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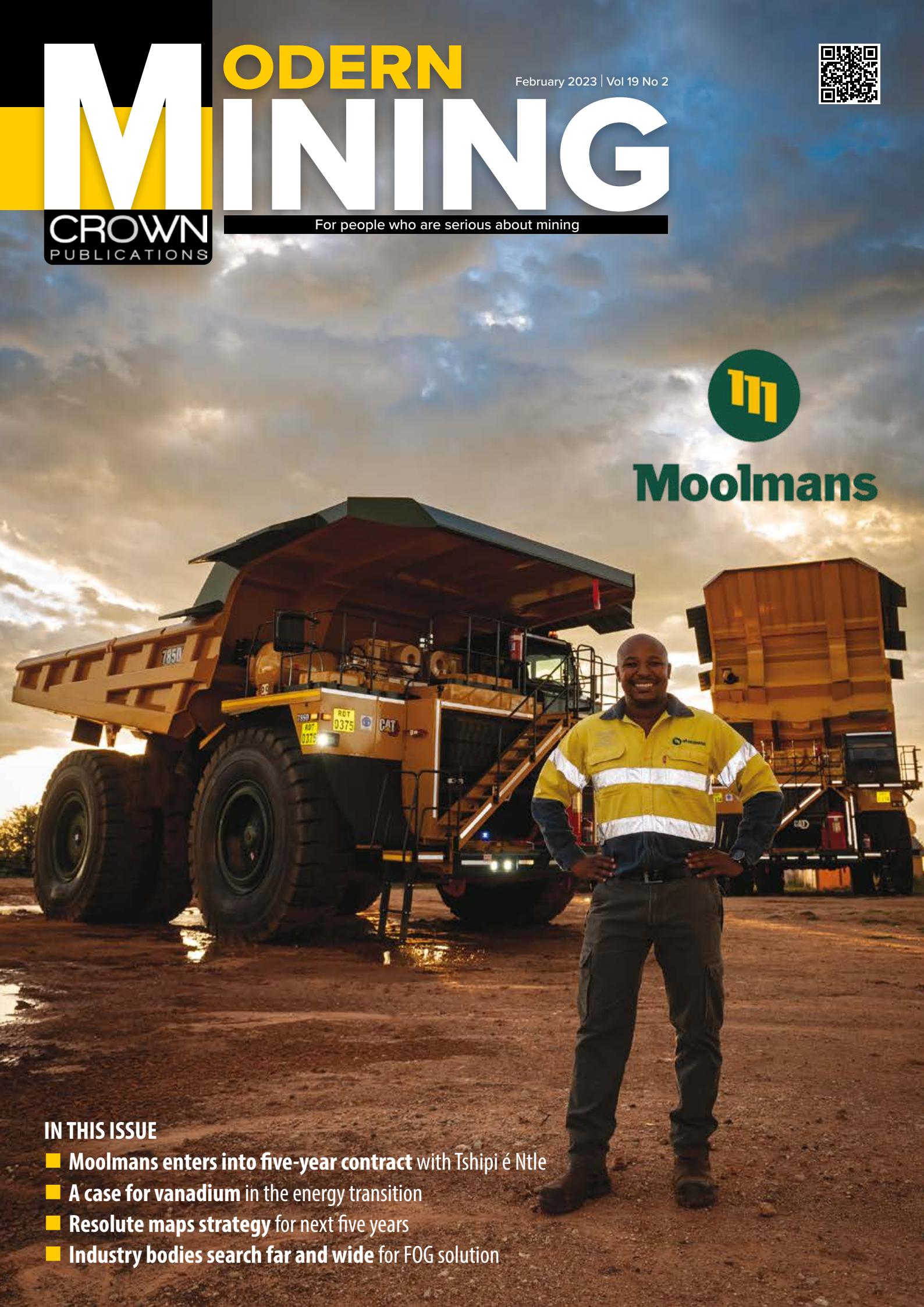

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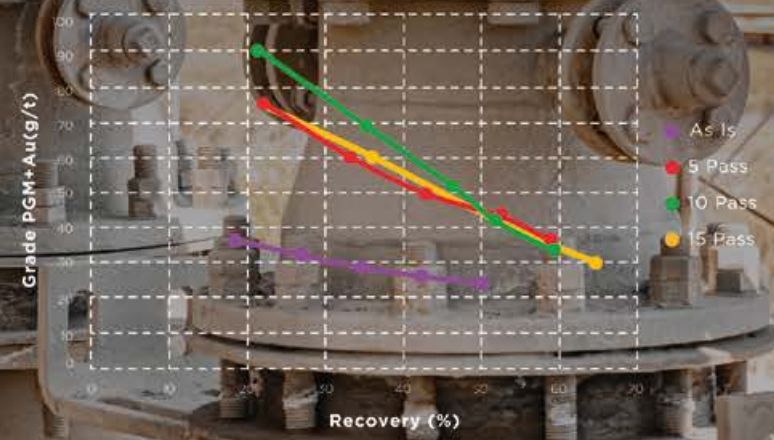

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Aveng's Moolmans has entered into a new five-year contract with long-standing client, Tshipi é Ntle. See story on page 8.

COMMENT

When things fall apart

Nellie Moodley

Gold is always your best bet, especially when things are falling apart, and it's best to invest in it before things fold. In fact, with turbulence in crucial areas around the world, investors have already been on the money as the precious metal showed its resilience, soaring to a new decade high. The World Gold Council's latest *Gold Demand Trends* report reveals that annual gold demand in 2022 increased by 18% year-on-year, hitting 4 741 t – the highest annual total since 2011.

Annual central bank demand more than doubled to 1 136 t in 2022, up from 450 t the year before and to a new 55-year record high. Purchases in Q4 2022 alone reached 417 t, bringing the total for the second half of 2022 to more than 800 t, the WGC said.

Gold bars and coins continue to hold favour with investors in several countries around the world. Total European gold bar and coin investment for 2022 surpassed 300 t, with the Middle East also posting significant growth.

"Total annual supply in 2022 continued its upwards trajectory, up by 2% y-o-y to 4 755 t. In particular, mine production increased to 3 612 t – a four year high," the council said.

On the back of strong demand for the precious metal, local gold producers are set to reap some handsome rewards with JSE-listed gold miner DRDGOLD reporting increased revenue of R2 654.3 million for the six months ended 31 December 2022. However, the company pointed out that volume throughput decreased by 14% primarily as a result of unprecedented load shedding, unscheduled electricity trip-outs at its Ergo plant related to the Eskom grid, and excessive rain.

While the strong gold price bodes well for both industry and government coffers, what does not bode well is the incessant loadshedding, and water shedding, which continues to place serious pressure on households, businesses and the country's ability to remain competitive.

With the *Investing in African Mining Indaba* only days away how President Cyril Ramaphosa, who's set to deliver the keynote address, is going to convince investors that South Africa is worth investing in, remains to be seen.

It is interesting to note that the president is to be accompanied by a contingent of eight ministers and three deputy ministers: the DMRE's Gwede Mantashe, and his deputy Dr Nobuhle Nkabane; Finance Minister, Enoch Godongwana and his deputy Dr David Masondo; Minister Ebrahim Patel; Minister in the Presidency, Mondli Gungubele and his deputy Thembi Siweya; Minister Thoko Didiza; Minister Barbara Creecy; Minister Blade Nzimande and Minister Mmamoloko Kubayi.

Never has our government contingent to the Indaba come through with this much muscle … a united front when everything is falling apart?

In this edition

Given the global energy crisis and the transition to clean energy, Bushveld Minerals CEO Fortune Mojapelo puts forth a strong case for investing in vanadium and flags some initiatives the company is progressing in line with the globe's green agenda (pg 14).

Also featuring this month is Resolute Mining's Terry Holohan, who maps the gold miner's comprehensive strategy for the next five years, aimed at unleashing pent-up value from its two producing gold mines, Syama in Mali and Mako in Senegal (pg 18).

For the Underground Mining feature, the Mandela Mining Precinct highlights the industry's search for Fall of Ground (FOG) solutions, pointing to some of the latest innovations being developed (pg 23). And, on the subject of safety, the mining industry recorded its first-ever January and calendar month without a fatality, as well as a significant reduction in fatalities for 2022 after a concerted effort by all stakeholders resulted in a record low number of 49 fatalities.

Our cover story, Aveng's Moolmans, meanwhile, has entered into a new five-year contract with long-standing client, Tshipi é Ntle (pg 8). ■

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SAIW / IIW ISO 3834 Certification is good for mining.

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Andrada Mining announces Uis Mine mineral resource expansion

AIM-listed Andrada Mining, an African technology metals mining company, has announced an inferred, mineral resource estimate (MRE) for tin over 11 historically mined pegmatite bodies located close to the actively mined V1/V2 pegmatite at the Uis Mine, in Namibia. The 11 pegmatites have been termed the Proximal Pegmatites and are located within a 3 km radius of the existing processing plant, the company said.

Andrada Mining CEO, Anthony Viljoen, commented: "The declaration of this inferred resource, using the historical drill data from the Uis Mine, significantly advances the total Andrada mineral inventory towards management's internal mineral resource target of at least 200 mt of mineralisation.

Andrada announces an inferred mineral resource estimate for Uis mine.

"These additional pegmatites, together with the mineral resource at the V1/V2 orebody, provide an entire resource portfolio of approximately 128 mt of ore, with a gross combined content of 170 kt of tin, making Andrada the owner of one of the largest tin assets globally.

"Furthermore, through our demonstrated ability to scale up production, rapidly and profitably, at existing operations at the Uis mine, we believe Andrada has the ability to compound the company's economies of scale and position it as one of the lowest cost tech-metal producers in the next five years."

The existing mineral reserve, currently being mined, as well as the ongoing infill drilling programme over the entire mining licence have also shown the potential of lithium mineralisation contained within the same pegmatites. Andrada looks forward to completing the work required to bring the lithium into production, as well as expanding the infill drilling programme to explore the huge opportunity that the lithium presents as a co-product revenue stream with the tin operation in the coming months. ■

Alison Atkinson is group director – projects & development for Anglo American

Diversified miner, Anglo American, has appointed Alison Atkinson as group director – projects & development, effective from the second quarter of 2023. Atkinson is currently the CEO of AWE, an arms-length body of the UK Government responsible for developing and maintaining essential elements of the UK's nuclear deterrent, incorporating some of the world's most advanced research and production capabilities. Duncan Wanblad, chief executive of Anglo American, said: "Atkinson's proven experience of leading large technology-based organisations delivering leading edge programmes and projects is ideally suited to the phasing and development of our portfolio of major growth options. This new role is therefore also central to our attainment of our Sustainable Mining Plan climate targets and ambitions." ■

Hitachi Energy and Sun Africa & UGT Renewables accelerate energy transition

Technology specialist, Hitachi Energy, recently signed a memorandum of understanding with Sun Africa and its sister company, UGT Renewables, to collaborate on utility-scale solar photovoltaic power generation projects that will accelerate the energy transition and provide access to energy in emerging and developing markets worldwide.

The parties agreed to collaborate at an early stage of prospective projects and will jointly engage with local and international stakeholders and provide optimised best-in-class and well-integrated solar power solutions that will enable developing nations to take significant steps towards broad and environmentally sustainable electrification.

Hitachi Energy provides complete engineered solutions for optimised power collection packages and high-voltage grid connections, that ensure safe and reliable aggregation and transmission of power from the solar arrays to the power grid. Grid-eXpand™ grid connection solar solutions span the entire electrification of large-scale photovoltaic plants to deliver significant value. They are engineered, assembled and factory-tested before delivery, ready for speedy and easy energisation on-site while reducing site-based construction risks.

Sun Africa and UGT Renewables will develop the projects, which after construction will be transferred to the designated operator for continued operation. ■

Hitachi Energy and Sun Africa & UGT Renewables to accelerate energy transition.

Critical Metals commences copper production at Molulu

Critical Metals, a mining company established to acquire mining opportunities in the critical and strategic metals sector, has commenced copper production at the Molulu Project, an ex-producing copper cobalt mine in the Democratic Republic of Congo. Production follows the completion of preparation work on site and the arrival of several vital pieces of mining equipment. This is a major landmark as the company moves towards securing further assets.

The mine will initially run on a single-shift basis and is estimated to produce around 10 000 tonnes of copper oxide ore per month on a steady-state production rate. The copper ore produced in January 2023 will be stockpiled for sale into the market in February 2023.

With much of the infrastructure now in place, the company has assembled a strong team of mining professionals onsite including a project manager, four geologists, two mine engineers, as well as the recently appointed mine manager and a complement of local village support staff, the company said.

Russell Fryer, CEO of Critical Metals, commented: "With copper ore production now underway, the company expects to be free-cash flow positive by the end of H1 2023, showing the high cash flow generation potential under current market conditions." ■

Critical Metals commences copper production at Molulu.

Lifezone Metals appoints Gerick Mouton as COO

Modern metals company, Lifezone Holdings, has appointed Gerick Mouton as its COO. Mouton is a mechanical engineer and professional project manager with 25 years' experience in strategic mining and mineral processing development, capital raising, leadership, organisational establishment and execution of multifaceted capital-intensive mining and mineral projects. As a global metals and mining professional, he has held senior and executive management positions within established international listed mining companies and engineering consultancies. The company believes this ability will support the creation of shareholder value and wider economic benefits to all stakeholders in the Kabanga project. Lifezone Metals also welcomed Manny dos Ramos to Tembo Nickel as its general manager. He will lead and manage day-to-day project development and operational work at the Kabanga project and Kahama refinery sites. ■

Anglo American loads first LNG dual-fuelled vessel in chartered fleet

Diversified miner, Anglo American, has announced that its newly launched LNG dual-fuelled Capesize+ vessel, the Ubuntu Harmony, loaded its first cargo of iron ore from its Kumba operations in South Africa. The vessel is the first of ten LNG dual-fuelled new-build ships that Anglo American will introduce to its chartered fleet during 2023 and 2024, delivering an estimated 35% reduction in CO_2 emissions compared to ships fuelled by conventional marine oil fuel. The use of LNG will lead to a significant reduction of nitrogen oxides and particulate matter from vessel exhausts, while the new technology also eliminates the release of unburnt methane.

Ubuntu Harmony has loaded its first cargo of iron ore from its Kumba operations.

The Ubuntu fleet is a key component of Anglo American's ambition to achieve carbon-neutrality for its controlled ocean freight by 2040 – with an interim target to reduce emissions from these activities by 30% by 2030 – all part of Anglo American's wider ambition to halve Scope 3 emissions by 2040.

Nolitha Fakude, group director of Anglo American for South Africa, said: "The metals and minerals we provide play an important role in helping key industries decarbonise. Transporting them in a sustainable way is a key part of this effort and the introduction of the Ubuntu fleet – named for the Zulu word meaning 'humanity to others' – helps us accelerate our transition to sustainable ocean freight."

Anglo American has established a comprehensive framework of initiatives for the decarbonisation of its maritime activities, including energy saving devices fitted to existing vessels, the use of voyage optimisation software, and a focus on exploring, trialling, and adopting alternative, sustainable fuel options – such as LNG, sustainable biofuel, green methanol and ammonia, and – further down the line – hydrogen. ■

Barrick's Tanzanian assets deliver record production

Gold miner, Barrick Gold's two gold mines in Tanzania, North Mara and Bulyanhulu, boosted their combined output to 547 000 ounces in 2022, achieving another step towards their potential Tier One[2] status in the group's asset portfolio as a combined complex. At the same time, exploration is continuing to deliver opportunities to grow the mineral reserves net of depletion at both mines, the company said. North Mara's transition to owner-mining is successfully ramping up its ongoing open pit expansion with improved efficiencies and costs, while technological advances in the underground operation are increasing productivity. The restart of mining at the Gena pit is on track. At Bulyanhulu, the focus is on ramping up the development of its declines to access the new Deep West mineral reserves and defining further exploration potential in Reef 2.

Barrick's chief executive Mark Bristow said, "Last year North Mara was officially recognised as Tanzania's largest taxpayer and Bulyanhulu was awarded the Best Compliant Employer prize by the National Social Security Fund. North Mara and Bulyanhulu also received the first and second runner-up recognition awards, respectively, for the Export of Minerals and the generation of foreign currency".

Since the take-over in 2019, Barrick has pumped $2.4 billion into the Tanzanian economy. Last year it paid $303 million in taxes, royalties, levies, dividends, and shareholder loan repayments and $476 million to local suppliers. ■

Barrick Gold's North Mara and Bulyanhulu boosted output in 2022.

Kore Potash provides updated Dougou Extension PFS

Kore Potash plc, the potash development company with 97%-ownership of the Kola and DX Potash Projects in the Sintoukola Basin, in the Republic of Congo (RoC), has updated its JORC (2012) compliant mineral resource, ore reserve, pre-feasibility study (PFS) information and production target at its DX Project. The updated mineral resource incorporates the most recent drilling results and interpretation of the geophysical data.

Brad Sampson, CEO of Kore, said: "The most recent drilling and geophysical data has further improved confidence in the DX Deposit and the economic attractiveness of the DX Project. The updated resource further confirms this project to be a low operating cost potash operation that can produce about 400 000 tonnes per annum of MOP. What makes DX unique is its low capex and shallow deposit containing high grade potassium chloride, qualities which are very rare in the potash industry." ■

Recent drilling has improved confidence in the DX Deposit.

Brad Sampson, CEO of Kore Potash.

PlatAfrica winners shine during PGI India visit

The winners of the annual PlatAfrica jewellery design and manufacturing competition recently visited India as part of their prize for winning the competition. The purpose of the trip was to further inspire the winners by exposing them to international trends and techniques, while assisting them with skills development and networking in the world's fastest growing market for platinum jewellery products. Hosted annually by Anglo American Platinum, Metal Concentrators and Platinum Guild International (PGI) India, PlatAfrica is aimed at showcasing South African jewellery manufacturing and design talent as well as building a local pipeline of talent in the industry.

The competition supports the local beneficiation of jewellery for global consumers through locally sourced quality platinum. PlatAfrica is a flagship market development initiative through which Anglo American Platinum contributes to the local downstream platinum jewellery industry by positioning it as a jewellery metal of choice.

PlatAfrica winners exposed to international trends.

The PlatAfrica PGI India tour took place from the 20th to the 29th of January in Mumbai, India. ■

Moolmans enters new five-year manganese

In line with its vision to be the premier mining contractor in Africa, Moolmans has entered into a new five-year contract with long-standing client, Tshipi é Ntle.

Moolmans' relationship with the mining company first began in October 2011. The initial five-year contract was a 'Greenfields' opportunity, with Moolmans establishing the entire open cut operation to provide a full mining service for overburden and manganese ore. Since then, there have been many changes to the market, which saw the contract renewed and revised in line with prevailing financial and operating conditions in the mining industry. Moolmans is again providing a full mining service to South Africa's biggest exporter of manganese, which includes bush clearing, topsoil stripping, drilling and blasting, loading and haul of ore and waste at the Tshipi Borwa mine in the Kalahari Manganese Field (KMF) in the Northern Cape.

"The renewal of this contract is testament to the value-added relationships we have with our customers and confirms our reputation in the industry for exceptional reliability and performance," says Jerome Govender, Moolmans' Managing Director. "We are delighted that we will continue to play a significant part in the future of the world's largest manganese-bearing region."

The Tshipi Borwa mine is an open-cast mine that operates through drill-and-blast and load-and-haul mining techniques. The contractor-operator model has resulted in the mine becoming one of the lowest-cost manganese ore exporters globally and has enabled a flexibly scaled production process that can respond to manganese ore price volatilities and market conditions.

This contract award will result in significant investment in equipment, people, processes, and systems. It is firmly aligned with the mining contractor's aspirations to be the leader in mining solutions and signifies a key strategic milestone for Moolmans, which is actively selecting and entering into long-term and commercially viable contracts to deliver on this vision.

Moolmans, the South African based contract mining subsidiary of the Aveng group, has been known to operate one of the largest and most diverse fleets of mining equipment in Africa to suit various operations and client requirements. Also, the company is

mining contract with Tshipi é Ntle

able to supplement this fleet with specialised and additional equipment if the project demands it. This was an important part of the new contract award.

Moolmans, with the support of Tshipi é Ntle, ordered 16 new Cat 785D trucks, five of which are already on site and awaiting commissioning. The remaining 11 trucks are expected to be fully operational by June 2023. In addition, two new Liebherr excavators and four new bulldozers are on back order, together with an existing Liebherr excavator, which is undergoing a full OEM refurbishment.

This is complemented by the company's sophisticated maintenance software and service excellence which Moolmans deploys to achieve the highest levels of equipment reliability and best-in-industry production. To ensure maximum availability, utilisation and productivity, Moolmans has developed effective and accredited maintenance systems tailored to maximise equipment economic life in a sustainable, reliable, and predictable manner.

As a contract mining company with more than 60 years' experience across the African continent, Moolmans' success is attributed to an executive team that brings diverse expertise and extensive experience, along with a new energy and innovative ideas, to invigorate growth of the business, as well as a workforce of more than 3 000 employees, including skilled and experienced operators, disciplined project managers, qualified engineers, SHEQ professionals and a range of support staff, all grounded in a culture of customer centricity. This enables the business to work closely with customers and suppliers to identify and implement improvements that will drive down unit costs and optimise efficiencies.

Aligned to Aveng's purpose of providing a better life, Moolmans is intently focused on improving the quality of life for and bringing economic benefit to all its stakeholders, including employees, communities, customers, and investors. This also means creating opportunities for employment, training and development.

"For us, being Africa's premier contract miner means that not only do we demonstrate the highest standards of safety, keen environmental management and exemplary social responsibility but our people also love working for us, our host communities celebrate our presence, and our customers choose us to execute large and complex projects," adds Govender. ■

Critical Minerals outlook

By Alana van Wouw, market analyst at Crane Ridge

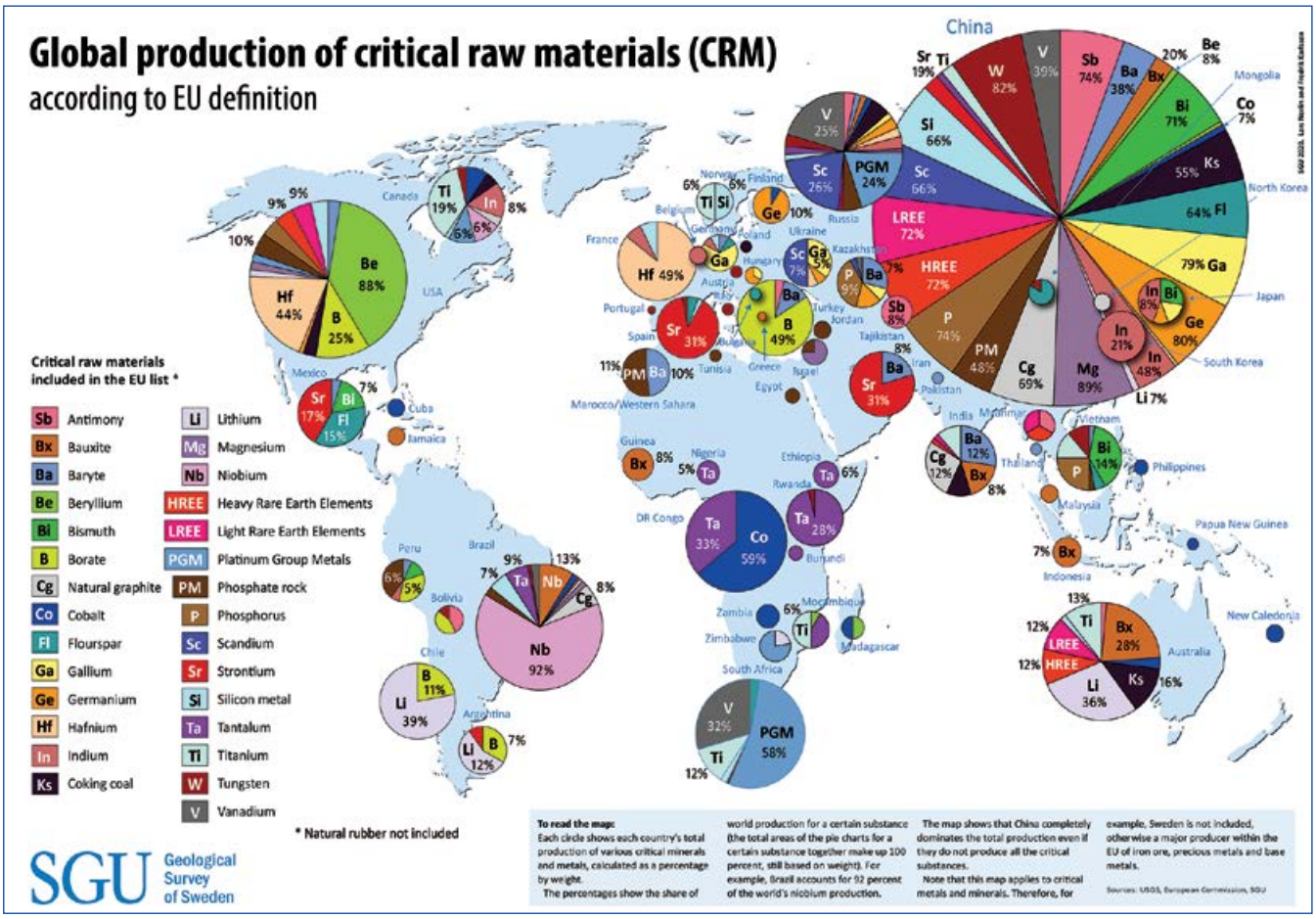
Fashionable as it may be to talk about critical metals in a world migrating towards a clean-energy future it is equally important to ask why some metals are considered critical and others not. A critical metal is one that is essential to produce a critical technology, such as for energy, defence, aerospace or medical technologies. These metals are usually rare and are needed in large quantities, often in the form of alloys, to produce products.

Knowing what is genuinely critical in an economic sense, and not simply rare with limited economic value, could save industries from wasting time and money looking for metals that may not have a big future market.

The critical label applied to some metals can be confusing because scarcity could reflect a situation where demand is so small that there is little incentive to explore for more – but when the hunt does start the scarcity factor fades.

Lithium is a classic case of a metal that had a small market a few years ago when it was mainly used in making glass, ceramics and as a lubricant – and even as a medicine to treat bipolar disorder. But the discovery of its use in batteries – particularly for electric vehicles and other renewable energy applications – has made it a critical metal.

In the case of lithium, geologists and miners need to understand the expected future demand for the metal, which could be very different from what it is today.



Global production of critical raw materials.

Above: Africa has experienced a surge in exploration for critical energy metals.

Centre: Africa is estimated to hold around 10% of global proven and potential reserves of key minerals.

Overall, lithium is an incredibly important metal for the future of energy storage and electric vehicles, but it is not the only metal that is important in this transition. Other metals, such as cobalt, nickel and rare earth elements, are also essential for renewable energy and other applications, and their availability and sustainability must be addressed. By understanding what is critical, industries can be better prepared to meet the needs of a changing economy.

The demand for these metals is expected to increase significantly in the coming years as the world transitions to a low-carbon economy. To ensure there is sufficient supply to meet the growing demand, it is important to promote responsible mining practices, develop recycling and reuse technologies, and ensure that the use of these metals is done in a way that does not harm the environment or local communities. Additionally, it is important to ensure that these metals are priced in a way that reflects their true value, and to promote public-private partnerships to develop new sources of supply.

Critical minerals outlook - The market for rare earth elements

In reality the market for rare earths and other critical metals is far more complex than it appears at first glance. China is the dominant producer of rare earths and other critical metals but it does not control the market, which is highly fragmented with many players and sources of supply. There are, for example, some rare earth deposits outside of China in Australia, India, the United States, Canada, South Africa and elsewhere, some of which are already in production. There is also significant demand for rare earths and other critical metals from other major consumers such as Japan, South Korea and Europe, who are looking for alternative sources of supply. Finally, the development of recycling and substitution technologies could also reduce the demand for rare earths and other critical metals over the long term. In short, although China is the dominant supplier of rare earths and other critical metals, the market is far from controlled by China. This means that other countries and companies can compete for market share and that the supply of rare earths and other critical metals is unlikely to be disrupted by Chinese policies or other geopolitical developments.

Critical minerals - Copper and nickel global demand grows

Copper's role in energy efficiency is just as important as its role in energy generation. Wiring and cabling made of copper are more efficient than those made of other materials, and they are also more reliable. Copper wiring has a much lower resistance to electricity, allowing for lower losses and higher efficiency. In addition, copper is much more durable than other materials, which means it can withstand the harsh conditions of power plants and substations for longer periods of time. Copper further has the ability to dissipate heat more quickly, which is important for the safe operation of electrical equipment.

Copper is also a key component of renewable energy sources such as solar panels, wind turbines and geothermal systems. It is used in the wiring and cabling of solar panels and wind turbines, as well as in the heat exchangers and pumps of geothermal systems. In addition, copper is used in the production of batteries for electric vehicles and in the construction of charging stations. With the increasing importance of renewable energy sources for electricity generation, the demand for copper is also expected to increase. For example, the ICA

Overall, lithium is an incredibly important metal for the future of energy storage and electric vehicles, but it is not the only metal that is important in this transition. Other metals, such as cobalt, nickel and rare earth elements, are also essential for renewable energy and other applications, and their availability and sustainability must be addressed.

New metal production can be more sustainable by taking an environmental approach.

The Global Critical Metals Road Map is a comprehensive effort to ensure access to strategic and critical materials for the world's growing demand for clean energy, sustainable transportation, and green technology.

estimates that the demand for copper for renewable energy applications may quadruple by 2035.

Critical minerals - Environmental cost of new metal production with low-emission energy generation

The environmental cost of new metal production with low-emission energy generation is dependent on the type of energy generation being used. For example, if renewable energy sources are used, such as solar, wind or hydroelectric, the environmental costs are much lower than if fossil fuels, such as coal or natural gas, are used. Renewable energy sources are generally more sustainable and produce fewer emissions than fossil fuels. In addition, many of these renewable energy sources require far less land and water to produce power. The use of renewable energy sources also helps to reduce air and water pollution associated with metal production. Finally, the use of renewable energy sources helps to reduce the amount of global warming potential associated with metal production, as these sources produce far less carbon dioxide emissions than traditional fossil fuels.

New metal production can be more sustainable by taking an environmental approach. This involves implementing measures such as energy efficiency, emissions reduction, cleaner production and resource recovery, as well as investing in renewable energy sources. Additionally, companies should ensure that their production processes adhere to environmental standards, such as those set out in the UN Global Compact. By taking these steps, metal production can become more sustainable and help to reduce its environmental impact.

Critical minerals outlook – Global critical energy-metals roadmap

Globally there are currently five countries that have a Global Critical Metals Road Map: The United States, Japan, Canada, the European Union and Australia. Each of these countries has its own critical metals road map, which outlines the steps needed to secure a sustainable supply of critical metals.

The Global Critical Metals Road Map is a comprehensive effort to ensure access to strategic and critical materials for the world's growing demand for clean energy, sustainable transportation, and green technology. The Road Map provides a framework for governments, industry and other stakeholders to collaboratively develop policies and strategies that will ensure an accessible and secure supply of these essential materials.

The Road Map focuses on both the short-term and long-term needs of the global critical metals industry and provides a blueprint for the development of a secure, responsible and sustainable supply chain. The Road Map outlines the steps needed to secure a reliable supply of these metals and outlines best practices in exploration, extraction, recycling and distribution.

The Road Map also identifies areas of research that should be pursued in order to develop a secure and sustainable supply of critical metals. Finally, the Road Map outlines the potential for public-private partnerships, and the need for increased international collaboration and coordination.

Overall, the Global Critical Metals Road Map provides a holistic approach to securing the future of the global critical metals industry. By providing a road map for governments, industry, and other stakeholders to collaborate, these Road Maps ensure that the world's growing demand for critical metals can be met in a responsible, sustainable and secure manner.

Critical minerals outlook – Africa needs to create a critical energy-metals road map

Africa is abundant in many critical minerals that are essential for a range of industries, including energy, automotive, electronics and telecommunications. However, the continent is not currently exploiting its potential as a supplier of these minerals.

In order to unlock the potential of Africa's critical mineral resources, there is a need to develop a comprehensive strategy and road map. This road map

should outline the steps necessary to identify and develop mining sites, secure necessary infrastructure, and technology, and ensure that the benefits of the mining activities are shared among the different stakeholders.

The road map should also include strategies to ensure the safety and security of the mining operations, as well as measures to mitigate any potential environmental impacts.

In addition, the road map should include strategies to ensure the prosperity of local communities, particularly in terms of job creation, community and infrastructure investment.

Finally, the road map should include measures to ensure the effective utilisation of Africa's critical minerals. This should include policies to encourage the development of value-added processing facilities, as well as research and development to identify new uses for the minerals.

The availability of critical energy metals in Africa is an important factor in the development of the energy sector. These metals, including cobalt, nickel, vanadium and lithium, are essential for the production of batteries, renewable energy storage solutions, and other energy-related technologies.

As demand for these materials is increasing globally, the African continent is making efforts to increase its supply of these critical energy metals. In recent years, the Africa has experienced a surge in exploration and mining activities for critical energy metals.

For example, the Democratic Republic of Congo (DRC) is the world's leading producer of cobalt and is estimated to account for around two-thirds of global production. The DRC also hosts significant reserves of nickel, vanadium and lithium. Elsewhere in Africa, countries such as South Africa, Zimbabwe and Namibia also possess significant reserves of critical energy metals. In addition to exploration and mining activities, some African countries are also exploring other sources of critical energy metals. For example, Ghana and Angola are looking into recycling programmes to recover these materials from discarded electronics and other sources.

It is difficult to provide an exact percentage of critical energy-metals in Africa since this will depend on the specific metals being considered and the geographic scope of the analysis. According to the World Bank, Africa is estimated to hold around 10% of global proven and potential reserves of key minerals and metals, including some that are critical to energy production.

Africa can get involved in the critical metals development by investing in mining operations, expanding research and development of new technologies for mining and refining, and creating opportunities for local entrepreneurs to explore and capitalize on the potential of critical metals.

Furthermore, African nations that have the resources to invest can help to drive the development of critical metals by providing incentives and financial support to start-ups, research facilities and organisations focused on the production and development of the metals. Finally, African governments can help to create a favourable environment for the development of critical metals by providing tax incentives, better regulations and strong support for research and development.

Africa can get involved in the critical metals development by investing in mining operations.

Some of the steps that could help to create an energy-metals industry that is competitive, innovative and sustainable, which will in turn contribute to economic growth and development in Africa include:

1. Identify critical mineral resources within Africa and their potential economic value.
2. Develop policies and regulations to enable private sector investment and promote access to financing to development of these resources.
3. Establish a transparent and accountable licensing and permitting process for mineral development.
4. Establish a training and education programme to ensure that local and regional stakeholders are equipped with the necessary skills to develop and manage mineral resources.
5. Establish a monitoring and enforcement system to ensure that mineral development is conducted in an environmentally and socially responsible manner.
6. Establish an infrastructure development plan to ensure that the necessary infrastructure is in place to support mineral development.
7. Develop a regulatory framework to ensure the equitable distribution of benefits from mineral development.
8. Establish international partnerships to share best practices and develop local capacity for mineral development.
9. Promote research and development of mineral development and technologies.
10. Develop a comprehensive marketing and communications strategy to promote the development of Africa's critical minerals. ■

African governments can help to create a favourable environment for the development of critical metals by providing tax incentives, better regulations and strong support for research and development.

A case for vanadium in the energy transition

By Fortune Mojapelo, CEO Bushveld Minerals

Fortune Mojapelo, CEO Bushveld Minerals.

The phrases 'just energy transition', 'green energy transition' and 'clean energy transition' are frequently used. Despite their popularity, confusion remains as to what the energy transition truly means. At its core, the term refers to the shift from fossil fuels, such as oil, natural gas and coal, to renewable energy sources like wind and solar to fulfil global energy demand.

Within this shift are multiple undercurrents. One is the electrification of everything, where electricity becomes the energy carrier used to power everything from industry to mobility to information. As a result, electricity's share of global energy demand will double over the next 20 years to approximately 45%. For context, in 1980, it was just 10%. Electricity's major technical limitation is the difficulty in storing it. Consequently, the more widespread the usage of electricity, the greater the need for various methods to store it, from small batteries in electronics to larger ones in cars to massive schemes using gravity and water dams.

Electric vehicles (EV) replacing internal combustion engine cars (ICE) is one example of electrification of mobility. According to Canalys, sales of EVs are rising rapidly and expected to equal ICEs by 2030, when 35 million new EVs will be sold each year globally. According to the International Energy Agency, an EV requires six times the mineral inputs of a comparable ICE. To meet this demand, nearly 400 new mines for battery metals such as lithium, graphite, nickel and cobalt will be needed by 2035 according to Benchmark Minerals. And EVs are just a subset of mobility applications, that include shipping, rail, air, etc.

Methods to produce electricity are also changing

Bushveld Minerals Vametco plant.

South Africa has 25% of the world's vanadium resources.

Above: Product on conveyor-belt.

Top: Aerial view of the Bushveld Minerals plant.

due to a substantial drop in costs for solar and wind power generation, which, together with hydro power, now makes them the cheapest ways to generate electricity. However, these forms of generation are variable and require stationary energy storage to balance the timing difference between when electricity is generated and when customers demand to use it. On top of this use case, energy storage helps make the power system more efficient as a whole by providing ancillary grid services, increasing the capacity of transmission and distribution networks, smoothing energy demand through peak shaving or load shifting and increasing the resilience of a power system against weather or man-made shocks. Unsurprisingly, Bloomberg New Energy Finance forecasts stationary energy storage to grow twenty-one-fold to nearly 1 200 gigawatt hours of installed capacity by 2030. According to Precedence Research, the annual value of this market will exceed $400 billion by then.

To date, most energy storage has been provided by large, pumped hydro schemes or systems using batteries similar to those found in EVs. However, as the market grows and the uses for energy storage expand, the technology mix is also diversifying. Vanadium redox flow batteries, (VRFBs), are increasingly contributing to new energy storage deployments thanks to their long lifetimes of over 20 years with no performance degradation, scalability, safety and full reusability of their vanadium electrolyte. They are as modular as other types of batteries but become much cheaper when four to ten hours of energy storage is needed daily. A

Smelting process.

recent independent life-cycle assessment study by Denkstatt found that lithium-ion batteries have 66% more global warming potential than VRFBs, making VRFBs a more sustainable storage technology. These favourable characteristics have led the International Energy Association and World Bank Group to forecast that, as a result of energy storage applications, vanadium demand will roughly triple in the coming decades.

China is leading the way in VRFBs, accounting for 95% of the global market. The Dalian Energy Storage Power Station was completed in November 2022. This battery has a storage capacity of 400 MWh, that will be doubled to 800 MWh, and can support 200 000 residents with their daily electricity needs. An even larger, 1 000 MWh VRFB has started construction in Xinjiang and will be completed by end of 2023. Over 3 700 MWh of VRFB projects have been announced in China over the last 18 months, and a recent white paper forecast China's cumulative VRFB installed capacity to reach 24 GW by 2030.

This growth is a direct result of policy aimed at diversifying the technologies used to store energy. China already dominates global supply chains in producing lithium-ion batteries for EVs and storage, but it has limited domestic supply of many of the minerals these batteries use. At the same time, it is the largest producer of vanadium in the world. Chinese policies explicitly favour deployment of VRFBs and establishment of supply chains, such as VRFB assembly and vanadium electrolyte production, leading to innovation, manufacturing scale and cost decreases. China already has nearly a dozen local VRFB companies. Last year, the two largest vanadium producers in China, Pangang Group and HBIS, both announced construction of vanadium electrolyte plants. Meanwhile, CNNC Hua Yuan announced an investment of $71 million for a new subsidiary focused on vanadium technology.

And this supply chain development is not limited to China. The Dutch minerals company, AMG, has announced a 6 million litre electrolyte plant in Germany and a partnership with Shell to build a vanadium processing facility in Saudi Arabia that will include an electrolyte plant. In Australia, the government has included vanadium mining and processing under its $1.3 billion Modern Manufacturing Initiative, which will include construction of an electrolyte plant. The United States and EU consider vanadium a critical material, and the recent Investment

CellCube is constructing a hybrid mini grid comprising 3.5 MW solar plant and a 1 MW/4 MWh VRFB, the largest in Africa.

Reduction Act is expected to further support the growth of the VRFB supply chain in the US.

We have invested over US$ 160 million in acquiring and refurbishing two of the world's four operational primary processing vanadium plants, currently supplying >3% of the global market, and growing. Bushveld Minerals has positioned itself to support vanadium's role in the energy transition and is excited to help steer the world towards a sustainable future. With some of the largest high-grade reserves, solid infrastructure, and existing brownfield processing capacity, built decades ago, the company recognised South Africa's unique position and opportunity to build a significant vanadium industry. Our vertical integration strategy has seen us combine upstream, primary vanadium mining, beneficiation, and downstream energy storage businesses to drive adoption of VRFBs.

Aerial view of Bushveld Minerals mine.

Bushveld, together with the Industrial Development Corporation, has built an 8 million litre vanadium electrolyte plant in East London, South Africa, that will be the largest in the world outside of China. We also developed and rolled out an innovative vanadium electrolyte rental product to take advantage of the non-degradation of vanadium electrolyte and ensure its reusability once a battery is decommissioned. The company has further invested in VRFB manufacturing capacity, through a 25% shareholding in Austrian based VRFB manufacturer, CellCube, and is currently constructing a hybrid mini grid comprising 3.5 MW solar plant and a 1 MW/4 MWh VRFB, the largest in Africa. This mini grid is structured as an independent power producer and thus did not require any funding from the mine to which it supplies electricity. In addition, it decarbonises operations and, unlike projects that only use solar PV, it reduces exposure to Eskom's supply challenges and tariff changes. This first of its kind in South Africa project is an initial step in rolling out storage at Bushveld's operations and will serve as a large scale VRFB reference site for the mining industry, utilities and other users.

According to the US Geological Society, South Africa has 25% of the world's vanadium resources, the second most; however, it produces only 7% of annual production. The potential to grow and beneficiate vanadium in country, is massive. Greater overt policy support for the vanadium industry would build on work already undertaken by companies such as Bushveld. This would grow the vanadium and VRFB industries in South Africa while producing local products to address our power system challenges. For example, while procurement for energy storage is starting in South Africa, led by Eskom and the Independent Power Procurement Office (IPPO), it does not have any allocations targeting VRFBs specifically, as is done in China. A technology-specific procurement for energy storage would mimic what the IPPO does when it procures electricity generation, such as gas, solar or wind. In addition, more flexible delivery timelines for high local content technologies, such as VRFBs, could allow participation in larger tenders, as local supply chains, from mines to manufacturing plants, need more time to scale up than those already established overseas. Government entities have many powerful incentive policies in their arsenal, from tax incentives to infrastructure investment, to R&D grants; however, none target vanadium or vanadium-based energy technologies. Providing explicit, short-term direction towards vanadium-based industries, as is being done for hydrogen, would support an enabling environment for investment, innovation and employment.

Bushveld Minerals is pleased to be able to support South Africa's advancement by providing numerous jobs at its BELCO, Vanchem and Vametco facilities, while advancing innovation and creating an educated and highly skilled workforce. The company is pleased to be leading the charge to demonstrate the commercial viability of a local VRFB supply chain for the growing global stationary storage market. But for South Africa to maximise this new opportunity in vanadium, Bushveld's efforts will not be sufficient – overt policy is needed to attract and direct further investment. ■

Resolute's Mako Gold project, in Senegal.

Resolute Mining's CEO, Terry Holohan.

Resolute maps comprehensive strategy for next five years

By Adam Baynes: Consultant at Tavistock

With over eight months at the helm, Resolute Mining's CEO, Terry Holohan, is confident that the company is in a strong position to unveil a new long-term strategy aimed at unleashing pent-up value from its two producing gold mines, Syama in Mali and Mako in Senegal.

Speaking in an interview for *Modern Mining*, Holohan looks back on what he sees as a year of steady improvement, picking out highlights such as meeting production guidance for the first since commissioning the Syama underground mine, solving problems he inherited in the sulphide plant and the underground mining operations, achieving consistent balance sheet improvement over the last six quarters and making his own mark with high quality appointments.

"We've made it a priority to add some engineering expertise to the executive management team, so we now have myself and Geoff [Montgomery, COO], who has been key in bolstering the engineering side and turning things around."

Aerial view of the Mako Gold pit.

Personnel additions at Resolute haven't stopped at senior management; experts across a range of fields have been brought in from around the world and at one point the company was employing as many as 160 expats at Syama.

Throughout this period of transformation, the emphasis on hands-on management was always important for Holohan and, as confidence in the new setup grew, problem resolution became faster and more efficient. Equally, Resolute values its Malian staff and is now whittling down its expat workforce, meeting internal employment targets and training up its local workforce so it can maintain operations at a lower cost.

"We really believe that the opportunities at Resolute are massive, and now that we've spent the required time and capital to improve issues at site, and we're through the worst of the Covid-19 pandemic, we have the personnel and skillsets to take advantage," Holohan continues.

On the corporate finance side Resolute raised a partially underwritten A$164 million in November and December 2022 to strengthen the balance sheet and provide a financial platform for growth. As a result, the company's top ten shareholders now own over 45%, including a burgeoning register of North American institutions such as Condire (new to the stock in 2022).

"We've had a lot of North American investors come in long term [since the raise], who are keen on our three-year expansion programme, which is low capital, sweating the asset and doing exploration work."

Resolute also believes that ultimately Syama represents a far larger opportunity over a five-year period and beyond, and that this, too, is highlighted in the healthy capital support from North America, which Holohan interprets as a mandate from investors.

"They [investors] want to see us gain market support for what we're doing at the moment, produce six to eight quarters of consistent improvement in productivity and cash, and demonstrate that we've got a decent exploration play in Syama North."

This last point on exploration has become an increasingly valuable aspect of the longer-term strategy Resolute is formulating. In January 2023, the company announced a sizeable update to its Syama North Mineral Resource Estimate, now over three million ounces in an increase of 58% at a cut-off grade of 1 g/t Au. The company also conducted an aeromagnetic survey in Q3 2022, which suggests further mineralisation structures are likely at Syama as they continue the programme.

"Each time we drill at Syama North we get excited; it has exceeded our expectations so far and a lot of the mineralisation is close to surface and adjacent to areas where we are currently mining. There are companies with a US$200 million market capitalisation just based off a resource the size of Syama North."

Holohan notes that there is a fine balance in allocating funds for both existing production and exploration, especially given encouraging signs of potential exploration at Syama North Extension and a further small programme in Guinea, but he is confident that Resolute will not have to go back to the market to top up funds for the current pipeline of projects.

And when it comes to prospecting for exploration opportunities, Resolute has a unique relationship with the small-scale artisanal miners they operate alongside.

"They're the best geochemists in the world, and we view their impact as positive," Holohan enthuses. "We have great relationships with the communities so there is never an issue with exploring where we want, but we can also develop an idea of potential mineralisation from how the artisanals fare in a particular area."

The company has over 30 years of industry experience, and it is perhaps the longstanding nature of Resolute's work in Mali that affords them this mutually beneficial relationship with local stakeholders. The company has built schools and is now considering higher educational opportunities for children that started in kindergarten at those schools.

It has consistently supported local businesses, implemented fishing and agricultural projects and, as signatory to the World Gold Council (WGC), is now "aggressively aiming to achieve 100% this year on the World Gold Council's Responsible Gold Mining Principles" (RGMPs), having achieved 88% on the last WGC audit in 2022, according to Holohan.

Syama mine in Mali.

"The fact that we announced our award of ISO certification status in January of this year shows that we want to be an industry leader with a great track record on safety, jobs and education in the local community." The company is closing in on four years with zero hours lost to injury, to boot.

Aside from the push to promote its dedication to the principles of ESG, Resolute has mapped out a comprehensive strategy for 2023, and the next five years.

"2023 is going to be a year of consolidation. We are confident we will be able to produce more gold at Syama, and we plan to bring about improvements on costs and start injecting small capital in enhancements of the plant."

At the Syama North exploration prospect Holohan expects to provide a Pre-Feasibility Study sometime in 2023 and believes Resolute will be able to start mining the resource this year.

This, according to Holohan, will be the key to mapping out a five-year strategy, and could provide the basis for a promising period for the Australian gold miner. ■

Resolute is training its local workforce so it can maintain operations at a lower cost.

Andrada Mining – Reigniting the town of Uis

By Cath Drummond : consultant at Tavistock

Uis is a small town located in Namibia's desert regions called Damaraland. Renowned for its local mineral wealth, the region birthed Uis Tin Mine in 1911. At its peak, Uis Mine was one of the world's largest hard-rock tin mines until the late 1980s, when tin became unfashionable, and its price saw a significant decline with many large deposits disappearing off the investment radar.

The future of tin at this point appeared gloomy and many operating mines were forced to close. The town of Uis was left derelict with a sprinkling of artisanal miners keeping hope alive, fully understanding the metallogenic jewel of the Erongo region.

Fast forward twenty years, and Anthony Viljoen, a mining entrepreneur, having grown up fully entrenched in the mining world, started mopping up tin deposits in Southern African. This marked the beginning of the creation of a globally significant portfolio of mineral assets including an expansive multi-mineral deposit within a pegmatite belt stretching beyond Uis Mine and its surrounds.

The recently announced additional mineral resource estimate for the deposit of 57 million tonnes, confirms Andrada's ownership of one of the largest tin assets globally. Management is targeting a minimum mineralisation of 200 million tonnes.

Initially, the plan was to use Uis Mine as a catalyst for regional exploration but after rolling out an intense drilling programme, Andrada discovered that the pegmatites also hosted key tech-minerals, namely lithium and tantalum, which are crucial in the drive toward a cleaner, greener economy. At the time of picking up the asset, the additional revenue potential of these tech-metals was not fully comprehended.

Several years later the transition to net zero emissions emerged as a foremost global theme leading to the exponential increase in the value of electronic vehicle battery metals such as lithium. Andrada's entrepreneurial approach enabled the company to fluidly transition its strategy and vision of becoming the 'tin champion of Africa' to that of a significant technology metals mining company.

Andrada CEO Anthony Viljoen.

Uis Mine in Namibia.

Uis Mine has provided the perfect springboard into the energy market. Since listing as the only pure-play tin company on AIM in 2017, Andrada has achieved major milestones in a short space of time.

As part of its phase one growth plan, the company established a pilot processing plant which commenced operations in August 2019 producing tin concentrate, which it delivered to its offtake partner, the Thailand Smelting and Refining Company (Thaisarco) in February 2020.

Having successfully ramped up production thereafter, Andrada began an expansion of the plant to increase production at Uis from around 780 to 1 200 tonnes per annum of tin concentrate.

Demonstrating remarkable resilience in challenging market conditions marred by Covid-19 and severe supply restrictions, the Andrada team completed the Uis Phase 1 Expansion project and plant commissioning in August 2022 and late 2022 respectively. The production ramp-up is progressing according to plan.

Whilst maintaining a focus on current tin operations and its expanded production capacity, Andrada is fast-tracking the construction of lithium and tantalum separation circuits. It is also upgrading the confidence level of its lithium mineral stream with a

An aerial view of the Uis Tin Mine at night.

confirmatory drilling programme underway to prove up the resource and bring it into the measured and indicated category. Results to date have confirmed the scale and quality of the deposit in line with the company's high expectations.

According to Viljoen, "Andrada looks forward to completing the work required to bring the lithium into production, such as expanding the infill drilling programme to explore the huge opportunity that lithium presents as a co-product revenue stream within the tin operation".

The desire to realise the full polymetallic potential of the Uis deposit has never been greater and Viljoen has lofty ambitions of being a part of the global drive towards energy transition. He believes that the Uis Mine, with its host of key tech-metals, will be the catalyst catapulting the company from being a junior miner to mid-tier status in the next four years.

While the Uis resource offers a tin deposit that is significantly larger than the company initially anticipated, the real bonanza for Andrada is the inherent lithium and tantalum mineralisation in the orebody. The fact that Andrada is already mining and is able to expand its production facilities gives the company a huge competitive advantage not only in the supply of tin but also in the lithium space.

For the town of Uis, Andrada's activity has served to reinvigorate the town, bringing with it employment opportunities and a renewed sense of optimism. This will be amplified in the coming years with feasibility studies for a much larger Phase 2 underway for the construction of a 10 million tonnes per annum ROM operation.

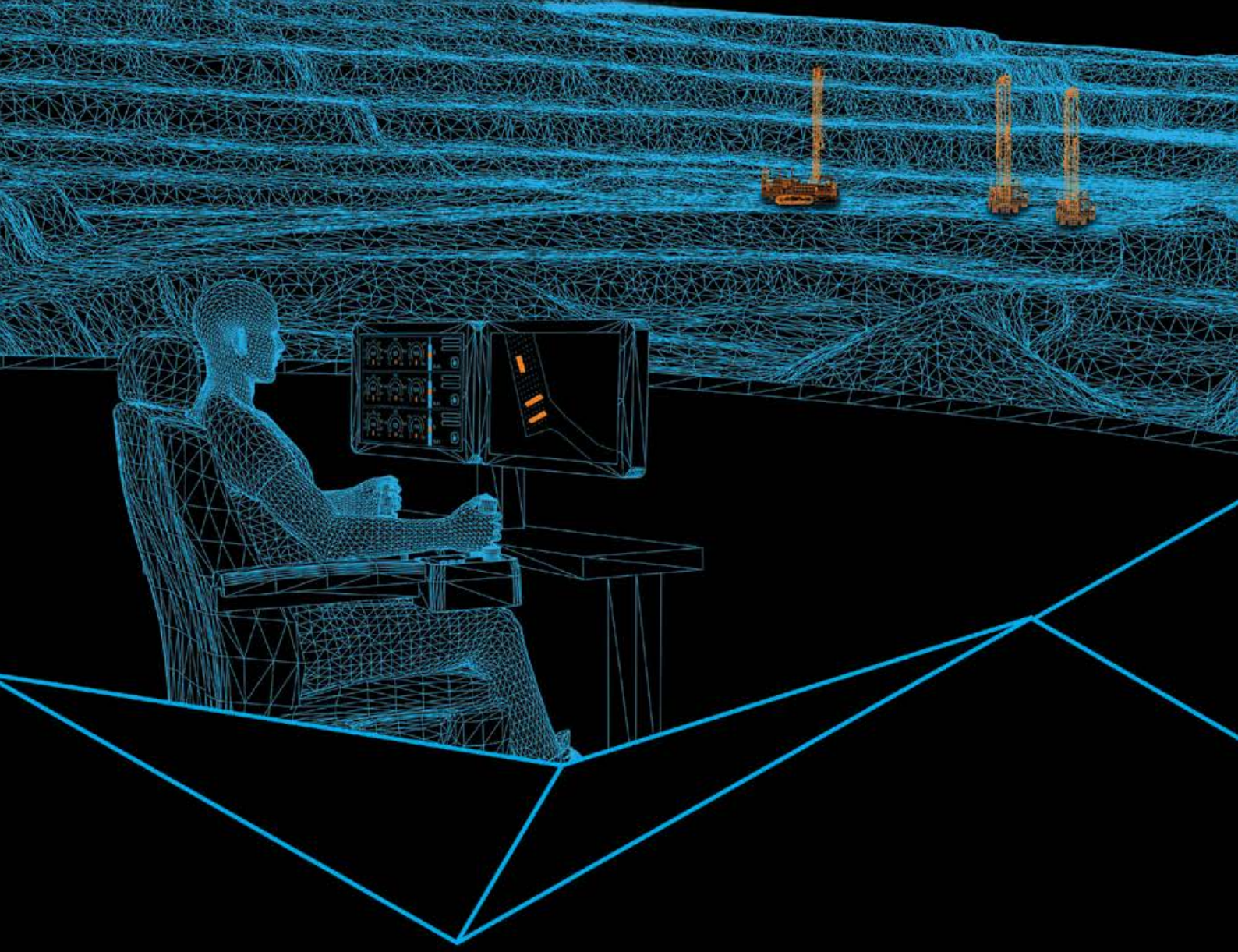
Since commencement of production, the company has developed its business aspirations in Namibia through the expansion of its mineral resource base, production volume and portfolio coupled with a strategic focus on supplying metals to the technology and renewable energy sectors. In pursuit of its sustainability goals, Andrada has also focused on contributing to local communities and Namibia as a whole through economic and social initiatives.

Andrada's vision is to become a multi-technology metals producer.

The company is currently investigating options to unlock opportunity from the B1/C1 (15 km from Uis) Licence Area that is located 15 km from Uis Mine, and which contains a primary lithium mineral accompanied by tin and tantalum mineralisation.

Furthermore, Andrada has an aggressive exploration plan to confirm the mineralisation in its Brandberg West Licence area located 107 km from Uis. This area contains a polymetallic deposit constituted of primary mineralisation in tin and tungsten and secondary copper mineralisation.

Andrada's vision of becoming a multi-technology metals producer is enhanced by the underexplored potential of its mining licences and the future looks promising in terms of bringing these deposits into production and leveraging the knowledge gained from successfully building the Uis Mine. It is clear that Andrada has all the factors of becoming a large mid-tier mining company, capable of identifying and developing assets of significance to the global mining market. ■



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Industry bodies search far and wide for FOG solution

The mining industry's aggressive drive to identify and implement solutions for Fall of Ground (FOG) incidents, which over the past few years have accounted for roughly a third of mining fatalities, has seen industry bodies, the Mandela Mining Precinct (MMP) and the Minerals Council South Africa spearhead the Rock Hazard Identification (RHID) and Safe Removal Innovation Challenge 2022, targeting a fit-for-purpose solution. By *Nelendhre Moodley*.

A commercially viable innovative solution for FOG will be ready before year-end.

Amid a strong line-up of contenders, including participants from across the globe, local supplier of advanced geotechnical monitoring radar systems, Reutech Mining's Sub surface profiler (SSP), took top honours.

According to Michelle Pienaar, Programme Manager: Advanced Orebody Knowledge (AOK) at the MMP, in a bid to eliminate falls of ground incidents, the industry bodies have embarked on several initiatives zeroing in on FOGs.

"The Minerals Council South Africa and the Mandela Mining Precinct, and their partners, have dramatically shifted the importance and visibility of innovation in mining in South Africa and look to continue making progress in the arena, with projects such as the RHID solutions challenge."

Although FOGs have traditionally been the largest single contributor to fatalities and injuries in the mining industry, the Elimination of FOG Fatalities Action Plan (FOGAP) looks to address this challenge through investing in Research and Development for appropriate technological innovations, amongst others. A critical component in this endeavour, explains Pienaar, is improving geological confidence at the face and enhancing accuracy in the identification of geological risks.

"After the regression in mine safety in 2021, good improvements have subsequently been made due to the efforts of various parties in 2022," says Pienaar, who adds that even one fatality, is one too many.

Of the 60 fatalities that occurred in 2020 and the 69 that took place in 2021, 22 were FOG related at both times; however, as at December 2022, fall of ground incidents accounted for only six of the 47 fatalities. These figures were reported by the DMRE on the 12th of December 2022 – final statistics for the year have yet to be released by the department.

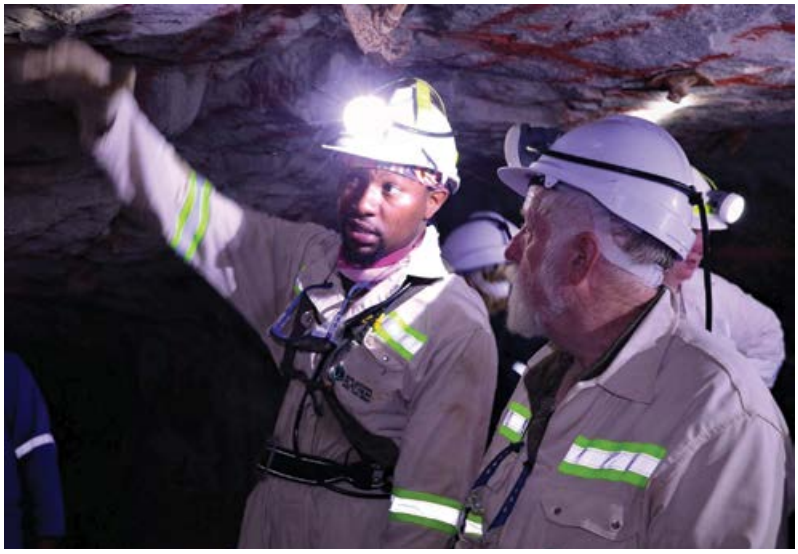
"Currently, the capability to identify geological structures and risks at the rock face is limited. Most notably, after the 'blast' phase, mine workers are exposed and vulnerable to FOG due to rocks being dislodged during or after the blast, poor ground conditions and geological phenomena, including faults, joints and factures. To mitigate the risk posed by the rock-mass instabilities, there is a need to develop a methodology to assist in the accurate identification of faults, joints and fractures in the hanging wall. This will enable mines to take appropriate remedial actions to prevent FOG incidents."

As such, the MMP and Minerals Council South Africa have initiated two sub-projects –- the Rock Hazard Identification programme (driven by the AOK Programme) and the safe removal programme (driven by the FOGAP/Rock Engineering Technical committee (RETC). The industry bodies invited innovators to identify and implement new technology to encourage the development of user-friendly solutions for the South African mining industry.

"These innovations firstly had to be useful in improving geological confidence at the face and in reducing errors in the identification of geological risks and secondly, be able to make the underground mining environment safe after blasting and before workers enter the area for drilling."

Flagging the requirements for a fit-for-purpose tool, Pienaar, explains that aside from being a practical, value-adding solution to the mining workforce, the technology offered had to be lightweight,

After the "blast" phase, mine workers are extremely exposed and vulnerable to FOG.



Sibanye-Stillwater was identified as the ideal champion for the Rock Hazard Identification programme.

rugged, easy-to-use and efficient. Importantly, it should require little start up time. Additional features needed to include:

- ❑ The ability to provide real-time information on the conditions of the rock face and hanging wall.
- ❑ Able to identify and delineate areas that are problematic or can do so automatically.
- ❑ Provide a warning (audible and/or visual) to flag an area in danger of an imminent failure.
- ❑ Remove the user's need to touch the rock during examination.
- ❑ Is quick and easy to use and interpret, provides 2D or 3D visualisations of the rock features, and potentially incorporates AI analysis to auto-analyse information.
- ❑ Is mobile and practical – whether handheld, wearable or autonomous.
- ❑ Preferable that the solution allows for quick and easy dissemination of information remotely.

Reutech Mining's Sub Surface Profiler.

"Given that industry-support to drive the uptake of the identified solution is imperative, Sibanye-Stillwater was identified as the ideal champion for the Rock Hazard Identification programme and platinum miner, Impala Platinum, as the champion on the Rock Removal programme."

A winning solution

Seven applicants were chosen for the pitching den, including the winner, Reutech Mining and the runners up, the CSIR's Advanced Internet of Things Group, TCS Research and Flyability as well as entrants Stratafy, Ramjack Technology Solutions and RockMass Technologies.

The winner, Reutech Mining's Sub Surface Profiler (SSP), consists of a ground penetrating radar (GPR) system that investigates and identifies rock mass hazards at the rock face and at entry of working areas.

According to Pienaar, although Reutech Mining's SSP is currently in use at a few local mining operations, additional research is needed to enhance the inclusion of geo-referenced scan data and topographical correction features.

"Strong pitches were delivered by all seven finalists; however, Reutech was pronounced the winner based on its level of technical readiness, operational success, reputation, focus on worker safety, effectiveness at identifying hazards and user-friendly solution. As the winner, Reutech Mining will have access to seed funding of R1m from the FOGAP R&D fund, which will enable the company to enhance its solution to meet industry needs."

Given the innovative solutions provided by the finalists, the industry bodies are keen to partner with the finalists to refine and further develop their innovations.

"A test piloting site will be identified (either at one of Sibanye-Stillwater's underground operations or at the MMP's Test Mine) to allow participants to test their solutions.

The MMP and the Minerals Council South Africa are hopeful that a commercially viable, innovative solution for FOG will be ready before year-end.

Pienaar notes that taking the route of a 'challenge' to the global community offers a number of benefits, including:

- ❑ A platform for industry bodies to come together with a common goal and objective in mind.
- ❑ Combining efforts, skills and knowledge.
- ❑ Sharing information and learning.
- ❑ Supporting technology innovators.
- ❑ Recognising innovators.
- ❑ Directing innovators on the needs of the industry. ■

MMP

The Mandela Mining Precinct is a public private partnership between the Department of Science and Innovation and the Minerals Council South Africa (hosted by the CSIR).

It is an initiative aimed at revitalising mining research, development and innovation in South Africa to ensure the sustainability of the mining industry.

The Mandela Mining Precinct implements the South African Mineral Extraction, Research, Development and Innovation strategy (SAMERDI), which includes the Advanced Orebody knowledge programme as it is concerned with the identification of hazardous rock.

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Source and service to optimise uptime while reducing risk

According to SEW-EURODRIVE managing director Raymond Obermeyer, sourcing individual components from different suppliers for on-mine power packs, motors and drives can be a complicated process that often results in extended lead times, which are a headache mining operations can do without.

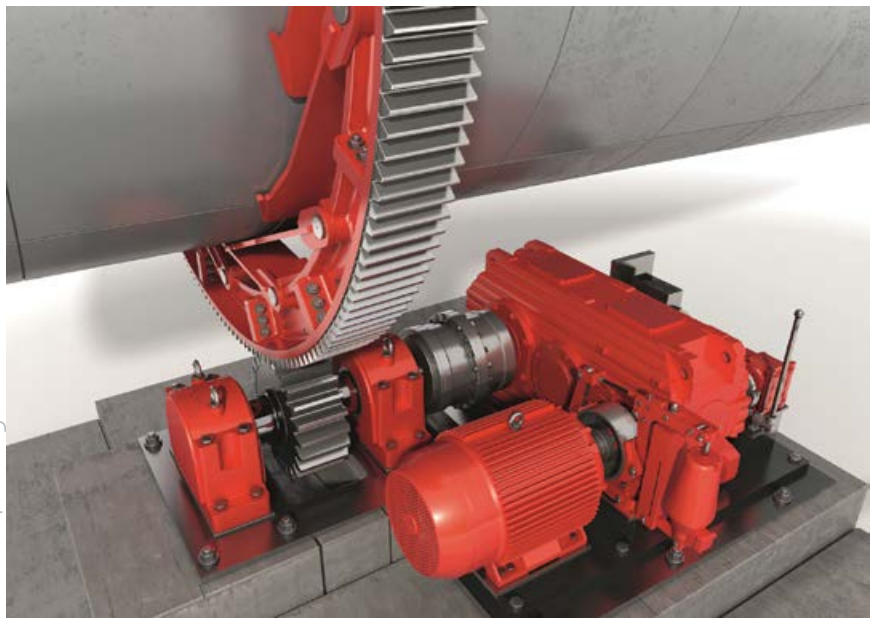
SEW-EURODRIVE managing director Raymond Obermeyer.

As mines continue to focus on optimising uptime and reducing operating costs, there are growing calls for original equipment manufacturers (OEM) able to supply all components required, which Obermeyer explains results in a single line of responsibility and a less complicated procurement process. Mining operations, he says, are also looking for skilled and responsive field service support to advise and attend to equipment whenever necessary.

"This latest trend is a natural evolution in the mining sector as it has a positive impact on performance and return on investment," says Obermeyer. "Gone are the days when mines had large infrastructure to manage complex supply chains and infinite sources of supply; the focus today is on efficiency, reliability and performance."

The current trend, he explains, is for mines to look for supply partners who will take more responsibility for their technological solutions. In the field of motors and drives, for instance, there is considerable complexity and risk in developing a power pack from various company's components.

In SEW-EURODRIVE's extensive involvement around Africa's mining industry, the company witnesses a greater focus on streamlining the supply chain and sharing risk with supply partners. This often means looking to a single OEM to provide all aspects of the solution, which brings a number of benefits.



Complete SEW-EURODRIVE girth gear solution for the mining industry.

"Many mines do not want to be as involved in complex sourcing arrangements which require various components to come from different OEMs," he says. "For a start, it introduces a technical risk that the mine must assume at site level as all aspects of the solution must be perfectly specified. If there is any 'hitch' in the process, mine production could be impaired – even if only temporarily."

Another risk is that the responsibility for any future malfunction would need to be assigned to one or other of the OEMs involved. This requires a technical investigation to establish where exactly the source of the problem lies. The process can take time, and not all OEMs may respond with the necessary speed.

"This causes delays, and downtime is very costly; mining operations are becoming better equipped to measure the value of these

feature

SEW-EURODRIVE offers complete solutions for the mining industry.

non-productive periods," he explains. "It is one of the reasons why priority is increasingly given to a product or solution that is quality engineered, reliable and preferably supplied with a warranty."

These conditions make for maximum uptime, and need to be supported by a responsive service offering for maintenance or repairs. Obermeyer says the strategy of SEW-EURODRIVE has been in direct response to this trend. The company offers its customers an all-in-one solution that can be delivered with short lead times, while prioritising uptime and reducing technical risk.

"The central benefit we offer with our integrated SEW-EURODRIVE power packs is that all our components are engineered to perform to the level demanded by the application," he says. "We are so confident of our equipment's capability that we provide a warranty to this effect."

The result is a high-performance solution designed to the highest German engineering standards, backed up by a responsive support infrastructure around the continent. This gives the user the uptime they expect, keeping production processes streamlined and efficient – quickly earning back the value the mine has invested.

"As mines embrace the technological ability to track their real costs, they invest in solutions that deliver higher outputs – as this is where real value is created," he says. "We support their efforts by providing motors, geared motors and drives that ensure them the lowest cost of ownership."

Obermeyer explains that the company's strategy includes a progressive branch establishment strategy through southern, central and eastern African markets. This enhances the platform for the company to deliver its strong service ethic. The high level of service in turn leverages the capacity of its modern and expanded facility in Aeroton, Johannesburg, which supports these branches.

This facility has enabled a three-fold increase in stockholding, which is vital to ensuring that customers get what they need timeously. Not only does it serve the company's South African branches in Nelspruit, Durban, Cape Town and Gqeberha, but also supports over 23 more countries in Africa.

"Our state-of-the-art condition monitoring systems are another way that SEW-EURODRIVE ensures the uptime of our equipment," says Obermeyer. "With our dedicated approach to service and equipment uptime, we are changing the way our industry operates and pioneering an innovate new approach." ■

Quality manufacture at SEW-EURODRIVE is underpinned by testing including load testing.

M&C and ACTOM Turbo Machines share in generator GO success

Electric motor repairers, Marthinusen & Coutts (M&C) and ACTOM Turbo Machines successfully performed the General Overhaul (GO) of Sasol's Secunda gas turbine driven 147 MVA (120 MW) generator.

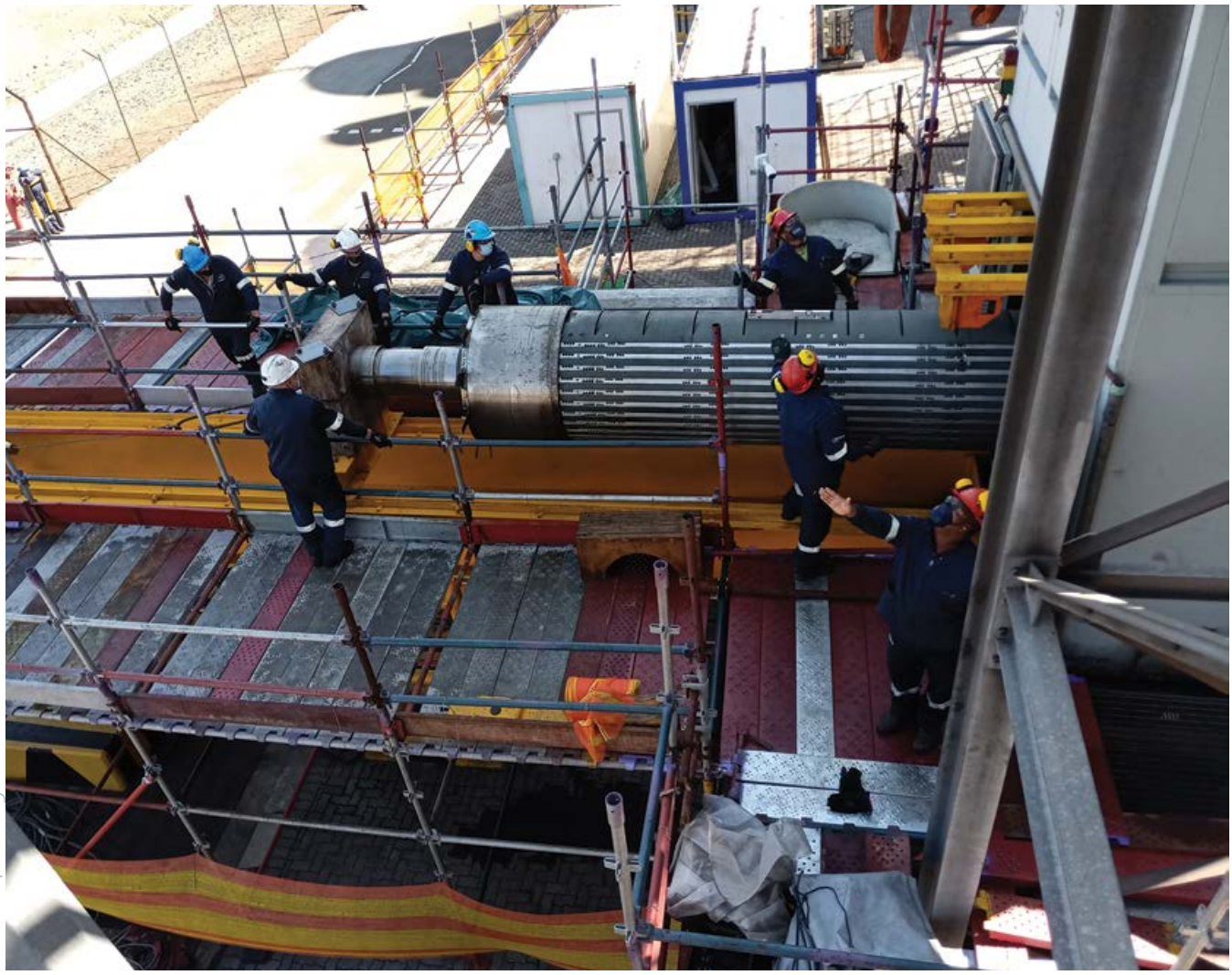
Sasol uses a feed stream of natural gas piped from Mozambique to drive the 2 × 147 MVA turbines and generators. A major General Overhaul (GO) was performed after about 100 000 hours runtime, the company said.

Mike Chamberlain, M&C's marketing & commercial executive who project managed the GO, said M&C was appointed lead contractor on the GO for the 147 MVA generator and took direct responsibility for all the electrical work involved, while ACTOM Turbo was charged with the responsibility of executing all the mechanical work.

The core portion of the contract was carried out during a 34-day shutdown period late last year, when the generator's 34 t, 9 m long, 1 m diameter rotor was removed and transported to M&C's Benoni Power Generation workshop for removal of the rotor's coil retaining rings, inspection and cleaning of the windings and overhangs, plus high-speed balancing of the rotor, before being returned to site for reinstallation.

"At the same time testing and cleaning of the stator windings were carried out on site, and loose wedges were repaired. We also did *in-situ* Partial Discharge and Tan Delta testing, as well as end-winding resonance frequency tests on the 11 kV stator," said Chamberlain.

The GO procedures were completed with the reassembly of the generator on site and performance of a test run witnessed by the client.



ACTOM Turbo Machines removing the 147 MVA rotor from the stator.

feature

However, the teams were confronted, prior to the shutdown, with unexpected complications that had to be first resolved before any of the GO procedures could be carried out..

Special equipment was provided for removal of the rotor out of the stator core, on a sliding rig with trolleys running on a track to bring it out into a central position on the frame structure, from where it could be lifted by a 120 t mobile crane for transport to the workshop.

The rotor threading frame structure, comprising three steel A-frame pedestals anchored onto concrete plinths, was intended to provide support to the rotor threading structure used to remove – and later re-install – the rotor.

"As a precaution before commencing the work, we assembled and checked the threading frame structure in our workshop. All the welds on the A-Frame pedestals failed inspection and had to be re-welded," said Chamberlain.

"On site we found that the structure did not fit, as the cable racks and electrical boxes were in the way, so the railway beam was cut away to clear these obstructions. Furthermore, the railway track was inadequate for supporting the weight of the rotor. It was also necessary to manufacture a new more stable coupling side trolley and modify the skid plate on which the sliding skid runs, to ensure proper protection of the stator windings during removal of the rotor."

Despite the challenges, the contract was completed within the shutdown period with days to spare.

Hamar Controls innovates to stay ahead

To meet the strong demand for commodities, mining houses are progressing both brownfield and greenfield projects; however, supply chain challenges are severely hampering project timelines and throwing schedules off kilter. Even though the world has returned to normality following the Covid-19 pandemic, supply chain disruptions persist with the knock-on effect of labour shortages at ports leading to extensive shipping delays and soaring freight costs. As a result, many companies are experiencing depleted inventory levels for key components and equipment. By *Nelendhre Moodley.*

Electrical substation (e-house) built and equipped by Hamar Controls.

So how are suppliers to the mining sector ensuring that they deliver equipment timeously to progress project development? *Modern Mining* recently spoke to Hamar Controls MD, Chris Joubert and business development manager, Bennie Venter, to find out just how manufacturers of key components are working around these hurdles.

Established in 1981, Hamar Controls has been providing MCCs, electrical substations and associated products to projects across the world.

"The services we provide for this industry include electrical, control and instrumentation (E,C&I) design, mobile substations and E-houses, control cabins, motor control centres (MCC), distribution boards, PLC and control panels, instrumentation selection and supply and site installation of the E,C&I, including racking and cabling and testing and commissioning of all supplied equipment. We have extensive experience in different types of conveyor systems, stationary and rail mounted stackers, reclaimers including bridge, drum and bucket wheel reclaimers, ship loaders and ship off-loaders," says Joubert.

Given the global shortage of key components such as variable speed drives, and various electrical and PLC equipment, Hamar Controls has cast its net far and wide in search of alternative product suppliers.

"Although we remain committed to partnerships with our global OEM suppliers, there is a product backlog of up to 50 weeks and often the stock we require is not readily available from our key branded suppliers. In order to best serve the needs of our customers we have been seeking out alternative products and suppliers and have found several smaller suppliers that are able to provide the products we require at significantly shorter delivery times, with product quality and performance on par with those of well-known brands. We have successfully managed to integrate product with existing customer installed base products," explains Venter.

He adds that these smaller companies are internationally based and have been supplying product to projects for decades.

Owing to the severe shortage of shipping containers, the company, whose strength lies in its ability to deliver customer specific manufactured products,

6000 tph waste spreader where Hamar Controls did the electrical design, equipment manufacturing and installation.

and turnkey projects, has also been pursuing innovative ways to address this challenge.

According to Venter, Hamar Controls' order-book has shown strong growth this year and therefore there is a need to find innovative solutions.

To this end, the company has been fitting out and renewing used containers, going so far as to transfigure 6 m containers into fit-for-purpose 3 m containers.

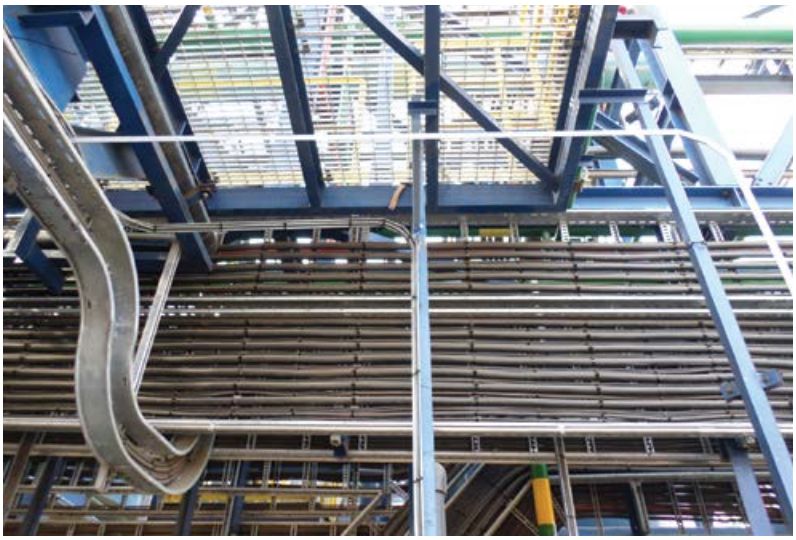
Apart from recently supplying a constant flow of MCCs fitted into containerised substations to a mine in Mozambique and a 12 m substation with MCC and control system for a mine in Lesotho, Hamar Controls has been contracted by a leading materials handling equipment supplier to design and manufacture substations and MCCs for a stacker and a reclaimer. The project is at the design phase and, once completed, will be supplied to a diamond mine.

"Although most of our customers are in Southern Africa, we have successfully completed projects in North Africa, Qatar, China and Malaysia," says Joubert. ■

Electrical and control panels as work-in-progress on the factory floor.

A 3 m container converted into a substation and equipped with LV MCC and DB plus MV incomer switchgear.

3 m containers in the process of being converted into substations.



Cable reticulation on a mine in Africa as part of a turnkey supply and installation contract.

Hamar Controls

- Since inception in 1981, Hamar Controls has been providing electrical, control and instrumentation products and services to industries such as iron ore and aluminium smelters, coal, diamond, gold and platinum mining, harbours and ports and most other industrial plant.
- Although the mining sector remains its core business, accounting for roughly 80% of business, the company also supplies substations and MCCs to the sewerage, water purification, food production, breweries and food and beverage sectors.
- The Roodepoort-based entity is a Level 2 B-BBEE company.

Why investment in mining fails

By Alana van Wouw, market analyst at Crane Ridge

The investment cycle in mining is the process of acquiring, developing and operating a mineral project. It begins with exploration, which is the process of finding and assessing the potential of new mineral deposits. Once a deposit is identified, the next step is to go through the permitting process and secure financing for the project. From there, the project moves into the development phase, which involves constructing the necessary infrastructure and equipment for the mine.

Once the mine is in operation, the project enters the production phase, where materials are extracted, processed and sold. Finally, the project enters the closure phase when operations are shut down and the site is restored to its original condition.

The investment cycle in mining can be a lengthy and expensive process. It requires significant capital investment for exploration, permitting and construction. It is also a risky process, as there is no guarantee that a mineral deposit will be economically viable.

Despite these risks, the investment cycle in mining can provide a steady source of income for companies and investors, as well as an important contribution to local economies. It is important to note that not all investment cycles in mining will be successful. As the industry is heavily regulated, there are numerous factors that can affect the success of a project.

Mining is a complex process that requires substantial investment in both capital and resources. Investment in the sector can fail for a variety of reasons, including fluctuations in commodity prices, regulatory uncertainty and operational inefficiencies.

One of the primary reasons why investment in the mining sector fails is a lack of transparency in the industry. This can make it difficult for shareholders and investors to understand the financial and operational risks associated with their investments.

To improve transparency, mining companies

The investment cycle in mining can be a lengthy and expensive process.

Above: Gold was an attractive investment in 2022.

Centre: Materials are extracted, processed and sold.

should provide detailed information about their operations, including financial performance, resource utilisation, and environmental impacts.

Additionally, companies should provide regular updates about their progress and potential risks. Another way to increase transparency is to improve the disclosure of corporate governance and board oversight.

Companies should provide clear guidance on the roles, responsibilities and composition of the board of directors, and should make information available on the qualifications, experience and performance of the board members. Companies should also provide clear guidelines as to how the board is expected to oversee the company's operations and investments.

Finally, companies should strive to increase shareholder engagement, by providing investors with the opportunity to participate in company decision-making processes and to receive regular updates.

Companies should provide investors with timely and accurate information regarding their investment. Additionally, they should conduct regular financial audits and develop reporting systems that are transparent and easy to understand.

Companies should also have adequate management and internal controls in place to ensure the accuracy and completeness of financial information.

In addition, they should invest in data mining and analytics to identify critical trends and patterns in their operations that may affect their businesses. This can help pinpoint problems before they become too costly to address and give investors greater confidence in the company's operations.

Data mining and analytics can also help companies to identify new opportunities for growth and identify areas of potential risk.

Finally, companies should strive to create an open dialogue with their shareholders and investors. This can be done through regular meetings, calls and conferences, as well as through other methods such as investor relations websites and social media. Having open and honest communication with shareholders and investors can help to build trust and ensure that they have a thorough understanding of the companies' operations and objectives.

Common challenges facing the mining industry in Africa

1. Lack of access to capital

Many African mining companies lack access to the capital needed to invest in the infrastructure and technology required to create a successful and profitable mining operation.

One option is to partner with larger mining companies who can provide access to the capital needed for such investments. This partnership could include joint ventures, where the larger mining company provides capital for the infrastructure and technology needed, while the African mining company provides the resources and labour.

Another option is to access capital from international financial institutions or development banks. These institutions may provide loans at lower interest rates to African mining companies, thereby allowing them to access the capital needed to make the necessary investments.

In addition, African mining companies can look to venture capital and private equity firms to obtain financing for their projects. Finally, African governments can provide incentives and subsidies to mining companies to encourage them to invest in infrastructure and technology.

2. Poor Infrastructure

Inadequate infrastructure is a major challenge in many parts of Africa. Poor roads and insufficient power supply make it difficult to move goods and access mineral resources in remote areas.

Lack of efficient infrastructure can also limits access to health care, education and other basic services and can make it difficult for businesses to access markets, customers, and resources.

To address the challenge of poor infrastructure, governments and development partners need to invest in roads, power and telecommunications networks.

Investments in infrastructure should be combined with incentives for private sector development and measures to reduce red tape and corruption. In addition, governments should invest in human capital by providing quality education and health services to ensure that all citizens can benefit from the improved infrastructure.

Lastly, regional cooperation and integration should be encouraged to ensure that infrastructure projects benefit the entire region and create mutual benefits for the countries involved.

3. Environmental Damage

Mining activities often cause significant environmental damage, including land degradation, air and water pollution, and loss of biodiversity.

The most common environmental impacts of mining activities include deforestation, soil erosion, air and water pollution, and increased soil salinity. Mining activities can also lead to the destruction of natural habitats, the introduction of invasive species, and disruption of local ecosystems. The disposal of waste products from mining operations can create long-term risks to the environment, including soil and water contamination.

Mining activities can also cause noise and air pollution, which can have serious consequences on human health. It is important that miners take steps to minimise the environmental impacts of their operations.

These can include implementing effective dust and noise control measures, restoring mined land to its natural state, and practicing responsible waste management. Miners should also strive to use cleaner and more efficient technologies where possible.

By taking these measures, miners can help to protect the environment and ensure that their operations are sustainable in the long-term.

Mining forms an important part of the global economy, but it is essential to ensure its these activities are conducted in an environmentally responsible manner.

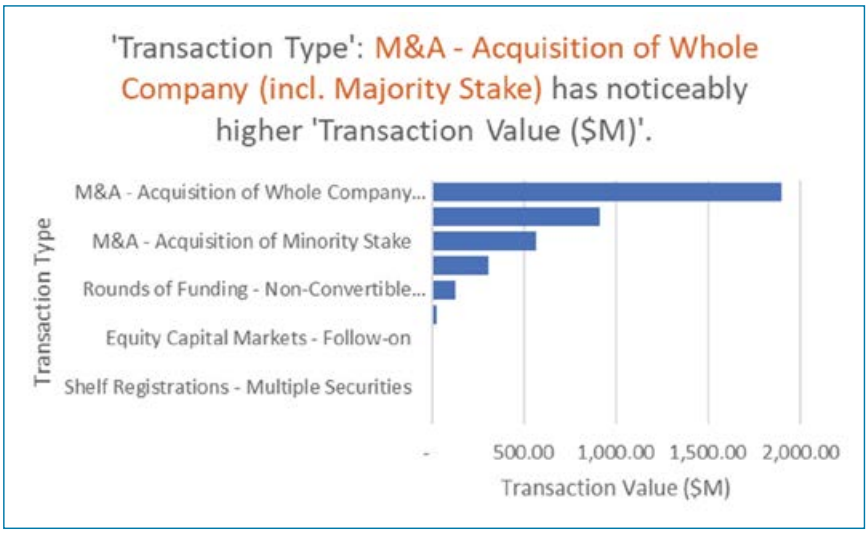
4. Poor Governance and Corruption

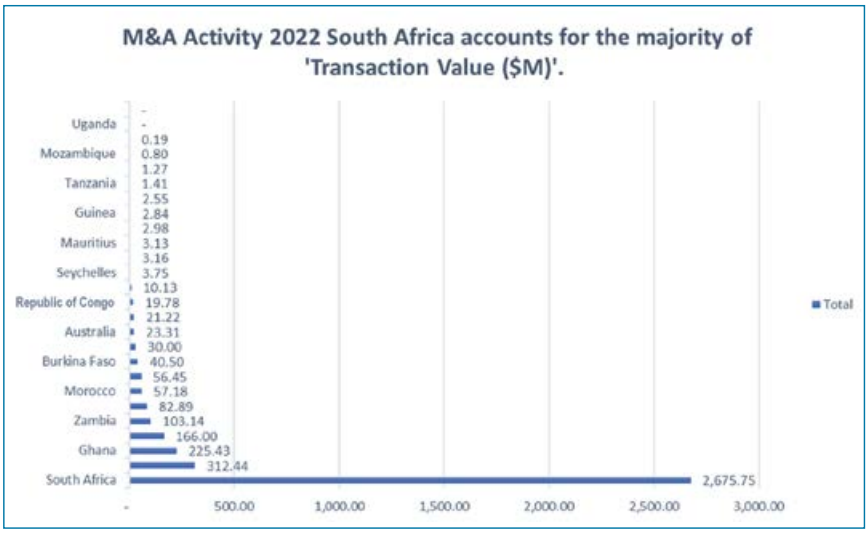
Poor governance and corruption are major challenges in Africa. Unregulated mining operations can lead to environmental and safety hazards, and bribery and other forms of corruption can lead to misallocation of resources.

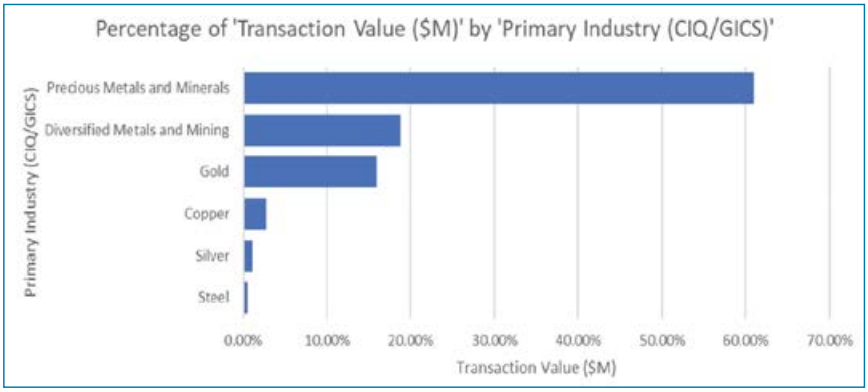
To tackle these issues, governments across the continent should focus on improving the transparency and accountability of their institutions.

This can be done through the implementation of independent anti-corruption commissions, the adoption of international standards of accountability and disclosure, and the enforcement of clear laws and regulations.

Governments should focus on increasing public participation in decision-making processes, and ensure that citizens have access to accurate information about the mining sector. They should invest in capacity building







initiatives to ensure that mining operations are compliant with international standards.

Finally, initiatives should be set up to ensure that mining companies are held accountable for their actions and that the proceeds of mining are used to benefit local communities.

5. Low Levels of Technology

African mining companies frequently lack access to latest technologies, which can lead to inefficient and unsafe operations.

One way to address this issue is to provide African mining companies with more access to technology transfer. This could be achieved through international partnerships and collaborations with advanced mining countries, such as Australia, Canada, and the United States.

These partnerships should focus on sharing best practices and training in the use of safe and efficient mining technologies, such as automation and data analytics. International organisations, such as the United Nations, could help facilitate the transfer of technology and resources to African mining companies, while African governments could provide incentives for international companies to invest in technology transfer programs in African countries.

Overview of M&A - Mine Investment Activities in 2022 for Africa

In 2022, there were several mining investments into Africa. What was clearly noticeable was the high transaction types as M&A – Acquisition of Whole Company was dominant with Majority Stake acquisitions following closely. This trend can be attributed to the continued growth of the African economy, as well as the increasing demand for natural resources.

The continent is home to numerous multinational companies that are looking to capitalise on the continent's rich mineral resources. This has led to increased competition, as well as increased investment into the continent's mining sector.

In addition, the African Union has been pushing for increased regional integration and foreign direct investment, which has seen a significant increase in the number of companies setting up operations on the continent. As a result, more and more companies are looking for ways to acquire or obtain majority stake in African mines.

This has led to a sharp rise in the number of mergers and acquisitions taking place in recent years. Majority stake acquisitions have been particularly popular amongst foreign companies, as these acquisitions allow them to gain a foothold in the African mining industry without having to buy an entire mine or invest in a new project.

The results of the breakdown of commodities that were attractive in 2022 can be seen in terms of the following categories:

Precious Metals and Minerals: Investors saw opportunities in investing in gold, silver and other precious metals and minerals because of their potential for higher returns and price appreciation as well as hedging against inflation.

Diversified Metals and Mining: Investors saw potential in investing in diversified metals and mining companies because of their exposure to multiple metals and minerals and their large-scale operations, which can help to mitigate risk.

Gold: Gold was an attractive investment in 2022 due to its long history of being a store of value and hedge against inflation.

Copper: Copper saw investment due to increased demand from industrial and manufacturing uses, as well as its potential for price appreciation.

Silver: Silver saw investment in 2022 because of its use as an industrial metal as well as its potential for price appreciation.

Steel: Steel saw investment in 2022 due to its use in infrastructure and construction projects, as well as its potential for price appreciation. ■

Ross Harvey, director of research and programmes at GGA.

South Africa has to attract more mining investment, fast

By Ross Harvey, director of research and programmes at Good Governance Africa (GGA)

In the last financial year, the mining sector almost single-handedly delivered the tax revenues the South African Revenue Services so desperately needed post-Covid. But the latest production data released by Stats SA shows a nine percent year-on-year reduction. As Investec has indicated, persistent and heightened loadshedding continues to weigh heavily on the energy intensive mining sector and remains a key downside risk to the country's growth potential. The national energy regulator (NERSA) has granted an 18 percent tariff increase to Eskom, South Africa's highly indebted electricity parastatal. Nersa's stern rebuke to the utility is cold comfort, though, although the granted increase was significantly less than the 32 percent originally requested.

The single biggest hindrance to investment in the South African mining sector, which remains the lifeblood of the economy, is loadshedding.

The single biggest hindrance to investment in the South African mining sector, which remains the lifeblood of the economy, is loadshedding. The second is the inefficiency of current transport logistics. Transnet, which is meant to operate freight rail and ports, has cost the South African mining industry significant sums in lost revenue. A prolonged strike last year may have cost $44m per day in export revenue. This exacerbates the pre-existing long-term trend of declining investment. Exploration expenditure, for instance, has declined from 5 percent of the global total in 2003 to less than 1 percent two decades later. This means that an exploration pipeline has not been developed, and the expansion of existing mines is not particularly promising, given that many are old, deep and increasingly expensive to extract from.

Beyond these two major constraints to investment in the sector – either for exploration or for production expansion – there are serious deficiencies in South Africa's minerals legislation. These deficiencies come at the opportunity cost of foregone new investment, as well as disincentivising expansion investment. This is not only because the substance of the legislation that directly governs mining is a problem, but because there are elements of the law that are inconsistently implemented. There are a number of specific issues that need to be fixed. I focus on five below that are, in my view, worth tackling sooner rather than later.

Persistent and heightened loadshedding continues to weigh heavily on the energy intensive mining sector.

First, the Mineral and Petroleum Resources Development Act (MPRDA) has to be changed in respect of how it governs licensing application processes. Whether a company is applying for an exploration or a production license, the process needs to be clearly defined in legislation. Previously proposed amendments to the 'first-in-first-assessed' system have thankfully been abandoned, but there is still room for chicanery. For instance, Clause 2 of Section 9 of Chapter 4 says: "When the Minister considers applications received on the same day he or she must give preference to applications from historically disadvantaged persons". This provides too much room for the type of fraudulent application lodged by Khulubuse Zuma's Imperial Crown Trading (ICT), which the DMRE accepted but the Constitutional Court eventually threw out. A digitalised cadastre system, which is still not properly functional (you can only access it if you are a registered applicant), would solve this problem immediately, as it would indicate which concessions are up for application or renewal, and by when. It would also time-stamp applications the minute they were uploaded. The cadastre must be built properly, implemented as soon as possible, and referenced explicitly in Section 9 of the MPRDA.

Second, it remains patently clear that the MPRDA is incongruent with a range of other related legislation and regulations. The 2008 Amendment Act (the version of the MPRDA currently in force because subsequent amendments failed and were extraordinarily confusing) was introduced specifically to make the Minerals Minister responsible for "Implementing environmental matters in terms of the National Environmental Management Act."

But, as Helen Acton at Good Governance Africa (GGA) points out, it is not that simple: "The DMR has continuously tried to assert environmental authority in the mining sector, demanding that the attainment of a mining right trumped the need for any other

authorisation by the [Department of Environmental Affairs].” The upshot is that we now have “a legislative vacuum concerning whether holders of prospecting or mining rights obtained under the MPRDA require an additional environmental authorisation under NEMA.” Among other things, Section 38B of the MPRDA needs to be modified and enforced, as it was excluded when the 2008 Amendment Act was enacted in 2013, leaving confusion in its wake.

Third, ministerial discretion remains excessive within the legislation. To give credit where it is due, investors are better off than they were a decade ago when the first-in-first-assessed system of processing licence applications came under fire. Proposed amendments to the MPRDA would have given the minister the power to invite applicants to apply on the basis of his or her discretion. Moreover, there was talk of a move to an auction-based system, where concessions would be auctioned off like oil blocks. This only works if the geology is meticulously mapped first, which is not the case in South Africa. Nonetheless, too many elements of the MPRDA resort to relying on the minister’s power to decide. This makes investors twitchy and should be abandoned. Everything that can be codified should be codified so investors know they have full recourse should anything go wrong, instead of having to rely on essentially personalised deal-making.

Fourth, the social and labour plan (SLP) requirements of the MPRDA are too formulaic and narrow. This produces a minimum compliance response from industry instead of a healthy, sustainable commitment to changing the broader governance system within which any given company operates. I attended a recent major mining house event at which the people responsible for community-level development projects disclosed that SLP drives overly narrow Corporate Social Responsibility (CSR) initiatives. In other words, companies either end up simply building hospitals or schools (never mind who will supply services and staff to these facilities beyond the life-of-mine) or doing local government’s job for it. A recent Intelligent Report by GGA demonstrates a strong correlation between strong performance on GGA’s Governance Performance Index (GPI) and political stability at the local municipal level. The message is clear – companies would derive better development bang for buck investing in institutional capacity to improve government effectiveness than building amenities that should be provided by the governing authority tasked by the constitution to do so. The MPRDA should enable rather than hinder this.

Fifth, implementation of the MPRDA is inconsistent and unclear. That is not only because the capacity to carry out basic bureaucratic functions is often absent (for reasons that remain unclear to the public and to other departments within government), but because the MPRDA does not necessarily lend itself to proficiency. For instance, if the law stipulated clearly that environmental authorisations for mining licences sat firmly within a specific section of the Department of Environmental Affairs, there would be no role confusion or conflict of interest. Similarly, if licensing applications had to be processed within three weeks, the required administrative capacity could be easily provided. Of course, a proper cadastre system could simply use AI to execute this function. The same is true of mine stoppages, which mining companies still complain are arbitrary instead of a function of a healthy relationship between firms and the government. A punitive approach to responsible companies, while irresponsible, politically connected companies continue to operate without water licences, for instance, makes investors wary.

With a dwindling tax base, and a growing number of dependants on increasingly fewer jobs in South Africa, the urgency of reversing investment decline in the mining industry cannot be overstated. Mining remains a catalytic player and it is not exaggerative to say that the industry will be in its death throes if prompt and serious action is not taken. Yes, electricity and transport logistics have to be addressed as matters of utmost general priority, but other steps must simultaneously be taken to send the appropriate signal to investors that South Africa is a serious mining capital destination. ■

Transnet has cost the South African mining industry significant sums in lost revenue.

Exploration expenditure has declined from 5% of the global total in 2003 to less than 1% two decades later.

Mining remains a catalytic player and it is not exaggerative to say that the industry will be in its death throes if prompt and serious action is not taken.

Grindex expands geographic footprint

Dewatering, slurry and sludge pump specialist Integrated Pump Technology will be marketing the Grindex submersible pump range in more countries around Africa.

With the quality Grindex brand, the company's success in southern Africa has led to an expansion of its geographic footprint, according to Jordan Marsh, general manager at Integrated Pump Technology. This feather in the company's cap comes with a five-year renewal of the Grindex distributorship – a step up from the previous three-year term.

"We welcome this vote of confidence in our ability and look forward to the business we anticipate from a number of exciting new markets," says Marsh. "Our strategy over the years has been to build traction across Africa through a systematic expansion into more markets." The seven new countries where Integrated Pump Technology will market the Grindex brand are Angola, Gabon, Kenya, Malawi, Rwanda, Tanzania and Uganda. This substantially augments the company's potential for growth, Marsh says. It has already had great success in South Africa, Namibia, the Democratic Republic of Congo, Zambia, Botswana, Mozambique and Madagascar, as well as Lesotho and Eswatini.

Grindex expands geographic footprint.

"This step will see our mining focus growing into territories that are highly prospective," he explains. "For this reason, we have recently employed a dedicated person to handle these areas, which include identifying and appointing the most suitable local agents and distributors."

He notes that, in many of these countries, the mining sector plays a fundamental role in pioneering economic growth and creating the basis for development. With the buoyancy of commodity prices in recent years, these areas have improved as targets for global investment. ■

Magna Tyres showcased its latest OTR Tyre portfolio at Mining Indaba

Dutch OTR tyre manufacturer, Magna Tyres, returned for the fifth time as an exhibitor to the Investing in African Mining Indaba. Magna Tyres South Africa MD, Robert-Jan Geurink said: "For Magna Tyres South Africa the show offered the perfect opportunity to reconnect and meet up with important and key decision makers in the mining industry; not just in South Africa but around the world. At the same time the show provided us with yet another platform to visibly showcase Magna Tyres as the fastest growing second tier OTR tyre producer in the industry."

Magna Tyres South Africa's objective at the 2023 event was to attract and capture new, long term business partnerships for the future. The company showcased its most popular tyre product – the Magna MA60 in size 800/80R29 along with the all-new underground mining range, which debuted at the show.

The Magna MA60 is a specially developed 60-ton articulated dump truck tyre pattern operating in a variety of demanding mining and quarry applications. ■

Magna Tyres showcased its OTR Tyres at Mining Indaba.

Efficient Engineering builds SA's engineering base for growth

Leveraging the global economic recovery, Efficient Engineering is gearing up for continued growth – while strengthening the industrial foundation of the South African economy.

According to Gary Colegate, chief operating officer at Efficient Engineering, the company has seen exciting growth in orders from OEM customers in the mining sector who recognise its world class design and fabrication capability. Its ongoing upskilling efforts have been matched by the latest technology, including a recent R55 million investment in state-of-the-art CNC floor and table type machining centres.

Buoyant commodity prices have been driving new projects and expansions across the mining sector, Colegate points out. Much of the company's new business is also from significant aftermarket demand, such as buckets or bowls on rigid earthmoving trucks. He notes that many global OEMs active in South Africa are looking to maximise their local content, due to considerations of cost effectiveness and disruptions in global logistics.

As a result, Efficient Engineering has had considerable success in capturing business from its overseas competitors. Its agility and ability to fulfil orders rapidly have given it an advantage in an environment where issues in global supply chains have led to longer lead times.

"With our engineering legacy dating back over half a century, we employ some of the most experienced artisans and boilermakers in South Africa," he says. "Our quality systems and in-house design and production capacity ensure that we compete toe-to-toe with the world's best; matching them in terms of our cost-competitiveness and quality." ■

Efficient Engineering gears up for continued growth.

Automation is a key trend for overhead cranes

Growing awareness of the benefits of full crane automation is currently the most noticeable trend in Africa's overhead crane industry, says Marc Kleiner, MD of crane manufacturer Condra.

He says that records show a significant increase in the number of tender documents specifying provision for crane automation post-installation. Kleiner notes that although Condra received no orders for fully automated cranes during 2022, the number of enquiries for such machines was well up year-on-year.

"Repetitive crane operations, such as those in refinery operations, offer clear potential for increased productivity through automation. South Africa has the technology and the local manufacturing capability to deliver it, and now the market is becoming increasingly aware. I don't think we will have to wait long before automation gains a foothold."

Kleiner stresses that Condra has offered full automation across its product range since 2020, the culmination of continuous development since the company's first semi-automated crane installation at a Durban spice company in 2003.

Kleiner notes that about one in five enquiries received by Condra now includes specified provision for future automation, a requirement met by incorporating wheels and rails with tighter tolerances, and provision of fitment and wiring points for the future attachment of cameras with cognitive movement control ability, the main requirements for automation.

"Condra is in a good position going into 2023. We have a solid order book which includes contracts recently signed with steel companies and mines across Africa both above and below ground." ■

Crane automation is the most noticeable trend in Africa's overhead crane industry.

Weir Minerals applies casting innovation at Isando plant

With the recent opening of its new Replicast Plant at its foundry in Isando, Weir Minerals Africa has been reducing turnaround times and further improving on quality levels. Plant manager Umar Smith says there are also sustainability benefits from the new technology.

"As part of our Project Vuka, the new plant allows us to cast multiple small components per batch rather than just one at a time," says Smith. "We can also reduce our knock-out times from days to just a couple of hours."

The state-of-the-art facilities enable Weir Minerals Africa to cast high chrome parts weighing up to 250 kg. There are two phases to the new process, he explains, which uses polystyrene to create moulds. The first phase is the polystyrene moulding process, which occurs after the polystyrene beads have been expanded. The second phase is where the ramming, pouring and demoulding takes place.

Weir Minerals Africa can cast high chrome parts weighing up to 250 kg.

In contrast to the traditional moulding line – where resin and catalyst are used to bind sand – the Replicast Plant uses silica sand of 30-35 AFS grade together with the polystyrene mould, he says. ■

KANU acquires KEMACH

Equipment supplier, Kanu Equipment, has entered into an agreement to acquire Kemach Equipment South Africa. Kanu is the largest distributor of Liebherr, Bomag and McCloskey equipment on the African Continent and Kemach distributes the same brands within South Africa, in addition to Bull TLBs and Kemach Forklifts.

Kanu distributes Liebherr, Bomag and McCloskey equipment.

"The synergies are obvious, and of ultimate benefit to our customers. We are confident that under the direction of the Kanu Management Team these premium brands in the Kemach stable will receive the dedicated support they deserve. In addition, existing Kanu customers in Africa will benefit from the new resource available within South Africa," the company said in a statement. ■

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Published 12 times a year, Modern Mining covers the entire spectrum of the mining industry from 'grassroots' exploration through to beneficiation. Modern Mining's goal is to deliver objective reporting and incisive articles not only on the technical aspects of mining but also on broader issues such as empowerment, sustainability, and regulatory issues. The emphasis is on original writing and reporting based on face-to-face interviews and visits to mining operations, both in South Africa and further afield. In terms of layout, it features a crisp, modern design which complements the high-quality editorial.

People who are 'serious about mining' read Modern Mining. It contains high quality and credible editorial which is valued by engineers and non-technical readers alike. For advertisers it offers a focused approach as well as tailored, integrated marketing campaigns. In terms of circulation, Modern Mining ranks among the mining monthlies with the highest ABC certified circulation. It reaches mining people throughout Africa and across the globe and is proud to offer advertisers a list of more than 30 countries as part of its mailing list. The print edition is distributed to a managed target audience. This is complemented by PDF replicas nearly 11 657 in total – of which 8 156 are distributed locally and 3 501 into Africa – which are mailed out each month and make up a significant total of the distribution.

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