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Mining in Southern Africa

One of the world's last mining frontiers

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A Rising Region

Emerging from the shadows of a mining giant

Skilled (Trained) operator checking the pressure on the gland water pumping system. Photo courtesy of Minopex.

Blessed with abundant resources and well-positioned to become an international energy hub, southern Africa's mining industry is emerging from the shadows of the dominant regional mining player, South Africa. While some countries have long mining histories, such as Botswana, others like Mozambique are scrambling to address the most African of challenges: a lack of sufficient infrastructure to export these commodities and a skilled labor shortage that threatens the evolution of mining throughout the region. As governments and the private sector work together to find an adequate solution, companies continue avid exploration in one of the world's last mining frontiers.

South Africa's recent inclusion into the BRICS group of nations, thanks in part to the country's wealth of mineral resources, recognizes that the continent's economic powerhouse will play a significant role in global development. Taking into account the southern African nations of Botswana, Mozambique, Namibia, Zimbabwe and Zambia, the region as a whole offers many opportunities for mining companies who can stomach a little risk with their reward.

Thanks to their proximity to South Africa, one of the world's premier mining destinations, southern African countries are able to draw upon the world-class expertise easily available. Botswana, recently rated the top mining destination in Africa according to the Fraser Institute rankings, is best known for diamonds but is quickly pursuing strategies to diversify into other minerals, such as coal and uranium. Namibia's mining industry is forecast to expand more than 50% in value terms by 2015, and increases in production of base metals and uranium will contribute to further expansion. Mozambique's mining sector is expected to experience phenomenal growth thanks to increased investment in coal production from international majors. Zambia's copper belt will see five new mines come online in the next five years, whereas neighboring Zimbabwe has yet to convince investors, though even their wariness has started to wane.

Aside from simple geology, Africa's demographic and economic growth is also an incentive. According to Roger Dixon, chairman and corporate consultant of SRK Consulting in South Africa, "this results in huge opportunities for mineral development. If companies in the industry ignore these opportunities, then they will miss out on one of the engines of the world economy over the next 10 years."

Southern Africa is still considered an "untapped resource," according to Kyle van der Berg, business solutions manager for Micromine Africa, a mining software company. "There are many minerals in the ground that remain unexplored at present. This will change as mining becomes more effective, and we will see much more development happening in the coming years," van der Berg said.

Kyle van der Berg, business solutions manager, Micromine

Knight Piésold Consulting South Africa's section manager mining, Peter Jenner, remains slightly more wary however. "There are many opportunities in the region; it is simply a matter of whether or not they will be developed. It is not an easy market for quick returns, but still has much untapped potential," Jenner said.

For years, southern Africa's mining industry has been known internationally as the shining diamond hub of the world, yet it is now coal that is creating the most excitement. Southern Africa is in a prime position to supply China and India with their insatiable demand for "the black diamond." According to some estimates, Mozambique is primed to become the world's third-largest coal exporter by 2015, though for this to occur, significant investments into rail and port infrastructure are required. While two predominant sources of investment and procurement of assets in Africa remain Canada and Australia, John Burke, director of Issuer Services Division at the Johannesburg Stock Exchange touched on the investment potential offered by the Asian giants. "Both India and China are resource hungry and we foresee great interest continuing from these countries," Burke said.

Yet the lack of sufficient infrastructure is hampering long-term, large-scale mining development, and is a significant source of frustration for exploration companies in the region. As mineral exploration starts to reach production stage, the challenge of exporting the resources becomes ever more apparent. Large multinationals, such as Vale in Mozambique, have committed bil-

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Siegfried Errath, CEO, OMSA.

lions of dollars on operations including rail and port development, but many mining juniors lack sufficient capital to develop their own solutions.

In Botswana, significant coal development is being put on hold until a means of transporting the coal is secured. "There needs to be political will to develop infrastructure projects," said Chris Wilkinson, president, MCS, a mining consultancy company based in Johannesburg.

Nevertheless, the infrastructure challenge does not deter companies from succeeding in the region, as long as the obstacles don't overshadow the tremendous potential. "The mining industry in Africa is growing, so we need to continue to make our presence felt on the continent and be prepared to face the challenges," said Francois Hay, managing director, BM Earthemoving & Liebherr, one of the leading explosives companies in Africa. "There is substantial growth in Mozambique, Botswana, Zambia, DRC and Zimbabwe, while Namibia is growing steadily as well."

While the challenges may not deter companies, they can certainly hamper the ease of doing business in the region. "Time taken for delivery is sometimes challenging, and consignment stocks occasionally have to be installed locally," said Siegfried Errath, managing director, OMSA, which designs and manufactures lubrication systems.

With so much development, a sufficient service and support sector is necessary and many of the continent's industry, financial, and technology leaders can be found in South Africa.

The market

As fuel for the globe's energy needs begins its exodus from southern Africa, the role of energy-hungry India and China in developing southern Africa's mining industry is becoming more apparent as a number of these markets' key players position themselves throughout the region.

"In 2011, the trade flow between Africa and China was $150 billion; a large portion of that is a small- to medium-sized enterprise (SME)" base and another large fraction of that is from traders exporting mineral ores to China," said George Lo, director of Standard Chartered Bank's Africa-China Corridor.

SMEs are at the forefront of this investment into Africa. "They are actually presenting a platform for majors to come in; the companies are looking to these SME players to understand the market and in some instances partnering with them in a local project," said Lo.

This trend, however, is beginning to change, as majors are themselves starting to move in. "Three years ago there appeared to be a trend that anyone could call up a mine, say they could put them in touch with a large Chinese importer, cut a deal and make a margin. Now we see many Chinese companies coming to the continent themselves. I think SMEs played a massive role in laying the foundations and help the local investors in understanding the Chinese as a culture," said Lo.

Often seen as higher risk, there is still a big market for juniors and some financial institutions have begun to focus their efforts on these fledgling companies. "The bulk of our investments are with junior mining companies and not the larger corporations. We like to see ourselves as having a higher risk appetite than normal banks because we are a development finance institution," said Mbuyazwe Magagula, head of mining and minerals beneficiation, South African Industrial Development Corp (IDC).

Examining the global market trends, Tony Zoghby, global industry leader of mining, Deloitte, notes that commodity prices have been gradually increasing, "but if these costs are contained, I think mining companies will be well placed into the future. I believe China is the major driver of this; it has now become the benchmark for things like steel production and coal-usage; the whole world is revolving around China's use of resources. India is getting there but remains like a sleeping giant."

The ongoing financial crisis in Europe has positioned Asia to take a leading investment role in the continent. "While the most recent IMF forecast downgrades the growth expectations in Europe and the Americas will certainly have an impact, the most pressing factor we see is the continuing economic development of countries like India and China. 40% to 50% of basic mineral commodities are going to China at the moment, so any slowdown in Chinese economic growth will have severe repercussions for the mining industry," said Investec's Anton van Dalsen, in charge of commodities and resource finance in South Africa.

While the state of the world markets has a direct effect on the investment capital coming into southern Africa, perhaps even more important is the availability of skills on the ground to develop these resources.

South Africa – Mining history and expertise for a fledgling region

With its long and extensive history with mining, South Africa has become a regional hub for mining skills and expertise. As the southern African region develops its own mining aptitude, with some countries requiring this more than others, this regional engagement of expertise and technologies is critical to the continuing growth and development of the region.

Many services companies have seen their growth based on the region's development. "Projects in Mozambique over the past two years have revolved around exploration and planning; only now are many of these going into operation. We have sustained our growth through the feasibility of these projects, leading us into our next phase of expansion," said Duncan Lee, general manager of Europe and Africa for

Maptek, who distribute mining software through the region.

Martin Foster, country manager, Aggreko South Africa agrees, “We have traditionally been heavily involved in supporting African utility companies and although we see that continuing, we are also looking to expand our presence in industries such as mining, oil and gas and manufacturing.”

The Skills

The skills shortage in the mining sector present across the region can be boiled down to two key factors — the lack of education focused on these skills, and the wide gap between education and experience. This was a common sentiment felt by professionals across the region. “Exploration geologists, government certified engineering management, and artisans, such as boilermakers, are in high demand,” said Mercy Chigoma, a mining recruitment consultant with South African-based Hire Resolve.

Yet not all the players are worried. Though acknowledging there is currently a lack of artisanal skills in the region, Mark Humphreys, managing director of South African Group Five Projects, said: “South Africa still has the best developed tradesman pool in Africa, with Namibia, Botswana and Zimbabwe not far behind.”

It is not just skills that are in demand across the region, but also experience. “There is an age problem among qualified, certified professionals. There are recent graduates with education and older professionals with skills, but companies are lacking the group in the middle; this is the biggest problem currently faced,” Chigoma said.

This is confirmed by those who service the mining sector. “Finding adequate skilled labor is a difficulty we often face,” said Martin Frere, managing director of central region for Fugro Airborne Surveys Ltd, who conducts airborne geophysics for the mining sector around the world. “The primary professionals we use are pilots, electronic engineers, geophysicists and aircraft maintenance engineers, and there are not sufficient graduates coming out of the appropriate schools, with the exception of pilots. It is also disappointing there are not more black pilots or aircraft engineers coming through. [Although we have] training and bursary programs in place, it has been difficult to find the raw material; we are finding more often we have to look outside the country.”

For others, the trend appears broader than just southern Africa. “If you look at world markets, this is a global issue. Relatively speaking, we are not in such bad shape here,” said Dave Morris, COO of engineering firm Taggart South Africa.


Jay Wileman, president, Sub Saharan Africa for General Electric. Photo courtesy of ANTHEA DAVISON/NEKO-LIME.

This skills shortage has proved beneficial to some South African companies. “[Mining] is one part of the business that is largely responsible for us growing to the size that we are now. The lack of skills in the mines and the necessity of outsourcing help to carry on running their operations presents us with an opportunity,” said Errath.

It is not just finding the skills, but also the ease with which they can be placed in country. Offering a broad overlook on southern Africa, James Dallas, CEO, Hire Resolve, voiced sentiments that were repeated across the region. "Mozambique has high levels of malaria and a dated bureaucratic policy that makes it difficult to arrange visas and relocate staff, though this can be done. Botswana and Namibia are well-regulated countries and they are easy to place candidates in."

Another common complaint seen in many of the more challenging markets was the poaching of skills amongst competing companies, often forcing them to offer higher industry wages or attractive retention packages to keep their projects operational.

As mining cultures mature in these markets, local skills must be developed.

Power and Technology

IT infrastructure, power and mining technologies have proved to be some of the key concerns of those operating in the area and South Africa is providing the solutions.

The technology present in southern Africa, while differing from country to country, faces many hurdles. "In comparison to the IT infrastructure in Europe, there is not enough development in southern Africa. The further north you go in southern Africa, the more challenging it becomes," said Matthias Going, manager of knowledge management at ThyssenKrupp Materials Handling in South Africa.

New technologies present in the project management of these mining operations also take into account the unique aspects of projects in Africa, such as rapid turnover of staff who may find it difficult working in the challenging environments present in the region. "With operations or maintenance of a single project, you may have five years to implement and improve upon software, but with project management you have a new team and rapid succession of phases that each bring their own set of system, processes and people," explains Steven Golding, CEO, SSG Consulting, which focuses on project management.

Adopting a social networking platform for its client, SSG Consulting found that a technology was needed to easily and securely share information with all parties of a mining project, which could be spread in locations across the region. Introducing their flagship project, KEY360, Golding stated that collaboration on a mining project "can be done in a matter of minutes, even with parties located in remote locations from one another."

There has also been an increase in companies, like global energy giant GE, taking a bullish approach to the continent's growth and development. "Africa is currently charting a similar development path that we have seen countries like China, India and Brazil

9,000 litre hydrostatic oil circulation system, designed, manufactured and installed by OMSA. Photo courtesy of OMSA.

take before [and] it is only a matter of time before this continent reaches similar levels of development," said Jay Wileman, president, sub-Saharan Africa for GE.

Wileman further discusses how some of the key issues sometimes associated with Africa are perhaps not as unique as some might think. "The challenges are very much the same across the globe, including power, water and productivity. This includes the lack of electricity and key infrastructure in remote places where it can be difficult to supply fuel for power plants, particularly with power demands continuing to increase."

Aggreko, which offers temporary power and energy solutions to the mining industry, found this often unreliable environment offered a key market opportunity. "[Aggreko] provides emergency power for mines that have grid power, but require stand-by power in the case that power fails; this is a major issue in Africa," said South Africa country manager, Martin Foster.

Water is becoming a scarce commodity in the region and, as mining develops from coast to coast, responsible usage has become a key concern. "Water will become a more valuable commodity; more specifically, in acid mine problems, assessing the volume of damage and where it is occurring will help environmentalists focus their efforts in the correct places," said Fugro's Frere.

Namibia's increasing number of desalination plants proves testament to this. Companies like Commodas Ultrasort, the mining division of Norwegian group TOMRA Sorting Solutions, who focus on sensor-based recognition and sorting systems, appear to be taking on this challenge. "Most coal beneficiation plants use water intensive separation processes such as dense medium separation (DMS) or jigging plants. In recent years, interest in dry coal separation technologies has gained momentum because water is becoming a scarce resource in many coal producing regions," said Lütke von Ketelhodt, general manager of Commodas Ultrasort Southern Africa, discussing the company's new dual energy X-ray transmission technology; a new dry beneficiation coal sorting process.

With many of the region's technology experts based in South Africa, the country continues to provide the region with innovation and technology necessary to move forward.

Rather than this being a hindrance to local industry, however, it could be viewed as the nurturing of potential by one of the world's mining giants.

Mbuyazwe Magagula, head of mining and minerals beneficiation at the South African Industrial Development Corp (IDC).

The Geology

While the geology of southern Africa is no doubt exciting, knowledge of this geology is often in short supply. Key to any successful mining project is the availability of adequate geographical data, a proven impediment in certain countries in the region. "One challenge we face in [southern Africa] is the quality of geographical information we work with. Fixing an accurate point from which to begin exploration is heavily reliant on government surveys and those of private companies, which are more accurate in some countries than others," said Maptek's Lee.

The recognition of this critical aspect in mining development is understood by local governments. "There are vast tracks of unexplored land across the whole of Africa where there is mineral potential. My experience with the southern African governments and people is that they have been most welcoming of exploration investment and supportive of the [exploration] programs," said Frere.

Proper analysis and understanding of the region's geology is key, though the resources to do this are not always in place. "We are lacking in water and soil labs and we end up sending our samples sometimes as far as the USA. There are also not certain niche experts, such as air or noise quality specialists, on the ground so we have to bring them in from areas such as South Africa," said Johannes Westra, owner, Loci Environmental, a Botswana environmental consultancy.

While the geological and environmental requirements of the region grow, so too does the demand for accurate information, providing a niche sector for international expertise.

Community Relations

With the large number of international companies moving into the southern African region, the impact that this will have on local communities is a concern.

"It is becoming increasingly more difficult to develop a successful project without understanding local communities. The management team must be able to create sustainable relationships with communities surrounding their operations and communities providing labor," said Mbuyazwe Magagula, head of mining and minerals beneficiation at the South African Industrial Development Corp (IDC).

For companies operating in the region, one consideration that must be remembered is HIV. According to 2010 UNAIDS statistics, Zambia, Zimbabwe and Botswana rate in the top five for HIV infection rates in the sub-Saharan region, with infection rates as high as 25% in Botswana. These numbers have had an impact on the mining labour force in the region. "Unfortunately, the whole region has been severely affected by HIV, which has had a major impact on the construction industry," said Group Five Projects' Humphreys, who has worked on a number of major mining projects throughout the region.

Westra connects this issue to the mining industry. "One problem in Botswana is that people get very excited over employment opportunities which could bring sometimes thousands of jobs to an area, but do not fully understand the environmental and social risks related to a project. For example, Selebi-Phikwe has one of the highest HIV infection rates in the country and this is likely related to a great influx of people coming up to work at the mines," said Westra.

Corporate social responsibility is also being demanded in the region, ensuring that local communities share in a slice of the resource pie. Somdeb Banerjee, executive in charge of Tata Steel South Africa, reflected on how these companies should be leading the way. "The world is going through very challenging times. I think it is the collective responsibility of the corporations to try and make sure that we bring about the change not only in terms of making corporations more profitable, but in terms of turning ourselves into corporations with conscience. I think to a large extent the responsibility is ours to ensure that we are there for the society and that we are not there to extract from the society."

Taking an in-depth look at each of the countries covered, this report will lay out the key players, the unique challenges and opportunities and an analysis of the overall operational climate of each country, proving why this region is one that international investors will be keeping a sharp eye on for years to come.

Mozambique

Southern Africa's 'Boom Town'

Mozambique was long synonymous with instability and civil war. The conflict that marred this southeast African coastal nation of 23 million people continued for more than 20 years, keeping Mozambique far from the minds of international investors and stalling the development of local industry.

Today, Mozambique is focussing on its next chapter and the country is quickly emerging as southern Africa's leading mining destination. Global mining giants such as Vale and Rio Tinto are shaping the new mining character of the country and helping raise its international status. New players, such as Indian giants Jindal, are also entering the scene, hungry to meet the growing energy needs of the Asian markets.

Though Mozambique still faces many challenges, predominantly underdeveloped infrastructure, an evolving mining regulatory framework and skilled-labour shortages, the country is rising on the international scene. "Mozambique is a very stable country, with a cooperative government, and an emerging economy that will be transformed in the coming years," said Manoj Gupta, director general, Jindal Mozambique Minerais (JSPL).

If managed correctly and responsibly, Mozambique's mining sector could prove to be one of Africa's great success stories.

House of coal — the framework in place

Ranked fourth largest in the world, Mozambique's coal deposits have quickly become a focus for coal-hungry markets worldwide. With a plentiful abundance of thermal and coking coal, some estimates suggest that Mozambique will be producing 25% of the world's coking coal by 2025. While the grade varies greatly across the country, the coal is concentrated predominantly in the Moatize coal basin in the northern Tete province. The presence of international mining houses based out of Brazil and India, as well as juniors from Canada, the UK, and Australia indicates that Mozambique has a sufficient framework in place to manage this boom.

On a March 2012 International Monetary Fund (IMF) staff mission to Mozambique, Johannes Mueller, mission chief for Mozambique, stated: "Mozambique's economy sustained a strong performance in 2011 despite a marked deterioration in the global economic environment. Economic activity is estimated to have grown by 7.4%, driven to a large extent by good harvests and a booming mining sector."

Mueller suggested other positive indicators of Mozambique's economy; signs that support a fiscal environment conducive to an attractive and stable investment climate. "Headline inflation decelerated sharply from its peak of 16.6% at the end of 2010 to 2.5% in February 2012, greatly benefiting the poor, and should remain well in single-digit levels this year. This remarkable disinflation reflects the determination of the authorities in tightening monetary and fiscal policies, favorable developments of international prices, a good harvest, and a stronger metical [local currency denoted as MZN]."

This economic growth has been due, in part, to Mozambique's regulatory framework, despite mixed reviews about its maturity and robustness.

"Mozambique has one of the most advanced and well-crafted regulatory frameworks in the region. The level of investment the government has been able to attract, and the relationships with the investors that they have developed, demonstrate that it is quite conducive. In the past the fiscal regime was, like licenses, negotiated almost on a case-by-case basis, but there is now a more general fiscal framework," said Casimiro Francisco, chairman, Mozambique Coal Development Association (AMDCM).

Gareth Clifton, country manager for Kenmare Resources, who focus on rare earths, agreed. "[The process] is clearly laid out and is undergoing quite a bit of change at the moment. The legislative framework is quite strong and allows us to do business."

The change referred to by Clifton is the proposal undertaken in 2011 to review and amend Mozambique's mining law, set to be debated in parliament mid-2012. The main points to be examined, according to an announcement by deputy minister Abdul Razak, are an increased contribution to


Michael Griffiths, chairman, Mozambi Coal.

state revenues by the mining companies and higher levels of participation by Mozambicans in the mining industry. It will also aim to reduce the current periods for prospecting and surveying and extend the licensing period for artisanal and small-scale activities. Mining certificates, currently available to any person resident in Mozambique, are slated to be shifted to Mozambican citizens.

There are ways to manage the bureaucratic difficulties presented within the country, particularly by the creation of local partnerships. "While there is a lot of red tape and bureaucracy [in Mozambique], this was made easier for us by partnering with a Mozambican company who knew the ropes and opened the doors; it is a mutually beneficial relationship," said Andries Kruger, general manager Africa, Australian Globe Metals and Mining.

The government of Mozambique is attempting to create a strong environment for investment. "There is a strong willingness on the part of the Mozambican government to really embrace what they have here; they really want this development to happen. This is why I think Mozambique will be one of the leading economies in Africa in the next 10 to 15 years," said Michael Griffiths, chairman, Mozambi Coal.

The players

There are currently three main projects in production in Mozambique: Minas Moatize, Vale, and Riversdale, with more on the way.

The production of coking coal at Beacon Hill Resources' (BHR) subsidiary BHR Mining's Minas Moatize coal project began in 2011. "The attraction of Minas Moatize was that it was a relatively rare coking coal asset," said Justin Lewis, chairman, Beacon Hill. "When we originally focused on Mozambique, the country had few attractions, other than the fact that this mine was producing and coal was well-priced in 2009. Since then, the region has developed greatly and perceptions have been changed by mining giants like Rio Tinto buying Riversdale and other majors moving into Mozambique."

In February 2012, BHR released its definitive feasibility study on the Minas Moatize, which concluded an 11.5-year mine life and a production of 2.2 million metric tons per year (mt/y) of saleable coking and thermal coal. This was based on a JORC mineable reserve of 42.65 million mt, of which at least 8.72 million mt will be top quality coking coal. Destined primarily for India, the first shipment of Minas Moatize saw 10,650 mt of thermal coal trucked to Beira where it left the port in December 2011. In the future, the group has stated it intends to use the Sena rail, though the terms of this will not be completed until mid-2012.

Vale's mine, also in Moatize, represents the company's largest coal project with an estimated investment of approximately \$1.658 billion and an anticipated annual production of 11 million mt of metallurgical and thermal coal. The first exports of coking coal occurred in December 2011 and the Vale board has approved a \$6 billion expansion for its Moatize coal project to lift output to 22 million mt/y. Initially utlizing the Beira corridor, Vale is currently awaiting the completion of the railroad to Nacala.

Riversdale Mining Ltd., a name now held in reverence by aspiring juniors throughout the country, is one of the key coal projects currently in the country. Mining giant Rio Tinto acquired 99.74% of all Riversdale shares through Rio Tinto Jersey Holdings, including its Zambeze coal project, in Mozambique in 2011. The company claims that the two mines run by Riversdale, the Benga and Zambeze projects, represent a Tier 1 resource, with potential for long life and expansion.

Construction of the Riversdale mine was completed by South African Group Five Projects (Pty); a project which the Group Five Projects managing director Mark Humphreys said proved to be "very successful". The company has also recently been awarded the construction of the Chirodzi coal project for Jindal Mozambique Minerais (JSPL). "Mozambique we see as having huge potential," Humphreys said.

Alongside these operating mines, there are a number of projects due to come online in the near future. One common feature linking many of them is overcoming the power challenges present in the country through local power generation projects at the same time as exporting coal to fuel projects in their home countries.

Mozal Aluminium Smelter Alumina Handling, Mozambique. The scope of work comprised the supply, fabrication, corrosion, protection, transport and erection of structural steelwork, platework and piping installation. Photo courtesy of Group Five.

Jindal Mozambique Minerais (JSPL), a part of the $15 billion Jindal group (the fourth largest entity in India), is historically focused on its core business steel and power, but is now adopting a more diversified portfolio that is being directed towards mining. Director general of Mozambique, Manoj Gupta, explains how this is reflected in their interest in Mozambique's coal sector: "[JSPL's] operations in Mozambique started in 2008 with the intention of providing coking coal to our steel plants in India… We have carried out feasibility studies and we are currently developing a mine."

The only Indian company to be granted mining rights for 25 years, JSPL will begin producing 1 million mt/y of coal in 2012 with the goal of ramping that up to 4 million to 5 million mt/y in the next five years, but the infrastructure development is critical. While there is a focus on exporting this coal, JSPL also plans to develop its own power plant in Mozambique by 2015. "It is our intention to build a 2,640-megawatt power plant [in Mozambique], using coal that we are unable to export and we have expressed interest in collaborating with the government in developing the country's infrastructure," said Gupta.

ETA Star, another Indian mining player, is hoping to establish its own power plant in India which will be supplied by its Mozambique coal. Following three years of exploration in the Moatize coal basin, the coal resource has been estimated to be 2.6 billion mt of easy-to-select resource. After completing their conceptual and viability mining study in early 2012, the next step for ETA Star is "a bankable feasibility study and then, in 36 months, we aim for ETA Star to take it into production. In the first phase there will be 2 million mt/y of exportable prod- uct; three years later we may be able to operate a 10 million mt/y mine. Of this resource 40% to 50% of the product will be coking coal and the rest thermal coal," said Mohamed Sathak, deputy general manager, ETA Star.

Coal, coal, coal and...

While Mozambique is focused on coal, there are, however, other commodities in the country to be considered.

Kenmare Resources is a UK-based producer who, unlike the majors in the country, is focusing on rare earths and strategic minerals, including ilmenite, rutile and zircon: the ores used in titanium dioxide.

Producing since 2007, they are currently undertaking a 50% expansion on their 800,000 mt/y capacity. With other major players, such as BHP, having relinquished their sands projects in Mozambique, there is currently little competition in this market.

Australian Globe Metals and Mining is also focusing on rare earths and strategic elements and has concentrated its efforts on the Tete region where it has now moved its geological team.

"We are focusing on getting a fluorite resource to the market, as well as identifying more targets in the region," said Dries Kruger, general manager, Australian Globe Metals and Mining. "There is also potential for phosphate, making it multicommodity and comparable to Palabora in South Africa, without the copper."

Globe Metals and Mining has also recently announced its Memba project, a joint venture focused on a 10-km titanium belt and plans to start drilling in 2012.

Other exploration companies, including Australian Kimberley Rare Earths Ltd and Australian Southern Cross Resources have also begun to identify rare earth deposits in the country, ensuring that this resource will stay on the minds of investors for the foreseeable future.

The road to coal has many potholes

"Before 2000, Mozambique was not a mining country; we have no mining history. Following the World Bank [mapping] program in 2003, there were new digitized maps and information available, as well as a new mining law; this is what attracted investors," said Mario Diniz Ernandes Deus, founder of Gondwana, a local Mozambican geological and surveying company.

With the mining sector on the verge of a sustained boom, there are first a number of key issues to be addressed.

Throughout the southern African region, skilled labor has proved to be one of the largest impediments to industry. This has become a particular challenge in Mozambique where decades of conflict have prevented a well-trained population from emerging.

"An important concern is the shortage of skilled manpower and the need for training; miners are bringing in expatriates, leading to complaints from locals that they are not benefiting from the projects," said Casimiro Francisco, chairman of the Mozambique Coal Development Association (AMDCM).

"Finding skilled labor is Bearing Man Group's largest challenge, not only in Mozambique, but across the region. To address this we aim to develop local skills," said Mark Lubbe, general manager of BMG, which supplies engineering components and conveyor systems. JSPL faces a similar problem. "Mining is very new to the country, so it is necessary [for us] to build up local expertise," said Gupta.

The Mozambican government is doing its part to address this problem. "[The AMDCM] are in agreement with the minister for natural resources' strategy to develop training centers, and are reviewing the proposal for establishment of a research and development center to address the skills shortage," said Francisco of AMDCM. Whether Mozambique can produce these skills internally remains to be seen.

The environment in Mozambique means it is also susceptible to another threat: malaria. Discussing their work with mining clients in Mozambique, International SOS's Stéphane Carre, regional general manager for southern African territories said: "in the north of Mozambique malaria is always a key concern for two reasons. First, the risk of malaria is under estimated by many of our clients [and] in many cases, education about malaria is still very weak."

With such rapid development occurring in Mozambique, the concerns of the local population must not be forgotten. Originally involved in a World Bank project to map Mozambique in 2003, Gondwana has also been involved with Vale practically since their arrival in Mozambique. After completing mapping and other work for companies such as Riversdale, and expanding their office to more than 200 people, Gondwana can provide a unique Mozambican insight into some of the current concerns. "There is now a tendency to think that people are coming and taking all our wealth and we are left with empty holes; this is the social component that companies coming here must keep in mind otherwise we will have tense relationships in the future," said Joao Manuel P. Reynol Marques, managing partner, Gondwana.

While debates about population resettlement, lack of jobs and contracts being offered to local partners and political corruption have surfaced, the Mozambican government and companies present in the country must ensure that these vast resources benefit the local population.

From pit to port – the infrastructure dilemma

Adequate infrastructure is a concern common across the southern African region and correctly managing and addressing this issue will be key to the success of Mozambique's mining industry. Analyzing this, Anton van Dalsen of Commodities and Resource Finance at Investec, a South African specialist banking and asset management group said: "Investec is keen on Mozambique and its extensive coal deposits, but to a degree the projects there, with their reliance on things such as railways and ports, are more logistical exercises than mining ventures."

Rolling on the railway?

Establishing an efficient rail link from the Tete region to the port of Beira is essential to ensuring the movement of coal to the global market and there are currently a number of national and regional initiatives underway. Rail seems to be the best solution since, in March 2012, Riversdale had its proposal to use barge transport on the Zambezi river rejected by the government due to environmental concerns, leaving it, like other coal majors in Mozambique, dependent on a rail solution.

Taskforce One, a conglomeration of Minas Moatize Vale, Rio Tinto and Mozambique Ports and Railways (CFM), is currently working with the government of Mozambique to complete the refurbishment of the Sena rail line. The initial capacity of the line will run at 6.5 million mt/y, and later on to a fully operational capacity of 12 million mt/y in late 2012. This refurbishment is aimed at providing a solution for coal producers who have largely had to rely on exporting their coal by truck; a clear challenge in a country with an underdeveloped road network.

Vale is taking the lead and quickly putting in place all the necessary measures to get the rail line underway. In December 2011, Vale signed an agreement with the Malawian Transport Minister, which will allow Vale to build and operate a rail line across the southern tip of Malawi, linking the Moatize coal basin in the Tete province, to the port of Nacala, a key export point for coal.

Of concern to some juniors in the country is access to these railways. "I am certain the Mozambique government is aware that the railway lines have to be managed by them and not by the companies," said Michael Griffiths, chairman, Mozambi Coal.

Off to sea

The port of Beira is instrumental to the export of Mozambique's coal and its premier departure point. It is also a key link for the neighboring states of Zimbabwe, Zambia, Malawi, and the DRC. As the exit point for coal coming out of Mozambique's Tete province, and as the potential departure gate for many of the resources leaving the wider region, the port of Beira must have the capacity to manage growing volumes. CFM, matched by funding from the public and private sector, has started to undertake a capital dredging program to allow for larger cargoes to enter the port.

Capt. Giordano Scotto D'Aniello, the head of commerce for Italian Coeclerici Logistics, stated that, with Beira, "the problem was draft restriction and the limitation at berth enabling the port to accommodate large vessels".

Handling more than 15 million mt/y of coal through sophisticated handling systems which load the coal onto larger vessels anchored offshore, Coeclerici Logistics is an example of a company who has found innovative ways of tackling the challenges presented in Mozambique. This type of innovation has secured them a $150 million, 20-year contract with Vale; the biggest transshipment project awarded in the world. If Mozambique is to fully benefit from its extensive coal resources though, infrastructure must remain a key area of focus for the government.

The support and service sector

Mozambique has a service sector that, while still young, is trying to keep up with the mining boom seen throughout the country. Large, multinational companies have scooped up some well-established Mozambican companies, though a core of Mozambican born and bred firms remain.

Due to the remote locations in Mozambique in which many mining companies operate, unique solutions are often required to manage these long and often difficult distances. Bearing Man Group, for example, set up a fully stocked store on site for Kenmare Resources.

Other companies, like South African Execujet Aviation Group, have seen great expansion in their operations due to the large amount of exploration occurring through the country. This exploration has also boosted business for companies that focus on geographical airborne surveys, such as Geotech Airborne Ltd South Africa. Discussing recent growth in business, general manager Malcolm Moreton said: "Mozambique and Zambia have proved to be amongst Geotech's most successful stories thus far."

To manage the growing market, many companies are also busy trying to establish themselves more fully in the country, such as Thyssenkrupp, who are currently establishing a local representative office in Maputo.

While there is still room for more players to enter the market, its relative youth has not yet appeared to hinder current operations in the country as support from neighboring South Africa and abroad have managed the shortfall.

The future

With infrastructure development currently underway, a government that appears to understand the importance of international investment and is creating a business environment conducive to this, and both an international and Mozambican service sector ready to provide the services necessary, the future of Mozambique's mining sector looks promising.

"The mining industry in Mozambique is taking off [but] there are a number of challenges with the authorities and the skills of the local people," said Gondwana's Joao Marques. "New investors to Mozambique must be prepared to face these problems... They must be willing to engage with local authorities."

Although issues undoubtedly remain, the mining industry of Mozambique is nonetheless accessible to those willing to engage with it.

Zambia

Africa's copper resource

If Namibia is yellow with uranium and Mozambique black with coal, Zambia is shining with a strong copper tone. Generating 3.3% of the western world's copper, Zambia is ranked seventh in the world for copper production. This southern African nation is also the world's second largest producer of cobalt, producing 19.7% of the global total. It also has significant quantities of selenium and silver, has more than 300 gold occurrences and produces some platinum group elements; important by-products of the copper mining and processing. The other important metal production has been zinc and lead from the carbonate-hosted deposits of Kabwe. With ore grades reaching as high 40% combined zinc and lead, these deposits rank among the highest-grade zinc-lead deposits in the world.

Zambia has a long history with copper, with production beginning as early as the 1930s. In 1990, after years of losses, the government privatized its copper mines, the Zambia Consolidated Copper Mines (ZCCM), which has increased copper mining output and profitability. Economic growth has been increasing in the country since 2004, largely due to high copper prices and foreign investment. There is an estimated 2 billion mt of total mineral resource on the Zambian copperbelt. With five new mines estimated to come online before 2017, the mining industry in Zambia appears to be booming.

Zambia's economy is heavily reliant on mining, particularly its copper and cobalt, and the mining sector contributes approximately $822 million to the country's total exports. While the country has taken steps to diversify the industrial and manufacturing base, this has not yet been largely realized.

There have recently been a number of critical government actions focused on the mining industry; specifically the discussion of introducing a windfall tax, the possible defaulting of 400 mining companies in the country and an increase of corporate tax from 3% to 6%. Despite these concerns, Zambia remains clearly on the radar of international investors.

Frederick Bantubonse, general manager of the Chamber of Mines of Zambia, is optimistic for the future of Zambia's copper scene.

"The potential for the mining industry in Zambia is vast and unrealized at this point," Bantubonse said. "We see fantastic growth in the sector: we anticipate that by 2016 we will have doubled the current copper production from 750,000 mt/y to 1.5 million mt/y. In attaining this goal we will have to bring in a great deal of labor and business for the logistics, equipment, and engineering needs of the mining industry, which will create even more economic growth for Zambia."

Zambia's mining framework — development and controversy

Zambia's mining sector is framed by the 1995 Mine and Mineral Act, which the government states "greatly simplified licensing procedures, places minimum reasonable constraints on prospecting and mining activities, and creates a very favorable investment environment." The Environmental Protection and Pollution Control Regulations have also introduced a framework for what the government views as responsible development. Yet there have been a number of recent events that have greatly affected the investment climate in Zambia, like the rising price of copper, and have caused concern for investors.

In March 2012, the Ministry of Mines and Natural Resources threatened to cancel the mineral processing or exploration licenses of more than 400 mining companies for defaulting on meeting statutory obligations required by law. These included mining giants such as ZCCM-IH, First Quantum Minerals and Equinox Zambia Ltd. The companies affected were accused of defaults such as non-payment of area charges, failure to commence and carry out prospecting operations, submission of sub-standard or false reports that do not represent exploration progress, failure to submit a decision letter in respect of an environmental project brief and failure to keep full and accurate exploration or mining processing records.

In November 2011, the government announced it was doubling the country's copper royalties from 3% to 6%. There had also been a moratorium on the issuance of new mining licenses, but in April 2012 incoming Minister of Mines and Natural Resources Christopher Yaluma stated the country would slowly start to resume the issuance of mining licenses.

The players

Zambia plays host to a number of the world's mining giants, such as Barrick Gold, Vedanta Resources and Glencore. The country will have five new mines come online in the next five years;

Interview with Hon. Mr. Wylbur Simuusa, former minister of mines, Republic of Zambia (now minister of lands and natural recourses)

What does the Zambian government see as the premier challenges facing its mining industry and what are some of the steps you are taking to address these?

The biggest challenge that we have as a government is the fact that mining contributes 80% to foreign exchange earnings but contributes only to 5% to 6% of the tax revenue to government. In terms of mineral resources endowment, Zambia is among the richest in the world, particularly considering cobalt and copper. Zambia's emeralds have been rated best in the world and it is a paradox that Zambia has been ranked in the last Human Development Index among the poorest in the world with more than 80% of our people living on under a dollar a day. We need to correct the current tax regime as the IMF and World Bank have categorically stated that Zambia is not collecting adequate taxes from the mining industry and this is largely due to our own capacity.

March 2012 saw more than 400 Zambian mining companies facing closure for defaulting on meeting with statutory mining obligations as required by law. Can you comment on this situation?

I had suspended issues on submitting licenses to allow for a review of the current system. During this investigation we found that as far back as four years ago most of these companies have not paid their area charges; they are not submitting returns. Those involved in exploration should be submitting geological reports to show their actions and results, but most of these licenses in Zambia are used for speculation purposes; they are getting the licenses, buying, selling and trading them, which is not what they are meant for. Companies know they should be law-abiding, but it would appear that the majority of those in the mining sector are not compliant.

Why should foreign investors choose to come invest and operate in Zambia?

Zambia just had a peaceful change of government and proved that it is politically stable and an investment destination where your investment is safe. Zambia also has many investment opportunities; only 50% of the country is geologically mapped, of that only 30% is currently being mined; the rest is unexplored.

Konkola North, Konkola Deep Mining project, the Mindola Synchlinorium project, Chambishi South Ore Body, and the Kalumbila mine. Yet despite all the activity currently underway in the country, the number of juniors present is surprisingly low.

ZCCM-IH is an investments holdings company that has the majority of its investments in Zambia's copper mining sector. It is the successor to ZCCM Ltd. Its shareholders include the Government of the Republic of Zambia (GRZ) with 87.6% of shares and private equity holders holding 12.4%. Its associated companies include the Mopani Copper Mines, Chambishi Metals, Kansanshi Mining, NFC Mining, Konkola Copper Mines, Luanshya Copper Mines, Chibuluma Mines and Copperbelt Energy Corp.

Canadian First Quantum Minerals Ltd owns the Kansanshi copper-gold mine in Zambia, the largest copper mine on the continent. 80% owned by its subsidiary Kansanshi Mining PLC, ZCCM-IH owns the other 20%. It is located in the heart of the copperbelt, near the city of Solwezi.

According to company statistics, Kansanshi produced 231,124 mt of copper and 109,629 oz of gold in its two open pit mines, Main and Northwest in 2010. In early 2012, the mine was undergoing expansion to increase capacity, due to be completed in two phases. Phase 1, an expansion to the oxide circuit, was set to be completed by Q1 2012. Further expansion to the oxide circuit is due by end of 2012 and expansion of the sulphide facilities are to be completed in 2014.

Konnoco Zambia Ltd is a merger of mining giants Vale and African Rainbow Minerals Limited (ARM). Originally developed by Anglo-American in the early 1950s, the mine closed but remained part of the Konkola ore body until 1995, when they became two separate entities.

Discussing recent developments, general manager of Konnoco Zambia, Gary Strong, said: "The mine will build up to an annual production rate of 2.5 million mt/y of ore, at a grade of 2.4%, producing 45,000 mt/y of copper in concentrate. There is currently a total of 2,500 staff working on the project, 400 of which are people permanently employed by Konnoco, which will employ 1,500 people at full production."

Few juniors operate in Zambia, with this market still retaining much room for development. However, there are some intrepid explorers working to overcome the country's challenges. Companies such as Copperzone Resources show the potential of such effort. Although still in the initial stages of exploration, Copperzone has already optioned one property to BHP, and Rio

Tinto an option to JV on another one of Copperzone's properties.

Zambia sparkles

Zambia has gained an international reputation for containing some of the world's best gemstones. These include emeralds, aquamarine, beryl, tourmaline and garnets. Other gemstones have been found in Zambia in smaller quantities including topaz, opal and agates and citrine. The country though has faced great difficulty accounting for all of these gemstones.

"$700 million worth of Zambian gemstones is declared globally, but in Zambia there were less than $10 million declared in 2011," said former Minister of Mines and Natural Resources the Hon. Wylbur Samuusa, suggesting that many of the stones reaching the global market are not accounted for when leaving the country.

Zambia also has a history of gold mining on a relatively small scale, with the 20 larger deposits having produced a total of slightly more than 2 mt of gold since modern mining began in 1902. Dunrobin has recently been re-opened by Reunion Mining and is scheduled to produce 500 to 600 kg gold per annum. More than 300 gold occurrences have been reported throughout the country. As rare earths become more sought after in the global market, there has also been mention in the country of potential deposits.

Southern Africa's drilling capital and service sector

Comparative to the region, Zambia hosts an impressive number of local drilling companies. "There is a lot more competition in the market than there was in 2005, and a huge increase in the number of drilling companies operating in the copperbelt," said Rob Geldenhuys, managing director of Ox Drilling, who currently operate 19 rigs between Zambia and neighboring Zimbabwe.

While the number of drilling companies may be high, drilling skills in the country can be more difficult to come by. "One of the challenges is gaining government recognition that there is a shortfall in the skilled drilling labor pool in Zambia, and it can be challenging to obtain work permits [for expatriates]," said Geldenhuys.

Kris Jedrzejczyk, managing director of Blu Rock Mining Services, has faced similar issues. "It is a big challenge to find adequate skills. Partly, this is because there has been a sudden boom in demand. I employ many Zambians, but I [have also] lost many to serious illness," he said.

What skills are available are also somewhat restricted in their scope. "In Zambia, there are not many companies who focus on underground drilling. They tend to focus on surface drilling and they do not have the adequate, large, mechanized, machinery in place to manage underground drilling," said Jerson Huamani Rojas, managing director of Peruvian-owned company Reliant Drilling. Others, such as Barning of SGS Consulting see this differently, "Zambia has had eight decades of mining experience behind it and over the years the labor force has acquired a lot of cross-cultural and cross-disciplinary experience."

Zambia is host to some very unique geology, which can be of concern to both drillers and miners. The Konkola North Copper mine, for example, was once said to be the wettest mine in the world. Certain ground formations also create new challenges. "We drill in one specific area, belonging to KCCM, where the ground formation is unique to anywhere in the world. Due to rivers from millions of years ago, the rock is extremely fractured and there are some very loose stones... There is also some clay which swells up with water," said Jedrzejczyk.

Trevor Connell, the general manager for American Layne Drilling in southern Africa, confirmed this challenge. "KCCM's mine was quoted at one stage as the wettest underground mine in the world, and as we

Side tipplers for unloading wagons with a simple clamping mechanism to discharge into a bunker alongside the tracks. Photo courtesy of ThyssenKrupp.

work the whole area is being de-watered, making it very difficult to drill deep holes as the ground becomes soft and gravelly the further down we go. It is probably one of the worst areas of the world that I have ever seen for drilling."

There has also been a move by international mining machine giants to establish their footprint in the country; Hitachi, for example, has seen an opportunity in Zambia. Discussing the new refurbishment and repair factory they have recently opened in Lusaka, Akaike Youji, the President of Hitachi Construction Machinery Zambia Co. Ltd said: "we have been delivering Hitachi machines to the copperbelt since 2007.We expect this refurbishment factory to be open by mid-April with full operations underway be the end of 2012. We foresee Zambia as a key growth market in the region due largely to the development in the copperbelt."

Challenges abound

As is the theme throughout the region, Zambia too faces infrastructure challenges and a skilled labor shortage. "Adequate skilled labour is the main issue we face as there is generally a high demand for it," Huamani said. "We equilibrate the situation by bringing professionals from Peru."

Discussing recent concerns about engaging local contact, Rojas said: "we also do a lot of training on the ground in Zambia. Despite bringing 25 expatriates, we have maintained a high number of local employees currently standing at 600."

Discussing the lack of geological expertise in the country, William Mulenga, CEO of Zambian GeoHydro Consulting Services, said: "due to a shortage of highly experienced professionals in Zambia, sometimes we have gone outside Zambia to recruit experienced geologists, but this requires us to put up strong justification to secure work permits."

Zambia's electricity situation is also a challenge, yet according to some, this has not affected the mining industry as much as one would expect.

"There is an electricity shortage, but not as severe as you see in much of southern Africa and we have not yet had a major project stopped due to lack of power. Zambia will have a number of power plants coming online between 2013 and 2017, so we hope to actually have a surplus of electricity by 2016," said Bantubonse.

While the outlook for Zambia's mining sector remains hopeful, it is clear some critical issues must be addressed to adequately move Zambia's mining sector into the future.

Conclusion

Though not receiving as much attention as neighbouring coal giant Mozambique, Zambia appears poised for growth. With a strong service sector in place, as well as basic infrastructure between the main mining hubs, a more predictable regulatory environment, improved mining skills education and the securing of power to the region may remain some of the country's greatest obstacles to developing it's vast mineral wealth.

This position for growth is being noticed. Klaus-Peter Müller, managing director of ThyssenKrupp Materials Handling (part of the international ThyssenKrupp Engineering Group), for example, said, "Zambia does play a role in our southern Africa strategy and is meant to become more and more of interest to us due to its vast copper resources."

Five new mines set to come online in the near future should provide a substantial boost to the industry, attracting increased interest to the country and opportunities for a growing services sector. Zambia's mining industry does not appear to be slowing down anytime soon.

Zimbabwe

The risks vs. reward dilemma

"Risk is like beauty; it is in the eye of the beholder." This statement by Kalaa Mpinga, CEO of Mwana Africa, may best summarize Zimbabwe's investment outlook.

Zimbabwe is a country rich in resources, yet the wider world remains skeptical of its leadership. It hosts the world's largest high-grade chromite resource, second largest resource of platinum group metals (estimated to be 2.8 billion mt), more than 4,000 recorded gold deposits in the country (of which only 40% are being commercially exploited) and coal assets of more than 12 billion mt.

The mining industry is expected to grow 13.3% in 2012. Mineral exports grew by 138.1% in 2009 and 38.7% in 2010. Yet the government acknowledges that continued growth is dependent on investment. To increase the country's mining capacity by more than 80% in the next three to five years, the mining sector is estimated to require up to $5 billion.

Indigenization — the name of the game

Indigenization policy in Zimbabwe states "in any non-indigenous mining business whose net asset value is of or above one United States dollar, a controlling interest or a minimum or 51% of the shares is required to be held by indigenous Zimbabweans".

Yet despite this apparently simple statement, details remain unclear. To date, its implementation has seen companies' initial proposals rejected and a lack of confirmation as to how the government will determine the price it deems fair for its 51% share in companies operating in Zimbabwe. With companies unsure of these details and unwilling to sacrifice majority control, investment has been severely curtailed.

Anton van Dalsen, of commodities and resource finance, Investec, discussed Investec's outlook on Zimambwe: "We are more reticent about Zimbabwe; in the mining sector in Zimbabwe, there is a complete lack of clarity surrounding the precise content of their indigenization policy."

Bruce Dickinson, partner at law firm Webber Wentzel said: "the legislation is unclear; the one state-owned entity which could take equity in a project has not been set up yet and the new indigenization rules do not make provisions for offsets which have already been undertaken and recognized by the government. As a result, it is a challenging environment."

"Zimbabwe is a great location for diamonds and platinum, but is a victim of its own political situation," said Adrian Macartney, head of transaction advisory for Africa, Ernst & Young. "Governments must understand that capital markets have tightened in recent years, and people are already risk-averse to the idea of working in a country where they will potentially lose 51% of their investment to nationalization."

Most investors remain unconvinced. "Our Zimbabwean activities are limited at present due to the political environment," said Klaus-Peter Müller, managing director of ThyssenKrupp Materials Handling, echoing the thoughts of many others. "Zimbabwe is a large potential market, but we are waiting for the political situation there to stabilize," said Dave Morris, COO of Taggart, a South African engineering firm.

The recent affects of the indigenization program on Zimplats, the Zimbabwean subsidiary of Impala Platinum and one of the largest players in the country, has further added to these worries, with the Ministry of Youth Development, Indigenization and Empowerment rejecting the first proposals put forward by the company and insisting on reaching an agreement for the full 51%. (see "Impala Platinum Agrees to Inigenization in Zimbabwe," *E&MJ* May 2012)

However, for those who are still interested, there are steps that can be taken: "ensure you know the people you are working with through careful partner selection," said Mbuyazwe Magagula, head of mining and minerals beneficiation for the South African Industrial Development Corp (IDC), and "understand the legal and regulatory framework".

Indeed, the investment climate has been praised by some. "I think Zimbabwe is one of the easiest and friendliest countries to operate in. There is a mining law and code that has been there for a long time; it is straightforward and everybody understands it," said Mwana's Mpinga.

The players

Mwana Africa claims to be the first African owned and managed mining business listed on London's AIM market. Its premier project is the Freda Rebecca gold mine; a former operation of Anglo-American in Zimbabwe partially financed by the IDC and, at its peak, the largest gold mine in the country. The Freda Rebecca mine, which in 2011 completed its refurbishment program, produced 25,000 oz between July and December 2011 and is now running two mills at 50,000 oz/y. "Our next challenge will be to push our mills to stabilize at a rate of 100,000 mt of ore processed per month; and we feel this will be achievable during [2012]," said Mpinga, CEO of Mwana Africa.

Caledonian Mining Corp, owner of the operating Blanket gold mine, obtained the project from Kinross Gold Corp in 2006. The mine has a production capacity of 40,000 oz/y. Rio Tinto is also present in Zimbabwe, through its majority-owned Murowa Diamonds. The mine currently produces 250,000 carats/y through its processing plant, with a capacity to reach 450,000 carats/y.

The Zimbabwe Diamond Mining Corp (ZMDC) owns the Marange diamond fields, covering an area of 600 km^2 and suggested to be one of the largest diamond finds in more than a century. In a March 2012 interview with *Forbes*, Chaim Even-Zohar of Tacy Diamond Consultants stated that these fields could hold 25% of global rough diamonds by 2015. With up to 16 operable mines, he said production could reach as high as 160 million carats/y. There are four companies operating in the fields, Marange, Mbada, Anjin and DMC, who have been certified to sell their diamonds by the Kimberley Process. (see *E&MJ* article "The Kimberley Process - Fatally Flawed?, September 2011)

These fields have been made infamous due to allegations of human rights abuses, murders and corruption linked with Robert Mugabe's government. In November 2011 the Kimberley Process allowed two companies operating in the fields to start exporting diamonds. While this move should have perhaps indicated an encouraging shift, a flurry of complaints erupted from human rights groups following the announcement.

The Africa mining story

Issues abound in Zimbabwe. "While there are many international immigrants coming into the area, they are not familiar with the local conditions and can make mistakes. There are also some issues specific to certain countries; in Zimbabwe, for example, we have issues facilitating payments due to restrictions on foreign currency," said Leon Forstenburg, Knight Piesold's managing director.

Infrastructure is another challenge; in this case, one that has been acknowledged by the government. The country formerly enjoyed excellent infrastructure, comprising roads, railways and electricity generation. However, a distinct lack of investment over the past 10 to 15 years has meant that much of this has deteriorated and substantial investment will be required to rectify and remediate it.

Yet these problems can be overcome. "There is a skills problem, but it is manageable. From 2003 to 2009 many of Zimbabwe's skilled workers left but we have found that is it possible to attract some of the skills back," said Mpinga of Mwana Africa.

While Zimbabwe may have a dark history associated with even its more recent mining past, many in the industry are hopeful for the future. Paul Thomson, managing director of Minopex, who operate and maintain minerals and metals processing plants, discussed growth potential in Zimbabwe. "Zimbabwe has such potential for short-term growth capital, and we are keen to get in there but also circumspect; we anticipate operating in Zimbabwe in 2013 or early 2014... The real prize is Zimbabwe."

Knight Piesold's Forstenburg also appears positive and said: "Zimbabwe is the next great place to be, but it will take a few years to get off."

Botswana

A mining nation transforms

Nestled in the vast plains of the Kalahari just north of South Africa lies Botswana, whose area belies the sparse population: less than 2 million people inhabit a territory roughly the size of France. While these statistics may not conjure the image of a global player, Botswana's impact on the global mining sector disproves this theory.

Botswana is home to some of the world's largest diamond mines according to both production and value. Botswana's 22 million carats of rough diamonds mined in 2010 were worth around \$2.59 billion, which is \$210 million more than second-place Russia.

At the time of independence in 1966, Botswana's GDP per capita was \$70; since large-scale diamond production began over 25 years ago, however, that figure has risen to \$16,300. Both Moody's and Standard & Poor's have given Botswana an "A" credit rating; the best credit risk ranking in Africa. More importantly, the country has avoided many of the corruption problems that plague its African neighbors.

These statistics are largely thanks to the mining industry. Diamond mining accounts for more than one-third of GDP, 80% of export earnings, and half of the government's revenues thanks to their 50% ownership of Debswana, a joint venture with global diamond giant De Beers.

Botswana has uniquely friendly mining legislation. The Mines and Minerals Act, passed into law in 1999, contains clear regulations for every stage of the mining process. According to Parks Tafa, senior partner at law firm Collins Newman & Co: "if you have a bankable project, the government will do everything within its power to facilitate the project's success. Compared to other countries, there is minimal conflict between license holders and landowners, as the government negotiated with tribal groups to transfer mineral rights from their properties to the state."

Once a company is issued a license, their rights take precedent over the landowners. The government retains the rights to 15% of a project, but the law stipulates that they must pay market value, including compensating the developer for all expenditures from exploration through to development. Mining revenue comes back to the people through royalties and taxes, which help fund infrastructure projects and the general budget, so the government has plenty of reasons to support the industry," said Tafa.

Despite all this, there is serious concern over depleting levels of diamonds in the country, which according to some forecasts may become scarce in 20 years, leading to increased exploration for both more diamonds and alternative minerals. Botswana's diamond worries are best be summarized by Charles Siwawa, CEO of the Chamber of Mines: "as the slogan says, diamonds are forever, but unfortunately as a resource, they will not last forever."

Diamonds: focus on expansion

The Jwaneng mine, located just west of the capital city of Gaborone, is the richest diamond mine in the world and produced 11.5 million saleable carats in 2010. For this reason, Debswana has embarked upon an ambitious plan to extend the life of Jwaneng. With an investment of $3 billion, the "Cut 8 project" is expected to extend operations at Jwaneng.

According to Jim Gowans, managing director of Debswana, "this project is significant and will add another 100 million carats and drive us another six years to 2024 and position us for the possibility of Cut 9, which could then add an additional 20 million to 30 million carats and extend mine life to 2029."

While Debswana is currently the only diamond producer in the country, numerous other exploration companies are operating in Botswana. Of these companies, Gem Diamonds, a United Kingdom-based diamond producer, is developing the Ghaghoo diamond mine, a 20.5 million-carat resource expected to begin production in mid-2013.

"We are going in as an underground operation, starting small and growing from there," said Haile Mphusu, managing director of Gem Diamonds Botswana.

Coal and uranium: a diversified base

The development of Botswana's vast coal reserves, estimated at 212 billion mt, is crucial for the country's economy; however, the landlocked region lacks sufficient export infrastructure.

"The big problem in Botswana is that there is no railway line to export the coal, and to us that is a crucial thing; without a railway line you cannot get the coal industry going," said Johan Badenhorst, head of exploration at Asenjo Energy, who is focused on drilling at their Dukwe license.

Licensing is a challenge for coal companies, which may hold an exploration license for only seven years before applying for a development license. Without the infrastructure needed to foster development, investors are wary. "The big problem that we in the coal industry face is that we are struggling to get investors, because it is very difficult for people to invest in something when they do not know when it can be exploited," said Badenhorst.

One of the most developed coal projects is the Mmamabula deposit, owned by the Canadian company CIC Energy and focused on supplying coal to feed the domestic power station of the same name. "We acquired the resource in late 2005. Our latest resource statement is 2.4 billion mt in the measured category; compared to many of the inferred claims in Botswana, CIC Energy is many years ahead of many of the other exploration companies," said Dov Girnun, vice president of business development, CIC Energy.

Another issue is the quality of the coal found in Botswana; most is not at a grade suitable for export. "We have seen a shift in the seaborne traded market to a lower quality coal, specifically as India and China continue to be the largest importers of coal. These markets now look at 5,600 kg/kcal product, which is a lower grade product, and offers more potential for our coal resource," said Girnun. In April 2012, CIC Energy completed a private placement with Vitol Energy (Bermuda) Ltd. and entered into an agreement where CIC Energy will use Vitol's coal marketing expertise which they state will help the company reach its sales goal of 20 million mt/y of an export quality coal. This project, like many others, is reliant on the creation of adequate logistics solutions within the country.

The government recently lifted the moratorium on new coal exploration licenses that had been in place since June 2011, allowing them to develop a roadmap outlining the development of the reserves. The coal roadmap study suggested that Botswana has the capacity and potential to produce up to 90 million mt/y of coal for export. The government is currently studying the feasibility of building a new railway way line for coal exports, either through Namibia or Mozambique.

While neighboring Namibia's uranium resources are better known on the global stage, two players in Botswana are betting on the future development of the country's estimated 261 million lbs uranium oxide.

A-Cap Resources, led by Dr. Andrew Tunks, is currently developing its Letlhakane project, a 750 million mt resource that the company hopes to bring into production in 2013. "The deposit is a flat-line sandstone hosted deposit that occurs in the Karoo super group where all the uranium in Southern Africa is being discovered," said Dr. Tunks.

The resource is at a grade of 160 ppm. Though it is low-grade, A-Cap is examining different cutoffs where they could bulk mine. "With the price regime we will double the cut-off grade from 100 ppm to 200 ppm where there will be 70 million to 80 million lbs in it, which is enough for 25 years of production, effectively high-grading the project," explained Dr. Tunks.

Another Australian company who hopes to bring Botswana's uranium into fruition is Impact Minerals, who hold 30,000 km^2 of prospecting licenses adjacent to A-Cap's Letlhakane. In 2010 Impact Minerals made four major discoveries yielding two types of uranium mineralization. "Firstly, we found deposits in basement rocks below the Karoo; they are Proterozoic, about 2 billion years old. Secondly and more excitingly, we found mineralization similar to that in Canada's Athabasca Basin, which is the world's richest uranium deposit. We have found the same types of rocks and alteration systems, which is very promising indeed," said managing director Mike Jones.

Future outlook

More than just a diamond producer, Botswana's copper and nickel has attracted international players. The country is one of Africa's largest nickel producers, housing the Tati Nickel mine, a copper-nickel mine 85% owned by Russia's Norilsk Nickel. Its copper districts house producing mines from African Copper and Discovery Metals, as well as a host of other juniors exploring the region.

In its effort to diversify, the challenge that Botswana will face is ensuring sufficient railway infrastructure is in place; the key component to developing its coal and uranium resources. The country has thus far been successful at controlling its destiny, but needs foreign investment to continue to develop its diversified resource base.

Namibia

Beneath the sands

Largely covered by the sands of the Kalahari desert, the former German South West Africa protectorate of Namibia only gained full independence in 1990. Yet underneath its sands lies potential prosperity for its 2.3 million people. Known globally as a key uranium player, the country also hosts large onshore and offshore quantities of alluvial diamonds, small quantities of gold and other minerals. Namibia's economy is heavily reliant on the extraction and processing of minerals, which are responsible for more than 50% of the country's foreign exchange earnings.

Namibia itself faces a host of internal challenges. With one of the highest unemployment rates in the world and one of the most unequal income distributions, the effect of the global economic crisis on the mining industry, which accounts for 3% of employment and 10.8% of GDP, laid a heavy hand on the country. Global demand for diamonds dropped, investor confidence in uranium fell due to the Fukushima disaster in Japan last year, and the cost of producing metals increased. Signs of recovery, however, have started to appear as diamond and uranium prices again begin to rise and in 2011 a number of copper mines reopened.

Head of transaction advisory for Africa at Ernst & Young, Adrian Macartney, acknowledged Namibia's economic potential. "While growth in the world has stagnated, Africa is growing at a much faster rate; some of the highest growth rates in the world are in sub-Saharan countries. Namibia has been particularly strong in their mining having identified the importance of uranium."

Namibia's access to the Atlantic Ocean also provides many advantages over its landlocked neighbors. With the majority of its mining operations based in the western part of the country, access to the sea has been a great advantage for the import and export of mining resources and equipment. Indeed, for many companies this has been a primary factor in their investment decision. "Namibia, with its access to the sea, provides a strategic location from which to operate," said Bernd Muller, CEO of B.M. Earthmoving, the main Liebherr agent in Nambia.

With a number of unique challenges and opportunities facing Namibia, the outlook for the country appears positive, though heavily reliant on global confidence in uranium.

Interview with Hon. Isak Katali, minister of mines and energy, Namibia

Mining in Namibia expanded 32% in 2010 and is expected to expand by 50% by 2015; what steps are the government and Ministry of Mines and Energy taking to perpetuate this growth?
As a government we are trying to strengthen our capacity to monitor the industry regarding safety and adherence to laws and regulations. The Namibian government wants to ensure that the necessary basic utilities are in place: water, electricity, and roads. Currently, one of our key constraints is our shortage of electricity; we have a number of hydropower projects in the works, which will be completed by 2015. We are [also] working on two rail lines: one line will lead us through Zimbabwe, the DRC, and Zambia, and another will connect Zimbabwe, Zambia, and Botswana.

Can you clarify your position on expanding mining legislation?
We established our state-owned mining company, Epangelo Mining Company Ltd, to increase the participation of Namibians in their mineral resources. Individuals and groups of citizens are entitled to apply for exploration licenses [and] they can then invite investors to form a joint venture to explore and develop a mine together. However, there are those that do not have the opportunity to get an Exclusive Prospecting License (EPL), and we decided there must be a state-owned company to allow them to reap the benefits of their minerals. Individuals can no longer own mineral rights; it is good for the government to own rights to minerals. Investors are naturally profit-driven, and they have the right to profit from their investments; however, we believe that we should be able to benefit from our country's resources.

We are not waiting for foreign investors to become interested in Namibia, but instead are taking proactive steps to initiate these relationships. Namibia possesses a great deal of minerals that remain undiscovered. We are taking steps such as aerial surveys to have the most accurate information, not only for ourselves but also so potential investors have reliable information upon which to base their decisions. In marketing our country, we want to spread the message that Namibia has what it takes and we invite you to come do business with us.

The post-Fukushima years

The Fukushima disaster instantly shook global confidence in uranium and is still reflected in a certain distrust of nuclear energy by many. "You only need to look at the share prices to see how much Fukushima shook investors' confidence levels," said Werner Duvenhage, managing director of Langer Heinrich Uranium Ltd.

Duvenhage explained that while confidence is starting to return to the market, investors are starting to understand the necessity of uranium to global power supply: "the reality is starting to kick in that energy has to come from somewhere." Others in the market are even more confident; they hardly felt the initial downturn. The general manager of Australian Reptile Uranium, Klaus Frielingsdorf, said: "we did not really feel the negative effects from Fukushima; there was a period of uncertainty, but we did not experience a slowdown and appear to have now returned to normal."

While a tragic event, from an industry perspective there can be said to be some good that came out of the disaster. "Fukushima has turned everyone's attention to nuclear safety and that in itself is a good thing. For us to move forward as a clean and safe energy, we have to make sure it is, and is perceived to be, a very safe industry," said Dr. Wotan Swiegers, director of the Uranium Institute at Chamber of Mines.

Stability and safety – the Namibian regulatory framework

Namibia is the southern African region's premier uranium producer. Rated the fourth-largest uranium producer in the world, it has signed onto a number of international agreements related to the care and handling of uranium, such as the Palandaba Agreement, the Safeguards Agreement, and the Non-Proliferation Treaty. Namibia also has in place an atomic energy board and Radiation Protection Authority.

With an extensive framework in place to manage uranium, Namibia is a secure country to operate in. "[Namibia] is a very stable country with a stable government and infrastructure. It is quite developed and easy to operate in compared to other countries," said Alain L'Hour, managing director, Areva Namibia. Areva Namibia country manager Hilifa Mbako supports this perception. "Namibia also has a very stable fiscal regime, which is predictable. One can say it is a bankable country and any investor will not worry when investing here."

In April 2011, the Namibian government declared uranium, copper, gold, zinc and coal as strategic minerals of which state-owned mining company Epangelo holds the exclusive exploration and mining rights. This has caused confusion and worry amongst some investors, particularly considering Epangelo receives extremely limited funding from the government.

There have been differing opinions on the government's management of exploration licenses. At the time of publication, the Namibian government still had a moratorium on new uranium exploration licenses in the country. Ferdinand Leygonie, a principal consultant at Mineral Exploration International, who focuses on exploration and mining geology, points to one distinctive consequence of the current system. "A large portion of Namibian land is taken up by exploration licenses; large numbers of the Exclusive Prospecting Licenses (EPLs) are owned by local Namibians who wait for foreign investors," Leygonie said.

These views differ slightly from other Namibian experts. "The rush we have had over the past three to four years was actually an exploration rush; most of what was available in the country has likely been discovered," said Dr. Swiegers, director, Uranium Institute.

The who's who in Namibian uranium

There are a number of projects poised to come online in the next few years, but following the significant drop in uranium prices, many of these projects' timelines depend heavily on seeing the price of uranium increase. The consequent lack of operational mines has led to some unfair perceptions. "Many people underestimate Namibia; while there is not much online at the moment, there is a lot of activity in the construction and design phases," said Paul Thomson, managing director, Minopex.

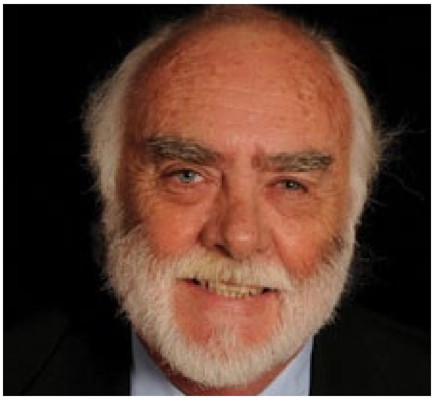
J.P. Morgan recently estimated that the incentive price for greenfield projects to come online in the next 20 years is $80/lb and estimated that the market will remain in deficit for the next four years. According to their stated forecasts, uranium prices will not surpass this point until 2015, when it may reach $85/lb. This estimate would appear to match many of the current production plans present in Namibia, but one unique point about Namibia's uranium is its grade. "The grade of Namibia's uranium is low in terms of world expectations — marginal for mining, but there is an abundance of it," said Dr. Swiegers.

Following a United Nations Institute for Namibia study, Epangelo Mining Co. was created in 2008 as a private company with the Namibian government as its key shareholder and holds exclusive rights to the country's strategic minerals. "Our strategy is to get the EPLs, perform the desktop studies and preliminary samples, exploration and pursue promising projects," said Eliphas Hawala, managing director, Epangelo Mining Co. " We were given 17 EPL's in November 2011 and are starting to pursue those now."

"Epangelo is under-capitalized; it is expected, as things presently stand, that Epangelo will not be able on a commercial basis to finance its investments and that whoever partners with Epangelo will be saddled with that obligation," said Peter Frank Koep, senior partner, Namibian law firm Koep and Partners.

Epangelo have thus far established such arrangements with Husab, among others, where they have signed MOU's in which they will receive a 10% stake on a free carry basis. They are also currently negotiating an umbrella agreement with Vedanta that would see a number of EPL's brought in. "Our ultimate goal would be to be involved in five major projects with an input value of NAD $5 billion in five years," said Hawala.

The status of Epangelo in Namibia has been a point of concern. "The presence of a wholly State-owned mining company and the lack of legislation and/or regulation make the current mining regulatory environment uncertain. A decision has been taken by the Cabinet of the Namibian Government that certain strategic minerals will in future be reserved for Epangelo and that should any other mining company wish to prospect or explore for these minerals, they can only do so with the consent and/or with


Dr. Wotan Swiegers, director, Uranium Institute at Chamber of Mines.


One of the CSR initiatives by Bannerman Resources – supporting underprivileged school children in the Erongo region. Photo courtesy of Bannerman.

the collaboration of Epangelo. There are no laws enforcing or regulating this. However, the decision has been implemented," said Koep.

Areva Namibia, a subsidiary of Areva Resources Southern Africa, is currently developing the Trekkopje mine, which it obtained in 2007, and accompanying desalination plant; a large-scale industrial project that represents the largest foreign direct investment ever made in Namibia. Now in the final "Maxi" stage of the project, the method of recovery used is an alkaline leach application and a first of its kind in the world. "This is going to be the first low-grade mine like this developed in the world. The fate of uranium in the next 20 to 30 years is going to be low-grade. With the increased demand for global energy and more reactors necessary to fulfill this, we will need more uranium and will have to move to low-grade uranium to fulfill this," said Hilifa Mbako, Areva Namibia country manager.

The mine is estimated to have a 12-year mine life and aims to eventually produce 300,000 mt/y.

Skorpion Zinc is also a world first, this time in zinc oxide extraction and production. Formerly owned by Anglo American plc, the company was taken over by Vedanta Resources plc, India's largest non-ferrous metals and mining company, in 2010. They produce 150,000 mt/y of special high grade (SHG) zinc, while the resource itself contains more than 20 million mt of zinc ore at a grade of 11%, resulting in approximately 2.2 million mt of zinc.

Beginning operations in 1976, Rössing is the world's longest running open pit uranium mine and the third-largest producer of uranium oxide globally. At the time of writing, Rössing Uranium, with the new owners of its Husab uranium mine, Taurus Mineral, a subsidiary of Chinese state-owned Guandong Nuclear Corporation (CGNPC), were in discussions to jointly develop one of the world's largest uranium deposits. Rössing Uranium is located only a few kilometers from the Husab mine.

Langer Heinrich Uranium Ltd is another key player in Namibia's mining scene. Owned by Paladin Energy Ltd, it has now completed their Stage 3 operations, which marked another 40% increase in production capacity. It has doubled production since Stage 1 to the current 5.2 million lb/y of uranium. "The feasibility for Stage 4 is done and under review at the moment. However, we will likely postpone Stage 4 expansion until the uranium price regime increases from $52/lb to closer to $85/lb," said Werner Duvenhage, managing director of Langer Heinrich Uranium Ltd

Reptile Uranium, a wholly-owned subsidiary of Australian Deep Yellow Limited, is an ASX-listed advanced-stage uranium exploration company which currently holds four EPL's and three Nova JV EPLs. Explaining Reptile Uranium's key focus, the Tubas-Tumas project, general manager Klaus Frielingsdorf said: "Tubas-Tumas Palaeochannel has the same mineralization character of the Langer Heinrich mine. The combined higher grade resource sub-set for Tubas-Tumas totals 34.8 million lb of U_3O_8 at 420 ppm."

Like many other uranium exploration companies currently in Namibia, Reptile Uranium also plans to produce in the near future. "We aim to have our Tubas Red Sand project producing by 2014... and expect to produce 250 million mt/y of iron ore product, working up to 500/y," said Frielingsdorf.

Bannerman Resources, another Australian uranium development company listed on the TSX, ASX and NAX, is focused on developing their Etango project, which they aim to see in production by 2015. "This is one of the top 15 undeveloped uranium mines in the world. From a production perspective, we want to produce between 6 million to 8 million mt/y, using the heap leach method, once it comes into production. We have currently estimated a 14 year mine life, but in our drilling we have seen this resource extend, which may create the possibility for a longer mine life," said Werner Ewald, country manager for Bannerman Resources.

Like many other companies with a uranium focus, "these timelines will largely depend on market demand and uranium prices," Ewald said.

Namibia also has a host of other resources being explored and developed. One of the unique ventures in the region currently being undertaken by Namdeb, the De Beers – Namibian partnership, is mining offshore diamonds. Holding nine licenses throughout the country, they announced the opening of the onshore $36 million Sendelingsdrif mine in the Sperrgebiet National Park, close to the Rosh Pinah zinc mine. Construction is slated to begin in 2013 with an 18-month construction period. Namdeb's last posted financial performance from 2010 saw them producing 1,472 carats of diamonds at an average stone size of 0.59; this was up 59% from their 2009 production levels.

Namibian Marine Phosphate is another example of Namibia's offshore mining potential. Barnabas Uuwanga, the CEO of Namibian project consultancy Lithon Mining Engineers, discussed the project. "We are very excited about our project with Namibian Marine Phosphate, it is the first marine sand mining operation of its kind in Namibia. Dredging 100 km out to sea, you pump the gravel into a hopper dredger, which then returns to shore and pumps the material into buffer ponds. It is then pumped 25 km further to where the plant will be."

Challenges

While many of the most prominent challenges in the region, such as infrastructure and skilled labor, are not faced to quite the same degree in Namibia, issues of administrative congestion, corruption and geological mapping continue to provide the country's mining sector with a number of problems. Harnessing international skills in the country has proved to be one of these matters, as has been finding a balance between local and international service providers. Rated 193rd in the world for unemployment rate, more than 50% of the population remains out of work.

This concern creates high expectations for the mining sector, with the number of international mining and service companies moving into the country looked to as a source of employment. For Namibia-born companies who fear the erosion of their business due to international competition moving into the region, there is a strong sentiment that the government must further support local business. "There is a strong push from within Namibia to grow the number of local companies as there are currently many international service and support firms moving in [to Namibia]. We often find that international mining companies only offer smaller contracts, or undesirable jobs, to local businesses, which does not give smaller companies the opportunity to grow or profit from these projects. We need to ensure that small- and medium-sized Namibian companies get a share out of this business."

Uugwanga also understands the hurdles that smaller, local companies face. "One of the challenges of being such a relatively small player in the mining space is that the established companies and investors coming here from Australia or Canada already have a working relationship with other companies. As a local company we have to work twice as hard to prove ourselves," Uugwanga said.

"Administration is a challenge, particularly the acquisition of work permits for expatriates; not in terms of the will of the government, but of the administration in place," MBako said.

Yet as always, not everybody agrees. "We have plenty of skilled workers coming out of Namibian institutions," Uuwanga said. Infrastructure inadequacies, while not present to the same extent as in many of Namibia's neighbors, are nonetheless noticeable in the country's ports and cause another challenge. "There is a capacity issue with the Namibian harbors; it is just not feasible to transport all of the product out of the country through these ports," Uuwanga said.

Leygonie believes that both the availability of geological information on Namibia, and the way such information is used, are issues that need to be addressed. "Namibia has not been sufficiently covered by airborne EM geophysical surveys and we believe there is an enormous potential to find more deposits comparable to the Skorpion [zinc] deposit, however this is mostly reliant on greenfield explorations. Many of the foreign mining companies currently in Namibia are doing stock exchange mining; they are not interested in conducting proper exploration and we have not seen proper progress in the country," said Leygonie.

The future waits on uranium

Namibia appears to be poising itself for growth. While certain points of contention remain, the country continues to draw international interest. In addition to the geological potential, its respectable ranking in the Fraser Institute's Annual Survey of Mining Companies 2011/2012 places it comfortably in the middle of the pack and fifth among the African nations included in the survey. Combined with a similarly respectable position in the World Bank's 2012 Doing Business rankings, at sixth in Sub-Saharan Africa, this adds a strong element of reassurance for investors.

Sharing a similar, positive sentiment, international engineering and environmental consultancy Knight Piésold has growth into Namibia planned for the near future. "Namibia is an area we see potential for serious growth and development. We know the market is expanding and we want to develop a solid plan for taking part in that growth," said Peter Jenner, manager for mining of Knight Piésold's office in Johannesburg. Resting largely on the international support of nuclear power, Nambia's future, while looking positive now, still holds its breath for a nuclear-friendly future. "Namibia is blessed with uranium, albeit a low-grade, and we have enough of it available to ensure a steady economic income for the next couple of decades. We are doing our best to ensure it is mined in a responsible and safe manner and that we will also do it in a sustainable way," Dr. Sweigers said.

Conclusion

The next frontier

While some countries in southern Africa are clearly better poised for growth than others, this region is unquestionably critical for international investors to consider. For those ready to take the plunge, industry leaders and experts can provide some helpful advice.

Many companies in the region see the importance that practical skills training can have on the development of the industry. "In Zimbabwe and Namibia, Micromine works with local universities that have mining curriculums and provide them with our software with which to learn. Once they start working in the field, there is no need for training time," said Kyle van der Berg, Micromine.

"From an international viewpoint, the mining industry in southern Africa is still maturing. However, for an international mining company, the opportunity to transfer skills and knowledge in the region is huge. Be prepared to be self-sufficient, to handle areas outside your core business activities, such as logistics, infrastructure, housing, recruitment, marketing and others. The lack of infrastructure and service companies in less developed countries can pose a problem for companies with unprepared management," said Mbuyazwe Magagula, head of mining and minerals beneficiation at the South African IDC.

Facing another investment concern often mentioned when discussing Africa, managing director of Knight Piésold South Africa, Leon Forstenburg said: "corruption is always a major challenge across the [southern African] region."

The southern African nations do not all suffer from this particular challenge to the same extent as elsewhere in the continent. In Transparency International's Corruption Perceptions Index 2011, Botswana ranked 32nd out of 182 countries, the highest in Africa. Namibia ranked a respectable 57th. Yet nonetheless, companies must be careful.

To address this correctly, investors must closely examine the legal framework present. "A well functioning transparent and independent legal framework with sufficient legal protection and recourse is vital," said Magagula.

David Butler, managing director for southern Africa for Control Risks also offers advice: "internally, you must have very clear guidelines and communicate them effectively to your staff. At the same time you must have very strong anti-corruption internal guidelines including the ability for people to 'whistle-blow'. "

Looking more broadly at the lack of geographical information present in some areas in the region, Ferdinand Leygonie, Mineral Exploration International, warns about investment going north instead. "There is potential in Namibia, Botswana, Zambia, but there is not enough modern geophysical information available. If these geophysical surveys were supported by government, more targeted work would be possible and these countries would open up exponentially, like Mali or Mauritania." Leygonie said.

David Butler, managing director, Southern Africa, Control Risks.

Investec's Anton Van Dalsen of Commodities and Resource Finance said: "some mining companies are concerned with issues of empowerment, permitting and infrastructure and decide that there are other areas in the world where it is easier to do business, but we believe there are ways to deal with these issues and southern Africa is a great destination."

Touching on the continuous issue of nationalization, "in terms of indigenization, it is about balancing and managing requirements," said Bruce Dickinson, a partner at Webber Wentzel law firm. His colleague Steven De Backer, the Director of Africa Group at Webber Wentzel said, "When moving into a country we advise our clients to take into account the local interests since they will probably be there for the long-term. If you make mining agreements too one-sided, this can cause friction with local communities or new governments."

"Africa offers an alternative investment option for Chinese investors in terms of them paying dollars for fixed assets that will keep the value of the dollar. I think we will see a lot more Chinese companies coming into Africa, not only to get the minerals, but also to keep the value of the money," said George Lo, director of the Africa-China Corridor for Standard Chartered Bank.

Maintaining a balanced portfolio and focus can help you weather commodity uncertainty in a sometimes challenging environment. "In addition to coal and diamonds, we are expanding further into tanzanite, gold, platinum, chrome, copper, and uranium. Having a diversified portfolio is a major advantage for us; if the price of coal drops, we can shift our focus other minerals," said Lütke von Ketelhodt of Commodas Ultrasort.

South Africa can be a great base for international companies, but it is clear that establishing a local footprint is vital for business. "We currently have a strong market position; this is largely due to our commitment to be based in Mozambique and establishing that local footprint." said Mark Lubbe of BMG. This can also help create positive community relations, a key aspect of continued success.

Looking across the region, Tony Zoghby, global industry leader of mining with Deloitte said: "these mining companies who are looking at investing in southern Africa must plan long-term; mining projects are not short-term investments. Africa is one of the last areas.

Mwana Africa CEO, Kalaa Mpinga, agreed: "I think the last remaining large mines to be developed in the world are in frontier states and that raises challenges."

Namibia, Botswana, Zambia, Mozambique and Zimbabwe certainly count among these frontier nations for the global mining community; characterized not so much by their current stage of industry development, which varies from country to country, but by the substantial untapped mineral potential the region possesses. For those companies able and willing to adapt to their unique business environments, the future holds the promise of significant profitability.

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