MODERN MINING

January 2023 | Vol 19 No 1

CROWN PUBLICATIONS

For people who are serious about mining

- **GoldOre eyes global growth** with the MACH Reactor
- **Commodities Outlook:** forecasting fundamentals for 2023
- **Top projects** advancing to production
- **Mining Indaba** to offer thrilling line-up of new topics

Special Mining Indaba issue

SOME OF THE PROJECTS WE ARE FORGING AHEAD WITH INCLUDE:

- The ongoing development of our Mintails acquisition, with the potential to add 50 000 ounces to our annual gold production and much needed environmental benefits for the area.
- Continued innovation and optimisation at Evander Gold Mines, mining what is one of the largest unexploited gold orebodies in the world.
- Increased investment in solar renewable energy at all our operations, representing significant cost savings but also assisting with our decarbonisation strategy.
- A host of ESG activities including the first blueberry harvest at the Barberton community project and continued support for the Barberton Mountainlands Conservation Area Biodiversity and Care for Wild Rhino project presently offering safe haven and care to orphaned Rhinos.

All part of delivering a smarter, more agile and future-focused approach to mining.

www.panafricanresources.com

Mining For A Future

CONTENTS

ARTICLES

COVER

COMMODITIES OUTLOOK

TOP PROJECTS

MINING INDABA PREVIEW

COMPANY PROFILES

REGULARS

MINING NEWS

COLUMN : ROSS HARVEY

SUPPLY CHAIN NEWS

ON THE COVER

Despite current market challenges, GoldOre has landed new business in new international territories in line with its strategy of global business expansion. See story on page 10.

COMMENT

A happy New Year?

Nellie Moodley

If the *horoscope* predictions for 2023 are to be believed, then I guess it's a happy New Year, on most fronts, which is a relief given the trials of the past few years. But, as South Africans we come into the New Year with legacy challenges, particularly those related to Eskom, which is likely to dim that upbeat forecast.

Obviously, the thought of the Department of Mineral Resources and Energy taking over Eskom has irked many people, with a number questioning the department's ability to effectively handle such a massive undertaking.

That the National Energy Regulator of South Africa recently agreed to an 18.65% increase in electricity tariffs, effective from 1 April this year, further burdening cash-strapped South Africans, is the straw that is breaking South African's back.

Citizens have long watched politicians and senior government employees serving themselves instead of the nation with the result that there continues to be gross mismanagement and poor maintenance of equipment and plants, and lack of investment in key infrastructure which now sees us facing stage six loadshedding. Ministers though are exempt from both loadshedding and water shedding – what a pity. It might have made a massive difference if they were forced to endure the same severe levels of shedding that the rest of us face.

The saying: *You can fool some of the people all of the time, and all of the people some of the time, but you cannot fool all of the people all of the time*, is most apt.

If this is the case, are we lining up for an Arab spring? Violent protest action is already erupting amid growing frustration at the electricity crisis, which is having a knock-on effect on water availability in some areas.

But South African's are not alone in being powerless; numerous countries across the globe face power issues, even if not of their own making.

The 53rd annual meeting of world leaders at the World Economic Forum in Davos, has seen some energy experts declare a global energy crisis amid the Russian invasion of Ukraine, with the war placing pressure on oil and natural gas supplies to many European nations.

From a power point of view, 2023 is certainly going to be a horrendous year for South Africans – with some experts predicting stage 8 and stage 10 loadshedding. Stage 10 loadshedding, what does that even mean? I shudder to think!

But on a more positive note, the issue of power will be unpacked in greater detail at the Investing in Africa Mining Indaba 2023 and attendees will certainly get a chance to hear what the Minister of Mineral Resources and Energy has to say on the subject. How the DMRE, which has failed for years to implement what some in industry regard as a "simple solution" for a cadastral system, is to succeed in turning around the failed power utility remains a mystery.

As the mining industry and related businesses gear up for the Investing in Africa Mining Indaba, the organisers report a thrilling line-up of new topics and a greater focus on emerging and junior miners, and ESG.

To give readers a view of how key commodities are set to perform in 2023, industry specialists have provided us with a Commodities Outlook, including the WPIC, which offers a PGM outlook, the State Diamond Trader provides an outlook for the diamond industry, coal miner, Menar, shares insight into the coal sector and our regular economist, Alana van Wouw, imparts her outlook on the zinc market.

This edition also features our top projects and gives an update on their latest developments, including production timelines. The top projects are: De Beers Venetia Underground mine, Renergen's Virginia gas project, Ivanhoe's Platreef project, Pan African Resources the Mogale Gold project and Orion Minerals Prieska project.

Meanwhile, our cover story, GoldOre, which is garnering much attention with its innovative MACH Reactor, has its eye firmly set on capturing world attention, says MD Adrian Singh. ■

Editor: Nellie Moodley
e-mail: mining@crown.co.za
Advertising Manager: Rynette Joubert
e-mail: rynettej@crown.co.za
Design & Layout: Darryl James
Publisher: Karen Grant
Deputy Publisher: Wilhelm du Plessis

Circulation: Brenda Grossmann and Shaun Smith
Published monthly by: Crown Publications (Pty) Ltd
P O Box 140, Bedfordview, 2008
Tel: (+27 11) 622-4770
Fax: (+27 11) 615-6108
e-mail: mining@crown.co.za
www.modernminingmagazine.co.za

Printed by: Tandym Print

Average circulation
July-September 2022: 13 141

MANUFACTURER AND SUPPLIER OF SPILLAGE CONTROL EQUIPMENT

BRELKO®
CONVEYOR PRODUCTS

NIP GUARD
SAFETY DEVICE
PATENTED

- Brelko Nip Guards improve worker safety around head, tail, and drive pulleys. Brelko Nip Guards prevent worker exposure to conveyor pulley nip points and pinch point hazards.

FEATURES

- Easy installation.
- Low maintenance.
- Simple design.
- Operates in all conditions.
- Manufactured according to SABS, CEMA, Australian and PROK mounting standards.
- Unique adjustable guard maintains a constant gap between the conveyor belt and guard, even when the conveyor belt is tensioned.
- Robust construction for longer life.
- Can be installed on bi-directional conveyor belts.

BELT TRACKING SYSTEM
3 / 5 ROLL TROUGHING FRAME
PATENTED

- Install the Belt Tracking System on the troughing side of the belt to centralise a misaligned belt, prevent spillage, decrease downtime, decrease maintenance and extend belt life.

FEATURES

- Easy installation.
- Low maintenance.
- Vibration free rolling action.
- Simple design.
- Adjustable troughing angle.
- Operates in all conditions.
- Manufactured according to S.A.B.S. mounting standards.
- Fully sealed construction of bearing housing prevents ingress of material into the bearing unit.
- Robust construction for longer life.
- Proven polyurethane impact rolls, last up to 3 times longer than standard rubber lagged rolls.

PRODUCTS

- Conveyor Belt Scrapers
- Angle & V Plough
- Chute Inspection Seals
- Belt Support Systems
- Hi-Impact Systems
- Belt Tracking Systems
- Keyskirt®
- Chute Sealing Systems
- Nip Guard Safety Device
- Installation & Service

Tel : +27 11 013 4000 Fax : +27 11 013 4150 E-Mail : sales@brelko.com Website : www.brelko.com

EAIF commits €25-million to 44 MW hydropower plant in Côte d'Ivoire

Private Infrastructure Development Group (PIDG) company, the Emerging Africa Infrastructure Fund (EAIF), has announced a €25 million finance facility to Ivoire Hydro Energy (IHE), which will build a 44 MW hydro electricity generation plant on the Bandama River near the village of Singrobo in Côte d'Ivoire.

EAIF's long-term financing package enables IHE to achieve financial close for the project, catalysing the design, construction and operation of the power plant and associated infrastructure, and boosting rural access to clean energy.

The new plant will be an essential strategic economic asset for Côte d'Ivoire, where electrification rates range from 88% in urban areas to as low as 31% in rural parts of the country. By displacing expensive peak-time diesel production and reducing CO_2 emissions by 124 000 tons per annum, the plant is also integral to the government's efforts to achieve the UN's Sustainable Development Goals on Climate Action (SDG 13) and on Affordable and Clean Energy (SDG 7).

Construction of the plant – as well as 3 km of access roads and a 4 km 90 kV transmission line and substation to connect the hydropower plant to the existing Taabo-Agboville transmission line – will generate over 500 jobs.

Paromita Chatterjee, investment director at Ninety One, the fund manager for EAIF, noted: "The new facility at Singrobo will be Cote d'Ivoire's first hydro-electric development by an independent power producer. We are excited that it delivers on three of PIDG's strategic objectives: mobilising private capital, enabling economic development and contributing to increasing Africa's stock of renewable energy infrastructure."

EAIF invests €25 million to build a 44 MW hydro electricity generation plant.

The Singrobo plant catalyses the Ivorian government's strategic plan for the development of the electricity sector, which aims to increase the total installed capacity to 4.2 GW (from around 2.2 GW currently) by 2030 mainly through Public-Private Partnerships, reaffirming EAIF's role as a pathfinder supporting the development of nascent renewable energy markets. A long-term power purchase agreement will see all the energy produced by the Singrobo plant sold to *Compagnie Ivoirienne d'Electricité*, the operator of Côte d'Ivoire's national grid. In addition to closing the rural energy access gap and strengthening economic productivity, the plant's flexible operating model enhances grid resilience, meaning it may be called in to meet baseload and peak demand. ■

Caledonia completes acquisition of Bilboes gold project in Zimbabwe

AIM-listed Caledonia Mining Corporation has completed the acquisition of Bilboes Gold, the parent company that owns, through its Zimbabwe subsidiary, Bilboes Holdings, the Bilboes gold project in Zimbabwe. The project is a large, high grade gold deposit located about 75 km north of Bulawayo, Zimbabwe. Bilboes gold has NI43-101 compliant proven and probable mineral reserves of 1.96 million ounces of gold in 26.64 million tonnes at a grade of 2.29 g/t, measured and indicated mineral resources of 2.56 million ounces of gold in 35.18 million tonnes at a grade of 2.26 g/t, and inferred mineral resources of 577 000 ounces of gold in 9.48 million tonnes at a grade of 1.89 g/t. A feasibility study prepared by the vendors (the DRA Feasibility Study) indicates the potential for an open-pit gold mine producing an average of 168 000 ounces per year over a 10-year life of mine. ■

Caledonia finalises acquisition of Bilboes gold.

AfriTin Mining rebrands to Andrada Mining

AIM-listed AfriTin Mining, an African technology metals mining company with a portfolio of mining and exploration assets in Namibia, has confirmed its name change from AfriTin Mining to Andrada Mining. The change of name took effect on 11 January 2023.

The name Andrada reflects the company's expanding lithium and tantalum resources alongside its existing tin production. It originates from *José Bonifácio de Andrada e Silva*, the Brazilian mineralogist and professor who first discovered petalite and spodumene, which are major lithium bearing minerals and a precursor to the identification of lithium. The company believes the Uis licence could host a globally significant lithium resource. Anthony Viljoen, CEO, commented: "I'm delighted to confirm the company's change of name and we look forward to rebranding as Andrada Mining. The company's potential lithium resource size in Namibia is extremely exciting, and the change of name reflects the importance of it within our growing production profile, beyond our existing tin operation. We look to the future with huge excitement as Andrada Mining plays its part in the energy transition." ■

Andrada Mining CEO, Anthony Viljoen.

Akobo Minerals continues rapid development of Segele Mine

Ethiopian gold exploration and boutique mining company, Akobo Minerals, says the company is ramping up its activities to develop the Segele Gold Mine.

The surface mining operations are underway, the process plant parts have started arriving and many designs are nearing completion, the company said.

The mining contractor IW Mining has made significant progress and reached a depth of 9 m in the incline shaft entrance, with only five additional metres depth needed to reach the depth where underground mining will begin. The first blast is expected to be completed within days and the development of safety procedures is nearing completion.

As the intensity of mining activities increases, IW Mining has begun recruitment of local staff, and additional earthmoving equipment is being sourced. The gold processing plant design and fabrication process is close to completion with only a few minor parts remaining. Plant contractor Solo Resources has successfully navigated the challenging processes of timely shipping from South Africa, Canada, Australia and China. A total of 19 shipments are on their way to site, the company stated.

An Ethiopian civil engineering firm is in the process of completing geotechnical investigations and foundation designs for the processing plant. Once the foundations are in place, construction and commissioning will be supervised by Solo Resources and Akobo Minerals.

Above: The incline shaft entrance excavation has reached a depth of 9 m.

Right: The ball mill and other major equipment for the crushing circuit have arrived on-site.

The company has also recruited experienced processing plant specialist, Manie Nienaber from South Africa, to lead the construction, commissioning and operation of the processing plant. ■

Orezone enhances management team

TSX-listed Canadian mining company, Orezone Gold, which is operating the open pit Bomboré Gold Mine in Burkina Faso, has announced the appointments of Rob Henderson as vice president, technical services, and Kevin MacKenzie as vice president, corporate development & investor relations.

CEO Patrick Downey, said, "I am extremely pleased that Henderson and MacKenzie have joined our team. Both are well-regarded industry professionals with significant worldwide experience in management, operations, exploration, capital markets and M&A. Henderson is a proven mining executive with extensive global operations and development experience including West Africa as VP technical services for Kinross Gold. He will lead Orezone's technical teams, ensuring ongoing operational excellence, and provide technical and management leadership as we advance Bomboré through the planned major sulphide expansion. MacKenzie has a strong technical and capital markets background, most recently as a leading precious metals analyst for Canaccord Genuity, with global experience in asset evaluation. His skillsets and experience will be invaluable as we expand our growth strategy in the region and look to grow our business into a multi-asset, multi-jurisdictional, high quality mid-tier gold producer."

Orezone enhances management team.

Henderson is a global mining industry leader with international experience in operating, building and acquiring mineral properties. He has worked in the industry for 35 years for Great Panther Mining, Amerigo Resources, Kinross Gold, DeBeers and Rand Mines and provided engineering services to international mining clients while with SNC Lavalin and Hatch.

MacKenzie has over 15 years of capital markets and industry experience. Prior to joining Orezone, MacKenzie held the position of MD: metals & mining equity analyst at Canaccord Genuity. ■

Kamoa Copper's growth profile aligns with sustainability and social initiatives

Canadian miner, Ivanhoe Mines' Kamoa-Kakula Mining Complex, in the Democratic Republic of Congo (DRC) produced 333 497 tonnes of copper in concentrate in 2022, achieving the upper-end of the original 2022 production guidance range of 290 000 to 340 000 tonnes. Kamoa-Kakula's 2022 production achievement represents a year-over-year increase of 215%, the company said. The 2023 annual production guidance for Kamoa-Kakula is estimated at between 390 000 to 430 000 tonnes of copper in concentrate, following the anticipated completion of the debottlenecking programme early in the second quarter of 2023.

Kamoa-Kakula's 2022 production achievement represents a year-over-year increase of 215%.

Executive co-chair Robert Friedland commented: "Kamoa-Kakula has firmly established a track record of excellence during the development of Phase 1 and Phase 2 operations, which has led to an industry-leading growth profile in terms of copper production that will continue as we bring Phase 3 online. Kamoa-Kakula also stands out among its peers as one of the few mining operations worldwide to deliver strongly on its original 2022 production guidance, which is further testament to the team of engineers and contractors who commissioned the Phase 2 concentrator several months ahead of schedule. With the Phase 3 expansion well on track, including the integration of Africa's largest single-line blister-copper flash smelter, Kamoa-Kakula is poised to become one of the world's leading producers of vital copper metal for global markets, a producer that will have one of the lowest, if not the lowest, carbon footprints in the industry." ■

Walkabout Resources appoints GM for Lindi Jumbo project

ASX-listed Walkabout Resources has appointed mining executive Charl van der Merwe as general manager of the Lindi Jumbo Graphite Mine in Tanzania.

Van der Merwe joins the Lindi Jumbo team at a crucial time, as preparations for mine commissioning and operations gather pace while construction continues. The Lindi Jumbo Graphite Mine is currently under construction and an estimated six months from the start of commissioning after further funding is finalised and remaining shipments commence.

CEO of Walkabout Resources, Andrew Cunningham commented: "This appointment significantly bolsters the company as it prepares for an exciting growth phase, with its high quality high-margin flake graphite mine earmarked to come on-line during a forecast period of severe global graphite supply shortfall". ■

Lindi Jumbo prepares for mine commissioning.

ERG and Gécamines restart operations at Boss Mining in the DRC

Eurasian Resources Group (ERG) and its joint-venture partner, La Générale des Carrières et des Mines (Gécamines), celebrated the restart of operations at Boss Mining with a ceremony held at its concession in November 2022.

Boss Mining, located in the Lualaba and Haut-Katanga provinces of the Democratic Republic of the Congo (DRC), has a long history of copper and cobalt production from significant open-pit resources. Boss Mining was placed into care and maintenance early in 2019 to allow ERG and Gécamines to assess different investments paths and conduct further studies to improve operations' economics and sustainability.

Benedikt Sobotka, CEO at ERG, said: "We are not only celebrating the return to production at this time, but also our long-standing partnership with Gécamines and its professional team, without whom this restart would not have been possible."

The phased restart will concentrate on processing historically mined fines over the next 16 months to produce copper cathodes and cobalt hydroxide. The operation will ramp up over the coming months to its full capacity producing, on average, 1 800 t of copper cathode and 300 t of cobalt hydroxide a month, by March 2023.

ERG and Gécamines celebrate the restart of operations at Boss Mining.

Anglo American invests $200 m to accelerate Zero Emissions Haulage Solution

Diversified miner, Anglo American, has signed an agreement with First Mode Holding (First Mode) to combine Anglo American's nuGen™ Zero Emissions Haulage Solution (ZEHS) with First Mode, the specialist engineering technology company that partnered with Anglo American to develop the nuGen™ ZEHS.

The transaction is intended to accelerate the development and commercialisation of Anglo American's nuGen™ ZEHS. Anglo American acquired a 10% strategic equity interest in First Mode in 2021. The transaction includes Anglo American making an additional capital investment of $200-million in the combined business to help fund the ongoing development of ZEHS which, upon completion of the transaction, values the business in the order of $1.5 billion and results in Anglo American owning a majority shareholding in First Mode. The balance of the equity interest at that time will be held by several of First Mode's founders and employees.

Anglo American accelerates Zero Emissions Haulage Solution.

In addition to accelerating the development and commercialisation of the ZEHS technology, the new combined business will allow strategic third parties to co-invest alongside Anglo American and First Mode, offering the opportunity to accelerate their own decarbonisation and participate in the potential offered by the clean ZEHS technology.

Ironveld achieves first production at refurbished smelter

AIM-listed Ironveld reports that its subsidiary, Ironveld Smelting, has completed refurbishment of the first of the three furnaces at the Rustenburg smelter complex and has successfully produced metal from the furnace, marking a transformational step in the company's development.

The refurbishment work at the Rustenburg smelter complex is proceeding well against the planned six-to-nine-month schedule envisaged at the commencement of works, the company said.

During December 2022 'cold commissioning' of mechanical equipment at the smelter was successfully completed and has been followed over the holiday period by 'hot commissioning' of the first of three planned operating furnaces. The furnace has successfully smelted test quantities of magnetite ore to produce HPI and titanium slag of marketable standard for the first time. Initial analysis of the HPI confirms that it meets planned quality and content specifications.

Ironveld Smelting completes refurbishment of first of three furnaces.

In the coming weeks, operations from the first furnace will be tested and optimised and extended to include production of vanadium slag, which requires a further processing step. First production sales are still on line to be achieved by Q2 2023 as planned.

The second and third furnaces at the smelter continue to be refurbished and are both expected to be in production by April 2023. Once the three furnaces are fully operational, the complex will be capable of processing around 40 000 tonnes of Ironveld's magnetite ore per annum which, in turn, will provide the following approximate quantities of finished products per annum: 20 000 tonnes of high purity iron; 190 tonnes of vanadium in slag; and 3 800 tonnes of titanium in slag.

Martin Eales, CEO of Ironveld, commented: "Our aim is to create a sustainable, socially and environmentally responsible operation that will prove to be rewarding for all stakeholders. The news that Ironveld Smelting has successfully smelted ore into marketable metal products in the first operating furnace is a fantastic achievement for the whole Ironveld team. We anticipate first revenues from initial production comfortably in line with our original expectation of Q2 2023." ■

Tembo Capital provides convertible loan facility to Orion Minerals

JSE-listed Orion Minerals has announced that substantial holder, Tembo Capital Mining Fund II LP (Tembo) continues its strong support of Orion, through providing a new unsecured Convertible Loan Facility of US$0.50 M.

Orion's CEO, Errol Smart, commented: "This funding provides valuable bridging finance to maintain momentum for commencement of the trial mining and dewatering operations at the Prieska Copper Zinc Mine in January 2023, while the IDC and Triple Flag funding facilities are finalised and draw down on that funding is achieved. It has been exactly six years since Orion exercised its option to acquire the Prieska Copper Zinc Project, and Tembo provided its first funding to Orion in the form of a convertible note to fund the acquisition of the project and undertake the first drilling in 2017. The project has since lived up to our technical expectations and, with Tembo's support, Orion has taken the project from a prospecting right application to a fully permitted mining right, supported by a bankable feasibility study (BFS), demonstrating potential for attractive financial returns. Our revised strategy announced in 2022, to accelerate start-up of production with mining from near surface ore sources, while dewatering the mine to access the Prieska Deeps Ore and ramp up to the BFS design of 2.4 mtpa run-of-mine operation, is fully supported by Tembo, who continues to provide financial support to unlock the investment." ■

Orion's CEO, Errol Smart.

Appointment of consultants for Kinusi Copper project

African focused mining and development company Marula Mining has appointed exploration and mining service company Geofields Tanzania to commence copper exploration work at the Kinusi Copper Project, in Tanzania. The appointment of Geofields follows the commencement of exploration activities by them at the company's Bagamoyo Graphite Project, earlier this month. Work at the Kinusi Project, where the company has secured a 49% commercial interest from local Tanzanian company Takela Mining Tanzania in 10 granted copper mining licenses located in Mpwapwa District in the Dodoma Region of central Tanzania, is to commence in February 2023.

Geofields Tanzania to commence copper exploration at Kinusi Copper Project.

Jason Brewer, Marula Mining PLC CEO said: "Copper prices have risen beyond $9,000/tonne, and copper demand is expected to increase as the transition to renewables and electric vehicles accelerates. Copper is one of the major components in electric cars, used in the electric motor, batteries, and wiring, as well as charging stations, and its attraction to investors as a key green metal will drive higher prices in the coming years. We believe that Kinusi has the potential to be the company's second operating mine in 2023 and we look forward to working with the Takela team in making it a success." ■

Asante reports 20,7% increase in average monthly gold production

Gold miner, Asante Gold, has announced a 20.7% increase in average monthly gold production for November and December 2022, as compared with the prior two months, from its Bibiani Gold Mine and Chirano Gold Mine in Ghana.

There are no comparable year-earlier results as Bibiani gold production commenced in July 2022 and Chirano was acquired on August 10, 2022. Asante's fiscal year ends on January 31, 2023.

Dave Anthony CEO, said, "Over the past 12 months Asante has been transformed from an early-stage exploration company to a mid-tier gold producer. The significant production gains in November and December bode well for the achievement of our 400 000 ounce target from Bibiani and Chirano for the fiscal year ending January 31, 2024." ■

Asante announces significant increase in production at Bibiani Gold Mine and Chirano Gold Mine.

New MD for SRK Consulting (SA)

Andrew van Zyl new MD for SRK Consulting (SA).

Andrew van Zyl has been appointed MD of SRK Consulting (SA), the South African arm of the global SRK network of consulting engineering practices. He is also a member of the SRK Global Board and Exco. Van Zyl stepped into the role from January 2023, taking over from Vis Reddy who completed a term of almost eight years as MD at the end of 2022. Having joined SRK in 2011, Van Zyl became a partner in the firm in 2015 and was appointed as a director in 2020.

"My new role is primarily focused on people, context and strategy, to give SRK's partners and practices a sounding board and to help build the complementary strengths within the company," he said. SRK Consulting (SA) comprises about 300 permanent staff and several associate consultants. An important secondary role is ensuring integration within the global group and increased collaboration with the balance of the 1700 staff across the globe – the company is increasingly benefiting from the establishment of niche, specialist technical centres of excellence around the world, the company said. Van Zyl has extensive experience in the mining sector, working initially in production and project roles and later shifting his focus into strategy, business development and valuation. ■

GoldOre eyes global growth

The Covid-19 pandemic continues to challenge mining business globally, with many projects being put on hold resulting in the closure of numerous smaller companies that lend support to larger mining houses. Fortunately, owing to GoldOre's business model, the company has been able to weather the storm and take advantage of the quiet time to further research and build up a formidable stock of MACH Reactors (ranging in size from 300 m³/h to 3 000 m³/h) and semi-pilot test-rigs in readiness for business opportunities and with stock available on hand to supply into projects, says GoldOre's MD Adrian Singh.

GoldOre's MD Adrian Singh.

GoldOre has a business model of outsourcing and leasing. The company has a small core team of employees to execute strategy and steer the business, with specific functions of the company being outsourced to other companies. While there are few employees, there are many stakeholders to support the business. Apart from the obvious benefit of job creation, this model also allows GoldOre to 'idle', without having to lay off employees, when times get tough. When there is little new business, the leasing model (although MACH Reactors can also be purchased) keeps the cashflow ticking over and allows a certain degree of 'hibernation' until business picks up.

Given the diverse business operating models available, with each offering pros and cons, GoldOre offers potential clients who may be uncomfortable with the outsourcing business model the company adopts, the option of purchasing MACH Reactors, including the option of purchasing spare reactors to mitigate any perceived risk.

Despite current market challenges, GoldOre has landed new business in new international territories (Turkey and Mexico), which is in line with the company's strategy of global business expansion.

According to Singh, landing the business in Turkey was a great achievement given the stiff competition from numerous competitors and the need to meet with strict due diligence requirements, including visits by the client to GoldOre's existing clientele to view the MACH Reactors in operation and obtain candid client reviews on the MACH technology.

"For the first time, GoldOre had to provide performance guarantees along with bank performance bonds, which has been an interesting learning curve for the company. The fact that GoldOre was able to secure the performance bond with the bank is testament to the credibility of the company."

The business landed in Mexico showcases the largest MACH Reactors installed to date, with capacities of up to 2 000 m³/h through a single reactor.

"Not one of the products from competitors is able to match this extensive capacity as their largest units only reach a capacity of 600 m³/h," says Singh.

GoldOre's MACH Reactor in operation at a mine in Rustenburg.

with the MACH Reactor

A further advantage and world for this application in Mexico is the reduced power requirement, by as much as a 70% power reduction from the original design of the MACH. The number of venturis and venturi speeds of the MACH were optimised to allow the client to tap into the benefits of the MACH without paying a penalty on carbon footprint.

"On the back of the numerous benefits afforded by the MACH, industry uptake for the product is looking positive," says Singh.

MACH Reactor gains market traction

"Until local mining and engineering houses have a change of mindset, embrace new technologies and move away from the age-old practices of nepotism, corruption and autocratic management styles that stifle free thinking by employees, we are bound to see South Africa falling short of international best practices in mining. GoldOre remains hopeful that, as a new consort of younger, free-thinking individuals move into positions of power, the South African mining culture may be refreshed," Singh explains.

In the meantime, the technology specialist's drive for product enhancements has seen GoldOre's collaborative partners in the potash industry conduct interesting research with the MACH Reactor and plan its inclusion in one of their new projects.

"The news is highly encouraging for GoldOre," says Singh, "and will be the MACH Reactor's first breakthrough into the industrial minerals sector. We hope it will lead to further growth for GoldOre in this business segment."

In addition, exhaustive testwork conducted using a semi-pilot MACH testrig at a platinum concentrator on the Great Dyke orebody yielded impressive improvements to recovery and grade. This translated into excellent project economics with the payback on investment being less than six months.

Singh is cautiously confident this will be an incentive to adopt a full-scale installation of the MACH Reactor and thus serve as a flagship example of what is possible with the MACH in the PGM sector.

Strategy for 2023

The year ahead looks promising as the company plans to focus its research efforts on the copper sector, where GoldOre has identified an exciting application that ties in well with the finer grinding most copper operators are incorporating.

"The benefits that the MACH technology brings with flotation preconditioning centres is around the selectively improved recovery of valuable fines that would otherwise be lost by conventional flotation technology. Grinding finer for liberation is great but flotation technology must also keep up to ensure

The MACH Reactor in operation at Mintek.

Industry uptake for the MACH is extremely positive for 2023.

GoldOre looks to unlock further opportunities in new geographies in 2023.

that fine liberated valuables are not lost to tailings. As the MACH is used to precondition ore ahead of flotation, the flotation technology that is employed in the circuit after the MACH does not have to be changed. This works to de-risk the application to a large extent – the flotation backbone of the plant stays the same and is always the fallback position. Copper circuits typically have high flowrates which the MACH caters for – the largest MACH Reactor has a design flowrate of 3 000 m^3/h through a single unit," explains Singh.

With the race to net carbon zero emissions and the focus on ESG being paramount, GoldOre is eyeing business growth through promoting cyanide destruction and arsenic remediation applications. Mining houses have traditionally been reluctant to invest in environmental remediation; however, on the back of government regulators and lending institutions becoming more stringent about the discharge of effluent from mines and a reduction in carbon emissions, there is a renewed focus on technologies that can cost-effectively and efficiently lower the impact on the environment.

"GoldOre has conducted much research in this field and is ready to collaborate with mining houses that wish to move their operations to compliance and beyond," says Singh.

A steep learning curve in designing and operating the world's smallest hydrodynamic cavitation testrig at a local research institution, has, he says, informed design refinements for a new batch of test-rigs that are set for development in the first quarter of 2023.

The test rigs will be made available to commercial laboratories and research institutions for product and project development, as well as to universities around the world for students undertaking post graduate studies.

According to Singh, GoldOre prides itself on collaborating with strategic partners and is always open to new opportunities for research and academic support.

GoldOre at Investing in Africa Mining Indaba 2023

As the world emerges from the Covid-19 pandemic with face-to-face meetings and in-person conferences once again becoming the norm, GoldOre will attend, participate in, and sponsor various conferences throughout 2023. In fact, the company will be attending the Investing in Mining Indaba conference in Cape Town in February.

"The Mining Indaba conference offers a great opportunity to network and showcase how GoldOre can assist businesses to improve project economics, while reducing the carbon footprints, of projects that are close to execution and looking to attract the right investment."

GoldOre is also sponsoring the Flotation '23 conference, which will be held in Cape Town in November 2023, and where the company will have an exhibition stand.

"We look forward to presenting our latest research and interacting with, and gaining new insights and ideas, from other delegates."

The equipment specialist is upbeat about 2023 as it looks to unlock further opportunities for its existing client base and potential new clients.

"On the back of a myriad of benefits of adopting the MACH Reactor, we look forward to growing our business and global footprint exponentially and taking a South African technology to all reaches of the globe," concludes Singh. ■

Right: Laboratory and semi-pilot MACH Reactors ready for installation.

Scan QR Code to watch video

INVESTING IN AFRICAN MINING INDABA

a Hyve event

REGISTER TODAY

6-9 February 2023 | CTICC, Cape Town

Unlock the future of African Mining

Through Investment: Stability, Security, and Supply

Network
Meet thought-leaders, government leaders, c-suite and other influential people in the industry all under one roof.

Learn
Will provide one week of pioneering talks from influential leaders and thought-provoking discussions from across the value chain.

Invest
Guaranteed ROI from targeted roundtables to meeting hubs , with more focus than ever on ensuring your objectives are met.

Get Meetings
Create meaningful connection through unmatched networking programme's and scheduled 1-2-1 meetings and get the most out of your time.

BE SURE TO FOLLOW AND INCLUDE US IN YOUR SOCIAL MEDIA POSTS USING
#MI2023 | @MININGINDABA

Platinum to surge ahead this year

By Edward Sterck, Director of Research, World Platinum Investment Council

Edward Sterck: Director of Research at the World Platinum Investment Council.

The platinum market is forecast to swing into deficit in 2023 and is well-insulated from economic headwinds. The platinum supply/demand balance is expected to be in deficit in 2023, a swing of over 1.1 moz following – on the face of it – two consecutive years of significant surpluses. This is due to constrained supply and strong demand growth in automotive and industrial applications, plus a significant reversal from negative to positive investment demand.

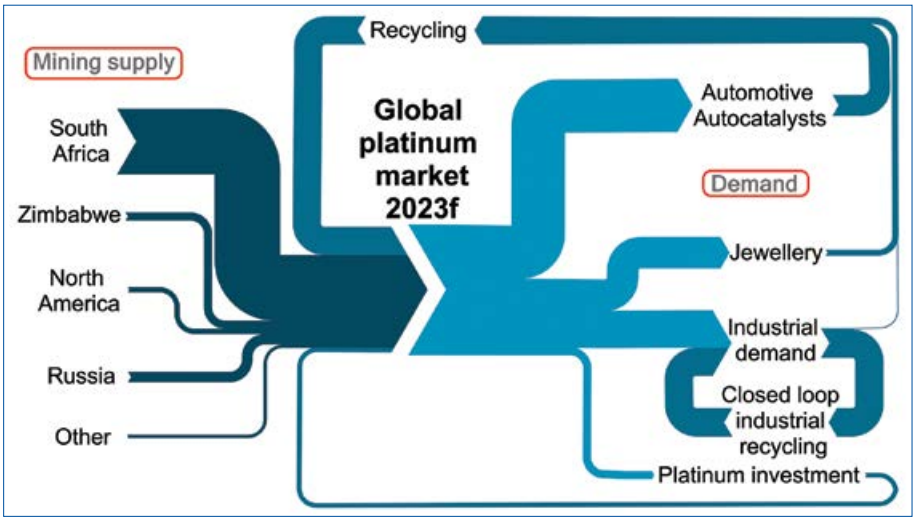
The surpluses of 2021 and 2022, at 1 147 koz and 804 koz respectively, belie the underlying market tightness, as evidenced by elevated lease rates, which prevailed throughout this time. The surplus of 2021 was largely attributable to a one-off supply boost stemming from a temporary bottleneck in production volumes resolving, plus investment outflows as investors rotated out of exchange traded funds (ETFs) into mining stocks to access high-yielding dividend income. The surplus in 2022 was due to further sizeable investment outflows, albeit driven by different dynamics. Weakened automotive production volumes, due to residual pandemic-related issues, also played a part, curtailing growth in automotive demand.

It is apparent that, over this period, platinum imports into China exceeded identified demand by considerable amounts; according to Bloomberg data, almost 2.5 moz of platinum in excess of identified demand entered the country between the beginning of 2021 and the end of the third quarter of 2022, a figure that fully absorbs the surpluses of 2021 and 2022 combined, none of which was captured by published supply and demand data. In all probability, a significant proportion of the investment outflows from exchange stocks and ETFs flowed to China to meet this unrecorded demand – explaining market tightness, despite the hefty surpluses. These excess imports are now largely geographically captive within China due to export controls, and therefore unavailable to meet 2023 metal shortfalls outside of China. Furthermore, they are only likely to become available domestically at significantly higher platinum prices than those seen in recent years.

Platinum mining supply was beset by operational challenges in 2022, which are expected to remain a feature throughout 2023. In particular, power outage issues in South Africa could well impact refined metal output negatively for the foreseeable future. While output from Russia is currently forecast to remain flat year-on-year in 2023, Nornickel has cautioned of risks to future production levels as it struggles with the impact of sanctions on mining equipment, spares and consumables.

Global mine supply in 2022 declined by 9 per cent compared to 2021, to 5 637 koz. South Africa represents the bulk of the drop and fell 14 per cent year-on-year to 4 012 koz, with reduced smelter availability adding to power outages. This year, total mining supply is forecast to rise 2 per cent only. Reduced availability of end-of-life vehicles, as automakers are still unable to meet new vehicle demand, sees recycling supply remain below pre-Covid levels in 2023. Overall supply is also forecast to rise by 2 per cent only.

The 19 per cent growth in total platinum demand predicted for 2023 is heavily influenced by growth in the automotive and industrial sectors. At around 40 per cent of demand, the outlook for platinum automotive demand is key to the supply/demand fundamentals of platinum. The automotive sector itself has been hampered in its post-pandemic recovery due to supply-chain issues – in particular, shortages of semi-conductor chips – meaning that fewer vehicles than expected had been produced before COVID-related disruptions and lockdowns impacted the industry. In 2023, car production will once again fall short, by more than an estimated 15 million vehicles, when compared with 2023 automotive production forecasts released pre-pandemic at the end of 2019.



Platinum mining supply and demand schematic. Source: WPIC Platinum Quarterly Q3 2022, Metals Focus.

Despite these challenges, platinum automotive demand has been remarkably resilient. In 2022, it grew by 12 per cent and the forecast is for 11 per cent growth in 2023, to reach 3 288 koz. Arguably, growth forecasts seem optimistic given economic predictions, but several factors support this trend. Firstly, vehicle production is still well below where it would normally be, even on an adjusted basis to allow for the recessionary economic outlook. Secondly, the market share of hybrid vehicles, which contain higher platinum group metal (PGM) loadings per vehicle than diesel or gasoline vehicles, is growing. Thirdly, platinum substitution for palladium will continue apace, surpassing 500 koz in 2023, up from 340 koz in 2022. Further, full implementation of China 6 and China VI emissions legislation by July 2023 will see platinum automotive demand in China alone reach almost 700 koz, some 2.7 times higher than pre-pandemic levels.

Changes in global vehicle production have a greater impact on the palladium market where more than 80 per cent of use is in automotive applications, primarily in gasoline engine vehicles. Vehicle production rising in 2023, albeit to levels still below recessionary demand, will also drive palladium automotive demand growth, although at a slower rate as platinum substitution escalates.

Similar to automotive platinum demand, the robustness of the expected growth in industrial demand for platinum is rooted in strong foundations which leave it well-insulated from the recessionary outlook. To put 2022 and the outlook for 2023 in context, 2021 was a record year for industrial platinum demand, reaching 2 450 koz. This was largely due to glass manufacturing capacity expansions which were not repeated in 2022, resulting in 2 110 koz of demand, a reduction on the prior year. In 2023 industrial demand is due to be the second highest year on record, with a forecast of 2 316 koz. Again, much of this growth is due to capacity expansions in the glass industry, which have already been committed, meaning they will go ahead irrespective of economic conditions, so providing a high degree of predictability.

Conversely, jewellery demand is struggling to reach pre-pandemic levels of demand, with the key China market remaining weak. Growth in other regions, especially the US, Japan and India, has, however, partially offset the decline in China. Demand in 2022 reached 1 953 koz, flat on the previous year and some 7 per cent below 2019. The outlook here is more uncertain as this segment of platinum demand could be more susceptible to recessionary pressures. The uncertainty as China moves away from its zero-COVID strategy adds further risk to the 2023 forecast, which is again flat at 1 954 koz.

In 2023, investment demand is expected to shift dramatically from negative investment demand of 525 koz in 2022 to positive investment demand of 212 koz. Bar and coin demand is forecast to grow by 49 per cent to 507 koz, primarily due to a reversal of disinvestment in Japan, but also improved product availability in North America and Europe. Exchange stock and ETF outflows will abate.

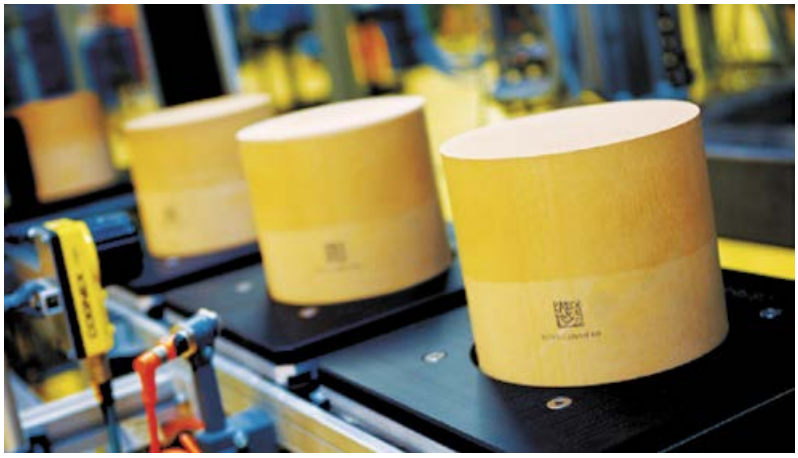
Bar and coin demand is forecast to jump 49 per cent in 2023, driving overall investment demand positive. Picture credit: ABC Bullion.

Platinum is benefiting from the emergence of hydrogen-related applications as a new end-use demand segment. With the focus shifting to COP 28 later this year, the need to decarbonise the world is more acute than ever and hydrogen produced in platinum-containing electrolysers and used to displace natural gas, or as an energy source in fuel cell electric vehicles, will have a significant role to play in the energy transition. Hydrogen-related demand for platinum is expected to grow substantially through the 2020s and beyond, reaching as much as 35 per cent of total platinum demand by 2040. Although this demand is a relatively small component in 2023, small changes in demand can have an outsized impact on price-setting in a market in deficit.

Picture credit: Fuel cell stack, Bosch.

Platinum is benefiting from the emergence of hydrogen-related applications, including electrolysers to produce green hydrogen and fuel cells, a new end-use demand segment.

Demand growth for iridium and ruthenium, used alongside platinum in electrolysers and fuel cells respectively, is also likely as green hydrogen supports decarbonisation. Concerns that availability of these metals, that are among the rarest of the PGMs, could constrain platinum-related green hydrogen applications have been significantly allayed following technical developments that have improved metal efficiencies and recycling. For example, a breakthrough in 2020 provided a platinum and iridium-based hydrogen electrolyser catalyst using up to 90 per cent less iridium, while improving performance threefold. In addition, as platinum supply grows to meet the demand for hydrogen applications, more of these minor PGMs will be produced from the polymetallic orebodies. ■



Picture credit: Johnson Matthey.

Manufacture of emissions control catalysts.

Zinc Ore outlook: Price performance review

By Alana van Wouw, market analyst at Crane Ridge

Year over year, the value of globally exported zinc accelerated by an average 44.6% compared to $8.7 billion for 2020.

Zinc futures are edging to around $2930 a tonne, which is in line with other metals. So, what is driving the zinc price now? Two key activities are the stronger dollar and the spike in Covid 19 cases in China. In October, China imported 1,007 Mt of refined zinc, down 77.55% on the month and 97.54% on the year. Europe could also influence the zinc price owing to the possibility of further supply disruptions and uncertainty around shortages of energy.

In 2022, numerous European zinc producers either had to shut down their smelters entirely or cut production due to high energy costs and low inventories.

The future of zinc is looking promising with opportunities in the construction and infrastructure, transportation, consumer goods, and industrial machinery sectors. The global zinc market is expected to reach $74.4 billion in 2027 and is forecast to grow at a CAGR of 4.4% from 2021 to 2027.

Rank	Countries Generating Greatest Surpluses from Global Zinc Trade	Value
1	Peru	$1.63 billion
2	Australia	$1.57 billion
3	United States	$1.5 billion
4	Bolivia	$1.4 billion
5	Sweden	$493.9 million
6	Turkey	$465.8 million
7	South Africa	$462.3 million
8	Chile	$427.0 million
9	Portugal	$341.9 million
10	Eritrea	$279.9 million

Zinc ore outlook: Demand and supply dynamics

The zinc market has been driven by the increasing demand for galvanized steel and infrastructure development in emerging markets such as India, Brazil, and Indonesia. Furthermore, growing demand from niche applications like smartphones, electric vehicles, mild hybrid engines, and power grid storage will drive the global zinc market.

Zinc exports from all countries totalled $12.6 billion in 2021. That dollar amount results from an average 11.2% increase for all shippers of zinc over the 5-year period starting in 2017. Back then, exported zinc ores and concentrates were worth a total $11.3 billion.

Year over year, the value of globally exported zinc accelerated by an average 44.6% compared to $8.7 billion for 2020.

The following countries posted the highest positive net exports for zinc during 2021. Investopedia defines net exports as the value of a country's total exports minus the value of its total imports.

The below graph presents the surplus between the value of each country's exported zinc and its import purchases for that same commodity.

Zinc Ore ESG outlook:

One of the most significant transitions for the zinc market is the green energy sector via rechargeable zinc-based batteries.

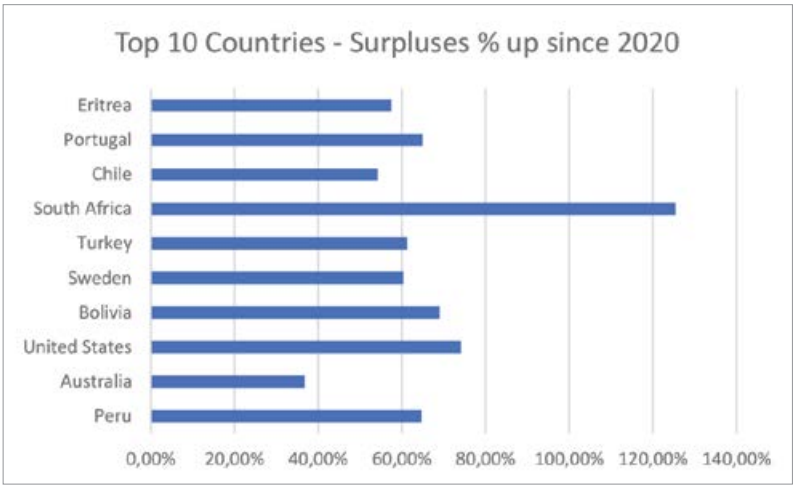
Currently there are six different types of zinc-based battery chemistries with different characteristics and resulting

applications: nickel-zinc, zinc-ion, zinc-manganese, zinc-bromine, zinc-air, and zinc-air flow. While these six battery types have a wide range of applications, their key use in facilitating the transition to green economies relates to renewable energy storage in residential, industrial and commercial settings.

In solar and wind power, the amount of energy produced fluctuates drastically due to natural phenomena (i.e. a lack of sun at night). Zinc-based batteries can be used to address this issue; storing power during peak production times and discharging it when demand exceeds production capacity.

While batteries are already used for such applications, the dominant chemistries rely heavily on rare materials and safety concerns remain a central element in the debate surrounding their use. Zinc batteries therefore provide a cost-effective, safe and reliable alternative to these battery chemistries for such applications.

An example of this process in action is Zinc8 Energy Solutions Inc which has redefined long-duration energy storage with its low-cost zinc-air battery that offers a 20,000-hour operating life and more than eight hours of storage.



The global rise in electricity sourced from renewable sources such as wind turbines and solar has led to increased demand for advanced batteries that can be used to stabilise intermittent supply.

The company developed the zinc-air batteries as an alternative to lithium-ion batteries for use in applications that require long-duration, high-capacity storage.

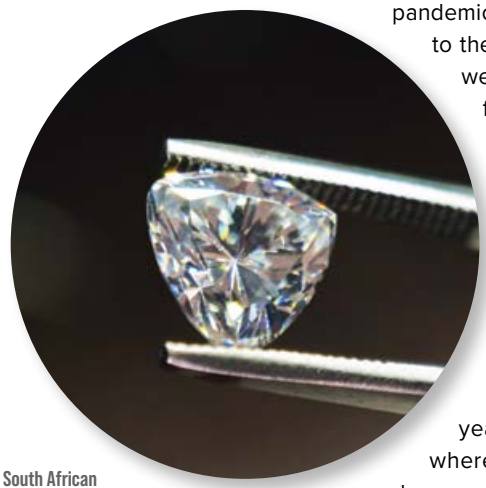
The batteries can store current from wind or solar and can be deployed in commercial settings, or as an industrial backup to replace diesel generators. The total addressable market in the commercial and industrial space in the US alone is $350 billion. ■

A significant transition for the zinc market is the green energy sector.

State Diamond Trader perspective on global Diamond Market Performance in 2022

By The State Diamond Traders' Godfrey Mance: Client Relations Officer

The global diamond market portrayed mixed sentiments throughout the year, with the first trimester upholding the trade positivity experienced in late 2020 and the entire 2021 calendar year. This trade peak was orchestrated by the inventory replenishment post, the easing of Covid 19 restriction levels in different diamond regions, and business returning to some sort of normality. It is a view of the industry that the pandemic created a vacuum which led to the depletion of inventories that were stored in companies' vaults for a long time and could not sell profitably previously. To some extent, the Covid 19 pandemic benefited the industry, not overlooking its negativities resulting in the closure of entities and the loss of employment, among others.



South African manufacturers are working hard to ensure that the industry is marketed locally.

It was during that stage, after years and years of anticipation, where polished demand and supply moved concurrently with the rough diamonds trade, allowing diamantaires to make decent profits. However, regardless of these exciting sentiments, the industry continued expressing concerns that, a price bubble had been created and that when it burst it would harm trade progression.

While the industry was postulating a slowdown in the second quarter of the year, Russian and Ukrainian sanctions by the USA gained momentum and influenced the direction of the market even further. The uncertainty brought about by these geopolitical issues further fuelled sentiments since the supply of Russian rough diamonds was disturbed. The expectation was that availability of rough diamonds would be limited, and the price be affected. Indeed, the industry saw diamond prices increasing as anticipated.

The African continent remains a critical player in the global diamond industry.

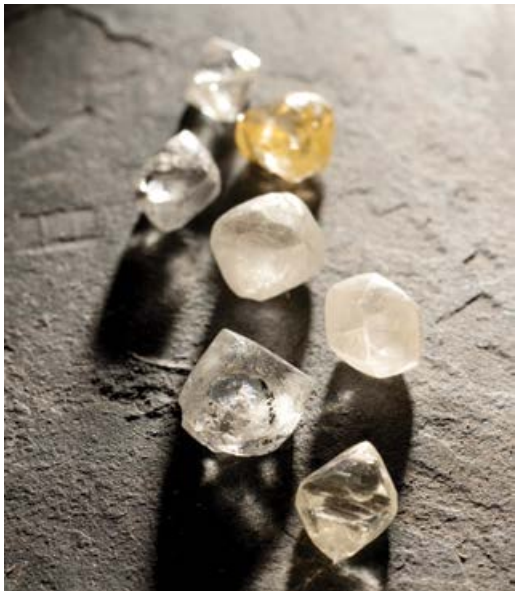
Finally, the postulated bubble burst, and the market experienced a reduction in the prices of polished diamonds, which were in excess supply following huge purchases at the beginning of the year. Unfortunately, rough diamond prices remained stable putting more pressure on manufacturers' profitability. The trade began noting that the rough diamond producers were holding prices firm and not adjusting as per the recent market traits. The industry commenced the final quarter of 2022 operating with great caution, avoiding inventory build-up and trading to fill specific orders from consumers.

Expectations are that the holiday season will result in a good trade.

2023 Outlook Postulation

Current forecasts by the IMF show that the global economic growth rate will continue to slow from the 6 percent in 2021, to 3.2 percent and 2.7 percent in 2022 and 2023 respectively. The slowdown is driven, in the main, by high levels of inflation in food and fuels. This in turn has negatively impacted consumer outlook. Given the progression of the industry since the outbreak of the Covid 19 pandemic and general economic climate fluctuations, it has been very difficult for analysts to predict the future direction of the market.

Diamond market performance depends not only on the traditional events of the industry but turns out to be affected by environmental factors as well. The



Rough diamond prices remained stable in 2022.

depth of influence of the sanctions against Russia and Ukraine has not been fully felt in the market and its understanding is crucial going into 2023.

Currently, the trade is optimistic with expectations that the holiday season will result in a good trade. In addition, the Chinese New Year, Valentine's Day, and the March Hong Kong Gem and Jewellery Shows are activities that usually suggest market direction in the new year. The Far East trade is expected to continue improving as the economy opens with the lifting of Covid 19 restrictions. The trade further hopes that important trade shows, such as the JCK Las Vegas and the Hong Kong Gem & Jewellery Show, will facilitate a return to normality and thus provide a feel for the market direction.

Nonetheless, the market is expected to continue being under pressure with prices of rough remaining high due to scarcity and polish not yielding the same. The diamond trade is a unique industry, purchasers need to be prepared to pay a good premium to win goods and be able to defend their premium at the sales point. Consequently, buyers are expected to continue exercising cautions and trade to fulfil orders. No buyer will want to purchase unnecessary inventory, unless permitted by the market direction.

Africa and the South African impact on the diamond industry

The African continent remains a critical player in the global diamond industry, especially in rough diamond production. According to the Kimberley Process Certificate Scheme Annual Global Summary: 2021 Production, "African rough diamond production was estimated to be 53% by volume and 70% by value towards the global production. These statistics further outline that South Africa is listed among the top 5 rough diamond producers in the world". There is no doubt that the South African diamond industry is a contributor to the country's Gross Domestic Product.

Although South Africa is not a 'primary' consumer of polished diamonds, manufacturers are working hard to ensure that the industry is marketed locally, especially through social media. As a result, consumers are becoming aware of the existence of the Diamond and Diamond Jewellery sector in the country and consumer perception is shifting. Initiatives such as the Enterprise Development Programme facilitated by the State Diamond Trader have been another important function seeking to reduce the challenge of barrier to entry. The programme intends to introduce young South Africans to the diamond beneficiation industry.

This industry is capital intensive, and the challenges faced by both small-scale miners and diamond processers in Africa are funding, technology, and access to sustainable markets. Another challenging factor is that the diamond business is largely generationally based, which becomes a competitive advantage for those whose businesses have been in existence for several years. For instance, most South African owned companies are owned by first generation owners whereas their competitors are, in some cases, owned by the tenth generation. This becomes a strength to one and weakness to the other. Nonetheless, the progression of the industry is promising and with the attraction of good business management, transparency and authenticity, it will continue reaching greater heights. ■

The industry began the final quarter of 2022 avoiding inventory build-up and trading to fill specific orders from consumers.

South Africa is listed among the top 5 rough diamond producers in the world.

2023 coal outlook: why reality matters more than idealism in energy markets

By Vuslat Bayoglu: MD of Menar

The IEA estimates that coal consumption for 2023 will likely remain at around 8 billion tons.

"Coal will remain the most significant contributor in the energy sector even in 2040. This is being realistic," Michelle Manook.

The outlook for coal in 2023 will be determined by the tension between idealism and reality. There is a growing global campaign to end coal usage. It is propelled by idealism – the idea that we can simply decree the replacement of baseload coal power with renewable energy sources. Of course, it would be great if it were realistic.

The campaign against coal will intensify following COP27 in Egypt. There will be a campaign to magnify the COP27 anti-coal messages. In the process, all other policy statements from world leaders expressing the desire to manage their energy transitions responsibly, and initiatives advocating for clean coal technologies, will be relegated.

But the scientific reality of the need for a reliable and cheap supply of power – a combination easily satisfied by coal – will remain intact, independent of any campaign.

The World Coal Association, whose constituent members participate in the global value chain of coal markets, is well-placed to appreciate coal's outlook more than lobbyists who are not interested in the reality of global energy economics. Michelle Manook, the WCA chief executive, is correct when she says coal will remain the most significant contributor in the energy sector even in 2040. This is being realistic.

Coal demand in India is expected to increase.

And that significant contribution will be driven by demand which, in turn, will be driven by affordability, energy security and reliability. While the energy pie will get bigger with renewable energy sources, nuclear, gas and hydro in the mix, coal will remain an important part of the pie.

The International Energy Agency estimates that coal consumption for 2023 will most likely remain at 2022 levels, around 8 billion tons. Geopolitical tensions associated with Russia's war in Ukraine are unlikely to be resolved anytime soon. There is ample evidence that Western democracies have increased their material support for Ukraine and will most likely tighten their sanction regime against Russia.

The tension brought into sharper focus the realism of coal as an important source of baseload power in 2022, far removed from the idealism that punted renewable energy as the panacea. That kind of realism will continue to prevail in 2023 as developed economies prolong the life of coal-fired power stations in pursuit of energy independence.

In addition to geopolitical tensions, global coal demand will be driven by China's economic growth and, to some extent, India's. It is worth noting that for most of 2022, China did not open its economy to fullest extent. The Zero-Covid policy led to numerous lockdowns in some of China's biggest cities, restricting the return to full industrial capacity.

It is most likely that in 2023, restrictions will be further relaxed. Coupled with this is China's leadership certainty arising from the re-election of President Xi Jinping. These factors, plus China's

quest for continued growth, mean that coal demand will continue.

China has no appetite for losing its status as the world's biggest manufacturing zone. It is largely driven by realism.

Even without these considerations, the IEA projected that coal consumption in China would increase by 1%, which equates to 43 million tons in 2023. The IEA noted, however, that given the wide use of coal across the economy, this forecast is subject to many uncertainties, such as economic growth, hydropower output or the evolution of heavy industry.

Meanwhile, coal demand in India is expected to increase, driven by expanded electrification and economic growth. In the IEA's forecast, Indian coal demand is expected to grow by 3% to 1.16 billion tons in 2023.

The IEA notes that the near-term future for EU coal consumption is uncertain, given the volatile situation with Russian gas flows. In its forecast, the expansion of renewables and energy-saving measures in 2023 may be sufficient to offset expected nuclear power plant closures. Assuming a higher availability of nuclear power plants in France than in 2022, the IEA forecasts a decline of 4 million tons in EU coal demand in 2023.

The IEA notes that coal consumption in the EU was expected to rise by 7% in 2022, which comes in addition to 2021's 14% increase in coal usage. This is being driven by demand from the electricity sector where coal is increasingly being used to replace gas, which is in short supply and has experienced substantial price spikes following Russia's invasion of Ukraine.

Several EU countries are extending the life of coal plants scheduled for closure, reopening closed plants or raising caps on their operating hours to reduce gas consumption. European countries such as Denmark, the UK, Italy, Germany and others are once again buying coal from South Africa. That demand continued while COP27 was sitting in Egypt.

Germany has been lauded as a global pioneer in applying renewable energy and environmental technologies. According to news agency Reuters, renewable energy accounted for 49% of German power consumption in the first half of 2022, largely sourced from wind, solar, biomass and hydroelectric sources.

The campaign against coal will intensify following COP27 in Egypt.

However, Germany's soaring energy prices and the failure of renewables to plug the gap left by restricted gas supplies from Russia, offer a cautionary warning to South Africa, which has accepted loans to fund installation of renewable energy supply and ditch its coal-fired fleet of power plants.

We should not forget that South Africa has the sixth largest coal resource in the world – equivalent to about 170 years of coal reserves remaining – and over 80% of the country's energy is produced from coal-fired power stations. The country only has around 6 000 MW of installed renewable energy capacity and this variable capacity has not stopped load-shedding.

We should not forget that South Africa has the sixth largest coal resource in the world – equivalent to about 170 years of coal reserves remaining – and over 80% of the country's energy is produced from coal-fired power stations.

The South African Government has committed to allow for the installation of more renewable supply. The adoption of the energy transition plan, backed by developed nations, has set the tone at the highest echelons of government that could result in declining investment in new coal mines.

This risk is that, as reality, rather than idealism, dictates terms, we might find ourselves with fewer operational mines and higher coal prices for Eskom and export. But since some prefer to believe by observation, we might have to wait for realism to discipline our idealism. ■

Several EU countries are extending the life of coal plants scheduled for closure.

Gearing to deliver

Time is money and, with this in mind, *Modern Mining's* Top Projects have an eye on the finish line, with the chosen projects, Renergen's Virginia gas project, South Africa's pre-eminent clean energy project, having started production of Phase 1 in September last year and diamond major De Beer's Venetia Underground Project (VUP) eyeing production in 2023. Interestingly, 2024 is turning out to be a milestone year for three of our top projects. Pan African Resources' newest tailings retreatment project – the Mogale Gold project –is set to deliver first gold production in December next year, as is Ivanplats, which is positioning its Platreef project as one of the world's largest and lowest-cost platinum group metals producers while Orion Minerals' Prieska copper-zinc project, armed with a revised production strategy, is also aiming to be in production in the latter part of next year.

Our top projects also come with a hefty price tag – in fact, the capex to get VUP into production is an eye-watering $2,1-billion, while Renergen's Virginia project required an outlay of R1 billion for Phase 1 and an estimated $1 billion for Phase 2. The Mogale project will cost an estimated R2.5-billion in capital expenditure while Platreef's phased development is set to cost $488-million for the initial 700-ktpa underground mine and a whopping $1.5 billion for Phase 2. Given that funding has proved to be a challenge for Orion Minerals, the company has revised the development of its Prieska project, which initially called for peak funding of R4.8 billion, to be developed in a phased manner. Initial development funding now amounts to some R360-million.

Aligned with the green agenda

While size matters, the massive price-tag to get these projects into production is not the only reason they are considered stand-out projects – these projects are set to play an essential role in offsetting the high rate of employment in the country while being firmly placed to meet the global agenda for a low carbon economy, with the minerals being mined to be used in the development of a more sustainable world.

Notably, Renergen's Virginia Gas Project is a game-changer for the South African economy, acting not only as a catalyst for the first commercial liquified natural gas project, but also as one able to catalyse the Free State and surrounding areas into a sustainable clean energy hub.

Ivanhoe Mines, meanwhile, is positioned at the vanguard of the global shift towards net-zero carbon emissions with its diverse portfolio of critical raw materials integral for the global transition from fossil-fuelled transportation and energy generation to electric vehicles and renewable power. Within its portfolio of green metals, Ivanhoe Mines has metals, including copper, platinum group metals and nickel, all of which are in demand for several clean technologies. Similarly, the Prieska project, set to produce copper-zinc, will be at the forefront of supplying metals required for the clean energy transition.

Importantly, Pan African Resources' Mogale Gold project plans to turn what once was a legacy liability left behind from historical mining activity into a high-margin income generating asset, capable of stimulating the local economy and the environmental remediation of the area.

Diamond miner De Beer's vision of being carbon neutral across its operations as it targets a net positive impact on biodiversity, sees the VUP come into production armed with a sustainability and technology roadmap to meet these goals. ■


Venetia Underground Project.


Platreef Project.


Virginia Gas Project.


Mogale Gold Project.


Prieska Copper-Zinc Project.

VUP on-track for production in 2023

2023 is a milestone year for De Beers Venetia mine – South Africa's largest diamond mine and biggest source of rough diamonds in the country – as it transitions to underground development. But, while size matters, the hefty price-tag of $2,1-billion to get it into production is not the only reason that the Venetia Underground Project (VUP) is considered a stand-out project. Aligned with the diamond major's vision of being carbon neutral across its operations, and targeting a net positive impact on biodiversity, the VUP comes into production armed with a sustainability and technology roadmap to meet these goals. *Modern Mining* was recently on site and filed this report. By *Nelendhre Moodley*.

The $2,1-billion VUP is a standout project.

De Beers Venetia mine transitions to underground development.

Located in the Limpopo Province on the border between Zimbabwe and Botswana, the Venetia mine has been in operation since 1992 and celebrates 30 years of delivering top quality, high value precious stones. The mine contributes 40% of the country's annual diamond production.

Following a sod-turning in 2013, which marked the start of underground mine development, the miner is on track to deliver an advanced automated mining operation to rival some of the world's best.

In looking to economically extract the kimberlites that extend well below the depth limit of open-pit operations, De Beers will mine the two orebodies at Venetia – K01 and K02 – which extend to depths of around 1 000 m below the surface. The project is being developed into three main construction areas – Top of Mine (TOM), Bottom of Mine (BOM) and Surface. TOM is the first four production levels (46L to 54L), while BOM (56L to 100L) is only mined through the shaft complex.

"Despite the headwinds associated with the Covid-19 pandemic and other challenges, the VUP remains on track for commissioning and ramp up in 2023. Thereafter, construction and production ramp up will continue in parallel. All the work done in the nine years to date has brought us to the production starting blocks," begins VUP project director, Allan Rodel.

On a site visit in mid-November, the miner was tracking well on the development of critical surface and underground infrastructure and was nearing completion, or had just completed, many key projects, including the first of two vertical shafts, which

had been permitted by the DMRE in August 2022.

Working in partnership with Orica, the miner has neared completion of an ammonia nitrate emulsion plant, with Phase 1 on schedule for completion in March and Phase 2 in November 2023.

Construction on its tailing's storage facility is underway with the dam being developed to meet the mine's demands to 2046 and, while the current business plan for VUP targets mining to 2046, Rodel says there is significant opportunity to expand the project beyond this time frame.

As the construction and installation of the five water doors is critical to fast-tracking the project, at the time of the mine visit, De Beers had already installed the first one.

Other significant infrastructure advancements include the completion of pump stations in the TOM and the establishment of production drives on levels 46 and 49.

VUP will eventually mine 6 Mtpa ROM to produce between 4,5 and 5,5-million carats per year – volumes reflective of the open pit operation. The TOM portion will deliver full production of around 4 Mtpa after about four years, following which the BOM will move into production, enabling nameplate capacity to be achieved in 2026.

Waste development for the BOM construction access will increase in 2023 when we start using the production shaft western skips to hoist material," Rodel explains, adding that the production ramp up beyond 2024 is dependent on the successful completion of the primary crusher on 54L and the BOM ground handling system.

The VUP comes into production at an opportune time – just as the global population surpasses eight billion people, which underpins future demand of resources and precious stones coupled with the forecast of a steep rise in the number of millionaires over the next few years.

Top and above: The VUP is being developed in line with sustainable business practices.

Above: The first of five water doors being installed at VUP.

Centre: The project is on track to deliver an advanced automated mining operation.

According to a report by the Credit Suisse Research Institute, the world will have nearly 40% more millionaires in 2026 than in 2021. The projection is that, by 2024, global wealth per adult should pass the $100 000 threshold, with the number of millionaires set to exceed 87-million individuals over the next five years. This augers well for an industry reliant on the wealthy to invest in the acquisition of diamonds and jewellery.

VUP drives sustainability, focuses on being water-wise and energy efficient

According to Rodel, the VUP is being developed in line with sustainable business practices and underpinned by its objective of meeting its 2030 goals, which focus on climate change, water, and biodiversity.

As mines consume large quantities of water, De Beers has a host of water saving initiatives planned, including a new water management system to collect groundwater from the sidewalls of the decline before it seeps into the mining area.

The Mobilaris system will be able to geolocate any one of De Beers' 900 employees to warn them of any safety related issues.

"De Beers," says Rodel, "will use the groundwater in other parts of the operation and, in this way, protect the decline from water damage while also offering a solution for the excess ground water".

In preparation for an unlikely 'Maximum Probable Flood' event, De Beers is installing five impressive water doors designed to seal off the dry side of the mine – where the water pumps and other critical infrastructure are located – from the 'wet' side, where mining occurs. The expectation is that these doors will never be closed as the pumping systems are designed to manage most significant rainfall events, without necessitating door closures.

The first water door is an imposing structure consisting of a steel frame some 8 m high, 8 m wide and 1 m thick, and is anchored into the host rock by 40 mm steel anchors.

"The water doors are the last step in containing water during a flood – they consist of a series of drain valves that control the release of water. In the longer-term, when we begin operating at the bottom of mine, the intention is to move away from water doors and mine flood stopes," says Rodel.

"In line with Anglo American's imperative for ensuring tailings dam safety, the Venetia Mine tailings storage facility (TSF) walls have been fortified," he explains, adding that, "In addition to having all the checks and balances in place to ensure the TSF surpasses all safety requirements, the walls have been strengthened with waste rock to guarantee they have sufficient capacity for the life of mine.".

The diamond miner recently entered a public-private partnership with the South African Weather Services (SAWS) to develop a Weather Radar system that will benefit Venetia Mine, the SAWS, and communities across the Limpopo Province.

The company has committed to funding the infrastructure development of the Radar system while

Infrastructure advancements include the completion of pump stations.

SAWS will be responsible for operating and maintaining the infrastructure.

"The Radar system will detect weather activities beyond the borders of South Africa into Botswana and Zimbabwe, where several of the tropical storms emanate. As a miner with a massive open-pit operation, there is potential to gather much of the stormwater in the open pit catchment area. However, mud-rush is an associated risk and it is therefore essential that we are prepared for potential storm occurrences and, if we are armed with information on the size and magnitude of an incoming storm, we can respond accordingly," says Rodel.

Energy efficiency at VUP

Aligned with Anglo American in advancing the adoption of green energy initiatives, De Beers has earmarked 60 MW of renewable power for Venetia Mine and is already considering transitioning its fleet from diesel to battery electric vehicles and implementing a number of energy saving initiatives, including Vent on Demand (VoD), a system that determines the ventilation requirement for each area and controls this automatically.

"Given that the various areas of the mining operation have different ventilation needs, the VoD system analyses the requirement for each area according to the number of people and equipment in use, and allocates the required amount of ventilation, thereby reducing the overall energy consumption deployed at the mine. Based on our studies we know we need to ventilate between 7 and 10 areas at any point in time – at least three have high ventilation requirements while three need medium levels of ventilation

The Mobilaris will track the multitude of underground equipment.

and the remainder need ventilation sufficient for a single individual," explains Rodel.

Taking automation, safety, and performance to the next level

De Beers' technology roadmap, which underpins its drive for improved safety and higher production performance, includes the roll-out of initiatives such as the SafeSentry Programme, which targets front-line safety ownership. To date, 193 employees have been trained on the programme.

In addition to employing Booyco Electronics proximity detection systems (PDS), the miner is adopting the Mobilaris solution, a location tracking system which uses multiple technologies, including Wi-Fi, to locate people and to track equipment.

"An electronic tag attached to each employee's headlamp will be able to geolocate any one of De Beers' 900 employees to warn them of any safety related issues, says Rodel. "The Mobilaris system, together with an underground clocking system, will eventually replace the existing system of locks and is being considered as a mechanism for asset control since it allows us to track the multitude of underground equipment."

According to Rodel, using technology, machine operators can be removed from a potentially hazardous operating environment to operate machines from the comfort and safety offered by the Integrated Operations Centre on surface.

Aside from piloting an automated production loading (APL) project, which targets remote loading and sees the operator remotely loading material into the bucket; autonomously tramming and tipping it into the loading zone, De Beers is implementing automatic drilling technology.

The miner is also using Optimine – a production tracking system – to track the quantity of material moved per hour and ensure productivity remains high. Operators are using Optimine to track their progress and benchmark it against their peers.

"Through the adoption of breakthrough technology and digitalisation we will change the way we mine, making it more effective, more efficient and more sustainable," concludes Rodel. ■

VUP project developers

- BBE Consulting
- TDS projects construction
- CC Crane
- Deswik Mining Consultants
- Redpath
- Master Drilling
- BMH Africa
- SA Weather Services
- Louwill Engineering
- Orica Africa
- Grinaker LTA
- Booyco Electronics
- Sandvik
- Murray & Roberts Cementation

SANDVIK

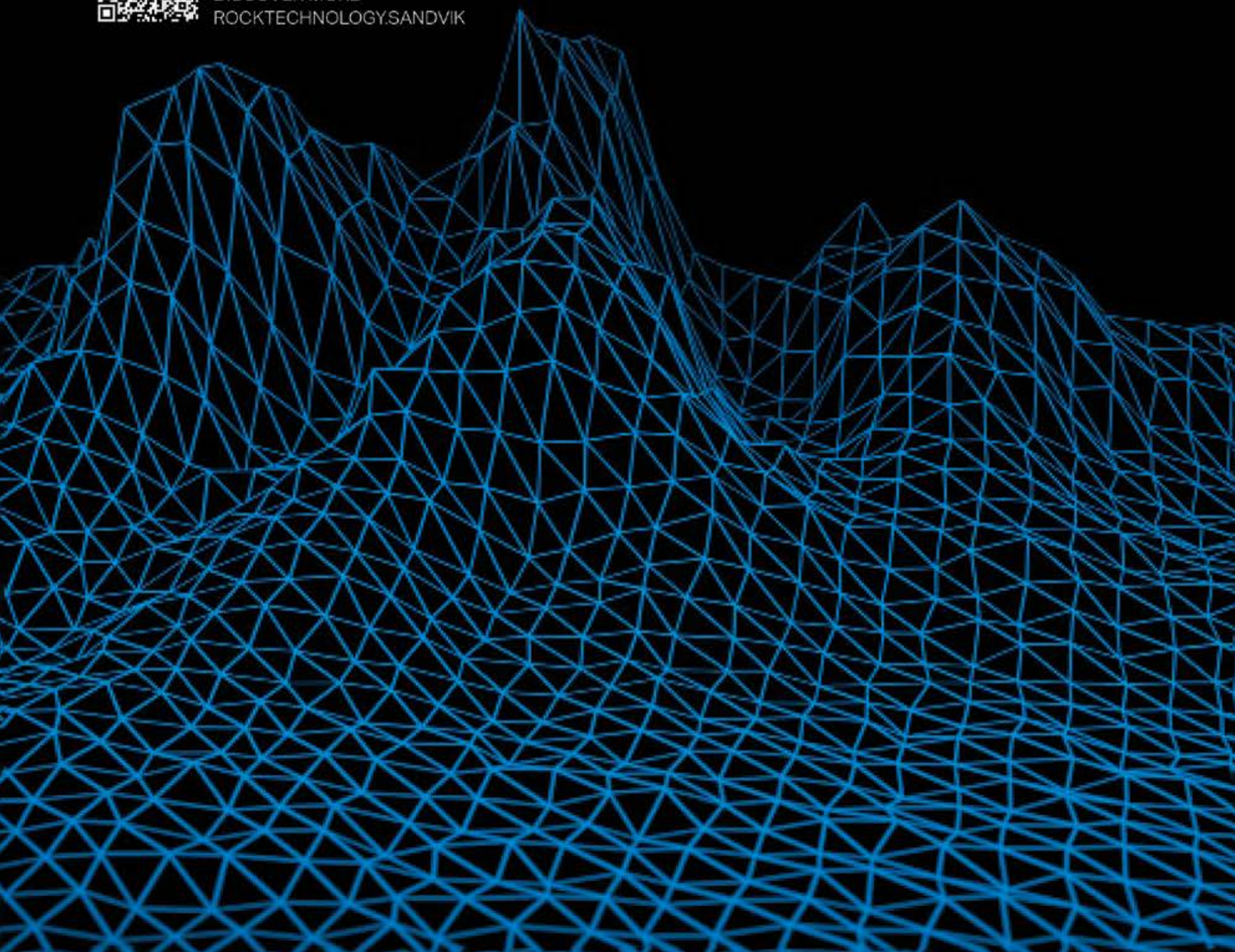
TURN PRESSURE INTO SUPPORT

Ground support is a complicated task, highly dependent on rock conditions. As mines get deeper, these conditions become even more challenging. They call for a ground support solution that can be installed quickly, works anywhere, and performs brilliantly.

MDX bolts from Sandvik are unique universal dynamic bolts made to provide reliable and long-lasting support in all ground conditions, including areas of intense seismic activity. They deliver quick single-pass installation, unparalleled expansion, and increased load-bearing abilities. You will be able to see the improvements immediately.

They will change the way you work.

DISCOVER MORE
ROCKTECHNOLOGY.SANDVIK



Ivanplats starts concentrator construction and

Ivanhoe Mines president, Marna Cloete.

TSX-listed mining company Ivanhoe Mines' South African subsidiary, Ivanplats, is underway with the next major step required to bring the first phase of its tier-one Platreef palladium, rhodium, nickel, platinum, copper and gold project in South Africa into commercial production. The construction of the Phase 1 concentrator plant has started and is the last crucial development step in Platreef's journey from discovery to first production. By *Chantelle Kotze*.

Ivanhoe Mines is at the vanguard of the global shift towards net-zero carbon emissions with a diverse portfolio of the critical raw materials required for the global transition from fossil-fuelled transportation and energy generation to electric vehicles and renewable power.

Within its portfolio of green metals, Ivanhoe Mines has copper – an irreplaceable element for advanced energy technology including electric vehicles, wind turbines and solar panels – and platinum group metals – which have an integral role to play in several clean technologies. Also in its portfolio is platinum, palladium, and rhodium – critical metals used in vehicle pollution-control devices, while platinum is also vital for zero-emission, hydrogen fuel cell technology. The portfolio further contains nickel – a key metal needed for electric vehicle batteries, and zinc – used in solar panels and wind turbines.

Armed with a solid and proven foundation built on bringing the first two phases of the world-class Kamoa Copper Mining Complex in the Democratic Republic of Congo (DRC) into production, Ivanhoe is confidently moving ahead with the development of its second world-class asset – Platreef, and work is in progress to restart zinc mining operations at its historic ultra-high-grade Kipushi zinc-copper-germanium-silver mine, also in the DRC.

On track to become one of the world's largest primary PGM producers

Located on the Northern Limb of the renowned, platinum-rich Bushveld Complex in the Limpopo Province, and adjacent to Anglo American Platinum's Mogalakwena mine, the Platreef project hosts an underground deposit of thick, platinum-group metals, nickel, copper and gold.

Since 2007, Ivanplats has focused its exploration and development activities on defining and advancing its original discovery at Platreef, now known as the Flatreef deposit. What makes the Flatreef orebody unique is its high-grade mineralisation, its palladium-to-platinum ratio of approximately 1:1 and its amenability to bulk-scale, highly mechanised, underground mining methods.

To date, Shaft 1 – which will provide the initial access point to the Flatreef deposit, and which will serve as Platreef's initial production shaft – has been successfully established. Three development stations have been completed on the 750-, 850-, and 950-metre levels and in May 2022, Ivanplats

Left: Platreef's Shaft 1 headframe and surface infrastructure.

Below: Civil construction activities and preparations for Shaft 2 sinking are well underway.

advances underground development at Platreef

Aerial view of the Platreef mine site.

completed the Shaft 1 production changeover – the process that enables underground mining to begin.

In April, Ivanplats undertook the first blast on Platreef's 950-metre level, which enabled the start of lateral underground mine development towards the high-grade Flatreef orebody. The company says the lateral development towards the first reef and stoping areas, as well as towards the first ventilation shaft location, is progressing well. As of November 2022, More than 300 metres of lateral development had been completed since work started in April of the same year, according to Ivanhoe Mines president, Marna Cloete.

At the end of the year, underground development work was focused on establishing the waste passes from the 750-metre and the 850-metre levels to the 950-metre level, and the installation of the required underground infrastructure on the various stations, she said.

With Shaft 1 now in operation and hoisting development rock from underground, Ivanplats said that its efforts would be focused on the surface construction activities required to bring Phase 1 of Platreef into production by the third quarter of 2024.

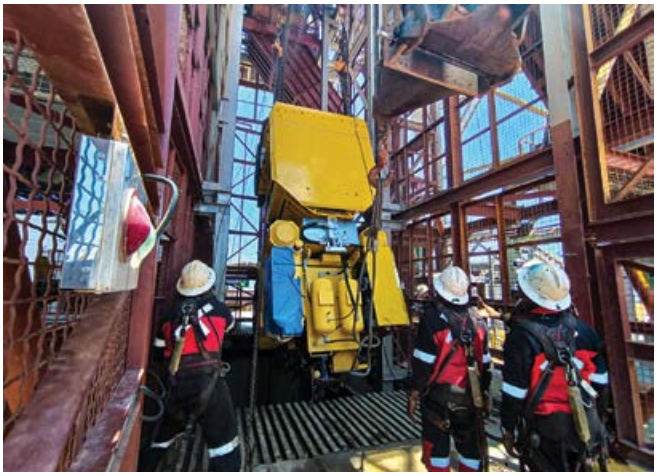
This entails continuing development of the 10-metre diameter Shaft 2 which is critical to the future Phase 2 expansion of Platreef by the end of 2027, the company said.

"Following the completion of the 26-metre concrete hitch-to-collar construction [at Shaft 2] in August 2022, Ivanplats plans to continue with the construction of the 103-metre-tall concrete headframe that will house the shaft's 6 million tonne-per-annum hoisting equipment," said Cloete, noting that this would be followed by the pilot drilling required for the raised bore centre hole of Shaft 2, and the start of the sliding of the headframe.

Once in operation, Shaft 2 will be among the largest material and personnel hoisting shafts on the African continent.

A key part in bringing Phase 1 into production is the construction of the Platreef's concentrator plant. Bulk earthworks for this began towards the end of 2022, with mill foundation civil activities and mill manufacturing progressing well. The company said in its November mine construction update that the

"Overall, we remain confident in the PGM market, while Platreef is well-positioned to be near the bottom of the world cost curve, and responsibly produce high-quality PGMs, nickel and copper over a very long mine life," Marna Cloete.



Above: New electric mining equipment being hoisted down Platreef's Shaft 1 in sections for re-assembly underground.

Centre: The lateral development towards the first reef and stoping areas, as well as towards the first ventilation shaft location, is progressing well.

Right: Civil construction activities at Shaft 2 in progress.

long-lead equipment orders for the concentrator had been placed in preparation for construction activities during 2023.

Together, these operational developments are aimed at building momentum towards first production in 2024 and positioning Platreef as one of the world's largest and lowest cost platinum group metals producers in the longer term.

PGM market fundamentals in favour of Platreef's development

Cloete says that platinum demand growth is expected to be driven by rising consumption in catalysts for heavy duty trucks, and increased use of platinum (in place of palladium) in autocatalyst systems for gasoline/petrol vehicles.

The World Platinum Investment Council said in its Q3, 2022 platinum quarterly update that the market is forecast to be in a deficit of 303 000 ounces in 2023 as global platinum demand is expected to increase by 19% to 7.7 million ounces while supply will increase by just 2% to 7.46 million ounces.

In terms of palladium and rhodium, Johnson Matthey – the largest secondary PGM refiner in the world – reports that the palladium and rhodium markets could move back into deficit in 2022, with lower South African supplies and downside risks to Russian shipments.

"Overall, we remain confident in the PGM market, while Platreef is well-positioned to be near the bottom of the world cost curve and responsibly produce high-quality PGMs, nickel and copper over a very long mine life," said Cloete.

With a favourable outlook for the company's metals in future, the company's 2022 feasibility study (FS) considered the viability of a phased development pathway to fast-track Platreef into production which was based on a steady state production rate of 5.2 million tonnes per annum, as well as an accelerated ramp up to steady state through the earlier development of Shaft 2.

The FS confirmed the viability of Phase 1, which comprises a stand-alone concentrator with a design capacity of 770 000 tonnes per annum, and an initial 700 000-tonne-per-annum underground mine targeting high-grade mining areas close to Shaft 1 at an initial capital cost of $488 million.

The FS also noted that while the 700 000-tonne-per-annum mine is operating using Shaft 1, the sinking of the project's second, larger, shaft (Shaft 2), that will drive the Phase 2 expansion to 5.2 million tonnes per annum, will progress at the same time.

Once Shaft 2 is complete in 2027, two additional 2.2 million tonne-per-annum concentrator modules will be constructed sequentially to meet the mine ramp-up schedule and the initial concentrator will be ramped up to its full capacity of 770 000 tonnes per annum, increasing the steady-state production to 5.2 Mtpa. The second phase is estimated to have a capital cost of $1.5 billion.

Development at Platreef is currently funded by Ivanplats' $300-million stream financing comprising $200 million gold stream financing and additional $100 million palladium and platinum stream financing, with efforts to finalise an additional senior debt facility of up to $150 million well underway. While the stream financing is expected to provide most of the capital required to fast-track Platreef into production, the expansion capital cost for Phase 2 may be partially funded by cash flows from Phase 1 and a project financing package.

Leveraging sustainable technologies

Aside from being well placed to supply the critical metals required for a decarbonised future, Ivanplats

Mine development advances with the battery electric, zero-emissions fleet of vehicles.

is investing in and advancing its own internal decarbonisation plans.

Although Platreef currently makes use of coal-based electricity, Ivanplats is exploring options to use electricity generated from renewable, green, solar power together with liquefied natural gas. The company is also in progress with the construction of a 5 MW solar facility. Construction started in the third quarter of 2023 and commissioning is expected in the second half of 2023. The solar-generated power from the plant will be used for mine development and construction activities.

Platreef's production profile at a glance

Both the Phase 1 and Phase 2 processing flowsheets incorporate a three-stage crushing circuit feeding crushed material to the milling and flotation modules. Flotation is followed by concentrate thickening, concentrate filtration, tailings handling and tailings disposal facility.

The Phase 2 annual production capacity would rank Platreef as the world's fifth largest primary platinum-group metals (PGM) mine on a palladium equivalent basis.

Future expansions to 12 million tonnes of ore per annum and beyond, as demonstrated in the company's previous studies, would position Platreef among the world's largest and lowest-cost nickel and PGM mines: producing more than 24,000 tonnes of nickel and 1.1 million ounces of palladium, rhodium, platinum, and gold per year.

Phase 1	Phase 2
Concentrator capacity: 770 000 tonnes per annum module.	Concentrator capacity: Two 2.2 million tonne-per-annum modules (Combined 4.4 million tonne-per annum).
Average annual production: 113 000 ounces of platinum, palladium, rhodium and gold, plus 5 million pounds of nickel and 3 million pounds of copper.	Average annual production: More than 590 000 oz of palladium, platinum, rhodium, and gold, plus more than 40 million pounds of nickel and copper.

The company is also using emission-free, battery electric underground mining equipment including face drill rigs and loaders, which will be charged using the solar power generated on site. ■

Renergen CEO Stefano Marani.

Renergen's Virginia Gas Project – SA's

JSE-listed Renergen's Virginia Gas Project is a game-changer for the South African economy, firmly setting the country on a clean energy, low carbon path. With a CAPEX outlay of R1 billion for Phase 1 and an estimated $1 billion for Phase 2, the project is one of the country's top initiatives currently being advanced. By Nelendhre Moodley.

"The Virginia Gas Project is the country's only onshore petroleum production right, which means that it is also the flagship project pioneering South Africa's upstream gas generation. The success of this venture is a showcase to international investors, who already have an ardent interest in investing in onshore natural gas and petroleum projects. Essentially, the project is the poster child for future investment in upstream gas initiatives," Renergen CEO Stefano Marani tells *Modern Mining*.

In early September, the Virginia Gas Project became operational, transitioning Renergen from explorer to producer of liquid hydrocarbons, and an imminent helium producer.

The project involved developing 52 km of gas assemblage pipeline and cryogenic liquefaction processing facilities in Virginia and Theunissen, in the Free State Province.

According to Marani, the project is a catalyst for the economy, not only as South Africa's first commercial liquified natural gas (LNG) project but also as one able to catalyse the Free State and the surrounding area into a sustainable clean energy hub.

Renergen is currently lobbying government to rezone its area of production as a special economic zone (SEZ), which will encourage businesses with heavy energy requirements to relocate and sustainably transition their operations to adopt a cleaner energy source, thus increasing efficiency and reducing costs.

"By diversifying the economy of the Free State away from mining towards manufacturing, towns in the area can become economically sustainable and able to thrive."

"By diversifying the economy of the Free State away from mining towards manufacturing, towns in the area can become economically sustainable and able to thrive."

Importantly, as the industry transitions to LNG, South Africa, an energy importer, will be able to improve its balance of payments by producing some energy domestically and thus importing less.

"For every litre of LNG produced locally, South Africa will be able to displace a litre of diesel it imports, thereby adding to South Africa's domestic energy security and improving the country's balance of payments. We need to wean ourselves off foreign energy if we are going to stop the economy bleeding out our exchange reserves" explains Marani.

Virginia Gas Project

The Virginia Gas Project comprises exploration and production rights on 187 000 ha of gas fields across Welkom, Virginia and Theunissen.

The asset is home to living microbial organisms that produce a constant, renewable source of gas and exceptionally high helium concentrations from large quantities of uranium and thorium deposits found underground, which renders the site a potential major global helium resource.

Renergen holds the production right on the Virginia Gas Project until 2042, with the option to extend it for a further 30 years.

Since it began production in September, the natural gas producer has been ramping up operations

Virginia Gas Plant.

pre-eminent clean energy project

to full Phase 1 capacity of 2 500 Gj of LNG per day, equivalent to 70 000 litres per day of diesel and 350 kg/d of helium.

"We have drilled, proved up the resource, designed, built and brought into operation the country's first commercial LNG plant, and are close to turning on the first liquid helium plant in sub-Saharan Africa, which will position South Africa as the world's 8th largest producer of liquid helium."

Leading producers of helium include the US, followed by Qatar, Algeria, Russia, Australia, Poland, China, and Canada.

According to Marani, barring the challenges and delays of some nine months, the Renergen team has done exceptionally well in bringing the project into production.

"We faced numerous headwinds, especially those related to the Covid-19 pandemic, including construction and supply chain delays as well as domestic strikes – all of which we have managed to navigate. The team has shown its mettle and resolve to deliver a pioneering project during trying circumstances."

The LNG produced is being supplied to customers including Consol and Ceramic Industries, with Marani already in advanced talks with key industry players keen to ink LNG supply agreements for both Phase 1 and Phase 2.

Phase 2 is significantly larger than Phase 1, with an estimated capital outlay of $1 billion, to produce 36 000 Gj per day, or the equivalent of 100 000 litres of diesel per day, as well as five t/d of helium, which accounts for roughly 8% of the world's helium market.

Phase 2 is in the planning stage, with Renergen anticipating "production by the end of 2025/ beginning 2026".

Looking ahead, Marani says a key milestone in advancing Phase 2 is achieving financial investment decision.

"There is strong interest from investors, and we are already in discussions with the US government, which has signed a retainer of $500 million of debt funding for Phase 2 and has several financial intuitions eager to co-lend. The Central Energy Fund announced that it would invest R1 billion to aid with Phase 2 development in return for a 10% stake in the project. Furthermore, the revenue from the first phase would also be used to develop the second phase."

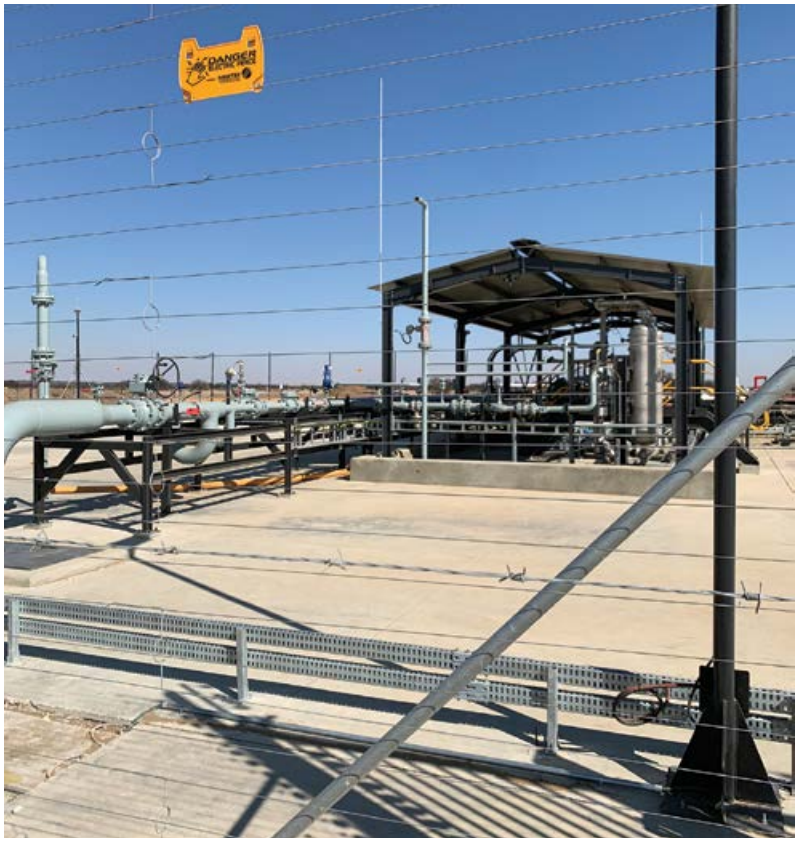
Cleaning the trucking business

As vehicles are key contributors to carbon emissions, a move to LNG will revolutionise the trucking industry and positively impact the country's carbon footprint.

According to the eNatis website, South Africa has an estimated 377 000 registered heavy-duty trucks operating nationwide.

Virginia Gas project.

"If you wanted to electrify the vast number of heavy-duty trucks currently operating on South African roads, you would need an additional 15 GW of installed capacity to recharge the trucks. As it stands, we do not have sufficient energy to meet our current needs. However, another viable way to lower carbon emissions is to transition heavy-duty trucks from diesel to LNG. In Phase 1 of the Virginia project, we are pioneering the use of LNG in heavy-duty trucks, which will radically reduce the CO_2 emissions the trucking industry produces. Apart from improving



Virginia project compression station.

Renergen has drilled, designed and built the country's first commercial LNG plant.

overall air quality, we will also be helping to reduce the vast quantities of carcinogens associated with emissions from traditional fuel sources," explains Marani.

Renergen currently supplies LNG directly (to Ceramic Industries and Consol); however, once Phase 2 is in production, the miner plans to develop LNG filling stations across the country.

"We will have dedicated LNG filling stations along all the major routes in South Africa – the N1, N4, N5, N3, N2, and N11 – which will make the transition to LNG seamless.

"Globally, there are around 24 million vehicles using gas. Petroleum producer, Total, recently invested in rolling out 750 LNG filling stations across the US; in Europe, there is a growing movement to adopt clean energy, be it battery electric or LNG-powered or dual fuel-powered trucks. China is also fast-tracking the switch from diesel to LNG and has 400 000 6x4 lorries on the road that run on LNG, while Nigeria has over 1 000 trucks fueled by LNG. LNG works; it is cheaper and cleaner. Under the right circumstances, the saving over three years is equivalent to the purchase cost of a new truck – imagine a free truck every year for improving your ESG."

Pipeline being laid.

Helium hero

Marani points out that the helium market is under severe pressure, exacerbated by increasing demand from the space race and hospitals – which require large volumes of helium for magnetic resonance imaging (MRI) machines – and from semiconductor manufacturers.

"The US government has seeded $500 billion in stimulus for semiconductors, which has doubled the requirements for helium in the semiconductor space and sent the price of helium skyrocketing."

Aside from project delays related to new helium initiatives, constant challenges associated with existing projects continue to intensify helium supply pressures. For instance, the Bureau of Land Management (BLM), which is responsible for the US's federally owned helium, continues to face challenges with its plant.

"The BLM is in the process of being sold, which questions its ability to continue long-term production. Moreover, Russia, which was meant to bring a helium plant online, has suffered a setback, with no certainty of when, or if, the plant will come into production. Additionally, Qatar's (Ras Laffan Helium 1 plant) continues to suffer intermittent outages and this, combined with the fact that its next phase helium projects have been delayed until 2026, means further supply pressures."

Given these supply pressures, the commodity is trading at attractive prices, particularly on the spot market.

Two key factors inform the spot price of helium – the urgency of need and whether it is in liquid or gas form.

"On the spot market helium can easily sell anywhere between $1 700 and $2 500 per thousand cubic feet (mcf), which is fantastic, especially compared to 2015 when the price for a spot load of helium was around $750 per mcf."

Although the clean energy producer remains hopeful that the prices for its products will continue to be robust, it has priced its models conservatively to ensure that the Virginia project remains viable and attractive, even when prices come off their peaks.

Bearing in mind the spot-market attractiveness, Renergen's Phase 2 capital outlay includes the acquisition of helium trailers, which will enable the helium producer to participate in the spot market as well as long-term off-take agreements. ■

Virginia Gas Project ticks the boxes

- ❑ First and only onshore petroleum production right in South Africa
- ❑ One of the richest sources of helium recorded globally
- ❑ Proven reserves of methane-rich natural gas
- ❑ A clean substitute for transport fuel, thermal fuel, and power
- ❑ Scalable plant

We strive to offer you the lowest cost of ownership

Weir Minerals is a leading designer and manufacturer of mine dewatering solutions, slurry pumps, hydrocyclones, valves, screens, centrifuges, crushers, feeders, washers, conveyers, rubber lining, hoses and wear-resistant linings for the global mining and minerals processing, sand and aggregate, and power and general industrial sectors.

For more information contact us on +27 11 9292600

WEIR

Minerals
www.global.weir
www.weirafricastore.com

Cobus Loots, Pan African Resources CEO.

PAR looks to commission its newest South

With a track record of successfully commissioning and operating surface tailings retreatment operations, AIM and JSE-listed South African gold miner Pan African Resources has embarked on its newest tailings retreatment project, the Mogale Gold project. The company plans to turn what once was a legacy liability left behind from historical mining activity into a high-margin income generating asset, capable of stimulating the local economy and the environmental remediation of the area. By *Chantelle Kotze*.

Once in production, Mogale Gold will increase the company's annual gold production by more than 25% to over 250 000 ounces per annum over an initial 13-year mine life, further entrenching the company's mid-tier gold producer status.

In October 2022, Pan African successfully completed the acquisition of two surface gold tailings assets for R50-million from Mintails Mining – a company that was placed in provisional liquidation in 2018. The assets acquired include the Mogale Gold tailings storage facilities and Soweto Cluster tailings storage facilities (TSFs), both of which are located on the outskirts of Johannesburg.

Since entering the acquisition agreement for the surface tailings assets in November 2020, Pan African's focus has been on developing a base case analysis on the Mogale Gold assets and it has since completed a prefeasibility study, fatal flaw analysis and definitive feasibility study (DFS) on Mogale Gold.

The DFS, released in June 2022, demonstrated that Mogale Gold has the potential to increase Pan African's gold production profile over the coming years by about 50 000 ounces per annum over its 13-year life of mine. This is equivalent to an increase of more than 25% on the 206 000 ounces of gold production that Pan African reported in the 2022 financial year ended June 30. This means that the company's forecast total gold output could increase to around 250 000 ounces per annum.

Equipped with the relevant know-how as demonstrated by the Barberton, Evander and, most recently, the flagship Elikhulu tailings re-treatment operations and a solid understanding of Mogale Gold's potential, Pan African is set for the successful development of yet another gold tailings re-treatment project, one of the last remaining tailings retreatment opportunities left in South Africa.

Oriel Shikwambana (right), operations manager at the Elikhulu tailings retreatment operation, with CEO Cobus Loots on site at the Mintails project.

A project with a good outcome for all

The Mogale Gold project, which is situated near the town of Krugersdorp to the west of Johannesburg, is currently characterised by environmental degradation, illegal mining, ongoing security threats, and theft and vandalism of critical infrastructure – a situation that is not conducive to the development of a successful local economy or sustainable communities.

By bringing to account some of the last remaining surface gold tailings resources located on the outskirts of Johannesburg, Pan African, together with its surface gold reclamation peers, DRDGold and Harmony Gold, can improve the social and economic opportunities within these areas.

"With a current environmental and mine closure liability of just under R200-million, the processing of the surface tailings at Mogale Gold would reduce this environmental liability to about R120-million, as the area would have been rehabilitated and the land restored to a more sustainable condition," Pan African Resources CEO Cobus Loots told *Modern Mining*.

The Mogale TSFs, which comprise various individual surface dams, namely 1L 8, 1L 10, 1L 13-15, 1L 23-25 and 1L 28, as well as two sand dumps – North Sand Dump and South Sand Dump – together contain a probable mineral reserve of 123.6 million tons with an *in-situ* grade of 0.29 grams per ton, for an estimated content of 1.14 million ounces of gold.

While Mogale would cost an estimated R2.5-billion in capital expenditure to develop – spent on a combination of the CIL plant, surface infrastructure and tailings facilities – payback is estimated to be

African gold tailings project in mid-2024

The North Sand Dump, which forms part of the Mogale Gold resource.

within 3.5 years after commissioning, and the DFS puts its operating costs at R78 per ton.

The company has already secured $80-million worth of senior debt from FirstRand Bank, acting through its Rand Merchant Bank division, which will form part of the funding for the Mogale Gold project's construction.

Using a low-cost hydro mining method to reclaim the tailings material, combined with load and haul mining for the sand dumps, the gold-bearing material will be sent to a carbon-in-leach retreatment plant with a throughput of 800 000 tons per month (with up to 900 000 tons per month achievable) for processing.

The plant will employ a similar proven processing technology to that of Pan African's flagship Elikhulu operation, which is currently processing about 1.2-million tons per month.

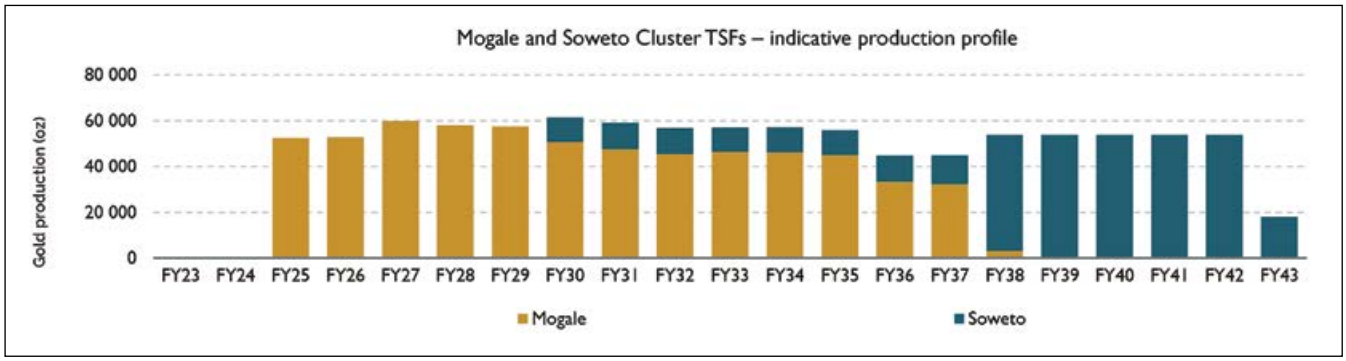
Loots said the company plans initially to re-mine and process surface dams 1L 23-25. Once the tailings have been reprocessed, the resultant residues will be consolidated and re-deposited into the West Wits Pit – a cavity left behind by historic gold mining activity near Krugersdorp – and later onto a new TSF to be constructed on-top of the West Wits Pit. As the tailings reclamation activity progresses, a second TSF will be established on the footprint of 1L 23-25.

"These two tailings storage facilities will be sufficient to consolidate the residues and in turn reduce the ecological footprint of the legacy area," said Loots.

To ensure adequate safety, compliance, and management of its TSFs and to prevent any risks that could negatively impact the environment and communities near these TSFs, Pan African is actively working with the relevant stakeholders to ensure that statutory TSF management standards, as outlined in the Global Industry Standard on Tailings Management, are implemented and maintained both in the planning and construction, and throughout the life of the TSFs.

Detailed engineering studies, environmental

The Soweto Cluster has the potential to add an average of 11 000 ounces per annum between years 6-13.



Mogale Gold will increase the company's annual gold production by more than 25% to over 250 000 ounces per annum over an initial 13-year mine life

The 1L 23-25 surface dams that Pan African Resources will re-mine and process.

Environmental Rehabilitation Opportunity

Pan African Resources' re-mining operations, which comprise the existing Elikhulu, Evander surface and Barberton tailings retreatment plants, provide a unique opportunity for the environmental rehabilitation and restoration of legacy residue stockpiles according to the far higher and more stringent environmental and safety standards and mine waste reprocessing technologies available today.

Consolidation of these residue stockpiles into optimised, safer, and well managed facilities, will offer several benefits for both people and the environment

authorisation and stakeholder engagement, are already well underway, while contract negotiations with engineering, procurement and construction management and contract mining companies are also in progress, said Loots.

Pan African expects to begin construction of the tailings retreatment plant in April 2023, followed by an 18 to 24 month construction period, with plant commissioning targeted to start in mid 2024, and first gold production set for December 2024, the company said.

Further growth through the Soweto Cluster

The Soweto Cluster TSFs, which comprise nine separate facilities located to the west of Johannesburg about 10 kilometres from the Mogale Gold assets, have the potential to further extend the combined mine life of the assets.

Although Pan African does not currently include the mineral resource of the Soweto Cluster TSFs in the Mogale Gold mine schedule, as further technical studies are required, a conceptual study has revealed that the Soweto Cluster resources could add eight years of mine life to the company's portfolio, extending the mine life to over 20 years and further increase combined annual gold production by as much as 60 000 ounces per annum when it comes on stream, the company said.

A technical study is underway to increase the mineral resource confidence of the Soweto Cluster, which currently has an inferred mineral resource of 119 million tons at a grade of 0.31 grams per ton,

The surface dams will be subject to low-cost hydro mining to reclaim the tailings material.

containing an estimated gold content of 1.2 million oz of gold. This is a similar grade and recovery to that of the Mogale Gold TSFs.

The conceptual model indicates that the Soweto Cluster has the potential to add an average of 11 000 ounces per annum between years 6-13 and an average of 54 000 ounces per annum between years 14-16, when the Mogale Gold resources are depleted.

Additional gold production growth projects

Apart from the production growth to be realised from the Mintails assets, Pan African has several additional growth projects on its horizon.

In December 2021, Pan African secured the right to another surface gold tailings resource – the Blyvoor surface gold tailings, on which the company is underway with an independent fatal flaw assessment and gap analysis.

If the company chooses to proceed with the acquisition and future development of the Blyvoor asset, which comprises six historical TSFs with total mineral resources of more than 1.4 million ounces of contained gold, Blyvoor could add an estimated 25 000 to 30 000 ounces per annum of gold production for 15 years.

Beyond these, Pan African also has organic growth opportunities at its Evander underground mine's Shaft 8, with plans to mine the down-dip extent of the Evander orebody at 24, 25 and 26 levels and at its Barberton Mine's Royal Sheba orebody. ■

Following the success of the 10 MW solar photovoltaic (PV) plant at Elikhulu, commissioned in May 2022, Pan African has completed a feasibility study for a 12 MW extension to this facility. The PV plant at Elikhulu is also the first grid compliant plant of its scale in South Africa. The company has begun site establishment for an 8 MW solar PV plant at Barberton Mines and plans to investigate the merits of a solar renewable energy plant at the Mogale Gold project.

The solar PV plant at Evander Gold Mines will provide an estimated 30% of Elikhulu's power requirement, materially reduce electricity costs, and is expected to reduce CO_2 emissions by some 26,000 tons per annum – contributing to an estimated 5% reduction in group-wide emissions. With a combined 30 MW planned to come on stream in the near term (by 2024), these benefits will increase three-fold.

Orion Minerals prepares for a busy 2023 at its in South Africa's Northern Cape

ASX- and JSE-listed junior base metals explorer and developer Orion Minerals is gearing up for a busy year at its flagship Prieska copper-zinc project located in South Africa's mineral-rich Northern Cape. Having agreed funding terms with development agency, the Industrial Development Corporation of South Africa and Canadian streaming and royalty financier Triple Flag, for combined pre-development funding of more than R360 million, Orion should soon have enough cash in hand to fund early works at its fully permitted and shovel-ready Prieska project. By *Chantelle Kotze*.

Orion Minerals CEO & MD Errol Smart.

Orion Minerals MD and CEO Errol Smart, who also heads up the Minerals Council South Africa's Junior Mining and Exploration Leadership Forum, has been vocal about the challenges faced by South Africa's junior mining sector when it comes to government policy and implementation, and development capital raising and investor mandate obstacles faced by juniors. This has resulted in the country's juniors having little success in getting their often-promising operations off the starting blocks.

Hutchings Shaft headframe at Prieska Mine.

With several barriers to entry, raising funding as a junior miner in South Africa is no mean feat and something Smart has been continually working on securing since 2019.

Smart says the company tested the market with its 2020 bankable feasibility study (2020 BFS) for a proposed 2.4 million-tonne-per-annum copper and zinc mining operation with a peak funding requirement of R4.8 billion but was met with limited finance success, owing to the project's high capital requirement and long lead-time. This saw Orion re-strategise its development schedule and led the company to investigate a phased implementation of its 2020 BFS instead.

"By starting at a reduced-scale first phase and a phased build up towards 2.4 million tonnes per annum means that Prieska will have a shorter lead time to first concentrate production, a smaller upfront funding requirement, and can start generating cash early – a demonstrable achievement that may attract further investment into the project," says Smart.

Prieska copper-zinc project

Hutchings Shaft headframe and cleared site at Prieska Mine.

Revised Prieska project development strategy

With prevailing positive macro-economic factors and the continued long-term positive outlook for both copper and zinc – key metals that are growing in demand for their role in an increasingly electrified and decarbonised world – Orion's revised strategy allows the company to capitalise on the positive near-term base metals market with a fast-tracked, yet smaller, route to first production and revenue generation.

Orion's early production scenario, which importantly maintains the core elements and material assumptions for the mine plan as outlined in the 2020 BFS, is assessing the merit of a phased development approach at Prieska in a manner that brings forward the start of production and allows for dewatering of the underground workings to begin ahead of the final investment decision for the full-scale 200,000 tonne per month Prieska Deeps mine project as originally planned in the 2020 BFS.

The strategy is investigating the upfront mining of the crown and above water remnant pillars rather than at the end of the project life; early extraction of the remnant pillars left behind during historic mining operations; and the start of dewatering of the underground workings using a modular configuration, ahead of the scale up to the full-scale pumping rate proposed in the 2020 BFS.

The work streams to form part of Prieska's early production BFS comprise a six-month trial underground mining programme of selected near surface remnant pillars and the +105 crown pillars; ore processing modular re-design; mineral resource estimation; ore reserves re-statement; and the financial modelling of the selected mining methods for the remnant pillar mining and the ore processing re-design.

While Smart could not give too much detail on production levels before finalisation of the BFS, he says the project would likely undergo a three-phase ramp up to reach steady state throughput of

Left: Investor visit to rehabilitated ore access point on 147 level.

Below: Investor visit by Triple Flag and IDC to rehabilitated underground haulage.

Water treatment plant delivery to Prieska Mine.

2.4 million ton per annum and should take an extra year or two to reach full target production. "In the meantime, however, we will achieve concentrate production from a run of mine of between 60,000 to 100,000 tonnes a month much earlier," Smart revealed.

Sources of finance for early works close to finalisation

The combined funding package that Orion is working towards finalising includes a pivotal R250 million senior secured, convertible debt facility from the Industrial Development Corporation (IDC) of South Africa, to fund the start of mine dewatering and the trial mining operations required to complete the mine's early production plan (announced in January 2022) to bankable feasibility accuracy.

It includes the December 2022 definitive agreements that Orion inked with Triple Flag, for a combined US$87 million (R1.49 billion) secured funding package, comprising an US$80 million (R1.37 billion) precious metal stream for 84% of the gold and 84% of the silver produced at Prieska – to be drawn down to fund mine development following completion of early production BFS, and a US$7 million (R120 million) early funding arrangement – conditional on Orion securing the IDC funding or an additional A$20 million funding to execute the agreed work focused on early dewatering.

The R250 million IDC funding package has satisfied the key condition to the $7 million (R120 million) Triple Flag early funding arrangement, and the combined almost R370 million will enable the start of dewatering within the Prieska Deeps mine and for Orion to begin a 6-month trial mining programme to demonstrate the mining method and the cost of this mining method, in a bid to complete Prieska's early production plan BFS.

Smart says the restated BFS on Prieska's early production plan is well advanced, with targeted completion in mid 2023, while the dewatering project is also well advanced, with underground storage dams and pump site construction completed and the shaft platform installed to facilitate pump installation.

The dewatering project is now expected to take 36 months at an estimated pumping rate of 500 m^3 per hour, instead of the original 12 months at an average pumping rate of 1,500 m^3 per hour, but at a third of the originally envisaged cost. Dewatering will run concurrently with early works and trial mining to lower the water level progressively to safely allow for early revenue production from the upper mine-levels.

Total dewatering of the mine is still required to access the main Prieska Deeps orebody and deliver the full 200,000 tonne per month throughput as envisioned in the 2020 BFS, yet currently subject to funding availability.

As electric vehicles and renewable energy continue to support the demand for copper, Smart believes there is growing copper production deficit building and that there isn't going to be enough copper produced to meet demand from as early as 2024. "It is going to take decades to build production up to where it needs to be to meet the current demand alone," he says.

With a new operating philosophy of staged growth, and an experienced development team to guide the company through this, Orion is focused on demonstrating to the market that while it may be a junior, it has a big vision for future growth. ■

Mining Equipment being delivered to Prieska Mine.

The right team for job

Orion has established itself as a proven explorer with an experienced study team capable of planning how to breathe new life into the historic Prieska mine, but as the company transitions from explorer to developer, it has stopped at nothing to secure a mining team with the knowledge and experience capable of executing the revised development strategy at Prieska.

Orion has appointed South African, Peet Van Coller who has a wealth of mining and mining contracting financial management experience, as the new group CFO.

Orion's Executive of Eastern Operations, Johan Stoltz, has experience in running ultra-deep mechanised mining operations and operations in the Northern Cape while Mine Manager Stoffies Odendaal is well versed in mechanised mining pillar extractions, cut and fill mining in hard rock conditions. Ben Otukile, the company's Engineering Manager, has a wealth of engineering experience in ultra-deep mechanised mining and with mechanised mobile mining equipment.

UMS GROUP

Value driven solutions to the **mining** and **metallurgical processing markets**

UMS Group is a unique **single source provider** that undertakes **concept, feasibility, design & engineering, construction** and **refurbishment projects** for its underground **mining** and **metallurgical processing** clients.

UMS GROUP
UNITED MINING SERVICES

Call Center +27 (0)11 445 4300
E-mail info@umsint.com
Web www.umsint.com

Ground Floor, Building 12 | Woodlands Office Park
20 Woodlands Drive | Woodmead
Johannesburg | 2191 | South Africa

UMS has regional offices in the United Kingdom; USA (Nevada); Botswana; Zambia

UMS METS

UMS SHAFT SINKERS

Investing in African Mining Indaba 2023 preview

African Mining Indaba 2023 has a thrilling line-up of new topics and a greater focus on emerging and junior miners, and environmental, social, and governance (ESG). Ahead of Mining Indaba, which takes place from 6 to 9 February 2023, *Modern Mining* caught up with Simon Ford, portfolio director, Investing in African Mining Indaba, and Tom Quinn, head of content at Mining Indaba, to chat about some of the noteworthy events lined up.

Tom Quinn, head of content and Simon Ford, portfolio director Investing in African Mining Indaba.

"We saw a record-breaking Indaba in May 2022 that really set the tone for the industry and for post-pandemic events as we lead up to February 2023. We are seeing a lot of early commitment and have no doubt this will be a sell-out event once again. With commodity prices remaining strong, demand for critical minerals, battery metals and rare earths really accelerating, we can expect this to translate into another bumper turnout and we are really excited to be back to our regular dateline in February," says Ford.

The mining industry, adds Quinn, has demonstrated a voracious appetite to particate at the 2023 edition of Investing in African Mining Indaba.

"With less than 10 weeks to go, we are quickly running out of stand inventory and expect to be completely sold out before the festive season. To date, we have confirmed dozens of first-time exhibitors and sponsors who will participate at next year's event, including the likes of Gecamines, Debswana Mining Company, MSTA Canada, State Government of Victoria (Australia), and many more."

With the number of government leaders and heads of government at the last live show in 2022, where three heads of state, a prime minister, 48 ministers and 19 high commissioners and ambassadors attended the Indaba, the event organisers are confident that Mining Indaba 2023 will attract at least as many high-level delegates.

"That Mining Indaba is given the utmost attention and support by state officials affirms the importance of the event and that it is driving positive policy change across the continent," says Ford.

He adds that the theme for this year's event, *Unlocking African Mining Investment: Stability, Security, and Supply*, captures the geopolitical shifts and economic disruptions being experienced, which are providing pressure points – as well as opportunities – within African mining as global economies seek security of supply, especially for their own energy transitions, as well as the raw materials and precious metals to bolster their economic power.

"As the world cautiously emerged from the global pandemic in 2022, we rightly focused on getting Africa's myriad economies back on track. While ESG, from investment to operations and social licence to operate, will continue to underpin the values of Mining Indaba, we find ourselves entering a new chapter in both pan-African and global economies," says Ford.

African Mining Indaba 2023 has a thrilling line-up of new topics.

New on the agenda

Taking cognisance of industry feedback, event organisers have several new initiatives and programmes lined up for 2023, including the Explorers Showcase, the Junior MINE and the Official Government Leaders Programme.

The Explorers Showcase highlights early-stage exploration projects and looks to stimulate much-needed conversation between explorers and investors.

"This ensures we can now claim to be driving investment into every stage of the mining production cycle through explorers, to juniors and to mid-tier miners and major mining companies. This is a great initiative, sponsored by BHP Billiton, which is our sponsor for the Explorers Showcase, and wants to align its own new initiative, BHP Xplorer, with Mining Indaba. The Explorers Showcase is supported by the Department of Mineral Resources and Energy, South Africa, and AfriMine young leaders Network helping to support exploration drives. To complement this, we will run the Junior ESG Forum, our ESG Awards,

and the new dedicated area for Junior Miners, aptly named the Junior MINE," explains Ford.

Speaking of the 121 Mining Investment conference, Ford adds that the event was extremely successful in reconnecting the industry and promoting relationship-building in 2022.

The 121 Mining Investment runs alongside the Investing in Africa Mining Indaba and is a meeting place for junior miners and investors.

This year, the event united 100 junior mining companies and over 400 institutional and sophisticated investors.

In 2022, Mining Indaba held its first dedicated Infrastructure & Supply Chain Forum which brought together vital mining supply chain companies and senior mining executives to discuss ESG-focused solutions to Africa's growing mining operations.

Following the success of the programme, the event organisers have integrated the Infrastructure & Supply Chain Forum with the technology-focused Mining 2050 stream, to create the new three-day InfraTech @ Indaba content platform, which looks at critical aspects of mining infrastructure, technologies, and building effective supply chains.

Also on the programme is the highly popular Innovation & Research Battlefield, a unique platform where academic institutions and start-ups showcase their latest ideas to decarbonise and make mining more sustainable. Modelled on the Mining Indaba Investment Battlefield, it seeks to bridge the gap

Above: Also on the agenda is the Young Leaders Forum.

Right: The Investment Battlefield at Mining Indaba.

Minister Gwede Mantashe at the Mining Indaba conference in 2022.

between great ideas and the resources needed to implement them.

"Thanks to the generosity of BHP and the University of Melbourne, our winners, the University of Cape Town, received a substantial cash prize of $30 000 to help bring their concept of community and asset sustainability when a mine reaches it end-of-life cycle, to reality," says Quinn.

Also on the agenda are the Ministerial Symposium, Intergovernmental Summit, Green Metals Day, Sustainability Day, Young Leaders Forum, and the General Counsel Forum. For 2023 Mining Indaba has also partnered with The Carbon Trust for the first time and continues its partnership with Women in Mining SA and UK.

Given that ESG-focused mining continues to dominate the entire value chain, topics of discussion include 'Energy Transition Metals & Minerals – How Can the African Mining Sector Ensure Security of Supply?'; a special investor focus on 'Qualification and Quantification of ESG risk and Uncertainty Across the Mining Lifecycle'; a Women In Mining panel; 'Resource Nationalism Through the Lens of Investment Risk, Security of Supply, the Impact of AfCFTA'; and the 'Hydrogen Opportunity' debate, which will feature industry leaders involved in bringing Africa's hydrogen potential to life.

With the continent under immense infrastructure-related pressure, the organisers have a line-up of speakers to discuss issues related to power and water, says Quinn.

"Power and water are not just necessities for mining operations, they are vital components of the communities who make a living from mining. We are delighted to welcome Mining Indaba's former chair of our advisory board, Mpho Makwana, to speak on power issues in his new role as chair of the management board at Eskom. Of course, IPPs and renewable energy have been a growing part of the Indaba for the last few editions, so we will hear from leaders such as Vivo Energy as well as operators like Anglo American and Gold Fields who are harnessing zero-carbon power to drive down emissions in their Scope1-3 footprint. The ICMM and Minerals Council South Africa will bring thought-leadership on water usage and efficiencies, as well as the critical need for tailings reduction and safety."

Global leaders who will take to the podium at the Mining Indaba include Anglo American chief executive Duncan Wanblad; Rio Tinto's chief executive, Minerals, Sinead Kaufman; the relatively new CEO at Exxaro Resources, Dr. Nombasa Tsengwa; Minerals Council SA CEO Roger Baxter, before he steps down from that role in April; Alphonse Kaputo Kalubi, chair of DRC giant, Gécamines SA, and the CEO of ICMM, Rohitesh Dhawan, as well as many other top executives deeply involved in Africa's mining industry. ■

WE ARE CLOSER.
THAN YOU THINK.

NOW. NEXT. BEYOND.

We move to help you reach your goals faster.

Drawing on the largest portfolio of industrial fluid power technologies, we engineer solutions to make your operation more efficient, powerful, intelligent and safer.

Call us: +27 011 979 4630 **or**
Visit our website at: www.boschrexroth.africa

HÄGGLUNDS BOSCH rexroth
A Bosch Company

The Bosch Trifecta at African Mining Indaba

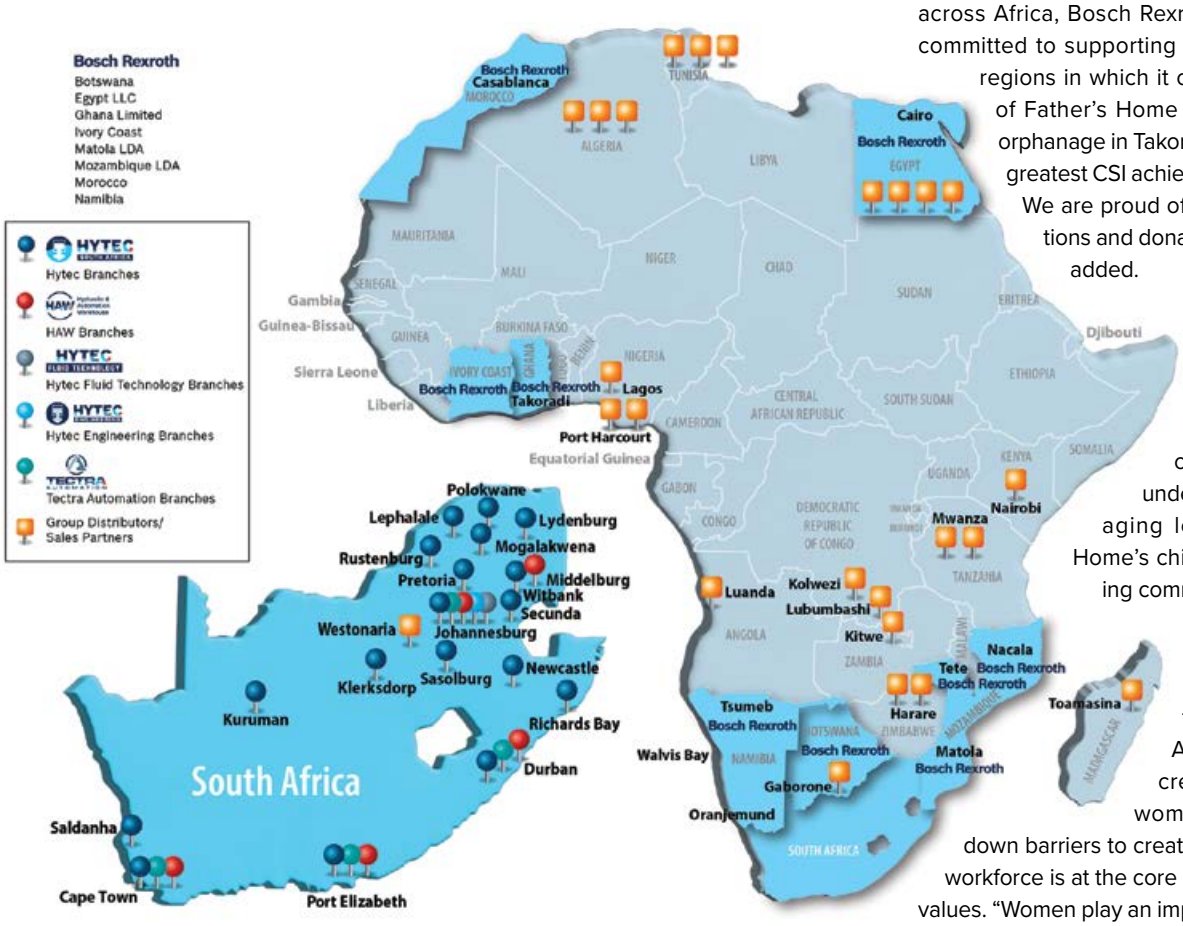
Bosch Rexroth Africa will make its first appearance at this year's *Investing in African Mining Indaba* in conjunction with Bosch Rexroth companies, Hägglunds Drives and Smart Mine. The companies will use the event to showcase how their innovations can shape the future of African mining and automation.

Bosch Rexroth South Africa Group CEO and President of Bosch Rexroth Africa, Chris Riley.

"The theme of our 2023 stand is *'We're closer than you think'* and will focus on the various ways that Bosch Rexroth Africa can assist customers with taking African mining and automation to new heights," says Chris Riley, Bosch Rexroth South Africa Group CEO & President of Bosch Rexroth Africa. "We will also showcase how our solutions can support industry opportunities and contribute to supply chain security for commodities throughout the continent."

A leader in the design, manufacture, installation, service, and repair of hydraulic solutions, Bosch Rexroth Africa is Africa's largest fluid power and automation company with 33 global brands and a network of over 35 branches servicing the continent.

The recent opening of Bosch Rexroth Ivory Coast in Abidjan, which will service the mining, industrial and energy sectors, is the Group's latest move in expanding operations across Africa to be more available to customers on the continent. The Group is expected to support customers in the Ivory Coast with a streamlined product offering and repair services.

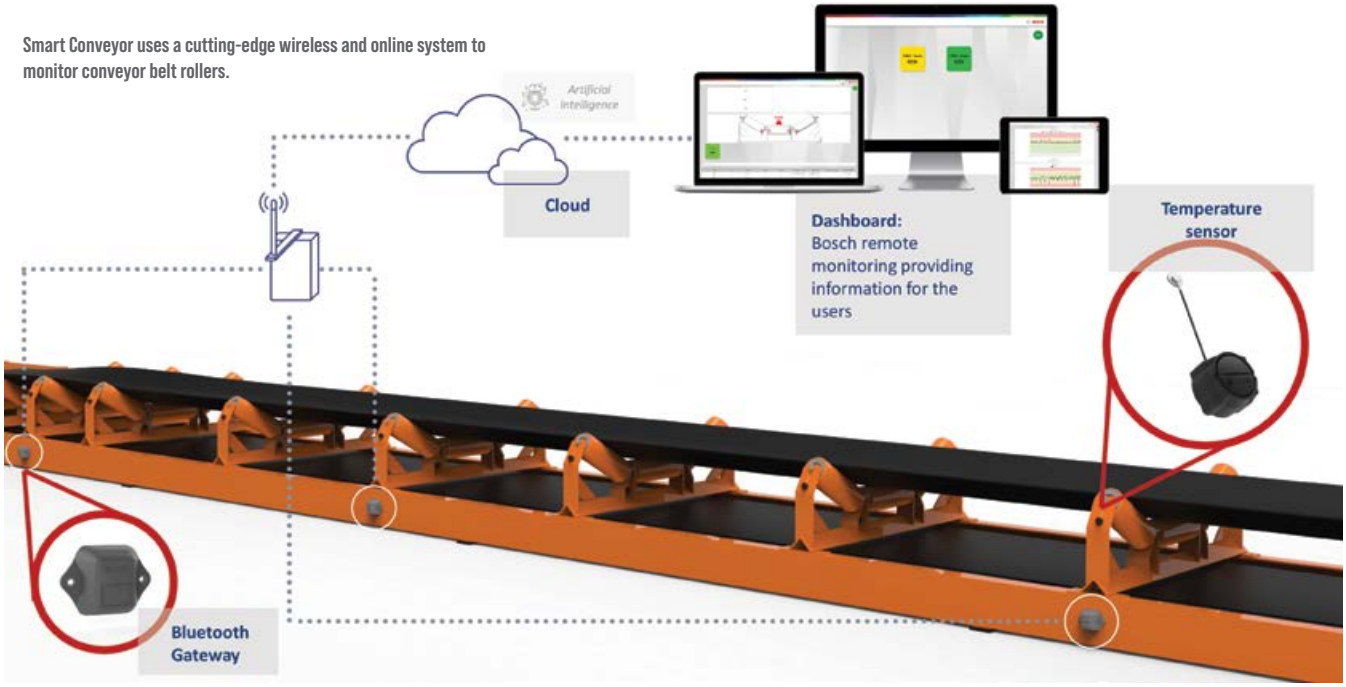


Bosch Rexroth Africa services the continent with 33 global brands and a network of over 35 branches.

With an emphasis on geographical expansion across Africa, Bosch Rexroth Africa also remains committed to supporting the communities of the regions in which it operates. "The adoption of Father's Home Care Ministries, a local orphanage in Takoradi, Ghana, is among the greatest CSI achievements of our business. We are proud of our continuous renovations and donations to the Home," Riley added.

Alongside monthly donations of food, nappies and water, the Group's plan to open a 110 m^2 library on the orphanage premises is underway to offer an encouraging learning space for the Home's children and the surrounding community.

In recognition of the vital role people have to play in driving Africa forward, Bosch Rexroth Africa is also invested in creating opportunities for women in mining. Breaking down barriers to create a diverse and dynamic workforce is at the core of Bosch Rexroth Africa's values. "Women play an important role in hydraulics,



Smart Conveyor uses a cutting-edge wireless and online system to monitor conveyor belt rollers.

which was previously considered to be a male-dominated industry. Change is driven by technology, innovation, better processes and social dynamics," says Riley.

The Group continues to set its sights on placing trailblazing women in leadership positions to drive innovation and leverage experience to expand the automation sector in Africa.

Taking African mining and automation to the next level

Focusing on mining digitalisation, Smart Mine will showcase how mining operations can be optimised through its range of state-of-the-art solutions – Smart Inspection, Start/Stop Retrofit, Smart Lockout and Smart Conveyor. "Smart Inspection offers optimal support during onsite and offsite inspection and maintenance processes in the palm of your hand through the use of digital devices," says Jonas Corali, General Manager of Bosch Smart Mining Africa.

African governments and mining companies have expressed commitments to delivering cleaner operations and finding ideal technological solutions to help execute this change. "The Stop/Start Retrofit system has the ability to reduce CO_2 by automatically shutting down vehicle engines during operational waiting periods. Essentially, this reduces fuel consumption and emissions while increasing the engine life of construction fleets," points out Corali.

With global supply chains experiencing constraints, Smart Mine aims to boost the productivity of African mines with its Smart Lockout and Smart Conveyor solutions that reduce downtime. "There's no doubt that the Fourth Industrial Revolution is with us. Our Smart Mine solutions are designed to deliver cutting-edge results for the automation and digitalisation of mining on the continent. They enhance safety, and increase asset availability and productivity. Moreover, they assist customers to reach their ESG goals," Corali added.

Hägglunds Fusion, the all-in-one hydraulic drive solution with a compact design.

Hägglunds Fusion: The Power of One

From a hardware side, Hägglunds Drives South Africa is showcasing Fusion – its most compact hydraulic drive yet. The motor provides unbeatable torque across a range of low power applications, while increasing productivity for apron feeders, belt feeders and infeed conveyors.

"This modular solution is not only durable, reliable, space- and cost-saving, but it is also highly flexible, ensuring that it remains efficient for clients and meets their expectations," states Kay Govinder, Sales Manager of Hägglunds Drives South Africa.

Summing up, Riley believes that Investing in African Mining Indaba 2023 is a great opportunity for Bosch Rexroth Africa, Smart Mine and Hägglunds Drives South Africa to network with African market leaders and showcase how product offerings can transform the future of mining and automation in Africa. ■

Geobrugg targets zero harm

The mining industry in South Africa had been working to find new ways towards the realisation of zero harm. Geobrugg offers highly specialised know-how in this field. Although our South African office based in Lanseria has only been in the country for a decade, it can rely on more than 65 years of experience in steel wire processing offered by our head office in Switzerland. Our team of dynamic people can provide technical support on various flexible rockfall mitigation systems. The BRUGG Group is one of Europe's largest steel rope and associated product manufacturers.

Round spike plate on MINAX mesh.

Geobrugg is at the forefront of upgrading or reassessing the safety of a mining operation. Traditional support and reinforcement systems such as shotcrete reinforced with electro-welded mesh or fibercrete used in underground mining are limited in their capability against dynamic loads. The development of diamond-shaped lightweight steel wire meshes MINAX of very high strength in recent years has offered alternative design solutions. In order to fully understand the behaviour and capacity of various ground support systems using these MINAX meshes, Swiss company Geobrugg has carried out many full-scale dynamic tests at its test centre in collaboration with universities and mines from all parts of the world.

The need to increase energy dissipation capacity in the support system, designs of different mines have been present for many years. With this goal in mind, systematic studies have been carried out, aiming to improve the performance of single elements and complete reinforcement systems. In addition, the development in recent years of diamond-shaped lightweight steel wire membranes of very high-tensile strength, has greatly boosted this trend. These powerful flexible solutions, combined with suitable anchors, have undoubtedly been a huge step towards solving situations where protection against dynamic load is imperative.

To prove the suitability of support systems with high-tensile steel mesh and bolts, and to analyse their bearing behaviour, a large-scale test centre was commissioned in Walenstadt, Switzerland. On a test rig, it is possible to apply large energies to variable ground support systems with variable bolt patterns and meshes with a total support area of 3.5 m x 3.6 m in a full-scale manner. The test site is instrumented by load cells, high-speed video analysis and accelerometers. It could be shown that a combination of high-tensile steel mesh with a specific bolt pattern can result in high-energy capacity surface support. Distribution of the impact loads during the stopping process to the different elements of the bearing support system depends on the strength and flexibility of the mesh and the bolt resistance and its pattern.

Given the characteristics of a structure that attempts to reproduce the conditions of a mine, boundary conditions are generated that do not allow a direct correlation of the results obtained in the test with the results expected at the mine. However, they allow comparisons between systems/elements of fortification and help to

Blast-on mesh installation.

GEOBRUGG®
BRUGG
Safety is our nature

THE MOST ECONOMICAL


Rockfall barrier


TECCO® slope stabilisation

DYNAMIC SURFACE


QUAROX®/SPIDER® draping systems


MESHA® installation handler

SUPPORT.


Installed MINAX® 80/3 with T3 connection clips


Underground spike plate

Your local Geobrugg specialist:
www.geobrugg.com/contacts

Geobrugg Southern Africa (Pty) Ltd
Stand 660 | Lanseria Corporate Estate
c/o Amelia and Electron Lane | 1739 Lanseria | South Africa
T +27 11 794 3248 | www.geobrugg.com

A BRUGG Group company

Attenuator at local diamond mine.

advance our understanding of the complex problem of ground support.

The new ground support designs, developed over the past few years, consist of high-tensile steel wire mesh MINAX, anchors and shotcrete. Because of the use of high-tensile steel wire (min 1770 N/mm^2) and the flexibility of the chain-link mesh, such a support system can be applied in areas with high static and dynamic stress.

On several rockburst occasions worldwide, it has been demonstrated that this type of design, with high-tensile chain link mesh MINAX, allows high energy absorption of the dynamic loads from periodic rockburst. This, depending on the magnitude of the incident, is usually without any maintenance requirements, which is fundamental for guaranteeing miners' safety and essential to increase the productivity of mining development ultimately.

GBE barrier.

Blast-on mesh

Installing an 8 mm cable on the leading edge of a mesh sheet helps to absorb the velocity of the blast. The mesh sheets can be used as permanent areal support in narrow reef mining. Uncontrolled fall of ground between bolts can be eliminated with the installation of MINAX blast-on mesh, which also reduces the time spent on inspection and barring following re-entry after blasting. Our team makes sure that sufficient training is provided to ensure the mesh is installed correctly. Geobrugg has specially designed round spike plates that can be used instead of flat washers. These round spike plates help to improve the load transfer between mesh and bolts, making it a complete system. Mesh sheets are connected with T3 Connection Clips. There is no need for additional bolts or overlapping mesh – no mesh wastage occurs.

Geobrugg solutions (rockfall barriers or drape systems) protect workers against rockfall and also protect access roads, production installations and buildings. The high tensile steel wire offers high energy absorption capacity and long life with low maintenance. The rockfall barriers offer protection against maximum energies up to 10 000 kJ. The barriers are easy to install and simple to maintain. Energy categories for the GBE rockfall barrier series bear the CE conformity marking. Geobrugg's barriers have a considerably smaller carbon footprint than concrete or steel constructions.

Attenuators for passive protection

Hybrid rockfall barriers are installed as passive protective measures. The barrier intercepts the rockfall and absorbs the energy, while the drape enables the rocks and other debris to roll into a catch zone in a controlled manner. Attenuators offer a moderately controlled form of slope protection.

A cost-effective solution

In many projects, geotechnical engineers are faced with challenges and always want a solution that offers less time on site, fewer materials, and the least impact on the environment. Solutions need to be effective while minimising the disturbance of the environment. Thanks to the aluminum-zinc coating on Geobrugg's mesh (MINAX, TECCO, DELTAX and SPIDER), the mesh blends into the landscape. Geobrugg's drape systems can provide the same level of protection as a conventional protective covering using only half as many nails. This can significantly reduce the total project cost and installation time.

If you need a specialist solution for geohazards, then Geobrugg is the answer. Reference projects can be found at www.geobrugg.com/projects. ■

MODERN MINING

CROWN PUBLICATIONS

FOR PEOPLE WHO ARE SERIOUS ABOUT MINING

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.

2023 features

January
- Africa's Top Mining Projects
- Mining Indaba Preview

February
- Underground Mining (incl Rock support & engineering)
- Motors & Drives

March
- Opencast Mining Contracting & Equipment
- Mining Indaba Review

April
- Modular Plants
- Pumps & Valves

May
- Crushing & Screening
- Commodities Focus (Diamonds, precious metals, etc)

June
- Junior Mining
- Power Supply & Energy Efficiency

July
- Green Mining (Environmental Management & Sustainability)
- Finance & Legal

August
- Women in Mining
- Suppliers to Mining Industry

September
- Regional Focus – West Africa
- Mining Technology (incl. shaft-sinking/raise-boring)

October
- Health & Safety
- Digital Mine

November
- Consulting Engineers / Project Houses
- Commodity Focus – Energy Minerals

December
- Materials Handling
- Explosives & Blasting

If its not INVAL®, it's not Invincible

INVINCIBLE VALVES®
1982 - 2022
40 YEARS

TRUST IS WHAT MAKES OUR NAME OUR PROMISE.

Major industries in South Africa and globally trust Invincible Valves to continually innovate and invest in valve solutions for their industries.

With in-house rubber lining services for valves, pipes, fittings and vessels, we are able to offer complete service, maintenance and reconditioning services with exceptional service, pricing and quality standards.

The bond we have with our customers, coupled with world-class facilities means that the Invincible Valves team is able to continually provide customers with our enhanced services that leads to their profitability.

+27 11 822 1777
enquiries@invalve.co.za
invalve.co.za

LEVEL 1
BBBEE

GENERAL INDUSTRY I MINING I PETRO-CHEMICAL I POWER GENERATION I WATER I SEWERAGE

Ross Harvey, director of research and programmes at GGA.

Is ESG the latest acronym or could it change mining substantively?

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

The dust has barely settled on the Climate Conference of the Parties (CoP27) held in Egypt in November last year, and the Cape Town Mining Indaba will shortly be opening its doors. What is the connection? Keeping the earth's temperatures to below 1.5 °C above pre-industrial levels will require the extraction of large volumes of critical minerals and metals to sustain the global energy and transport revolutions. Of course, detractors are not convinced that the world ever can become green, and indeed there are some difficult questions to answer pertaining to the environmental and human-harm footprint of minerals like lithium and cobalt. Also, the volume of energy required to produce aluminium for electric vehicles is intense. The number crunching has to be done meticulously to justify a particular development pathway.

Detractions aside, however, economic research is increasingly clear that a transition to clean technology is desirable, and that innovation switches away from dirty (fossil fuels) to clean technologies in response to changes in prices and policies. Indeed, we have seen this play out significantly over the past seven years since MIT economist Daron Acemoglu and his co-authors wrote that an optimal welfare response to the climate problem is a deft combination of research subsidies (towards clean technology) and carbon taxes. Indeed, we have seen the efficacy of the former in rapid price reductions of renewable energy technologies and its adoption at scale. Carbon taxes are also increasingly difficult to avoid.

Moreover, it remains clear that humanity is approaching various ecological tipping points beyond which abrupt and irreversible environmental change at large geographic scales is likely to happen. So wrote scholars Tilman Altenburg and Dani Rodrik, also seven years ago. On the back of this work, Anja Berretta and myself wrote a book chapter for the Routledge Handbook of the Extractive Industries and Sustainable Development. In it we noted the irony that 'any move towards a low-carbon future will still require vast volumes of minerals and metals to be mined which, if not governed well, may portend further ecological disaster. While progress towards clean, renewable energy and

Any move towards a low-carbon future will still require vast volumes of minerals and metals to be mined.

electric vehicles is to be welcomed, less thought has been given to the security and sustainability of the required raw material supply.'

It is therefore surprise that the theme for the 2023 Mining Indaba is *Unlocking African Mining Investment: Stability, Security and Supply*.

Below, I advance the argument that taking Environmental, Social and Governance (ESG) performance seriously is key to securing a truly sustainable supply of critical raw materials required for the energy transition.

First, metals such as copper, cobalt, chrome, manganese, lithium and platinum group metals (PGMs) are clearly critical for the transition, but they are increasingly found in politically fragile jurisdictions that score poorly on investment attractiveness. In other words, the resource curse – the paradoxical relationship between resource wealth and underdevelopment – is prevalent. If the resource curse is to be overcome across resource-wealthy African economies, then transparency and accountability are key steps towards that end. The 'G' of ESG simply means that companies become increasingly open to scrutiny, less inclined to pay bribes (as Glencore has recently been found guilty of doing in the DRC) and more dedicated to sourcing minerals cleanly and without political interference to gain preferential treatment. At the same time, the onus is on governments to ensure that exploration and production rights allocation processes are proper in every respect. There is no reason, for instance, why a functional cadastre system should not be implemented immediately in every African jurisdiction. A cadastre simply means that everyone can see which company is applying for which concession and where the process is at any given moment. South Africa's system now allows individual companies to access application forms online, but there is no transparent map of which companies own which concessions at present.

Second, while ethical sourcing is crucial to cleaning up supply chains, it is important to be aware that some well-intentioned schemes can end up inadvertently destroying the livelihoods of legitimate artisanal and small-scale (ASM) miners. The key here is for companies themselves to ensure that they engage with local communities sincerely and procure only from legitimate sources. The 'S' part of ESG is about mainstreaming social performance. Doing right by host communities cannot be treated as a tick-box exercise. In my current work as director of research at Good Governance Africa, I still see too many examples of companies striking deals with the local chief, conducting one meeting with 'community stakeholders', currying favour with the incumbent politician and their family and continuing as if the community will now be completely onboard with the proposed extraction. It doesn't work like that – relationship-building and communication take time, and the social licence to operate should never be a 'catch-phrase'; it is something that every company should take seriously lest they have to resort to paying private militia to protect their assets from aggrieved community members ten years from now (by which time the current CEO will have long since retired). Social and Labour Plans, as required by South African mining law, are too onerous and deter companies from contributing to the broader institutional framework that would enhance social development (such as education) in their host communities.

Metals such as copper, cobalt, chrome, manganese, lithium and PGMs are clearly critical for the energy transition.

Third, the 'E' is probably the most promising element of the current ESG milieu, in that mining companies increasingly have access to technologies which will help them to extract minerals and metals with a minimal environmental impact. Environmental performance is also typically easier to measure and report on than the social dimensions, which are a lot more qualitative. Lowering one's environmental footprint makes good business sense in the long run for two reasons. It increasingly allows you to leave more of the ore body available, extending the life-of-mine. It also reduces the human cost of sending people to

Progress towards clean, renewable energy and electric vehicles is to be welcomed.

Every firm and every government with an interest in mining needs to work towards a global ESG standard.

where robots can now go instead. Some of the push-back to this argument is that companies should be allowed to pollute in developing countries because this is simply part of what a 'just' transition looks like. Justice, however, is possibly best defined as reducing the divergence between social costs and private returns (the definition of negative externalities). Ensuring that companies internalise costs that were previously offloaded on those who could least afford the negative health implications of a destroyed environment only seems sensible and just.

Finally, ESG is not just some western imposition. It is an extremely useful lens through which to understand how firms and governments should think about the future. When we look back in ten years' time, it would be extremely disappointing if we had achieved an energy transition away from fossil fuels but had destroyed ecologies and livelihoods in the process. To reverse the resource curse and ensure a more liveable planet for all of us, every firm and every government with an interest in mining needs to work towards a global ESG standard that avoids the current confusion of different rating agencies measuring and weighting various metrics differently.

Early adopters of ESG principles will see optimal long-run returns.

Standards-divergence confusion notwithstanding, it is increasingly clear that future access to capital will be increasingly contingent on one's ESG credentials. In a recent intelligence report published by Good Governance Africa, the executive summary states the following: 'Asset management firms will be subject to rigorous disclosure requirements should they want to credibly market their funds as promoting sustainability. These rules are an attempt to regulate what is currently a disordered market, where firms are quick to employ the ESG concept for marketing purposes, but investors have no way of ascertaining whether the claimed credentials are legitimate or verifiable. In our view, this regulatory trend towards preventing concept abuse is a welcome development and will help to separate the wheat from the chaff in a world that is under immense pressure to achieve low-carbon growth.

Early adopters of ESG principles – those who mainstream social and environmental responsibility into how the firm is governed – will see optimal long-run returns. Those who engage in greenwashing or are too slow to adapt will suffer long-run decline.' I can think of no stronger closing words, and trust that delegates at the 2023 Mining Indaba will take the message seriously. ■

Doosan to introduce new global brand at CONEXPO-CON/AGG 2023

Equipment supplier Doosan will introduce the company's new global brand and logo, as well as several new products at CONEXPO-CON/AGG 2023, which takes place from 14-18 March 2023 in Las Vegas, Nevada, USA.

The company's new name and logo will integrate new brand values and its commitment to creating smart construction solutions of tomorrow.

"Fans of our current offerings will be delighted that the equipment will remain unchanged and continue to deliver the powerful, reliable, solutions admired worldwide," says Alice Banach, senior marketing manager, Doosan Infracore North America.

The Doosan exhibit (F9153) in the outdoor Festival Grounds area will showcase a sampling of the company's full line of construction equipment, the exclusive Transparent Bucket for Doosan wheel loaders, a battery-powered engine and several new machines, including the company's dozer line.

Cutting-edge technologies such as Concept-X demonstrations, safety features and electrification will be featured. The Doosan exhibit will showcase autonomous equipment, the new Smart X-Care™ fleet management service and the topography-scanning drone Concept-X XiteCloud.

The Concept-X autonomous worksite will feature three live demonstrations each day, along with other new products. First exhibited in 2019 with an autonomous Doosan® wheel loader and excavator, Concept-X is a smart control solution to tomorrow's worksites. It can survey worksite topography via 3D drone scanning, establish operational plans based on that data, and operate heavy construction equipment such as excavators, wheel loaders and articulated dump trucks without human intervention. ■

Doosan to showcase its line of construction equipment at CONEXPO-CON/AGG 2023.

New yard crane for Mpumalanga refinery

Crane manufacturer, Condra, has completed a 32-ton, 30-metre span container handling crane for Manganese Metal Company (MMC), the Mbombela-based metal refinery.

The purpose of the crane is to allow MMC to offload and load full containers from and onto either railway wagons or road transport trucks, allowing it to export product without interruption using multiple transport options.

MMC produces selenium-free manganese metal used in the production of aluminium beverage cans, certain types of special steels, chemicals, welding consumables and lithium-based rechargeable batteries.

Condra won the contract for MMC's container crane after competing against rivals. A turnkey proposal, short lead time, effective after-sales service and very low projected overall lifetime cost were among the reasons for the win.

Condra's turnkey solution includes the crane itself, down shop conductor system, the design, supply and erection of the crane's 43metre free-standing gantry, and calculations for foundations laid by an independent civils contractor.

The 32-ton double-girder electric overhead travelling crane will be used in the open. It features weather covers on all motors, anti-derailment brackets, and Condra's patented storm brakes to guard against movement caused by high winds.

MMC's gantry was delivered on December 5th, with the crane to follow in the second week of January 2023. ■

MMC's crane under load test at Condra's Germiston factory.

Komatsu announces plans to acquire German-based manufacturer GHH Group GmbH

Mining and construction equipment supplier, Komatsu, has entered into an agreement to acquire GHH Group GmbH (GHH), a manufacturer of underground mining, tunnelling and special civil engineering equipment headquartered in Gelsenkirchen, Germany.

Founded in the 1960s and currently part of the German-owned Schmidt Kranz Group, GHH offers a wide range of equipment focused on loaders (LHDs) and articulated dump trucks in the mid-seam mass mining, narrow vein and low-profile market segments. The company also supports customers with aftermarket parts and service support through the life of each machine. With the acquisition, Komatsu will add GHH's factories and rebuild facilities in key markets.

"We are very excited about this acquisition as it represents a great opportunity for Komatsu to expand its offerings for underground mining equipment and accelerate new product development through synergies with Komatsu's existing team and product offerings," said Peter Salditt, CEO, Komatsu Mining Corp. "By adding GHH's factories and rebuild facilities in key markets in Europe, South Africa, India and Chile, we also aim to strengthen production and service capabilities for our customers."

The official close of the acquisition is projected for the first half of 2023.

Komatsu is working to expand offerings for underground hard rock mining, creating new value for customers with the development of new equipment, processes and technologies that will help operations step forward to the next stage in the workplace of the future and provide a more sustainable environment for the next generation, the company said. ■

Komatsu to acquire GHH Group GmbH (GHH).

New technology enables real-time carbon monitoring

Heavy lifting and transport company, Mammoet, has developed a new technology platform that reports emissions data from heavy lifting equipment in real time. The system allows customers to accurately predict and monitor carbon output arising from large heavy lifting and transport projects.

Project planners looking to meet increasingly strict emissions regulations have needed to rely on estimates of total emissions, drawn from the make and model of equipment involved and how long they have been used. Mammoet's new technology increases the accuracy of this reporting by using data taken directly from the embedded electronics of on-site equipment, the company said.

The system, codenamed DAISY, transmits this data over mobile networks from local devices attached to the embedded systems of cranes and SPMT combinations. This can then be accessed from any worldwide location, providing a clear audit trail for governments and other authorities.

The system is currently in use in the Netherlands, monitoring the carbon emissions of a fleet of mobile cranes. It is planned for rollout across Mammoet projects according to customer demand during 2023.

Jacques Stoof, head of innovation at Mammoet, commented: "DAISY will be the most advanced system to accurately report CO_2, NOx and NH_3 emissions at equipment level at the operating location, improving on the generic approach the industry is currently using. Based on the actual reported emissions, clients will be given the option to choose for a more sustainable, less emitting fuel type to minimise their emissions footprint during construction". ■

Mammoet's new technology platform reports emissions data from heavy lifting equipment in real time.

TOMRA Mining to present diamond recovery solution at Mining Indaba 2023

Automated sorting systems specialist, TOMRA Mining, will showcase its sensor-based ore sorting solutions at the Mining Indaba 2023 exhibition (Booth M30-7), which will be held in Cape Town, from 6-9 February. Of particular interest will be its latest innovation in diamond recovery, the COM XRT 300 /FR sorter, a unique new-generation machine that has the potential to revolutionise diamond flowsheets. Kai Bartram, global sales director, Corné de Jager, global segment manager diamonds, and Helga van Lochem, area sales manager, will be on hand to discuss the benefits of TOMRA's portfolio of sorting solutions for the diamonds, metals and industrial minerals industry, as well as the advantages of its advanced digital products and services, like the TOMRA INSIGHT cloud-based platform, the company said.

Corné de Jager: diamond segment manager at TOMRA Mining.

A sensor-based sorting partner since 1993, today TOMRA Mining has more than 200 machines in operation across the world.

The TOMRA COM XRT 300 /FR is a new generation machine and an industry first in diamond sorting. It uses the company's proprietary ultra-high-resolution sensor, advanced new image processing and high-precision ejector valve system to produce an ultra-high diamond-by-weight concentrate with an exceptionally low yield. The sorter offers 100% diamond detection within the specified size fraction and >99% guaranteed diamond recovery with appropriate feed material preparation. It is also a dry process that does not require water or chemical reagents.

"Our Final Recovery sorter has the potential to revolutionise diamond flowsheets," stated Corné de Jager. "This user-friendly, compact, and easy-to-operate sorter offers higher efficiency and better grade, with fewer sorting stages and a smaller footprint. It reduces complexity and operational costs." ■

TOMRA Mining will showcase its sensor-based ore sorting solutions at the Mining Indaba 2023.

Index to advertisers

Enaex
Africa

Global Presence Local Touch

Mining Explosives, Technologies & Blasting Services

Enaex Africa is a premium blasting solution partner in all main mining regions, with a clear purpose to humanize mining. In Africa, Enaex produces and distributes a wide variety of explosives and value-added solutions, providing all the products and services required to execute the entire blasting process, including several types of bulk emulsions, package explosives, boosters, and conventional and electronic detonators, among others. These products are used in blasting for opencast and underground mining operations, quarries, and civil construction. Enaex is committed to embracing global and local sustainable development initiatives and have placed renewed focus on a safety, health and environment plan that reflects commitment to make sure our impact is – and will always be – a positive one. Enaex stands for Stronger Bonds - let's work together, grow together.

enaex.com

YELLOW CLEARANCE SALE

Offer Extended Until

28 FEB

620G | 670G | 770G	444G | 544K | 624K 644K | 644G | 724K | 744L	E210 | E260 | E300 E360 | E380	750J-II | 850J-II	310L | 315SL
MOTOR GRADER	**WHEEL LOADER**	**EXCAVATOR**	**CRAWLER DOZER**	**BACKHOE LOADER**

Contact your nearest John Deere Construction & Forestry Dealer today

www.deere.africa/en/our-company/contact-us/

JOHN DEERE

Offer valid until 28 February 2023. Ts and Cs Apply

Ts and Cs available at: https://www.deere.africa/en/current-offers/promotions/. Offer available on selected models only. Available in Eswatini, Kenya, Uganda, Ghana, Tanzania, Zambia, Ivory Coast, Senegal, South Africa and Morocco only.

Customer Care: 0800 983 821

www.deere.africa | africa@johndeere.com

JohnDeereAME | John Deere | John Deere Africa & Middle East