater recognition as mining jurisdictions. What are the reasons for this and how is the Government seeking to attract higher investment?
No region has opened up its mineral resources more than West Africa has in recent years. For diverse reasons, the region has been underexplored despite its rich geological map, with minerals such as gold, phosphate, iron ore, bauxite to name few minerals found. Senegal, which is growing economically, has significant advantages in developing its mineral resources. The main advantage is its political stability, the improved governance, the use of investment incentives and the newly revised mining regulations. The greater agenda is to unlock Senegal's vast mineral potential and to increase foreign investment in exploration and production. The country has recorded significant growth in production driven by investments in new phosphate and gold mines.

Senegal recently updated its Mining Code for the first time since 2003. What were the major changes and the motivation behind them?
The new mining code has been designed to improve the mineral sector's governance, attractiveness, accountability, safety and environmental protection. Implemented in March 2017, the new code gives incentives, multiple benefits to investors and improvements that could streamline administrative procedures for permitting. Like elsewhere in Africa, for the granting of mining licenses, priority is given to the applicant that offers the best conditions and guarantees for the government. To avoid any inconsistencies and ambiguities in fiscal provisions, tax provisions under the former mining code were transferred to the General Tax Code in 2012. The new code introduces many important changes to royalties and taxes calculations and even the option to enter a production sharing agreement, a concept more frequently found in the oil and gas sector.

In what ways is Government supporting the development of local companies to service the mining industry?
It is expected from mining activities to provide direct contribution to economic development at a local level. Therefore, the government, working with the private sector, will encourage and support SME & SMI's and develop a complex overall cluster with extensive backward and forward linkages. The mining hub for specialized services, logistics and training in the field, means a significant increase in the participation of local investors and entrepreneurs at all levels of the value chain. Mining companies may always freely choose their suppliers, sub-contractors and service providers as well as their partners. However, mining operators and their suppliers and sub-contractors shall use, whenever possible services and material originating from Senegal, provided these services and products are available at competitive conditions regarding their price, quality, warranties and time delivery.

What importance does the Government place on the mining sector as a contributor to Senegal's economic development?
Senegal intends to sustainably exploit its mineral potential and promote the emergence of a dynamic and competitive mining industry where local companies play a significant role in the value chain. By developing the mining sector, the government intends not only to increase the contribution of the sector to the national economy, but also to make it a lever for local development. To become a real catalyst, the mining sector will have to increase and diversify its production. Growth will be supported by the intensification of the development of strategic sub-sectors, including phosphates, gold and heavy mineral sands - zircon, iron, ilmenite. It will also require a substantial increase in research to improve knowledge of the geological and mining potential and thus attract new investment. •

Senegal: Previously overshadowed, now coming into its own

Sharing borders with Mauritania, Mali, Guinea, Guinea Bissau and Gambia, Senegal is situated on Africa's western coastline. Offering direct land access to six neighboring countries, the port in the country's capital, Dakar, makes Senegal one of the gateways to landlocked West Africa. Senegal has, however, experienced a difficult period economically. The country is now implementing its Plan for an Emerging Senegal (PES), launched in 2014, which is marked out in a five-year Priority Action Plan (PAP) of strategic pillars and sectorial objectives. The aim of the PES was to increase annual GDP growth to an average of 7.1% from 2014 to 2018 and reduce the account deficit to less than 6% of GDP, also keeping inflation below 3%. Within the plan, agriculture, mining and tourism were identified as key sectors for development, supported by almost 30 planned infrastructure projects.

Whilst not receiving the same level of recognition as many of its neighboring countries as a mining jurisdiction in the past, Senegal is no stranger to the sector. Société Sénégalaise des Phosphates de Thiès has been present in Senegal since 1948, for example, originally a joint venture between the State of Senegal and a French group, and since bought by the Tolsa Group approximately two decades ago.

In terms of gold potential, Senegal holds almost double Mali's portion of the Birimian Greenstone Belts in the southeast portion of the country. The country is also host to high-quality iron ore deposits.

Senegal's first and premier gold producer is Teranga Gold. The TSX-listed company's Sabodala mine has been in operation since 2009. When Teranga completed its IPO in 2010, Sabodala was producing just over 100,000 oz/y and had a reserve base of 1.4 million oz. Following an acquisition of an adjacent property and expanding mill capacity, Sabodala has been producing more than 200,000 oz/y since 2012, with increased reserves of 2.7 million oz. Sabodala had record production of 233,000 oz/y gold in 2017, generating free cash flow of US$40 million. The expectation is for the mine to produce more than one million oz and generate approximately US$250 million in free cash flow over the next five years. In terms of exploration, Teranga's 2018 program focused on Burkina Faso and Côte d'Ivoire.

"Senegal has been producing phosphate since the late 1950s and has been producing gold since 2009. We are also producing heavy minerals, such as zircon and titanium. The government's Plan for an Emerging Senegal (PES) has identified mining as one of the six drivers for the economy, and there are incentives in place to support mine profitability. Successful projects will also encourage further investment and growth."

- Aziz Sy,
President,
The Mining Chamber of Senegal

In close proximity to the Sabodala mine, Toro Gold's Mako mine has become Senegal's second gold producer, commencing production in January 2018 following an 18-month development period. "At the start of construction, we were looking at a million-ounce reserve and an average grade of 2.25 g/mt, plus a life of mine stripping ratio of a little over 5:1," highlighted Martin Horgan, Toro Gold's CEO. "It is a single open pit operation, flowing into a standard CIL processing plant. While the million-ounce reserve and eight-year mine life are on the lower end of the spectrum, it is a very straightforward project technically, with a good open pit grade and moderate strip ratio, meaning strong cash flow. We are now actively drilling both beneath and around the mineralization in the hope of extending the open pit and potentially going underground. More recently, we are also looking at the 25km to 30km vicinity of the mill to see if we can identify satellite targets."

IAMGOLD, which also has a presence in Burkina Faso, Mali and Guinea, has also recognized the country's potential, entering the market in the early 1990s. It is now carrying out a feasibility study on its Boto gold project.

Meanwhile, Mineral Deposits Limited (MDL) entered the market in 2004, when it was granted a permit by the Senegalese Government for mining exploration and development. The Australian company joined forces with the French company Eramet in 2011 to create TiZir Ltd – a 50:50 joint venture, under which Grande Côte Operations (GCO) was born. Since Eramet has recently acquired TiZir, it now holds 90% of shares in GCO. According to Senegal's Ministry of Mines, the exploitation of the heavy mineral deposits of the Grande Côte from 2014 ranks Senegal among the world's leading mineral sands producers, with 8% of production and 25% of the European market.

The economic impact of the mining industry, both direct and indirect, is very much recognized by the government. The Sabodala mine, for example, employs approximately 1,100 people, of which close to 95% are Senegalese, with over half from local and regional communities. Nevertheless, Senegal's mining industry is disproportionately small when compared to its geological potential. The government's drive towards the development of the sector coupled with the recently-updated mining code should go some way in increasing investor confidence.

An Attractive Investment Destination?

Senegal does seemingly tick many of the boxes considered by investors when assessing an opportunity: underexplored but proven geological potential, newly updated mining regulations and both economic and political stability. As a member of the West African Economic and Monetary Union (WAEMU), Senegal also shares a common currency with the other members – the CFA franc, which is pegged to the euro and therefore a relatively stable currency.

Senegal's 2017 Mining Code is competitive in the region, despite revisions in favor of economic benefit. "In 2003, the regime's focus was very much on attracting investors," noted Maname Fall, associate director at SOJUFISC, a Senegalese law firm. "The new regime, which came into power in 2012, believed that this mining code was not very advantageous to Senegal's people and to the state. They therefore increased the taxes and the royalty amounts from 3% to 5%. There is also a provision in the new code whereby a company will operate according to the tax regime under their original agreement, and this will not be altered if changes are made to the general tax code."

Explaining the changes in the context of West Africa's mining jurisdictions, Cheikh Tidiane Wade, senior legal counsel at Houda Law Firm, outlined: "Senegal's mining reform of 2017 followed the reforms seen in other West Africa countries, such as Mali in 2012 and Guinea in 2011. While some companies operating in Senegal objected at first, the new mining code was generally received quite well. However, the civil society indicated that the mining code was still skewed towards companies rather than benefitting the Senegalese people as much as it should."

The general sentiment around Senegal's mining environment is very positive and, considering investors tend to follow geological potential, the country is in a good position to capture the attention of juniors as well as the larger companies. "Wherever someone drills in the Birimian belt, they find gold," commented Alex Mackenzie, CEO at Bassari Resources. "My prediction is that Senegal will follow Mali. This gold belt is likely to become one of the biggest gold belts in the world."

Bassari Resources is focused on its Makabingui project, also on the Birimian Greenstone Belt. "The big plus under Senegal's Mining Code is that companies get all their exploration costs back from production," highlighted Mackenzie. "We are now focusing on getting this mine into production so that we can use the cash flow from Makubingui to fund further exploration, rather than issuing more shares and diluting the company further."

The company expects to move into production in the first quarter of 2019. Outlining the resource, Mackenzie commented: "There is a resource of around one million oz at an average grade of 2.6 g/mt, and within that resource, we have about 200,000 oz of reserves with an average grade of 5.7 g/mt. Significantly, we have used the fire assay method for gold analysis, which uses only a 50 g sample. Because of all the nuggets in the coarse nature of our deposit we are optimistic that if we assayed using the leach well method, which better picks up nuggety gold by using a 2 kg sample, our reported gold grade will in fact be much higher."

The company, listed on the ASX, has high expectations for the project. "I believe we can turn Bassari into another Randgold and bring its capitalization up to AUS$500 million to one billion," Mackenzie stated, also commenting that, having drilled 8km south of Makabingui, there is "gold all the way". "This should not be too difficult, because once we enter production we will bring in about US$100 million. Once drilling has been completed, these reserves will also increase in size. The production cost is about US$680/oz, while the gold price is about US$1200/oz. For a small company, this is a significant margin."

Senegal is also notable for its limestone reserves, placing the country in a strong position to take advantage of the region's planned infrastructure development and increasing cement demand. Dangote Cement is Africa's leading cement producer and has its headquarters in Nigeria, beginning operation in Senegal in 2015, and with plant capacity of 1.5 million mt/y. In total, the company has capacity of around 40 million mt/y, with production operations in 14 countries, which is projected to grow to 60 million mt/y in the near future. "Senegal is a significant region for cement production with large overcapacity across its three cement factories – about 200% of national consumption – primarily due to the country's large limestone reserves," commented Luk Haelterman, country manager at Dangote Cement Senegal. "In other West African countries, limestone reserves are limited. 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."

While low transport costs and local availability of raw materials are strong advantages for Senegal, the domestic price of cement is also one of the lowest in Africa. Because of this, the three cement operations have an international focus. Increasing capacity in Burkina Faso particularly is expected to increase competition and impact Senegalese suppliers due to its proximity to major export markets such as Mali, with which both countries share a border.

Sourcing Locally

A lack of skilled personnel and local service providers is a common and natural challenge for a country in the early stages of developing a particular sector. Whilst gaps in the market are certainly problematic for companies looking to invest in a relatively under-developed industry, they also create pockets of opportunity. Inevitably, these opportunities will first be taken by international companies, which will enter new countries according to demand or with a particular client.

In some cases, services can be sourced close by from more mature mining countries in the region. In others, as is the case with mineral analysis, companies must look further afield.

Acquisition of local companies is an attractive way for international providers to get a foot in the door. "We have seen many international companies making an effort to develop local people, some of whom then go on to establish their own business," outlined Francois Cherpion, general manager at Société Sénégalaise des Phosphates de Thiès (SSPT). "There are also a number of local companies being acquired by international companies, which then bring in their own expertise. What we see now is more of a "Senegalization" of companies, rather than only Senegalese national companies."

Such is the case with SENELABO, which was acquired by France-headquartered Geotec. "In Senegal, SENELABO has locally developed techniques that were not previously available and provided by geotechnical companies elsewhere," said Jean Christopher, general manager at Geotec. "Due to the expertise of Geotec, we have been able to develop the cable coring technique, which was not previously present in Senegal, enabling us to broaden our offering to the mining sector. We have also innovated in the development of drilling techniques, which requires personnel training and investment in materials. The new coring techniques we have introduced in Senegal took us a few years to de-

> From January 2018, our team oversaw a very positive first three months of production, meeting our expectations in terms of oz and cost. In the subsequent three months, up to the end of June, we have continued that strong performance. We expect to stay on target in terms of oz produced within the forecasted cost parameters. All in all, we have had a very successful construction period and have navigated the risk around commissioning well, with no significant issues moving into production.
>
> **- Martin Horgan,**
> **CEO,**
> **Toro Gold**

ploy and sell. We are now the only local Senegalese company that offers this coring technique."

SENELABO's objectives are to sell its services internationally and export its expertise to other countries in the region, focusing initially on Francophone countries. Indeed, Senegal's geographic position and port access make the country a convenient hub for companies to export services to the rest of the region.

Many service companies are increasingly viewing Senegal as a promising central hub for their West Africa services. As well as logistical advantages, such as the port access, there may be other benefits with the export of some services. "In countries such as Mali and Guinea, it is common for embargoes to be placed on explosives, meaning international companies cannot export explosives to these countries," highlighted Rokhaya Mbaye, managing director at Mineex, a Senegalese supplier of explosives to the mining and construction industries. "However, it is still possible to export to these countries from Senegal, since there is an understanding between the governments that allows us to have permits. This makes Senegal a very important country in the West Africa region, and there are no other local companies providing explosives. We therefore expect to see a lot of growth throughout West Africa."

Originally founded in 2011 to fill the dearth of Senegalese capabilities in this area, Mineex prides itself on competing at international standards. In 2017, Mineex integrated its operations with the French group EPC to gain access to more advanced technology.

Another way in which countries may be able to bolster their service segments is through the transfer of expertise from a related industry. OMA Group, originating from Togo, found its strength in providing logistics services to the oil and gas industry, with a presence in Benin, Ghana, Côte d'Ivoire and Nigeria, acting as a Hapag Lloyd agent. After opening its OMA Logistics Senegal office in Dakar in December 2015, the local branch quickly realized the potential of the country's growing mining sector. "There are many processes in both mining and onshore oil and gas that are the same, or at least very similar," stated Vincent Bayiha Kodock, country manager at OMA Logistics Senegal. "We

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Unlike most traditional mines, our environmental footprint is minimal as we rehabilitate the mining area immediately after mineral extraction and we are not using chemicals. GCO contributes to the sustainable development of the communities, bringing infrastructure, access to water, education, healthcare, agriculture and local business support. Last year, for example, 300 people living in the mining area were relocated into a brand new village we built, providing electricity through solar technology, schools and easy access to water. From our point of view, we feel that the Government of Senegal has a real intention to develop the country and make it attractive for the mining sector.

- Francois Godin,
CEO,
Grande Côte Operations

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see providing services to the mining sector as a natural extension of what we already do today in the oil and gas sector, not only in Senegal, but across West Africa. Through the development of intimate customer relationships both locally, as well as internationally through our overseas network, we can quickly identify exactly what customers need and expect from us, and where we can bring added-value to mine operators in Senegal."

Where possible, mining companies tend to work with local service providers, as long as they are competitive and meet their standards. "We work with local service providers and are always open to developing new relationships with Senegalese companies," said Francois Cherpion, SSPT's general manager. "However, we have to achieve optimum standards and make sure our partners are fully legal, so we cannot endorse informal services that do not contribute to the official GDP of the country."

Further development is needed before Senegal's service providers are ready to support the mining sector without international input, but the promising emergence and growth of local companies in mining services is indicative of future strengths in this area.

Logistics and Infrastructure

Despite Senegal's port advantage, there remain many challenges with the country's logistical infrastructure, amplified in the mining sector by the remoteness of projects from the more developed city centers. "There are many improvements to be made to develop the infrastructure in Senegal; most urgently, the rail system needs to be refurbished and brought back to life if we want Senegal to become competitive on the international markets," noted Assane Diouf, country manager at Damco, the supply chain arm of A.P. Moller-Maersk Group's transport and logistics division. "We anticipate this happening soon, as the African Development Bank and some international banks are investing heavily in African infrastructure. Additional development of ports in Senegal is also necessary. Today, the port in Dakar is too congested and the surrounding infrastructure is lacking; there are no rail options and there is an incredibly high demand for trucks, which leads to congestion on the roads, plus inflated truck prices."

Because of these logistical challenges, which are amplified when operating at remote locations, service companies are placing increasing emphasis on aftersales and are seeing most growth in this segment.

Senegal is also garnering more attention for its oil and gas potential, and the government is currently reforming its petroleum code. However, there are some concerns regarding discussions over taking tax provisions out of the code and adding them to the general tax code, which could potentially hurt some of the mining companies. "On the one hand, the government wants to gain maximum return from production, but on the other it also wants to reduce other taxes to give benefits to companies as well," commented Mamadou Faye, managing director at Petrosen, the implementing body for the country's petroleum policy. "We now have a profit-sharing system, society taxes and some advantages in production. There are many political sensitivities in petroleum and the public perception is often very negative. In actual fact, oil companies have made important investments and a great deal of return – just an evaluation of the discoveries requires more than US$1 billion of investment and, if this leads to development, we are looking at around US$4.5 billion of investment."

Petrosen has 46% ownership of Senegal's only refinery, and is pushing the government to support the construction of a second refinery for the processing of various qualities of crude oil and sale of the refined products into the region. "In addition, in the longer term, we could coordinate with producers in other African countries to transport their oil to our refinery in order for treatment followed by worldwide export," added Faye.

As well as the projected economic benefits for Senegal, there is an obvious positive knock-on effect for the mining sector. Lower-cost energy production will be a significant catalyst for mine development and contribute to more attractive economics considering the prominence of energy within most mines' cost structures. Most notable is the development of the Greater Tortue Complex, a gas project led by BP and Kosmos Energy in conjunction with a signed agreement between Mauritania and Senegal to split production on the cross-border offshore field. The area of focus is estimated to hold more than 25 trillion cubic feet of gas, and first gas is expected in 2021.

Just as companies established in this segment may venture across to mining, mining service companies are also keeping an eye out for opportunities to diversify their client base. Such is the case with local parts and equipment provider Afrique Mine et Industrie (AMI) SA. "We want to grow the oil and gas side of the business because at the moment, the ratio is very much in favor of mining, which accounts for about 75% of business," explained Abdou Mbackle Lo, AMISA's general manger. "Since the industry is volatile, this business model is not

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Mine development is largely linked to production cost and product processing. Energy is the most prominent factor. Being able to produce energy at a low cost will greatly benefit mines and act as a catalyst for faster mine development.

- Mamadou Faye, Managing Director, Petrosen

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always favorable. We want to balance and stabilize our income so we are not affected as much by the cyclical nature of either industry. When Senegal and Mauritania begin exploiting their oil and gas potential, we want this ratio to sit more at 50:50."

Particularly in line with government guidelines towards local content, there is high demand for local service providers operating at international standards. By offering a more cost-effective and logistically-convenient service without compromising on quality, local companies are in a strong position to capture market share. Reputation needs time to build but, with the right mechanisms and mentality in place, international experience alone will not hold up against strong local presence and expertise. In recognition, international players are seeking the best of both with their acquisitions of local companies and investments into warehousing and logistical infrastructure to hold inventory domestically and ensure rapid response times with clients. •

Burkina Faso

Population: 20,107,509 (July 2017 est.)
Land area: 273,800 sq km
Official Language: French
Capital: Quagadougou
Chief of State: President Roch Marc Christian KABORE (since 29 December 2015)
GDP (PPP): $35.78 billion (2017 est.)
Growth Rate: 6.4% (2017 est.)
GDP per Capita (PPP): $1,900 (2017 est.)

Exports: $2.797 billion (2017 est.), gold, cotton, livestock
Exports Partners: Switzerland 44.9%, India 15.6%, South Africa 11.3%, Cote d'Ivoire 4.9% (2017)
Imports: $2.923 billion (2017 est.); capital goods, foodstuffs, petroleum
Imports Partners: China 13.2%, Cote d'Ivoire 9.5%, US 8.2%, Thailand 8.1%, France 6.5%, Ghana 4.4%, Togo 4.4%, India 4.3% (2017)
Inflation rate (Consumer price): 1.4% (2017 est.)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank

16/54

2017 Score

57.1/100

Safety & Rule of Law

59.1/100

Participation & Human Rights

65.0/100

Sustainable Economic Opportunity

49.6/100

Human Development

54.8/100

TAXATION RATES

SOURCE: ICLG

Corporate Income Tax Rate

28%

Royalties
Gold: 3.5%
Base Metals: 3%
Precious Stones: 7%

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017

74/180

Score

42/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business

151

Starting a business

79

Dealing with construction permits

58

Getting Electricity

181

Registering Property

145


Mali
Niger
Burkina Faso
Benin
Cote d'Ivoire
Ghana
Togo
Your feet on the ground in Africa
NORTH
0 50 100 150
KILOMETERS
Geological boundary certain
Geological boundary inferred
Fault certain
Fault inferred
Thrusts
Existing
Closed
Gold resources/ projects
Existing mines
Closed mines
Projects
Mineral fields
Country Borders
Seaside
Roads
Minor roads
Railway
Sems Offices
Basic-ultrabasic complexes (Freetown, Guinea)
Cretaceous to Recent
Upper Proterozoic to Paleozoic
Plutonic rocks
Basic-ultrabasic complexes
Leucogranite
Undifferentiated granitoids
Volcanic and fluviodeltaic formations
Fluviodeltaic sandstone conglomerate, argilite (Tarkwaian)
Undifferentiated volcanics, volcanosedimentary rocks
Komatiitic to tholeiitic basalts
Andesitic volcanic rocks, chert (b); graphitic horizons
Basic volcanic rocks, chert (b), Mn levels (c)
Flysch-type formations with minor volcanic rocks -
Carbonated felsic volcanic rocks
Felsic volcanoclastic rocks, dykes, chert (b), manganese levels (c)
Flysch-type : sandstone to argilite (graphitic, conglomeratic levels)
Tourmaline-bearing sandstone and conglomerate
Chert and quartzite levels
Manganese-rich levels: quartzite, gondite, phyllite
Granitic, migmatitic and undifferentiated gneiss
Granite, gneiss, and migmatitic gneiss complexes
Plutonic rocks
Undifferentiated plutonic rocks (Leonian to Late-Liberian)
Basic and ultrabasic formations
Migmatitic and undifferentiated gneisses
Granulitic gneiss "basement"
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THE AFRICAN GEOLOGICAL CONSULTANCY GROUP

Hon. Oumarou Idani

Minister of Mines and Quarries,
Ministry of Mines, Quarries and Energy
Burkina Faso

Could you share the Government's economic growth strategy and the importance of the mining sector in Burkina Faso?
The government's ambition is to make the mining sector an important lever for sustainable socio-economic development in Burkina Faso by 2026. Achieving this ambition requires effective implementation of reforms in collaboration with other actors in the sector and in accordance with the following guiding principles: state ownership of mineral resources, integration of mines with the rest of the world, partnership, good governance, preservation of the environment, community development and mainstreaming of themes such as gender, environment, human rights and health. To this end, the strategy of our department focuses on two orientations – to create, on the one hand, favorable conditions for research and the rational and sustainable exploitation of mineral resources and, on the other hand, to increase the benefits of exploitation of mineral substances for sustainable development in Burkina Faso.

2018 is expected to be a record year for gold production in Burkina Faso. What have been the major catalysts for the sector's development and growth?
Several factors have contributed to the growth and development of the sector, the first being the stability of gold prices. Secondly, two gold mines entered into production in 2017 - Houndé in the province of Tuy and Netiana in the province of Nahouri. Thirdly, the National Agency of Supervision of Artisanal Exploitation and Semi Mechanized Miners (ANEEMAS) was created in 2015 to better frame the field. This organization will help to channel artisanal production, estimated at 9.5 tons in a study conducted by the National Institute of Statistics and Demography (INSD), into the official collection circuits. The start of construction of the Wahgnion mine and the start of production of SEMAFO's Boungou mine have also contributed to the favorable outlook. Finally, the adoption of the 2015 mining code also helps to frame the sector by offering investors more leeway to work in a peaceful environment with all the other actors, particularly the administration, the local populations and the civil society organizations.

What efforts has the government made to organize the artisanal mining sector and the associated challenges it presents?
The artisanal mining of gold has become the second largest occupation of rural populations after agriculture. Despite some advantages, this trend is accompanied by negative environmental, economic and social effects. The Ministry of Mines and Quarries has put the issue of mining craftsmanship at the center of its concerns. On April 26th, 2018, we organized the National Forum on Gold Mining with a theme of management strategies for better contribution to the national economy. The objective of this forum was to set up a framework for dialogue between the Ministry and the actors of the mining industry at a national level.

Although Burkina Faso is mostly known for its gold potential, the country has other resources to offer. Is there now an effort to diversify the sector?
The diversification of exploitable minerals in Burkina Faso is a challenge for the department. An increasing share of government revenue comes from the sector, particularly gold mining, although other minerals exploited include zinc, manganese and quarry substances. A fall in the gold price would be a risk to the macroeconomic stability of our country. In order to address this challenge, we have set three main lines of activity which are planned over the 2016 to 2025 period. The first is the development of the research of strategic and energy substances; the second is the monitoring and control of mining activities and infrastructure; the third is the promotion of careers in exploitation. The realization of these axes will increase the number of mineral substances exploited.

What are the priorities for the Government to ensure continued investment and development of Burkina Faso's mining sector?
The government's priorities to ensure investment and continuous development of Burkina Faso's mining sector are included in the National Plan for Economic and Social Development (PNDES), where the sector is expected to meet the following objectives: increase the share of extractive industries in GDP from 7.9% in 2015 to 10.2% in 2020; increase the proportion of local purchases in the food consumption of mining industries from less than 14% in 2015 to 25% in 2020; increase the average amount of local investments made by the mining industry from CFAF 2 billion in 2015 to CFAF 5 billion in 2020; increase the number of direct and indirect jobs created by the mining sector from less than 10,000 in 2015 to 20,000 in 2020. •

Burkina's Golden Promise

A case of high risk, high reward?

Surrounded by Mali, Côte d'Ivoire, Ghana and Niger, Burkina Faso is one of the region's few completely landlocked countries. Traditionally, Burkina Faso's economy has been primarily driven by agriculture, but the relatively recent shift in focus towards natural resources has already had an impact. GDP grew by 6.42% in 2017, versus 5.9% in 2016 and only 3.9% the year before. This growth is very much in line with the growth seen in the extractive industries, which accounted for only 4.5% of GDP in 2009, increasing to 7.9% in 2015, 8.3% in 2016 and 11.4% in 2017. "We see that the mining sector and other related industries contribute around 11% of Burkina Faso's GDP," commented Tidiane Barry, president of Burkina Faso's Chamber of Mines, which was established in 2011 to support the industry's growth. "This is expected to grow in the coming years. The mining industry is also the main driver for foreign direct investment into Burkina Faso, so the sector is also important in this respect."

The country currently hosts 12 mines in operation and a further two in construction. Neighboring countries such as Ghana, Mali and now Côte d'Ivoire are now familiar names in the mining investment community, and it seems that Burkina Faso's geological potential is also receiving greater attention. In fact, the country accounts for roughly 22% of West Africa's greenstone belt exposure. In line with this geological potential, the country is expecting record gold production in 2018 and has overtaken Tanzania in volume. This is perhaps surprising considering its first gold mine was Nordgold's Taparko mine, which poured first gold only in late 2007. Fast-forward 10 years to 2017, and Burkina Faso achieved 46.5 mt of gold production. This figure is against 38.53 mt in 2016 – an increase of over 18%. 27 mt of raw gold was poured in the first half of 2018, in line with the Minstry's ambitious vision to hit 55 mt/y of gold in 2018.

This significant growth is driven primarily by two factors, the first being the stability of gold prices and the second the new capacity coming online. Most significantly, Endeavour's Houndé mine had its first gold pour in October 2017 and announced commercial production within a month.

"Burkina Faso offers a wealth of geological potential, and the country is now following in the footsteps of Ghana and Mali. However, its development could be limited by competition, and Burkina Faso does face some challenges – for example, the fact that the country is landlocked entails extra costs for suppliers. We also need to build our own dams to ensure an adequate supply of water for our projects. The country's energy costs are also amongst the highest in the region and account for about 40% of our cost structure."

- Elie Ouedraogo, General Manager and Chairman, SEMAFO

The mine has an expected average annual production of 235,000 oz at an all-in sustaining cost of US$610/oz over its first four years.

A recent entrant to Burkina Faso is MNG, which acquired Burkina Mining Company in 2016 and Avesoro shortly thereafter, thus gaining control of the Youga and Balogo gold mines. With MNG's involvement, Avesoro added 160,000 oz to the reserve at Youga, which had previously been set for closure, and brought the mine to production in less than four months. The combined life of Youga and Balogo takes the company up to 2026. Avesoro expects 120,000 oz/y of gold production from the Youga Mine in 2018. The combined measured and indicated mineral resource is 16 million mt, with 924,000 oz of gold at an average grade of 1.73 g/mt and combined proven and probably mineral reserves of 11.2 million mt with 660,000 oz of gold with an average grade of 1.84 g/mt.

"With 11 mines built over the last 10 years, there is a strong local skillset in mine construction and operation. Orezone's current project is focused on oxide and free digging. The simplicity of the project allows for the mining contractors to be local. If the project entailed drilling, blasting and bigger fleets, we would likely have to use international mining contractors with greater expertise and capabilities. There are companies within Burkina Faso that are willing to enter the mining industry and take on big projects, but it all comes down to their capability of handling these big projects. Local contractors are building their capabilities but we are not yet at that point where we can see 100% local construction, but the progress in recent years has been impressive."

- Patrick Downey,
CEO,
Orezone Gold Corporation

SEMAFO's Boungou mine also had its first gold pour in June 2018. The company expects the new mine to double production capacity by 2019 in conjunction with its Mana mine, bringing SEMAFO's gold production up to over 400,000 oz/y. "Following our positive experience with Mana, we decided to augment our portfolio in 2015 with an acquisition involving the Boungou project, which we bought for US$150 million from a small exploration company," outlined Elie Ouedraogo, SEMAFO's general manager and chairman. "As the project was just at the scoping study phase, we brought it to feasibility study level in 2016. The latter yielded positive results for the company and its shareholders, showing an average life-of-mine head grade of 4.15 g/mt Au at a gold recovery of 93%. In six months, we had obtained a mining permit and started building the Boungou mine, with first poured gold 18 months later in June 2018. The construction process went very smoothly since we had kept the same operations team that had developed and run the Mana mine, plus we had already forged a strong relationship with the government."

If all goes to plan, SEMAFO expects Boungou to double its production capacity by 2019, bringing the company to over 400,000 oz/y. This will make SEMAFO the second-biggest gold producer in the country after IAMGOLD.

IAMGOLD is Burkina Faso's premier gold producer. The Essakane mine is one of IAMGOLD's flagship operations and had record attributable production in 2017 of 389,000 oz. IAMGOLD recently began mining at Falagountou East, the second satellite deposit at Falagountou of which the first, Falagountou West, came into production in 2015. The company is also looking at Essakane with a heap leaching project currently under study. "The heap leaching project is progressing well and the pre-feasibility study will be completed by June 2018; it has the potential to increase Essakane production by up to 20% and extend the mine life by two to five years," highlighted Oumar Toguyeni, IAMGOLD's regional vice president for West Africa.

Teranga Gold is also aiming for its first gold pour at its Wahgnion mine in 2019, whilst B2Gold's Kiaka project is expected to have a huge impact, with measured mineral resource estimates of 27.3 million mt at 1.09 g/mt gold for 953,000 oz, indicated mineral resource estimates of 96.8 million mt at 0.96 g/mt gold for 2.99 million oz and inferred mineral resource estimates of 27.3 million mt at 0.93 g/mt for 815,000 oz. Wahgnion, acquired by Teranga with the acquisition of Gryphon Minerals in 2016, is expected to produce between 120,000 to 150,000 oz/y over a mine life of 12 or 13 years with all-in sustaining costs of about US$850/oz.

Roxgold's flagship asset, the Yaramoko mine, has been in production since May 2016 following a greenfield discovery in 2011 and capital investment of US$106 million. The mine life is 10 years and, in 2017, Yaramoko processed an average head grade of 15.3 g/t gold. "Production has also been very strong and in 2017 we produced 127,000 oz gold, significantly above our initial guidance of between 105,000 and 115,000 oz/y," highlighted Roxgold's CEO, John Dorward. "Our cash operating cost was US$438/oz, which is extremely low. We have made a significant repayment on our debt, paying nearly US$30 million of our project finance, and built up to US$63 million of cash in the bank at the end of 2017. From having US$75 million of debt in May of 2016, we are now net cash positive. Yaramoko is one of the highest-grade gold mines in the world, with measured and indicated grades of over 17 g/mt and, so far, we have been delivering over 15 g/mt. About 70% of the gold is recovered in our gravity circuit and the balance comes out in our leaching circuit. It is a very clean metallurgical system with low sulfides, and nothing refractory about it with high overall

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Burkina is attractive based on its geological potential and mining-friendly environment. It is underexplored but is clearly fertile given recent discoveries such as B2Gold's, West African Resources' and Roxgold's. The government wants foreign investment, as do local communities. The fact that we went from discovery to production in five years shows just that.

- John Dorward, President and CEO, Roxgold

"

recoveries of 99%. Ground conditions have also been good."

With an exploration budget of US$9 million in 2018, Roxgold has been focusing on new discoveries, with a program involving 63,000 meters of drilling, focused on the Houndé belt.

Also performing well is Nordgold's Bissa-Bouly mine. Bissa was launched in 2013, and expanded in September 2016 with the launch of a heap leach operation at the nearby Bouly deposit. Bouly's average annual production is expected to be approximately 120,000 oz over a mine life of 10 years.

As well as gold, the Perkoa zinc mine, a joint venture between Glencore Xsrata and Blackthorn Resources, has been in operation since 2013, and there is also potential for resources such as manganese and other base metals.

Weighing up Risk: Burkina Faso's Investment Proposition

Beyond the initial attraction based on geological potential, investment tends to follow the path of least resistance. The tax system and mining code are important factors to consider and changes to either can be highly impactful, even if it is just the perception of added barriers by comparison to a previous state of affairs. "Côte d'Ivoire and Mali will likely see some influx of investment because they have very attractive mining codes," commented Barry, president of the Chamber of Mines. "Burkina Faso adopted a new mining code in 2015, and the reality is that the new code is less attractive than the previous one, so this is a challenge. The challenges are mainly around taxation – the previous code had more incentives for investors, which have now largely been retracted. Nevertheless, the government has always been open to dialogue with the mining companies to ensure that the mining code does not negatively impact a project that was already underway."

"There is a willingness to preserve the stability of the framework and steps are being taken to mitigate any negative impacts of the new mining code. Burkina Faso has a lot of potential but must remain competitive to continue attracting investment from foreign players. In the new mining code, the emphasis on local development is a positive aspect and is conducive to the competitiveness of the industry, since local development creates an environment of stability, peace and a better social condition in the region."

- Tidiane Barry, President, Chamber of Mines, Burkina Faso

For any country, dialogue is key in finding a balance, but the perception of several companies it that the conversation has been somewhat one-sided of late. "In the last two to three years, several factors have changed that have affected us," commented Johan Labuschagne, general manager at Nordgold. "The water tax, for example, created a lot of uncertainty and decreased the competitiveness of the operating environment versus countries such as Ghana and Mali. The rate is too high. We have also recently heard about the new fuel prices, which include a 38% increase in HFO, the prime driver for power generation. The final number is not yet confirmed. The moment the cost goes up, extending the life of the mine becomes more challenging and it is more difficult to invest in exploration. It is a very short-sighted approach to pursue returns from the industry in this way – an understanding of the nature of the business is required to keep the balance. Equally, even though the 1% local development tax is intended for development of the surrounding region, it rarely gets invested there. It is then up to the mining company if they choose to invest additional resources to develop the community. It would be preferable for us to be in control of the flow of investment into the area in which we are operating to see better returns and influence on community development."

Whilst Burkina Faso's mining code is still competitive within the region, there will always be a readjustment period when changes are made. It is common for governments to make policy revisions as a sector develops to maximize economic return, often followed by further adjustments if new investments taper off. "It is difficult to take a completely objective stance on the mining code," commented Emmanuel Yonli, lawyer at SCPA KAM & Some. "From each perspective – either that of the country or of the investors – it will always be the case that the code could be more attractive. With time, a balance will hopefully be reached. In fact, there are currently some revisions being made because there are still complaints about the changes that were made in 2015."

Other pronounced challenges are security and infrastructure. Because the country is landlocked, there is a heavy reliance on imports through neighboring countries, driving costs higher and impacting lead times. "At customs, lead times are long and taxes are already high – up to 48% on imports," noted Grant Palmer, country director at Geotech Drilling Africa.

Planned infrastructure projects should go some way in alleviating some of the challenges experienced by companies needing to shift products across the border. Notably, the Tema Port-Ouagadougou railway project, which would connect Ghana's port to Burkina Faso's capital, is currently open for tender.

Sourcing Locally

Because of the logistical challenges, it would make sense for companies to work with local manufacturers, but the segment remains underdeveloped. Part of the challenge is that, as with any sector, it takes time to develop a skilled workforce. "The biggest demand is in the area of maintenance – people qualified to fix equipment, either in plant or production engines," said Dina Yanogo, managing director at Exterhum Africa, a Ouagadougou-based company dealing with management and supply of personnel, with a focus on industrial sectors such as mining. "We also see high demand in the areas of geology, metallurgy and administration. Since most of the mining companies know us, we receive a lot of CVs and we use our intern database plus independent research through websites and social media; this large pool helps us to source the right people."

Exterhum also provides rental services for mining transport vehicles and plans to expand its capacity in this area.

These challenges lead to a dearth of local companies operating at the required standards to make them a viable alternative to the experienced international service providers. "It is three times more difficult to capture market share as a local provider be-

> **The success of Burkina Faso's mining industry is largely dependent on the gold price; over the last couple of years it has been quite stable. Prior to that, the gold price was quite volatile so we saw a bit of a slump. Today, we see much more investor confidence and we are currently working on securing new business opportunities with three potential greenfield projects.**
>
> **- Andrew Sarson, Mining Director, Burkina Equipements**

cause there are many international companies offering similar services with greater experience and larger capacity," commented Yanogo. "Investors come to us because they want to promote local providers; however, we still need to develop this field and we have to be ready to take on additional business."

International companies are therefore building their own in-country inventory, or working with trusted distributors and dealers. "Although we can generally get the parts from Europe quite quickly, the process of clearing those parts through customs can be quite cumbersome," explained Andrew Sarson, mining director at Burkina Equipements, part of the JA Delmas network of Caterpillar distributors. "There is definitely improvement needed in the process. In Europe, if a piece of equipment fails and the dealer does not have the required part, it can still be delivered the next day. As a dealer in Burkina Faso, we therefore hold a lot more inventory because of those inefficiencies in the system. Today, we plan six to nine months ahead with our clients. Even countries with the advantage of a sea port have many challenges – strikes, for example, can often mean huge delays on lead times for containers, and sometimes the dealer has to react and has no other alternative but to fly parts in by airfreight at additional expense to the dealer."

Similarly focused on simplifying the supply chain and reducing lead times is Socoghaf, a supplier of mining tools and a distributor for Hardox in Burkina Faso. "Our ability to hold large stocks improves reliability of supply and shipping in bulk reduces logistics costs," highlighted Socoghaf's CEO, Ghossoul Charbel. "We are also doing more and more maintenance on behalf of SSAB, which is more cost effective because we have the local workforce in place to support this activity. Planning is very important for mines and disruptions to timelines and unscheduled downtime can be very detrimental. Price is not the primary factor – reliability of supply and quality are generally more important."

The infrastructure within the country is also underdeveloped and power generation is particularly challenging. In a sector like mining, where power is both essential to operations and a significant part of the cost structure, the necessity of building power capacity increases the required investment, impacting the economics of the project.

Mitigating Security Risk

One of Burkina Faso's biggest challenges is security, highlighted by several incidents over recent months. These security risks are also particularly difficult to address. Not only is there a lack of coverage across the country and at its borders to monitor activity and control unrest, but appropriate precautions can be a huge expense, particularly for the juniors that dominate the greenfield exploration segment. "There are some very large companies in this part of the world, but the majority are juniors and very small," said Philip Whitehead, regional security manager for West Africa at MS Risk. "First of all, they do not have the resources for a security manager, so they often delegate to their HSE manager – it is not a subject they know a lot about and there are failings as a result. Equally, many of these small companies are owner-managed and are more concerned with getting gold out of the ground than the associated risk. There is often no process of quantifying the security risk to which they are exposing themselves."

MS Risk has positioned itself as a "virtual security manager", able to assess physical risk and plan to mitigate that risk and allocate personnel to monitor a project for a company at regular interviews over a certain period of time. On the prospect of addressing the broader issue, Whitehead commented: "To some extent, governments try to get involved and protect the industry, but their approach is very inefficient. The typical scenario is generally disappointing from a mining company's point of view. Mining companies are generally told they need to meet certain security requirements and support a number of gendarmes, for example, through a salary, accommodation, logistics and so on. However, what they actually get is poorly-trained security personnel with no understanding of industrial site security."

MS Risk is therefore working with governments in West Africa on industrial training packages and intelligence gath-

Image courtesy of Golden Rim.
Golden Rim Resources is developing its Kouri and Babonga gold projects in Burkina Faso.

"During the Bouly construction, we spent US$40 million, 30% of which was spent locally. However, there are not many local providers with the capability to supply and service big mining equipment. In terms of local development, we have built a dam and organized some local agricultural activity around it, from which we supply the mine site. We buy produce like potatoes and onions and we have now built an abattoir. We are always sure to meet with the local community and form a committee and initiate training programs to develop skills to open the door for more opportunities."

- Christian Ouedraogo, Deputy General Manager, Nordgold

ering to create a more comprehensive understanding of activity around the country that could potentially be a security risk.

Building Power Capacity

Power is often a challenge for mining companies due to the remoteness of their mine sites and even more so in countries with a power deficit. Burkina Faso has a significant disadvantage when it comes to power generation, but there are some ongoing initiatives which primarily focus on renewable energy projects, particularly solar. "There is a clear policy in place to drive a mixed energy portfolio, which includes the installation of a large solar power plant to create an autonomous energy source," outlined Adama Ouedraogo, CEO at Satel, a service company operating in telecommunications and energy. "The government is also seeking to help small companies and households shift to solar energy to decrease consumption of fuel, which can then free up availability for mine production. Within the new energy policy, there is also a focus on strengthening interconnections with Côte d'Ivoire, Ghana and Nigeria. There is also an intent to build a conventional 100MW plant in the east of Ouagadougou and another 30MW solar plant."

Burkina Faso's government is certainly aware of the need to improve the country's power generation and transmission, but the strategy seems in large part to rely on the private sector. IAMGOLD has taken the lead with its 10MW solar plant at Essakane, and SEMAFO is swiftly following suit with its 15MW plant currently under construction. "The envisaged energy transition is to increase the share of renewable energy in the energy mix," explained Oumarou Idani, Minister of Mines and Quarries. "This is why we encourage mining companies to develop initiatives to create endogenous production units, preferably in renewable energies and especially solar energy – a very available or even unlimited resource in Burkina Faso. One example is the hybrid power station set up at the Essakane mine, which was inaugurated on March 16, 2018. The message is to encourage mines and solar energy developers to invest in renewable energies to ensure the productivity of the extractive industries, while also ensuring electricity supply to the local populations."

Burkina Faso's mining industry boasts a number of success stories, demonstrating the country's functionality as an investment destination. Whilst the country certainly has its challenges, Burkina Faso remains an attractive destination by virtue of its promising geology and, due to its relatively underexplored terrain, its potential for big discoveries at high grades. •

Ghana

Population: 27,499,924
Land area: 227,533 sq km
Official Language: English (2010 est.)
Capital: Accra
Chief of State: President Nana Addo Dankwa AKUFO-ADDO (since 7 January 2017
GDP (PPP): $133.7 billion (2017 est.)
Growth Rate: 8.4% (2017 est.)
GDP per Capita (PPP): $4,700 (2017 est.)

Exports: $13.75 billion (2017 est.); oil, gold, cocoa, timber, tuna, bauxite, aluminum, manganese ore, diamonds, horticultural products
Exports Partners: India 23.8%, UAE 13.4%, China 10.8%, Switzerland 10.1%, Vietnam 5.2%, Burkina Faso 4% (2017)
Imports: $12.68 billion (2017 est.); capital equipment, refined petroleum, foodstuffs
Imports Partners: China 16.8%, US 8%, UK 6.2%, Belgium 5.9%, India 4.1% (2017)
Inflation rate (Consumer price): 12.4% (2017 est.)

IBRAHIM INDEX OF AFRICAN GOVERNANCE (2017)

SOURCE: MO IBRAHIM FOUNDATION

2017 Rank
6/54

2017 Score
68.1/100

Safety & Rule of Law
70.7/100

Participation & Human Rights
63.0/100

Sustainable Economic Opportunity
58.6/100

Human Development
69.9/100

TAXATION RATES

SOURCE: ICLG

Mineral Income Tax
35%

Royalties
5%

TRANSPARENCY INTERNATIONAL CORRUPTION PERCEPTIONS INDEX

SOURCE: TRANSPARENCY INTERNATIONAL

Rank 2017
81/180

Score
40/100

BUSINESS ENVIRONMENT RANKING (1-190)

SOURCE: THE WORLD BANK (2019 EDITION)

Ease of Doing Business
114

Starting a business
108

Dealing with construction permits
115

Getting Electricity
86

Registering Property
123


Burkina Faso
Ghana
Togo
Cote d'Ivoire
Your feet on the ground in Africa
NORTH
0
50
100
150
KILOMETERS
Basic-ultrabasic complexes
Leucogranite
Undifferentiated granitoids
Tourmaline-bearing sandstone and conglomerate
Chert and quartzite levels
Granitic, migmatitic and undifferentiated gneiss
Basic and ultrabasic formations
Migmatitic and undifferentiated gneisses
Granulitic gneiss "basement"
Existing
Closed
Gold resources
Existing mines
Closed mines
Projects
Mineral fields
Country Borders
Roads
Minor roads
Seaside
Railway
Sems Offices
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EXPLORATION
THE AFRICAN GEOLOGICAL CONSULTANCY GROUP

Hon. Kwaku Asomah Cheremeh

Minister of Lands and Natural Resources, Republic of Ghana

How important is mining to the socio-economic fabric of Ghana?

Mining has been a key sector of the Ghanaian economy over its known history, with gold ac-counting for more than 90% of the activities and value generated by the sector; hence the coun-try being known as the Gold Coast prior to independence in 1957. In recent times, the mining sector has been the single largest contributor to total national merchandise exports, averaging some 40%, contributed some 6% of GDP and notably also been the single largest contributor of about 16% of domestic government revenue. Over the past two and a half decades, Ghana has attracted significant mining sector investment amounting to about US$18 billion.

What is the Ministry's strategy when it comes to attracting greenfield investment to ensure the sector is sustained in the longer-term?

Currently Ghana has 14 large-scale operating mines, comprising of 12 gold mines and one each for bauxite and manganese and a large number of small scale mining operations. We are not resting on our oars though. By making available the information on resource endowment and following international good practice in terms of governance, along with working collaborative-ly with stakeholders and investors, and keeping the investment climate streamlined, we expect to whip up and keep investor interest in Ghana's mining sector.

What opportunities beyond gold would you promote to potential investors?

The government is keen on value addition across all minerals, including gold. As a first step, all gold exports have to be subjected to assay by the national assayer to help document both the value and composition of the exports. Some discussions have been initiated with the Ghana Chamber of Mines to commence refining a proportion of the gold produced locally to form the basis of further value addition. An initiative to internalize as much of the value chain of bauxite is also under way. Ancillary to this value chain, it is expected that we will develop local capaci-ty for production and supply of caustic soda, and alum, among others.

The solar salt industry, with its chlor-alkali associated industries, is also being explored, while advanced exploration of the iron ore deposits is ongoing to form the basis of the development of an iron and steel industry. Some industrial minerals like brown clays, kaolin and silica sand are being exploited on a small-scale basis already to supply local industries in ceramic, paint and glass manufacturing respectively. These are expected to be expanded given their potential for integration into the rest of the economy even better than gold. Beyond these, a National Supplier Development Program has been initiated with the intention of more generally integrat-ing the mining sector with the rest of the economy.

What challenges do you see ahead as the industry matures and how does the government plan to address these?

Dependence on natural resources revenues based on volatile commodity prices could signifi-cantly destabilize the government budget. Strategies have to be devised to sustain investment flows into the sector. Ghana has a comparative advantage in terms of its geological endow-ments and having an attractive governance, so the government is actively working at the inte-gration of the sector with the rest of Ghana's economy to address these challenges. For exam-ple, the establishment of the National Supplier Development Program (NSDP) seeks to expand the scope, deepen the depth and widen the breadth of linkages with other sectors. Improving the business environment through regulatory reforms will reduce bureaucracies associated with doing business in the country as measured by the World Bank's ease of doing business index. We will also work to improve the cost of doing business by improving upon the time needed to process mineral rights applications, including enhancing the Mining Cadastre with Australian government support and improving our infrastructure, especially in the area of road, port and energy. Development of strategic anchor industries, with emphasis on a strong and robust pet-rochemical and integrated aluminum industries, vehicle assembling plants, pharmaceuticals, and industrial salt, will support the diversification of the economy. Additionally, measures such as the establishment of industrial parks in all regions through government-facilitated free zone enclaves will allow investors to set up both upstream and downstream production facilities. •

Ghana: Breathing life into a maturing sector

Ghana is king when it comes to West Africa's gold mining industry – second only to South Africa in terms of gold production on the continent, and many companies have found great success in the country's share of the Birimian Greenstone Belts. As the mining industry has matured, the landscape has become dominated by large players such as Gold Fields, Newmont, Kinross and AngloGold Ashanti.

Gold Fields, which has seven operating mines in Australia, Ghana, Peru and South Africa, entered Ghana 25 years ago. As a result of a number of acquisitions over the years, the company holds a 90% attributable portion of the Mineral Resources and Mineral Reserves for Tarkwa and Damang, with the remaining 10% held by the Ghanaian Government as a free-carried interest. In 2018, Gold Fields bought a 50% stake in Asanko Gold Ghana, further cementing its strong hold on the country's gold resources. Total attributable annual gold-equivalent production for the company is approximately 2.2 million oz.

Measured by production, AngloGold Ashanti is the third-largest gold mining company in the world, with 14 mines and three exploration projects across Africa, Australasia and the Americas. AngloGold Ashanti has two wholly-owned and managed operations in Ghana's Ashanti and Western Regions. In the latter, the Iduapriem mine is an open-pit mine with a CIP plant and gravity circuit. Located in the Ashanti region, the Obuasi gold mine has been primarily an underground operation and has been on care and maintenance. However, the first gold pour from the redeveloped mine is expected in the third quarter of 2019.

Kinross's Chirano mine, approximately 100km southwest of Kumasi in the Western Region of Ghana, made the transition to a pure underground mine in 2017 and produced 246,027 oz that year. Meanwhile, Newmont's Ahafo operation commenced commercial production in 2006, with Akyem following suit seven years later.

These mine owners and operators are now focused on reducing footprints or moving into underground or throughput operations, with a greater emphasis on recovery and brownfield exploration to extend mine life.

In gold, it is primarily the larger companies that are driving exploration and there is relatively little greenfield exploration underway. Rather than capturing business with new market entrants, the opportunities for service providers in Ghana are more aligned with the changing requirements of existing players as they seek to extend mine life and expand operations. Enoch Kusi-Yeboah, general manager at Metso Minerals Ghana, explained: "Business is always dynamic, and the mining industry of five to seven years ago has metamorphosed into something very different; customer demands are mostly linked to resource prices. The development of new technologies and it's implementation options are dependent on the economic viability – good return on investment depends on finding the right tools for the task at hand."

While investors are certainly drawn to countries with proven geological potential, exploited land also means waning attractiveness as the potential for big discoveries is reduced. While Ghana has proven itself to be a strong mining jurisdiction with a relatively stable political and security environment, the geological risk has increased. Many investors are looking instead to less explored countries.

Nevertheless, the rebound in global commodity prices has restored some investor confidence and there are several instances of both new and old explorers striking gold in

> **"Due to the maturity of Ghana's mining sector, we have a policy environment that is generally favorable and has been developed through a great deal of dialogue between the industry and government. This is not the case in newer mining industries. In addition, there is a larger local talent pool than in many neighboring countries with a basic understanding of the sector, including a number of good engineers, geologists and other technical people."**

- Sulemanu Koney,
President,
Ghana Chamber of Mines

Image courtesy of IronRidge Resources. The Ghana landscape marked by drill rigs, a welcome sign of continued exploration activity in the established gold jurisdiction.

Ghana's southern region and also in the less explored north where new gold as well as lithium deposits have been discovered. "Not surprisingly, our mining sector has contributed strongly to Ghana's overall provisional growth in GDP, with the mining-quarrying sub-sector recording the highest year-on-year quarterly GDP growth rate in the Q1 2018 this year," said Hon. Barbara Oteng-Gyasi, Ghana's deputy minister for lands and natural resources, during the 2018 Africa Down Under mining conference in Perth. However, increased production in oil, gas and agriculture is progressively overhauling mining as the pillar of Ghana's economic development strategy – allowing the government to put tighter restrictions on mining companies – and Ghana faces stiff competition from younger West-African players like Côte d'Ivoire, Burkina Faso and Mali.
Emblematic of the mining sector's convalescence is the recent success of Azumah Resources, which received ex-

> "In Ghana, most of the mines have gone into underground operations to find high-grade ore which requires complex and sophisticated mining methods and more complex technologies unlike countries like Burkina Faso, which has untapped resources and does not need such complex equipment to extract minerals yet."

- Enoch Kusi-Yeboah, General Manager, Metso Minerals Ghana

ploration results from the Kunche deposit at its Wa gold project in northern Ghana in May this year. One drill hole returned impressive intercepts at the 1.5km strike orebody comprising an interval of 44m at 5.37 g/mt gold from 99m. This includes two high-grade zones of 1m at 144 g/mt gold and 20m at 10.27 g/mt gold. Further breakthroughs followed as Azumah's joint venture partner Ibaera Capital provided 'proof of concept' of a possible feeder zone that could lead to a deepening of the existing shallow pit design and for an underground mining option to be scoped.

"Ultimately, Dr. Jon Hronsky and the Ibaera team were successful in confirming exactly what we all had hoped for – that our deposits, particularly our main deposit at Kunche, have a strong depth component. These results have really proved a 'game-changer' for the Wa gold project," stated managing director Steven Stone, who will provide an Ore Reserve and Interim Project Update by the end of 2018, with a development decision scheduled for Q3 2019, after the release of a full feasibility study.

"We have a strong focus on our US$1.4 billion reinvestment into the Damang mine. We will also be focusing on our 45% stake in Asanko Gold Ghana, which will allow us to expand our operations. We continue to look for opportunities, but our main focus will be on developing our existing operations and assets in Ghana."

**- David Johnson,
Vice President –
Stakeholder Relations,
Gold Fields Ghana**

New explorers are increasingly heading northward as old players enjoy continued success in the region, and recent findings indicate the possibility of a whole new gold mining district in the country. Cardinal Resources – celebrating its 30th anniversary operating in the region this year – will be publishing a PFS for its flagship Damdini project located in the upper east region of north Ghana by Q3, 2018. The company has also struck gold at Ndongo, just 20km away from Namdini. The highest grading of 59.2 g/mt gold was within a 9m intersection of 23.3 g/mt from 60m.

In addition to its auspicious greenfields, the northern regions of Ghana are conducive to sustainable energy generation, making it a convenient area for companies exploring the potential for renewable power facilities. "We have incorporated solar into our project because it is well suited; the northern regions of Ghana have on average more sunlight than the south," commented Cardinal's CEO Archie Koimtsidis.

While gold persists as the centerpiece of Ghana's mining space, the government has made efforts to diversify its portfolio to undermine over-dependency on a single commodity. "At the moment, about 97% of mineral extraction is gold, so there is vast opportunity to diversify the country's mineral basket," highlighted Sulemanu Koney, president at Ghana's Chamber of Mines.

Other historical metals in Ghana include bauxite, diamonds and manganese; the government's move towards diversifications will broaden the focus to include base and clay metals, granites, solar salt and, most recently, lithium. The country joined the world's producers of lithium after an agreement with IronRidge Resources to carry out exploration in Ghana's southern region. Recent drill results show intersections over 100m ranging from 1.2% to 1.35% oxide.

The company has also rediscovered an historical lithium resource, Egyasimanku Hill, which was drilled in the 1970s. "We believe this will be a world-class project partly due to its proximity to infrastructure," said CEO Vincent Mascolo. "Our site is 90km from the capital of Accra, less than a 100km from the port of Takoradi and we have sealed roads to 1km of the site."

As the government continues to carry out nationwide mineral exploration exercises, lithium deposits have so far been discovered in the Volta, Western and Ashanti region of Ghana. Ramped up exploration is part of a broader government initiative to attract more investors, which most importantly includes the introduction of new and more beneficial legislation for areas like licensing, support services and health and safety.

Removing Barriers

While success stories continue to be written, several juniors are facing challenges due to a lack of exploration incentives. The mining code has been written and shaped with the large companies that have long been the stalwarts of the sector in mind. This is underlined by the provision in the mining code that companies investing over US$500 million have negotiation rights over taxes and royalties, whilst companies with smaller investments do not. "In Ghana's Mining Code, Act 703 dictates that terms are frozen for 15 years within a stability agreement, but a company investing a minimum of US$500 million has the opportunity to negotiate benefits above what is currently outlined," noted Koney. "The large companies therefore have an upper hand and the smaller companies and juniors are at a disadvantage. Equally, the government should remove the VAT on exploration and other services, such as drilling and laboratory services."

As with any mining code, a balance is crucial but not always easily achieved. "The Government is generally in a relatively weak negotiating position compared to companies," commented George Kwatia, Ghana and West Africa mining leader at PwC. "Equally, since Ghana does not have sunset clauses

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Wherever it operates, Kinross strives to be a responsible mining operator and a reliable development partner to its host countries and the local communities. This means responsibly managing our impacts while leveraging economic opportunity to generate sustainable long-term benefits in close collaboration with our local stakeholders. From 2011 to 2017, Kinross contributed significantly to the development of the Ghanaian economy with nearly US$1.8 billion spent in country: almost US$400 million to the national economy through taxes and royalties paid to the government; US$257 million through wages and salaries paid to employees, 98% of whom are Ghanaian and nearly US$1.2 billion through procurement of goods and services with local companies. In 2017, 73% of all procurement was done in-country.

- Adriano Sobreiro, General Manager, Chirano, Kinross Gold Corporation

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in its agreements with mining companies, it becomes very difficult to get the company reviewed. There are companies in Ghana with warranties dating back to the 1940s – even if the companies themselves have moved on, the warranty is linked to the concession even after the assets are sold. Therefore, there are still companies relying on agreements that have been signed 60 years ago with no clause for termination. Ghana's government wants to move forward from old regulations and previous mistakes, but the mining companies are not making it easy as they want the best for themselves. It has become a challenge for the government to shift to a place where mining regulations are mutually beneficial for both the country and the mining industry. This results in a reluctance from the government to enter into new agreements that favor the investor."

While there is certainly work to be done to capture more investment into greenfield exploration, Ghana holds many advantages having enjoyed a peaceful transition of power during its last election, and continuing to uphold its reputation as one of Africa's stable democracies. In addition, Ghana's well-established mining tradition presents a clear advantage over adolescent competitors that often lack in both overarching industrial framework as well as in-country competence. "There are several educational institutions generating very skilled Ghanaian professionals, including mining staff," noted Jeff Quartermaine, CEO of Perseus Mining.

The company has one of the biggest gold mines in the country, with 650km² of tenements centered on the Ashanti Gold Belt some 25km to 65km from the 60-million-ounce Obuasi gold deposit.

Local Engagement and Development

Although the maturity of Ghana's mining sector would imply a more tested and therefore more efficient process for local development, there are still a number of challenges to iron out. There has been a recent effort to increase reinvestment into local communities,

"Ghana is at an advantage compared to some other countries in the region due to availability of resources like water and power. For example, it is typically not necessary to have big start-up water volumes. Recent projects in Burkina Faso and Sierra Leone needed to have a full year's worth of water storage before the mines could open. Similarly with power, although the Ghana power grid is limited and larger companies tend to supplement capacity with on-site power generation, having access to a reasonably developed grid provides greater opportunity for smaller-scale mines.

- Jeffrey Coffin, Regional Manager - West Africa, Knight Piésold


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"There are great infrastructural issues within Ghana, which pose a challenge to logistics. In the pre-independence period, the colonial government constructed roads which led to resource bases. The road and rail networks in the country are all linked to mines. Since independence, there has been little follow-through on policies and infrastructure development has come to a standstill. However, it is these challenges that create the need for regional logistics companies.

- Henry Tabi, Managing Director, Barbex"

with an additional 4% of investment by government on top of the 4.95% of company revenue.

Perhaps most importantly, the royalty distribution was in need of attention to avoid the scenario of taxes paid by mining companies for the purpose of local development not properly trickling down to the mining region. "Until recently, only 4.9% of royalties paid by mining companies were reinvested locally around the site of operation," emphasized Koney. "Through advocacy, we secured the Mining Development Fund Act in 2016, which outlines a clear governance framework around the management of fund distribution from royalties. It has a national architecture coupled with a local committee, and dictates that funds will be used ultimately for the development of the host community under the label of the New Development Fund (NDF). The national board will act in line with the local communities to oversee distribution of funds."

The preferred approach of the Chamber of Mines would be for the two investments to be added together and distributed by one development committee. This would enforce accountability and ensure the funds are being used judiciously.

Local Content: Adding Value

Due to Ghana's position as a hub for mining activity in West Africa, the country is an obvious candidate to lead the way in development of local capabilities. Many local companies that have grown with the industry and raised themselves up to international standards are now competitive service suppliers within the region. A notable example is Atlantic Catering and Logistics, which began as a local startup in 2014, but drew on the years of experience in hospitality of the company's founder. "With our focus on ensuring a great brand, we ensured from the outset that our systems and procedures met international standards regarding quality and across all aspects that industries look out for," underlined Maud Lindsay-Garmat, the company's CEO and founder. "Over the last four years, we have acquired many customers, not just local companies but also multinational ones. Our message to the mining community is to trust local brands – we are a 100% Ghanaian company and exercise the highest level of standard of operation as the international companies. Supporting local businesses will improve and also grow the local communities and the economy as a whole."

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Finding the right person is always a challenge. Stellar provides an environment in which staff can make decisions and are accountable for them. We offer various in house training programmes and take advantage of appropriate third party training when available. Our health and safety program includes an incentive system whereby staff receive points for following correct health and safety regulations while driving. Points are converted to cash and paid to staff monthly.

- Patrick McQuaid, Managing Director, Stellar Logistics

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Operating from a more local base gives indigenous providers an immediate advantage, particularly when it comes to holding stock or enabling greater reactivity. "Our warehousing services are currently a primary focus for us," highlighted Soraya Anglow, executive director at Greenline Logistics, which has its headquarters in Accra. "Mining companies cannot afford extended periods of downtime so it is necessary for them to have extra stock available when it is required. Through the warehousing and distribution software and technologies that are available today, customers can monitor stock remotely and know what is available at the storage facility."

Despite a few clear advantages, it can be difficult for local companies to get a foot in the door. Since mining companies are expected to operate at international standards, with particular scrutiny from overseas stakeholders seeking to avoid negative publicity, most opt for a contractor with a proven track record. However, partly due to pressure from governments to look locally and partly due to a number of success stories and positive results, this is now changing. "Local mining contractors are becoming more involved in the entire mining process as mine owners are giving contractors the opportunity to participate," commented Joseph Titus Glover, managing director at Quantum LC. "Quantum LC aims to accommodate the international standard expectations of our customers. It comes down to having the right documentation and the right team with the required qualifications. Mine safety is also one of the company's main focuses with regard to operating at international standards."

Quantum LC primarily provides equipment and manpower to mining companies, also supplying mobile containers for projects such as site establishments, site offices and accommoda-

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SGS is working with local companies to reduce our consumables costs. We are encouraging local providers to manufacture consumables required in our laboratories as well as in the mining industry. Working with local manufacturers not only reduces our cost of production, but also our import costs. Ghana is just the starting line – if we can encourage local manufacturing in Ghana, we can also encourage development in the entire region. One of our main areas of focus is to grow our business from a local standpoint.

**- Mark Davidson,
Managing Director –
Ghana, Liberia & Sierra Leone,
SGS**

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tion, as well as a consulting component. The company seeks to leverage the presence of international companies in order to match their service standards. "We aim to establish joint ventures with international companies entering Ghana's mining industry," continued Glover. "These joint ventures enable knowledge transfer. For example, we had a joint venture with Basil Read Mining, a South African company, on our AngloGold Ashanti project. They had more relevant experience and knowledge for the project, and we were able to learn significantly, particularly in line with operating at international standards."

As well as growing local service capabilities, Ghana is now becoming a hub for services to the rest of the region. Many local companies are able to build on their experience and grow with their current mining clients that operate across the region or branch out independently into neighboring countries.

With this solid service foundation and due to Ghana's geographic position, there is now a large opportunity to de-

velop downstream activity to benefit the entire region. For example, Ghana's Precious Minerals Marketing Corporation (PMMC), which assesses the grades and grants certificates for all gold leaving the country, plans to build a refinery at its site in Accra.

One challenge that still lies ahead of the Ghanaian government is the taming of unruly mining territory. Illegal mining has taken a considerable environmental, human and economic toll on the country over the last years, robbing the economy of US$2.3 billion in 2016. According to the government, artisanal gold production sits at about 30% of total volumes. If the issue persists, it could constitute a deterrent to investors as other options emerge in the region. Illegal mining, or galamsey, is likely to persist as an issue for the foreseeable future, especially following the government's recent decision to lift a ban on small-scale mining. The ban was introduced in 2017 and, in the ensuing period up to early 2018, the illegal-mining task force carried out some 1,200 arrests. However, following persistent pressure from legitimate small-scale miners, in May 2018, the government announced its plans on lifting the ban. The Ghana National Association of Small Scale Miners had also repeatedly called on government to reconsider the ban, pointing to the US$551m of lost profit during the period of interrupted operations. In recent years, galamsey has transformed from an artisanal, rudimentary way of putting food on the table, to operations with capital machinery incorporating businessmen, associations, and politicians. The lifting of the ban is likely to hamper efforts to sufficiently delineate illegal mining and practitioners will be able to take advantage of the blurred line between illicit and legitimate artisanal mining to avoid prosecution.

With an estimated 200,000 illegal miners operating in Ghana, there is also great potential for ethnic tensions between the Chinese workers in Ghana and the local population, between law enforcement and local communities and between farmers and artisanal miners. In the absence of a robust framework surrounding illegal mining, farmers will continue to fall prey to galamsey which, by extension, will pose a serious threat to Ghana's food security. Mining companies that have paid for large concessions are also affected by illegal miners encroaching on their territories.

However, community engagement has become an increasingly integral part of mining operations and, with the right type of practices, explorers and miners could potentially constitute a reckonable force in undermining illegal mining. "The best way of describing our relationship with the community would be that we are entrenched," said Komitsidis, who so far has not experienced any issues with artisanal mining. "We have spent 20 years building trust with the community and learning about the culture. We engage on every level, from the guy who herds the cattle to local government authorities and everyone in between. It is as much a community development project as a mining site. Over the years, we have seen people come and go, but we are the constant in the background."

If properly regulated and developed, the artisanal mining sector presents opportunities for local development and economic growth. With the right support, some small-scale miners may even grow to fill the gap in the mid-scale juniors space.

As one of the region's more mature mining jurisdictions, Ghana is a country from which others can learn as they gain momentum. Ghana's mining industry has seen a great deal of success, but the competitiveness of the region's leading gold producer may wane as juniors pursue less-explored terrain in countries with greater incentives to invest in greenfield projects. Rather than placing an emphasis on attracting a continuous flow of new investment, Ghana

Image courtesy of IronRidge Resources.
Outcropping lithium spodumene from from IronRidge's project in Ghana.

"What the new government has done so well is to ensure that all departments involved in the extractive industry in the country are communicating. What could be improved, and is being considered at the moment, is automation and other technical aspects which will be important to increasing efficiency."

- Archie Koimtsidis,
CEO/MD,
Cardinal Resources

has instead adapted its operating environment according to the producers providing greatest economic benefit in the present. However, with a renewed emphasis on diversification of Ghana's resource exploitation and some promising projects in the pipeline, the mining sector will continue to be key in the country's economic development, and investors will find peace of mind in its longstanding stability and proven track record of successful projects. •

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THANK YOU

We would like to thank everyone who took time to share insights with us. Your knowledge helped make this book possible. We extend our special gratitude to:

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Geological Institute of Angola, Canga Xiaquivuila, Director General and Joao Paulo Kituxi, Geophysicist.
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Small Scale Miners Association of Zambia (SSMA), Simon Njovu, President.

Zimbabwe
Ministry of Mines and Mining Development, Hon. Minister Winston Chitando.
Oxley Consulting, Mark Oxley, Owner.
Prospect Resources, Harry Greaves, Director.

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