Africa – open for business?

Besides a long-envied geological resource abundance, Africa boasts many attractions for mining companies. Yet development has been hampered by political turmoil. Now, as much of the continent begins a concerted drive to increase investment in its mining sector, *IM Staff* take a look of some of the industrial mineral projects on the African horizon.

Africa's mineral wealth potential has, for decades, been the green-eyed focus of many an international mining company.

From a geographical perspective, Africa spans both hemispheres and has ports facing major Asian economies in the east, the North and South American continents to the west and Europe to the North.

Demographically, Africa has a young population, offering a plentiful source of labour which can be employed at a fraction of the cost of hiring western staff.

However, these advantages are frequently eclipsed by Africa's patchy reputation as a politically unstable, financially corrupt and natural disaster-prone region, where governments rely on international aid to prop up pitiful GDP figures.

A lack of home grown skills, rudimentary infrastructure and a perceived hostility to international operators who fail to offer local people a fair cut of the profits garnered from Africa's mineral assets, has prevented the continent as a whole from achieving its full potential as a mining destination.

But the continent's mining landscape is changing.

South Africa, which has long been a trailblazer for African mining, has seen its dominance of the sector begin to wane under cost pressures, tougher regulation (*see p23*) and falling commodity prices (*see p51*).

In North Africa, political upheavals in Egypt, Morocco and Tunisia, important sources of phosphate and bentonite, have shaken international confidence in these countries and cast doubts over their sustainability as raw materials suppliers.

Into the void have stepped new players such as Sierra Leone, Malawi, Mozambique and Madagascar, where the exploration of previously undeveloped mineral resources are offering these countries a chance to build up an export profile in the resource industry.

National governments looking to ease the passage of this ambition have provided mining businesses attractive tax rates, investment incentives and state co-operation to develop assets.

Although many countries are now coming under pressure to raise mineral royalty rates and increase the transparency of mining deals, the message both miners and host countries are keen to stress is clear: Africa is open for business.

Madagascan graphite

Dwindling productivity in Africa's precious mineral mines, coupled with price volatility and associated criminal activity, have meant that countries that previously relied on these resources are looking for more sustainable sources of mining revenue.

This is being sought principally from industrial minerals and metals, though the continent's particular prowess lies in iron ore - as a whole, Africa has a growing market share of 6-7% of global iron ore production.

More latterly, minerals such as rare earths in Kenya and Malawi, fluorspar and chromite in South Africa, phosphate and vermiculite in Uganda, and graphite in Mozambique, Tanzania and Madagascar, have come to the fore as potential sources of export revenue.

Although the extraction of African minerals has been underway for centuries, the arrival of industrial scale mining will be a first for much of the continent.

Madagascar, a 587km^2 African island country in the Indian Ocean with a long history of mineral extraction, has seen the transition from artisanal mining to industrial operations only in the last decade.

"Up until 10 years ago, Madagascar had not been exposed to 'modern' exploration techniques," Craig Scherba, chief operating officer for TSX-V listed graphite junior, Energizer Resources Inc., which is developing the 124m tonne (indicated and inferred) Molo graphite deposit in eastern Madagascar, told **IM**.

"As such, the country represents one of the last places in the world to be exposed to modern geophysical and geochemical techniques. It is therefore an untouched jewel box of mineral wealth, and it is in the best interests of the country to try and unlock this potential through the promotion of mining project development," he said.

According to the World Bank, the unlocking of Madagascar's jewel box, which includes extensive reserves of coal, iron ore, tar sands, and rare earths as well as graphite, is already well underway.

The arrival in Madagascar of major mining companies such as QMM and Sheritt International has facilitated the rapid development in the country's resource sector and allowed smaller companies, like Energizer, to take advantage of new road and port infrastructure.

In looking to export graphite from the country, Energizer will be joining an established network of producers including Etablissements Gallois and Stratmin Global Resources (*see table*).

"Madagascar is strategically positioned in the Indian Ocean, close to Asian, Indian and African economies, so it is geographically in an enviable position to translate its mineral wealth into monetary wealth for the country," Scherba explained.

The government is also doing its bit to encourage mining development, having introduced a number of investment incentives, such as export processing zones (EPZs), for companies exclusively exporting goods from Madagascar, offering a reduced profit tax rate of 10% as well as exemptions from customs and export duties.

Other mining-specific initiatives include the Major Investments in the Mining Sector (LGIM) regime, where qualifying companies benefit from reduced taxes on internal rates of return below 20%, as well as VAT exemptions and reduced rates for taxes on buildings and interest.

Depending partly on mineral prices and export volumes, the World Bank estimates that mining's contribution to Madagascar's national revenues could increase from their present level of 1% to 18% by 2018 and may catapult the country into the ranks of "resource rich nations" in the medium term.

Rutile from Sierra Leone

The end, or at least suspension, of national conflicts in hitherto war-torn nations such as the West African state of Sierra Leone, has opened up fresh opportunities for foreign mining companies to move in on mineral deposits that were previously too dangerous to access.

A former British colony, Sierra Leone became independent in 1960, but its first decades of self rule were marred by a string of military coups and civil conflicts. A brutal civil war raged in the country from the late 1990s until 2002, with UN peacekeepers finally leaving the country in 2005.

Since then, the country famous for its diamonds, has sought to profit more sustainably from its other mineral reserves, including iron ore, coal, mineral sands, bauxite, kaolin, limestone, bentonite and garnet.

Sierra Rutile Ltd, a mineral sands miner with its headquarters in the country's capital, Freetown, spotted the potential to mine rutile, a titanium dioxide (TiO_2) feedstock, in Sierra Leone, from a mine first operated in the 1970s.

"Sierra Leone is a stable and investor friendly country within a sector which is exposed to many

higher risk jurisdictions," Derek Folmer, Sierra Rutile's chief marketing officer told delegates at the 2013 TZMI Congress in Hong Kong last November.

Located in the south west of the country, Sierra Rutile's deposit has a JORC resource of over 600m tonnes at 1.29% rutile (measured, indicated and inferred), making it one of the largest natural rutile deposits in the world.

In order to operate its dredging and processing operations successfully, the company built its own infrastructure network to support the mine and has also invested in educational facilities to generate skilled labour in the future.

"People were hired from outside for their skills and ability to train other people, so we expect head count from outside to decline as the local population is trained up," Folmer said.

Another issue for the company is an unreliable power supply, a continent-wide problem that has hampered the productivity of many mining companies.

In the fourth quarter of 2013, Sierra Rutile entered into a memorandum of understanding with Smol Pawa Sierra Leone Ltd. to become a cornerstone purchaser for its Moyamba hydro-electricity project.

Moyamba is an 11–14MW run-of-river hydro-electric project located at the Singimi Falls on the Gbangba River, within 20km of Sierra Rutile's existing operations. The project will be developed as a public-private partnership with the government of Sierra Leone and will serve the communities of Moyamba and Njala University as well as Sierra Rutile's mine site.

Rare earths in Malawi

Despite having escaped the ravages of all-out civil war, Malawi, a landlocked country in East Africa, has experienced little in the way of formal industry in the past and relies heavily on aid to alleviate the effects of food scarcity and poverty.

Now, the national government is keen to expedite an economic shift from aid to trade with mining high on its development agenda.

In January 2013, the Malawi government launched the Mining Governance and Growth Support Project (MGGSP) in order to review and improve the efficiency and transparency of the existing mining act.

The project also initiated an airborne geophysics survey to geologically remap the whole country and identify possible targets for mining.

This accommodating business climate, coupled with the country's proven rich mineral deposits, has attracted the notice of TSX-V listed rare earths explorer, Mkango Resources Ltd.

Mkango is looking to develop the Songwe Hill rare earths project, located in the Chilwa Alkaline Province, a world class geological region notable for the abundance of large carbonatite intrusions (a host rock for rare earths).

"There is a strong initiative led by the Malawi government, World Bank, EU and the French government, to ensure that Malawi is viewed as an up and coming and viable mining jurisdiction with a vast amount of exploration and development opportunities," William Dawes, CEO of Mkango, told **IM**.

"The strap line 'open for business' would absolutely apply to Malawi. It has been under the radar, but it has plenty of potential to quickly progress as a premier African mining destination," he said.

"The MGGSP, supported by the World Bank, EU, and France will help facilitate development of the mining sector and hopefully reduce the risk profile for investors. We are confident that continued stakeholder support will enable Malawi to develop into one of the world's leading rare earth producers," Dawes said.

As for local involvement in the project, one of the key measures generally required to keep governments and communities on the side of mining companies, Dawes said that Mkango is making concrete efforts to give local people a role in developing Songwe Hill.

"We train and employ as many Malawian nationals as possible. Since 2010, we have employed and trained Malawian graduate geologists from Chancellor College in Zomba; some of whom are now working as full time senior geologists. As we move the project forward we will look to employee further qualified Malawians, in addition to providing skills training and jobs for local villagers," he said.

South African fluorspar

In contrast to the rise of nascent mineral exploration in many less developed African nations, South Africa's once mighty mining industry is struggling against subdued commodity prices, increased operating costs, constrained infrastructure and poor levels of productivity.

On top of this has come the burden of regulatory uncertainty with the proposed introduction of new mining laws, which is making it difficult to attract foreign investment for both expansion and greenfield projects.

Modifications to the 2002 Mineral and Petroleum Resources Development Act, proposed by Jacob Zuma's incumbent ANC government, which include a mandate for greater national ownership of mining projects, raising mineral royalties and setting minimum prices for minerals sold to local industries, has angered the domestic mining industry and spooked international operators.

In September 2013, officials including the mining and energy minister, Susan Shabangu, said that it was in negotiations with mining companies, unions and other stakeholders regarding the impact of the bill, but the final form that the legislation will take is still unclear.

At the heart of the industry's instability lies the difficult labour-management relationship.

In addition to high profile eruptions of violence at South Africa's platinum mines, the industrial minerals sector also saw unrest last year at both Lanxess' Rustenurg chromite mine and mineral sands miner Richards Bay Minerals' titanium slag facility in KwaZulu Natal, over pay and employment policies.

Under pressure to appease mining workers' unions, the government has pledged to make a concerted effort to engage with labour groups, including the Association of Mineworkers and Construction Union (AMCU), over the coming year.

Despite the country's troubles, mining companies are continuing to pursue industrial minerals projects in South Africa, including rare earths, chromite and fluorspar.

Locally-based explorer, SepFluor Ltd, is one of the companies seeking to tap into the potential in the South African fluorspar sector.

SepFluor is at various stages of development with its Nokeng, Wallmannsthal, Wiltin, Welgelegen and Kruidfontein projects, but it has felt the pinch of declining prices and weakened investor interest since embarking on these developments.

"The global economic recession and the fall in fluorspar prices from the end of 2012 have meant that SepFluor's capital raising programme has had to be pushed out. This, in turn, has meant the same for Nokeng's development timetable," James Duncan of SepFluor told **IM**.

However, the recent stabilisation of fluorspar prices at historically elevated levels is giving fresh traction to SepFluor's financing drive, which Duncan says bodes well for the development timetable of the company's planned mines.

For the Nokeng site, SepFluor has tabled a construction period of 21 months and is anticipating production of 185,000 tpa acid grade fluorspar (acidspar) and 30,000 tpa metallurgical grade fluorspar (metspar).

The company is also planning to construct a processing facility, the Ekandustria chemical plant, in anticipation of the South African government's minerals beneficiation agenda and the South African Fluorochemical Expansion Initiative (FEI).

SepFluor said the building of Ekandustria is dependent on the development of Nokeng, as this mine will be the plant's source of fluorspar.

Challenges remain

While there is no shortage of opportunities for resource development in Africa, operators in the region still face challenges.

Politically, even the most stable African countries, including South Africa and Madagascar where general election campaigns are presently in full swing, face uncertainty when it comes to law making which can affect business taxes and royalty rates.

Pressure for greater transparency in mining deals is promising a more level playing field, but could equally result in less generous terms for foreign resource companies and a less attractive environment for investors.

Another barrier in some areas is community opposition to mining development on environmental grounds.

A recent notable example came in August last year, when TSX-V listed Pacific Wildcat Resources Corp.

had its exploration licence for the Mrima Hill rare earths project in Kenya revoked by the country's government due to the concerns of local people regarding displacement, radiation and damage to woodland.

Cortec Mining Kenya, a subsidiary of Pacific Wildcat, is currently waiting for a decision from Kenya's High Court regarding its challenge to the licence revocation.

In its appeal to the authorities, Pacific Wildcat argued that it was working to promote the protection of biodiversity as part of its project development, as well as providing local employment opportunities, schools and fresh water wells.

Shortly before going to press, the company's CEO, Darren Townsend, announced that he would be stepping down as head of Pacific Wildcat, although there was no indication that this decision was prompted by the firm's Kenyan difficulties.

Pacific Wildcat's legal battle, while not unique in Africa or indeed anywhere in the world where mining projects are proposed, serves to highlight that satisfying competing stakeholder requirements is a tricky business.

According to John Dean, business improvement coordinator for UK listed First Quantum Minerals Ltd, which is presently developing nickel and copper mines in Zambia, running a successful project in Africa requires significant groundwork.

"[There is] a lot of early stage development work, particularly on the infrastructure side. [It's not a case of] showing up first thing with a bulldozer!" Dean told **IM**.

A World Bank conference hosted in November last year highlighted the need to make sure mining contracts "are sensitive to local people".

According to experts in risk mitigation for the mining industry, companies with effective and well-communicated corporate social responsibility (CSR) strategies deliver both higher income and equity performance when compared to those who fail to report on their social initiatives.

A report compiled by McCormick covering the financial performance of the 26 development companies covered in the PricewaterhouseCoopers (PwC) 100 Junior Mine 2012 index showed that between 2011 and 2012, a period of investment crisis in the resource industry, the six companies reporting on their CSR programmes lost just 13% of their market cap compared to 69% for the non-CSR reporting junior miners surveyed by PwC during this period.

Dean stressed that, despite perceptions surrounding Western mining companies operating in Africa, unethical deeds at the expense of local people are not the norm in business.

"People support the projects and livelihoods will be improved," he said, noting portions of foreign-run project investment are almost always dedicated to resettlement and community engagement programmes for people affected by its mining operations.

Industrial mineral projects in Africa

Mineral	Company	Location	Project	Notes
Barite	Mabwe Minerals	Zimbabwe	Dodge Mine	Company estimates barite production of up to 165,000 tpa and shipments of 140,000 tpa for 2014. Expected revenues between $14m and $16m.
Chromite	GlencoreXstrata	South Africa	Townlands Extension 9 project	Measured and indicated resources are 13.89m tonnes 41% Cr_2O_3, as December 2012
Chromite	GlencoreXstrata	South Africa	De Grooteboom project	Measured and indicated resources are 1.45m tonnes 40.3% Cr_2O_3, as December 2012
Chromite	GlencoreXstrata	South Africa	Klipfontein/Waterval project	Measured and indicated resources are 22.1m tonnes 42% Cr_2O_3 and inferred 121.6m tonnes 42% Cr_2O_3, as December 2012
Chromite	Samancor Chrome	South Africa	Scheiding chrome mine	Samancor Chrome (Pty) Ltd has targeted a chromite resource in the Limpopo Province for the development of an opencast mining operation with a two-year mine life.
Chromite	Lonmin Ltd	South Africa	UG2 - PGM tailings re-treatmetnt	Lonmin expects to mine one of the old tailings dams hydraulically for the extraction of both PGMs and chrome
Chromite	RioZim Ltd	Zimbabwe	Darwendale project	Resources of 6m tonnes of chrome ore estimated, as 2011
Chromite	Ruukki Group plc	Zimbabwe	Shurugwi project	Advanced exploration stage.
Chromite	Asia Thai Mining	Madagascar	Zafindravoay project	Advanced exploration stage.
Chromite	Asia Thai Mining	Madagascar	Beriana project	Advanced exploration stage.
Fluorspar	SepFluor	South Africa	Nokeng deposits; Ekandustria fluorochemical plant	600,000 tonnes (185,000 tpa acid grade + 30,000 tpa). First production in Q4, 2014. Fluorochemical plant products: 17,400 tpa (AHF) and 80,000 tpa (AlF3)
Fluorspar	Fluormin Plc	Tunisia	Zriba-Guebli	The project has single exploration permit, extending over 34.6km^2 and hosts large global fluorite-barite deposits. It is currently under exploration
Fluorspar	ENRC - SA Fluorite - Southern Palace	South Africa	Doornhoek	Exploration in 1978 indicated resource of 16m tonnes at 26.5% CaF_2 (20% cut-off) and 48m tonnes at 18%CaF_2 (10% cut-off). ENRC has recently drilled 44,000 metres of core and increased the resources. Future plans include include 15,000 metres of drilling.
Graphite	Kibaran Resources Ltd	Tanzania	Mahenge	Mahenge's Epanko deposit has a maiden inferred JORC resource of 14.9m tonnes grading at 10.5% C. The company commenced its environmental and social impact assessments for the project in January 2014.

Industrial mineral projects in Africa (continued)

Mineral	Company	Location	Project	Notes
Graphite, vanadium	Syrah Resources Ltd	Mozambique	Balama	In January 2013, Syrah unveiled a maiden resource for Balama of 157m tonnes graphite at an average grade of 17.1% C, using a 5% cut-off. In December, Syrah upgraded 90% of the indicated resource at the Ativa zone of Balama West to a measured resource of 11.6m tonnes grading at 19.9% C and 0.4% vanadium.
Graphite	AMG Mining/ Graphit Kropfmuehl Aktiengesellschaft AG	Mozambique	Ancuabe	AMG and GK acquired a 15 year mining concession for Ancuabe in 2012, when it said that it intended to restart operations at the past-producing mine and processing plant in Cabo Delgado province.
Graphite	Energizer Resources Inc.	Madagascar	Molo	The Molo deposit has an NI 43-101 total indicated resource of 83.99m tonnes at an average grade of 6.36% C and a total inferred resource of 40.32m tonnes at an average grade of 6.3% C, completed in February 2013. Energizer expects to complete a BFS for the project this year.
Graphite	Establissements Gallois	Madagascar	Toamasina	The private company operates two sites in Toamasina, on Madagascar's northeast coast, with three mines on each site serving one processing plant.
Graphite	Stratmin Global Resources Plc.	Madagascar	Loharano	JORC indicated resource of 421,000 tonnes at 5.15% C and an inferred resource of 5.23m tonnes at 4.04% C. The company completed two sales of around 200 tonnes graphite to Europe-based companies in 2013.
Graphite	Uranex Ltd	Tanzania	Nachu	In March 2013 Uranex announced a graphite discovery at Nachu. Preliminary assays of surface outcrops indicated grades of up to 13.95% C. Subsequent sampling in May 2013 included further results of up to 54.7% C.
Graphite	Societe Malgache du Graphite	Madagascar	Ambatomitamba	Societe Malgache du Graphite plans to restart the Ambatomitamba mine to initially produce 1,500 tpa flake graphite before ramping up in two phases to 2,500 tpa and 4,000 tpa
Graphite	Triton Minerals Ltd	Mozambique	Balama North and Ancuabe	In November 2013, Triton took a 60% interest in Balama North and Ancuabe, up from a 49% stake it held with its JV partner, Grafex Ltd. Reverse circulation drilling at the sites during 2013 confirmed the presence of graphite mineralisation.
Mineral sands: rutile, ilmenite, zircon	Sierra Rutile	Sierra Leone	Lanti Dry Mining and Gangnama	2013 production was 120,349 tonnes rutile and 32,349 tonnes ilmenite. The company was granted approval from the Sierra Leone Ministry of Mineral Resources for two exploration licences adjacent to its current mining licence in Area 1.
Mineral sands: ilmenite, zircon, rutile	Kenmare Resources	Mozambique	Moma mine	Current production is 800,000 tpa ilmenite plus 50,000 tonnes co-product zircon and 14,000 tonnes of co-product rutile. It is planning an expansion, which, after it is complete, will see capacity increasing from 800,000 tonnes to 1.2m tonnes ilmenite plus associated co-products pa.
Mineral sands: rutile, ilmenite, zircon	Base Resources	Kenya	Kwale	Base is looking to produce on average 330,000 tpa ilmenite, 79,000 tpa rutile and 30,000 tpa zircon in the first seven years of a planned 13 year mine life. Over the final six years, production volumes will average 200,000 tpa ilmenite, 55,000 tpa rutile and 19,000 tpa zircon. Base expects to begin shipments in February 2014.
Mineral sands: ilmenite, zircon, rutile	Tormin	South Africa	Tormin	Feasibility studies have shown a capacity of 1.2m tpa producing 47,800 tonnes of concentrate pa with a grading of up to 81% zircon and 11.6% rutile and more than 100,000 tpa Ilmenite
Phosphate	Cominco Resources	Republic of Congo	Hinda project	JORC compliant phopshate resource of 432.8m tonnes at 10.6% P_2O_5, which is expected to support a 26 year mine life. Milling after pre-screening of 8.7m tpa at 19% P2O5. Company is working on full pilot scale work programme ahead of a DFS. Proposed production of 4m tpa.

Industrial mineral projects in Africa (continued)

Mineral	Company	Location	Project	Notes
Phosphate	Diamond Fields International Ltd	South Africa	South Western Cape	Granted a marine exploration licence for phosphate and associated minerals by the South African government, valid for five years and covers an area around 47,468km^2. Phosphate-rich rocks averaging between 16.2% and 17.8% P_2O_5 occur over large portions of the shelves off the west and south coasts of southern Africa.
Phosphate	Balarmara Resources	Togo	Carbonated Phosphate Project	The 2.2bn tonne phosphate project ranges between grades of 14-16% P_2O_5 with sections of around 80-100m tonnes grade 18-20% P_2O_5.
Phosphate	UCL Resources, Maiward Mining LLC, Tungeni Investments cc	Namibia	Sandpiper Marine phosphate project	The government has suspended marine phosphate exploration for 18 months while it conducts an independent study into impacts on fishing industry. The JV, Namibian Marine Phosphate holds are marine mining licence over 2,000km^2 on the Namibian continental shelf.
Potash	Allana Potash	Ethiopia	Danakil potash project	Located in the northeastern Danakali Depression. 32.97m tonnes proven resource grading 28% KCL and 60.81m tonnes probable resource grading 28.8 KCL.
Potash	African Potash	Republic of Congo	Lake Dinga project	Exploration work planned to delineate a JORC compliant resource. Phase 2 drilling programme to be completed by Q3 2014.
Potash	Elemental Minerals	Republic of Congo	Sintoukola potash project	JORC compliant measured and indicated mineral resource of 959m tonnes at an average grade of 15.11 K_2O (23.91% KCl).
Potash	JV: AgriMinco Corp./ Danakil Potash Corp.	Ethiopia		
Rare Earths	Frontier Rare Earths Ltd	South Africa	Zandkopsdrift	Zandkopsdrift has an NI 43-101 indicated resource of 32.4m tonnes at 1% TREO and an inferred resource of 10.1m tonnes at 1% TREO, completed in 2011. In December 2011, Frintier signed a strategic partnership agreement with Korea Resouces Corp (Kores) for the financing and development of Zandkopsdrift.
Rare Earths	Great Western Minerals Group Ltd	South Africa	Steenkampskraal	GWMG upgraded its NI 43-101 resources estimate for Steenkampskraal in November 2013 to measured resources of 16,600 TREO and indicated resources of 67,000 tonnes TREO.
Rare earths	Mkango Resources Ltd	Malawi	Songwe Hill	Songwe Hill has an NI 43-101 Indicated resource of 13.16m tonnes grading at 1.62% TREO and an inferred resource of 18.59m tonnes at 1.38% TREO. A pre-feasibility study for the project is currently underway.
Rare earths	Tantalus Rare Earths AG	Madagascar	TRE	Tantalus are currently exploring the TRE site in northwest Mozambique and working towards an NI 43-101 resource.
Rare earths	Pacific Wildcat Resources Corp.	Kenya	Mrima Hill	Mrima Hill has a total measured and indicated resource of 48.7m tonnes at an average grade of 4.4% TREO, in addition to 47.8m tonnes of niobium at 0.66% Nb_2O_5. The company had its mining licence revoked by the Kenyan government in August 2013 but is appealing this decision.
Rare earths	Rift Valley Resources Ltd	Angola	Ozango	Rift secured a drilling rig to test the Longonjo rare earths prospect at Ozango during January 2014. Early stage exploration at the site has returned grades of up to 18.9% TREO.
Rare earths	Peak Resources Ltd	Tanzania	Ngualla	Ngualla has measured and indicated resources of 21.5m tonnes at 3% TREO. Peak expects to complete its PFS for the project in Q1 2014.