MODERN MINING
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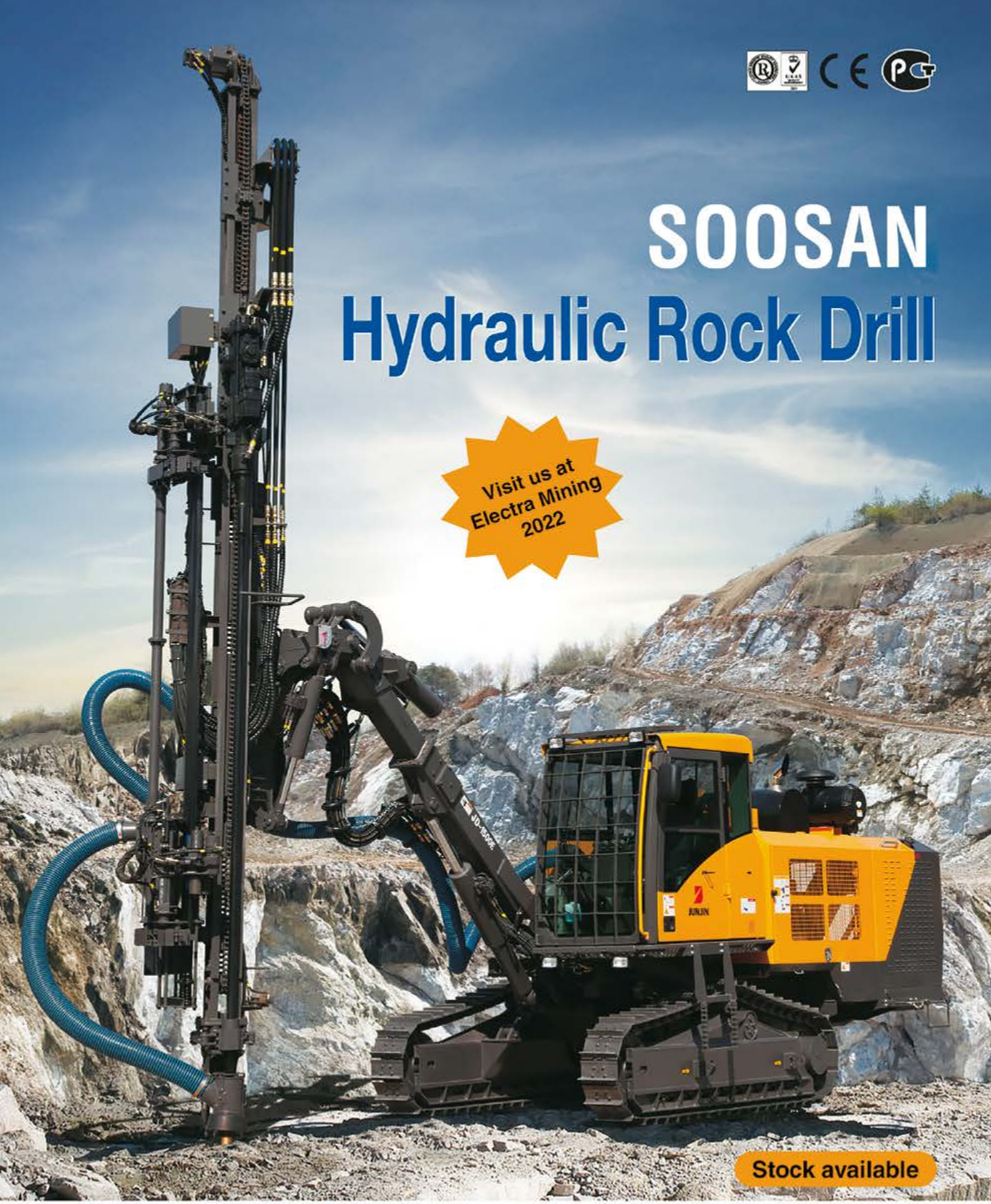
For people who are serious about mining

PNR LOOKS TO RESURRECT Selebi-Phikwe Mine

- **PUMP FAILURE PUTS EASTERN BASIN** at risk of flooding
- **KAL TIRE WALKS** the ESG talk
- **VEDANTA INVESTS HEAVILY** to increase production



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ON THE COVER

John Deere recently made inroads into the mining and quarrying sectors and is on a drive to expand its African mining footprint. See story on page 8.

COMMENT

A state of disrepair

Nellie Moodley

The state of disrepair of South Africa's key infrastructure (power, roads, rail, water and port) sees citizens dodging potholes on a daily basis and going days and weeks without water and power.

With the country currently at Stage 6 load shedding, this begs the question, could it possibly get any worse and is there any hope at the end of this rather dark and dingy tunnel?

While we do face a stream of never-ending infrastructure related challenges, there are some green shoots of positivity on the horizon. In fact, the Group of Seven leaders (G7) recently pledged to raise $600bn over the next five years to finance much needed infrastructure development in developing countries –good news for Africa and South Africa, in particular, if we can just land some of that $600bn. The 'Partnership for Global Infrastructure and Investment' initiative was recently relaunched by the G7, which consists of seven of the world's advanced economies: Canada, France, Germany, Italy, Japan, UK and US (and the European Union).

On the topic of infrastructure related developments, state-owned entity Transnet says it will issue a tender this month for the procurement of new locomotives. This is long awaited news for miners, especially bulk commodity producers whose export volumes have for years been throttled by limited rail capacity which, in turn, has limited export tonnages and thereby stymied additional earnings potential.

The Minerals Council South Africa recently flagged the negative impact constrained rail had on bulk commodity miners, noting that South Africa's exported bulk mineral tonnages dropped to their lowest level since the Covid-19 lockdown in the first half of 2020, causing exporters and the country to miss out on the full benefits of the high commodity price cycle.

"The constraints on exports of coal, chrome, iron ore and manganese are a continuation of the difficulties mining companies and traders faced during 2021, when they experienced an opportunity cost of R35-billion if delivered tonnages were measured against targets set by Transnet, and a R50-billion opportunity cost if deliveries were measured against the capacity of the rail and port infrastructure and rolling stock. If there is no change or urgent intervention to address the logistical bottlenecks, the mining industry is likely to incur similar opportunity costs this year, if not surpassing historical losses," said Henk Langenhoven, chief economist at the Minerals Council South Africa.

South Africa's mining sector was a critical source of revenue for the fiscus in 2021, playing a significant role in stabilising the economy's slow recovery from the disruptions caused by the Covid-19 pandemic. Mining contributed R481-billion to GDP, up from R353-billion the year before.

According to Langenhoven, currently, better commodity prices are compensating for underperforming export volumes but, "the price cycle may reverse, or volumes may deteriorate to such a degree that it negates the price windfall".

Fingers crossed that the new locomotives will be operational sooner rather than later and alleviate the constrains faced.

In this edition:

On the subject of good news, *Modern Mining* had a serendipitous encounter with Premium Nickel Resources (PNR) at the Mining Indaba and chatted to Jaclyn Ruptash, VP Corporate Affairs and former Alphamin Resources CEO Boris Kamstra, who is now the lead looking to resurrect the once mighty Selebi-Phikwe mine in Botswana. According to Ruptash, PNR is on a path to establish a brand new mine where the Selebi Mines once stood tall (p 14).

We also spoke to Kal Tire about its pioneering tyre recycling initiatives (p 28); AECI on meeting its green agenda (p 30) and FSE's Mariette Liefferink who shares insights into how pump failure is putting the Eastern Basin at risk of flooding (p 32).

In our cover story John Deere, renowned for its agricultural and construction equipment, outlines its mining strategy, which includes entrenching its footprint in Africa (p 8). ■

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Nkwe Platinum's new solar-powered water system

Platinum producer Nkwe Platinum, which is owned by the Zijin Mining Group, recently launched its first solar powered water supply system for the Ga Mpuru Village in the Garatau community, situated next to the Zijin Garatau Platinum Mine.

The pumps installed on the water borehole and storage tanks are powered by a complete solar system. In addition to providing round the clock water for the members of the community, the solar system also powers a security electric fence for the water supply infrastructure, making it a self-sustaining unit. The community will now have access to over 55 000 litres of clean water from a pipeline which spans over 2 kilometres within the community. Taps and water troughs are stationed at various strategic points along the pipeline to cater for both the community and livestock.

Nkwe Platinum rolls-out solar-powered water system for the community.

The advantage of using water storage tanks include the allowance of instant water supply during any point of the day when the demand exceeds the water supply. This solar-powered water system forms part of Nkwe Platinum's second generation Social and Labour Plan, which enables Local Economic Development (LED) projects in the form of clean water supply to the local mine communities over the next few years.

To date, Nkwe Platinum has spent over R45-million on its Social and Labour Plan. The investment included the upgrading of the Garatau Community access road, as well as adult training and education, bursaries, learnerships, internships, traditional leadership training and excavator operations, which have benefited the surrounding mine communities of the Zijin Garatau Platinum Mine.

Zhiyu Fan, the MD and CEO of Nkwe Platinum said: "The successful implementation of this solar-powered water supply system highlights the importance of the mine development being closely related to the sustainable development of our surrounding communities. It serves as an example of our commitment to this core belief." ■

Harmony and Absa CIB conclude ground-breaking sustainable finance transaction

Absa Corporate and Investment Banking (Absa CIB) and gold miner Harmony Gold recently finalised a new syndicated, multi-tranche, multi-currency, sustainability-linked and green use of proceeds term debt package (the New Syndicated Facilities). The transaction, valued at around R10.40 bn, is a landmark and market leading transaction as it is not only one of the largest completely sustainability-linked debt packages in Africa but is also the largest in the sector over the past 12 months, the company said.

Harmony and Absa CIB conclude finance transaction.

"This is a ground-breaking transaction in terms of Sustainable Finance in the South African market and will set the benchmark for future deals," says Tawanda Madondo, principal: resources and energy for Absa CIB.

Having invested significantly in its Sustainable Finance and ESG value proposition, Absa CIB was able to offer a complete market-leading ESG solution to Harmony following market best practice.

The New Syndicated Facilities comprise:

- ❑ A green use of proceeds R1.50 bn term loan.
- ❑ A sustainability linked $100 mn term loan.
- ❑ A sustainability linked R2.50 bn revolving credit f❑acility.
- ❑ A sustainability linked $300 mn revolving credit facility. ■

Kareerand project receives regulatory approval

South African gold miner Harmony Gold Mining recently received regulatory approval for the Kareerand expansion project which will ensure continued retreatment of surface deposits at Mine Waste Solutions. Mine Waste Solutions' reclamation operation in the Stilfontein/Orkney area of the North West province treats 2.2 million tonnes per month from historical tailings facilities through the Mine Waste Solution plant. Residue is then deposited on the existing Kareerand tailings storage facility, which is running out of tailings deposition capacity, thus necessitating the building of an extended tailings dam. The Kareerand expansion project is expected to produce around 100 000 ounces of gold per annum and to add 16 years life of mine at an estimated all-in sustaining cost of about R572 000/kg over the life of the mine. "This low risk, low-cost operation will ensure healthy returns for investors, the creation of jobs for another 16 years, and the rehabilitation and restoration of land in the area," said Peter Steenkamp, Harmony's chief executive officer. ■

Kareerand expansion project gets the greenlight.

NERSA approves Cennergi's 80 MW solar project for Grootegeluk Mine

Cennergi Holdings (Cennergi), a subsidiary of diversified mining company Exxaro Resources, has welcomed the registration of its 80 MW Lephalale Solar Project (LSP) by the National Energy Regulator of South Africa (NERSA). LSP is the first phase of the decarbonisation of Exxaro's flagship Grootegeluk mine at Lephalale in Limpopo province.

Roland Tatnall, MD of Energy at Exxaro & Cennergi, expressed the company's excitement at this milestone and its role in accelerating Exxaro's target of carbon neutrality by 2050.

"The team worked incredibly hard to ensure LSP was one of the first large renewable energy projects to receive registration through the streamlined NERSA process in a record time of 47 days. And, in line with the Memorandum of Understanding we executed with Eskom last year, we are advancing a comprehensive renewable energy solution for Exxaro's presence in Mpumalanga which we hope will provide a blueprint for the Just Energy Transition in the province."

Cennergi believes that LSP is one of the largest projects financed behind-the-meter renewable energy projects in South Africa at such an advanced stage. ■

Exxaro's flagship Grootegeluk mine approved for solar power.

Renault Group and Managem Group ink deal for Moroccan cobalt supply

French automobile manufacturer Renault Group and Managem Group recently signed an agreement for the sustainable supply of Moroccan cobalt. Managem Group is an industrial mining company that has been exploiting a diversified portfolio of metals for more than 90 years. The group is present throughout the entire mining cycle, from exploration to the sale of raw materials. The strategic partnership aims to secure low-carbon cobalt sulphate produced in Morocco and will allow for guaranteeing traceability of electric battery supply chain. It also marks a new step towards reducing the impact on the environment, given the expertise of Managem Group, which has optimised energy efficiency at its facilities through the use of green energies, of which more than 80% comes from wind power. Under the terms of the agreement, Managem Group will supply 5 000 tonnes of cobalt sulphate per year for a period of seven years, with first delivery in 2025. The partnership strengthens Morocco's positioning as a platform for the production and export of equipment, motor vehicles and now strategic and critical materials of Moroccan origin such as cobalt, manganese and copper for the manufacture of batteries. ■

Renault Group and Managem Group ink cobalt supply deal.

Goldplat granted Water Use License for SA operation

AIM-listed gold producer Goldplat has been granted a Water Use License for its South African operations. The licence, valid for 12 years, includes the abstraction and use of water in its recovery processes and the impact on its new tailings storage facility (TSF).

The new TSF will be constructed over the next four months at a remaining cost of £350 000. TIt is expected to have sufficient capacity to store the tailings Goldplat will produce in its current operations for the next seven years.

According to Goldplat, the new TSF will also allow it to divert all deposition from the current facility, which will provide the company with the ability to process the current facility to recover the JORC resource of an estimated 81 959 ounces of gold through a third-party facility. To enable Goldplat to process the current TSF through a third-party facility, it will need approval to install a pipeline to this third-party processing facility and will need to finalise commercial agreements with the third-party. Goldplat expects to receive this approval by the end of the current financial year.

Werner Klingenberg, CEO of Goldplat, said that the license was not only the first step towards processing its current TSF, but also an integral part of the South African operation's future plans. The water use management plan will ensure good governance with regard to water use and its impact on the surroundings. ■

Goldplat's local project granted a water-use license.

Kamoa Copper produces a record 29 800 t copper in May

Copper producer Kamoa Copper set a new monthly production record in May, producing 29 800 tonnes of copper in concentrate from the Kamoa Copper Mining Complex in the Democratic Republic of Congo. Kamoa Copper achieved record monthly production despite planned interruptions during the month, which included scheduled maintenance on the Phase 1 concentrator plant for two days. The Phase 1 and Phase 2 concentrator plants are currently processing at a combined annualised rate of around 8 million tonnes of ore – about 9% above nameplate capacity, and are expected to ramp up to 9.2 mtpa of ore by the second quarter of 2023. This will increase the company's annual copper production to more than 450 000 tonnes and will rank Kamoa Copper as the world's fourth-largest copper producer.

Kamoa Copper set a new monthly production record in May 2022.

Kamoa Copper management anticipates that the accelerated ramp-up of the Phase 2 concentrator plant positions the operation to deliver in the upper end of its 2022 copper production guidance of 290 000 to 340 000 tonnes. Ivanhoe Mines founder Robert Friedland commented: "Together with our joint venture partner, Zijin Mining, and alongside the Congolese nation, we have resolved to fast-track expansions at the Kamoa Copper Mining Complex to meet rising worldwide demand for the responsibly-produced copper metal." ■

Rainbow to demonstrate separation technology expertise

London-listed Rainbow Rare Earths has entered into a Memorandum of Understanding (MoU) with a diversified chemicals group based in South Africa to investigate the opportunity of extracting rare earth elements from a nitrophosphate process stream at its phosphoric acid production plant near Johannesburg. Under the terms of the MoU, Rainbow will conduct a rare earths extraction pilot study with the chemicals group, which will involve initial grade test work on processing stream material. This will be followed by a technical programme to confirm a flowsheet using Rainbow's knowledge and intellectual property (IP).

Rainbow has already completed preliminary sampling of the processing stream, with initial results indicating a Total Rare Earth Oxide grade of 0.81% total rare earths oxides (TREO), with a circa 27% weighting to high-value neodymium and praseodymium (NdPr), alongside economic levels of terbium and dysprosium, similar to Phalaborwa.

Subject to a successful outcome, the parties intend to negotiate terms for a potential joint venture agreement to extract value from the rare earths present in the phosphoric acid processing stream.

Rainbow Rare Earths CEO, George Bennett, said: "This is a very exciting opportunity for Rainbow to release additional value from a nitrophosphate processing stream by efficiently producing separated rare earths, which are currently untapped within the phosphoric acid production process." ■

Rainbow partners to demonstrate separation technology expertise.

Filter press to aid in protecting and preserving water resources

Menar-owned Zululand Anthracite Colliery (ZAC), the sole producer of prime anthracite in South Africa, recently commissioned a new 25 ton-an-hour filter press at its coal washing plant, in Emakhalathini KwaZulu-Natal. The filter press removes slurry from the water used in the coal washing process and will aid in preventing incidents such as the coal slurry spill which occurred at ZAC, after the end wall at Slurry Pond 3 failed on December 24, 2021.

As ZAC engineering production superintendent Howard Atkinson explains, "The filter press filters slurry-laden water and removes all the ultra-fines from the water to enable reclaimed water to be reused in the beneficiation process".

The filter press plant, which costs R14.5-million, was commissioned on 10 May 2022 and was in full production by 16 May 2022. "The principal aim of ZAC's sustainable water management policy is to minimise and reduce freshwater consumption in all our operations," said ZAC GM Wayne Rowe. ■

Minerals Council concerned about logistics constraints on mineral exports

South Africa's exported bulk mineral tonnages dropped to their lowest level since the Covid-19 lockdown in the first half of 2020, with rail, port and border constraints negatively affecting users of these state-owned services, causing exporters and the country to miss the full benefits of the current high commodity price cycle. The constraints on exports of coal, chrome, iron ore and manganese are a continuation of the difficulties mining companies and traders faced during 2021, when they experienced an opportunity cost of R35-billion if delivered tonnages are measured against targets set by Transnet, and a R50-billion opportunity cost if deliveries are measured against the capacity of the rail and port infrastructure and rolling stock.

"If there is no change or urgent intervention to address the logistical bottlenecks, the mining industry is likely to incur similar opportunity costs this year, if not surpassing historical losses," says Henk Langenhoven, chief economist at the Minerals Council South Africa.

South Africa's mining sector was a critical source of revenue for the fiscus in 2021, playing a significant role in stabilising the economy's slow recovery from the disruptions caused by the Covid-19 pandemic since March 2020. Mining contributed R481-billion to GDP, up from R353-billion the year before.

Rail constraints continue to negatively impact exports of coal, chrome, iron ore and manganese.

John Deere targets African mining

While equipment supplier John Deere has a range of products that is synonymous with the construction and agricultural sectors, the company has recently made inroads into the mining and quarrying sectors and is on a drive to expand its African mining footprint.

Above: Inside the cab of the 1050K Crawler Dozer.

Right: John Deere 1050K Crawler Dozer in action.

"John Deere is now delivering construction and mining equipment directly into Africa because we understand the region's exponential growth potential. The projected growth rate of the Africa's population is projected to average around 2.5 billion people by 2050, which sets the scene for high infrastructure development demand across the continent. As a result, the region remains a key priority for us," Griffiths Makgate, Construction and Forestry sales manager for John Deere Africa and Middle East tells *Modern Mining*.

The equipment manufacturer's fleet of machines, which includes backhoe loaders, wheel loaders, motor graders, crawler dozers, articulated dump trucks and excavators, helps with infrastructure development such as roadbuilding, land clearing, removing rocks, constructing waste dumps, site development, quarrying and mining applications.

The company has been manufacturing equipment for 185 years and its construction equipment is well respected across the globe because it offers optimal uptime, increased productivity and low daily operating costs.

John Deere 670G Motor Grader.

In March 2021, John Deere announced the expansion of its construction line-up to 18 countries in Southern and Western Africa – areas that have a strong mining focus.

Discussing the company's African mining growth strategy over the next few years, Makgate says that John Deere is working closely with its dealers – Senwes, AFGRI Equipment, TATA and Mascor – to ensure a wider coverage across the continent.

John Deere currently covers Africa and Middle East through its wide dealer network.

"Given that our main focus is ensuring we have a more extensive footprint within the continent, we have increased the number of new dealers across Africa. The dealers are focusing on establishing a strong sales and aftersales presence and are working to ensure that customers have product and parts available on time. Moreover, our technicians are continuously trained to ensure they deliver a high level of service," he says.

With the mining industry's uncompromising attitude towards improved efficiencies, increased productivity and ultimately greater tonnages delivered, the robust product range available from John

growth

Deere is easily able to handle Africa's arduous mining conditions.

"We are focused on becoming strong partners to emerging mining contractors as our machines are reliable, easy to maintain and have fuel saving features which help reduce the total cost of ownership for a customer throughout the machine's life cycle. Our products are designed to deliver optimal performance and uptime."

According to Makgate, customers have access to product support through the world-renowned John Deere dealer network.

"John Deere brings value to the table: when a customer engages with us, we can sell a lot more in terms of value. We pledge to offer customers aftermarket and product support that will assist them to achieve their goals. We keep existing machines in the market running with our parts availability and specialised technicians," he says.

Not only does John Deere offer advanced machines, but it offers tools that help better manage fleet and improved productivity. JDLink™ is the John Deere telematics system which allows owners and managers to remotely connect to their machinery to monitor and track operations, productivity and machine health. In July 2021, John Deere announced that subscriptions to JDLink™ are now free of charge to users.

John Deere 310S Backhoe loader.

John Deere E300 Series Excavator.

John Deere Financial

To assist its clients with product financing, the company has established John Deere Financial which offers tailor-made asset finance.

According to Makgate, unpredictable circumstances can easily disrupt clients' plans and it is during these times that clients can turn to John Deere Financial for the necessary support via its flexible financial solutions.

"The financial package structure, along with considerations of the term and deposit, mean that clients can expect rates as low as prime minus 9%. This low interest rate means smaller instalments." ■

Electra Mining

John Deere will be showcasing its range of equipment at Electra Mining 2022 and has a few new surprises in store for visitors to its stand (A28). Electra Mining takes place from 5-9 September at the Expo Centre Johannesburg.

PPM plant.

PGMs can be a win for the economy

Phathutshedzo Netshitangani.

By Phathutshedzo Netshitangani: acting plant metallurgist at PPM

In recent months, rating agencies Moody's and S&P Global both upgraded South Africa's credit rating outlook thanks to strong commodity prices boosting the country's income. Although mining output contracted in the first quarter of the year, it is still a key contributor to the economy because of the resilient performance of metals.

The war in Ukraine has dealt a major shock to commodity markets, altering global patterns of trade, production and consumption in ways that will keep prices at historically high levels until the end of 2024, according to the World Bank's latest Commodity Markets Outlook report.

As a major net exporter of minerals and net importer of oil, commodity prices remain important for South Africa. However, solving chronic structural issues and strengthening investment — including foreign direct investment — will be critical to propelling growth and creating jobs.

Platinum group metals (PGMs) are used in the industrial and manufacturing markets, especially in vehicle pollution control devices. Technological changes influence the supply of a commodity because advanced and improved technology reduces the cost of production, which raises the profit margin. This motivates the seller to increase supply.

As the global economy rebounds from the Covid-19 pandemic, and looking at platinum's great future in the renewable energy market, platinum's price is also likely to rebound. It's South Africa's time to make hay while the sun shines on PGMs.

There are enough platinum group element deposits in the Bushveld Complex in South Africa to supply world demand for many decades or even a century using current mining techniques. Demonstrated research on reserves and resources published by mining companies makes detailed calculations up to a maximum of about twenty years ahead, but there is abundant and adequate geological evidence that these deposits continue far beyond where mining companies have proven, according to rigorous international reporting codes.

For each one kilometre of depth into the Earth in the Bushveld Complex, there is an estimated 350 million oz of platinum. As a comparison, annual production of platinum from the Bushveld Complex

PPM Process Plant.

currently is only around 5 million oz and South Africa had estimated reserves of around 63,000 metric tons of platinum group metals late last year.

By all accounts, South Africa is in the pound seats to boost GDP with the combination of the higher prices for PGMs and its position as the world leader in platinum supply. Unfortunately, the outlook isn't entirely as rosy as it seems.

South Africa faces problems that inhibit growth and many are structural, including an insufficient electricity supply and onerous regulatory burdens with excessive red tape. In fact, in his address at the 2022 Investing in African Mining Indaba, President Cyril Ramaphosa acknowledged the need to fix the regulatory and administrative problems that have festered in the mining sector.

In addition, political instability and community unrest, which often leads to the closure of roads to various mining operations, have now also become a concern as investors worry about another bout of serious civil unrest. As a country, we cannot rely on commodities to solve chronic structural problems, labour market challenges, and lack of dynamism outside of the mining sector.

Through platinum mining, there is still an opportunity to breathe new life into the economy by embracing the movement toward sustainability, green economies and the fourth industrial revolution. The metal is a key component of catalytic converters in hydrogen fuel cells. Europe is already working on an energy transition with large scale deployment of hydrogen fuel cells and other renewable energy sources until 2050. Growing the continent's green economy and greater adoption of green energy is vital to reduce Europe's reliance on gas imports. This strategic acceleration of the growth of the hydrogen economy has a direct positive impact on platinum prices as demand for PGMs grows.

At the Investing in African Mining Indaba, President Ramaphosa also spoke of South Africa's Hydrogen Strategy, which is aimed at "stimulating and guiding innovation along the value chain of hydrogen and fuel cell technologies". It is also helpful that investors are keenly aware of platinum's role in developing hydrogen economies that will be drivers of achieving net-zero carbon emission targets.

Merensky Primary Mill.

Primary Mill Discharge Screen.

Sustainable management of the mining and commodity sector can fuel global economic growth while reducing the environmental footprint of human activities, and it will be critical in providing opportunities for decent employment, business development and increased fiscal revenues.

Looking at the remainder of 2022 and heading into 2023, commodity prices are expected to remain well above the most recent five-year average. Although the commodities market is somewhat volatile and it's challenging to predict when or how things will change, the current situation is a boon for our nation's mining sector and the hope is that we can take this opportunity to position South Africa's economy to grow with a boost from PGMs' gain. ■

DISCLAIMER: Phathutshedzo Netshitangani is acting plant metallurgist at Pilanesberg Platinum Mine (PPM). The opinions expressed in this article are those of the author and should not be interpreted as expressing those of PPM.

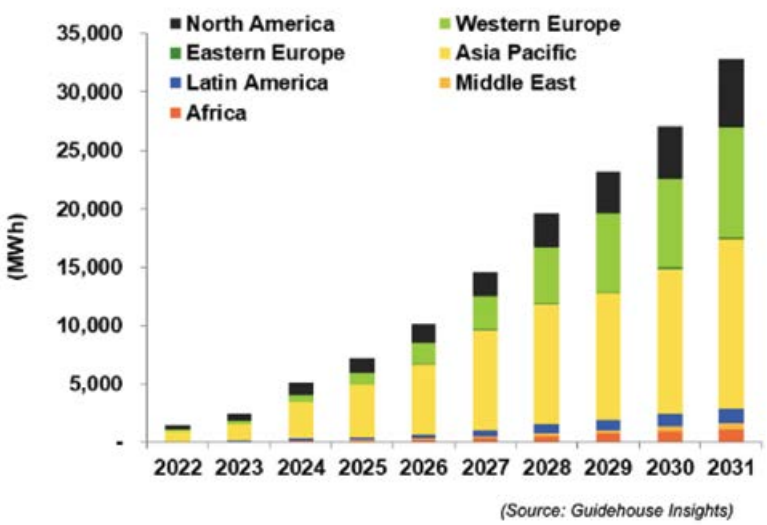
Vanadium set for 'disruptive' demand growth: Vanitec

The use of vanadium in the battery energy storage sector is expected to experience disruptive growth this decade on the back of unprecedented vanadium redox flow battery (VRFB) deployments.

This is according to an independent analysis by market intelligence and advisory firm, Guidehouse Insights, which says that global annual deployments of vanadium redox flow batteries (VRFBs) are expected to reach around 32.8 GWh per annum by 2031, representing a compound annual growth rate (CAGR) of 41% over the forecasted period.

Renewable energy solutions are growing in demand.

Annual Installed VRFB Utility-Scale and Commercial and Industrial Battery Deployment Energy Capacity by Region, All Application Segments, World Markets: 2022-2023.



(Source: Guidehouse Insights)

Solar and wind power are fantastic sources of low-carbon energy.

The VRFB deployment forecast by Guidehouse Insights would equate to between 127 500 and 173 800 tons of new vanadium demand per year by 2031, according to Vanitec calculations based off Guidehouse's projection. That would be more than twice as much vanadium as is currently produced annually today.

In a report on the metals required for clean energy commissioned by Eurometaux - Europe's metals association – VRFBs were identified as one of the alternative energy storage technologies that may grow in importance and might reach penetration rates of 20% of the market. These findings point towards significant vanadium demand increases equivalent to +110% of current demand, and echo Guidehouse Insights' demand forecast.

Vanitec, the international global member organisation whose objective it is to promote the use of vanadium-bearing materials, says that while vanadium is mainly used within the steel industry, it is increasingly being recognised for its use in VRFBs. These long duration batteries can store large amounts of electrical energy produced by solar and wind power generators on a daily basis as a means to drive the deep decarbonization of electric power systems.

Vanadium has therefore been classified as a critical raw material by several countries around the world. The European Commission identified and formally registered vanadium on the 2017 list of Critical Raw Materials for the European Union, while the United States, Canada and Australia have also listed vanadium as critical to supporting their economies.

As power grids across the world continue to replace fossil fuel power plants with large scale renewable energy solutions, long-duration energy storage is critical to ensuring reliable grid operation. VRFBs assist by smoothing out peaks and deficits in power demand, thereby maintaining a consistent and uninterrupted flow of electricity to the grid.

Vanitec CEO John Hilbert says renewable energy has become one of the most talked-about topics in recent times. "Solar and wind power are fantastic sources of low-carbon energy. However, renewable energy is a variable power source that poses a key challenge in the global effort to displace fossil fuels

with renewable energy generation. Energy storage solutions like VRFBs are essential in enabling the energy transition to a carbon neutral world, as they provide stationary, utility-scale and long-duration energy storage with low maintenance costs, safe operation, and little environmental impact."

The VRFB market is poised for steeper growth in the coming years, especially as demand for long-duration storage capabilities increases, but also owing to the technology's durability and safety. Other advantages of VRFBs include:

- **Application:** Stores large amounts of variable renewable energy to be used at other times of the day, when the electricity is demanded.
- **Durability:** Minimal capacity degradation resulting in significantly longer cycle lifetimes than Li-ion battery technology. VRFBs could be fully discharged multiple times each day without impacting the longevity of the system.
- **Reusability:** Liquid electrolytes used in VRFBs can be reused in another battery after the rest of the battery components have worn down. This improves the battery's economics and sustainability.
- **Safety:** Flow batteries use aqueous electrolytes, which are largely composed of water and inherently non-flammable. VRFBs do not present the same explosion or fire risks that Li-ion systems do.

Energy storage solutions like VRFBs are essential in enabling the energy transition to a carbon neutral world.

"VRFBs are also supported by existing industries in their scale up. Many vanadium industry stakeholders see VRFBs as a major source of new demand for the metal that has traditionally been used in steel alloys," states Mikhail Nikomarov, chairman of the Vanitec Energy Storage Committee (ESC) and CEO of Bushveld Energy.

VRFBs are a proven and rapidly growing commercial-scale technology that can store energy from renewable sources and provide on-demand, round-the-clock, carbon-free power. ■

PNR looks to resurrect the champ – Selebi-Phikwe mine

Premium Nickel Resources (PNR), a Canadian company focused on the exploration and development of high-quality nickel-copper-cobalt mineral deposits, is the new kid on the mining block targeting the resurrection of Botswana's once mighty nickel and copper giant – Selebi-Phikwe Mine. By *Nelendhre Moodley*.

The project was formerly operated by BCL Limited. Through its wholly owned subsidiary and operator, Premium Nickel Resources Botswana (PNRB) recently announced the closure of an asset purchase agreement with the liquidators of BCL to acquire the Selebi and Selebi North nickel-copper-cobalt mines in Botswana. PNRB also reached an agreement with the liquidator of the Tati Nickel Mining Company to acquire the Selkirk Ni-Cu-Co-PGM Mine located roughly 75 km to the north of the Selebi Mine.

PNR's Boris Kamstra and Jaclyn Ruptash.

PNR's ambition is focused on redeveloping both mines as modern, environmentally sensitive, efficient producers ultimately supporting Botswana's position as a world class effective producer of nickel and copper, Jaclyn Ruptash, VP corporate affairs, tells *Modern Mining*.

"PNR is on the path to establishing a brand new mine where the Selebi Mines once stood tall," she says.

Led by a skilled team with strong financial, technical, and operational expertise, PNRB was established in 2019 with the intent to qualify as a bidder and ultimately submit an Indicative Offer for the BCL and TNMC assets under liquidation.

More recently, the team was reinforced by former Alphamin Resources CEO Boris Kamstra, who was instrumental in taking the Bisie tin mine in the Democratic Republic of Congo from exploration to a commissioned mine, now valued at around $1-billion. Kamstra will be instrumental in the development of the project, as PNR's COO – mine redevelopment lead.

The Selebi-Phikwe mine began production in 1974 and was one of the largest nickel copper mines on the continent. It operated continually until it was closed in 2016.

"PNRB qualified as the preferred bidder in the liquidation process in February 2021 and has since completed the asset purchase agreement and transitioned ownership of the Selebi Mine consisting of the Selebi and Selebi North nickel-copper-cobalt deposits. We did not acquire any of the legacy infrastructure or mines associated with the Phikwe property. PNRB also negotiated an asset purchase agreement to acquire the Selkirk Mine and surrounding prospecting licenses in the Tati Nickel Mining Company liquidation. With the completion of the transfer of ownership of the Selebi Mine, PNRB has commenced the process to recharacterise the remaining resources, including a current drill programme and borehole EM studies," explains Ruptash.

The Selebi-Phikwe mine, formerly operated by

PNR has invested $17-million to fund the project, including ongoing exploration drilling, borehole EM and metallurgical sampling.

BCL, comprised a mining complex, a concentrator and a processing facility and related infrastructure (rail, power and water).

Shaft sinking and plant construction started in 1970 with the Selebi shaft being established in the 1980s.

The mine was in operation for 35 years, producing 3,600 tons per day from the Selebi shaft, and an additional 1,500 tons per day from the smaller Selebi North Shaft which opened in 1990, located 8 kms north.

The combined output was 5,100 tons per day or roughly 1.5 mtpa. Due to a failure in the processing facility, mining concluded in October 2016. The operations were subsequently placed on care and maintenance.

According to Ruptash, PNRB acquired the assets with the aim of re-defining and upgrading the resources to produce a copper concentrate and a separate nickel concentrate.

"PNRB is actively collating historical data, converting the paper trail into digital format, including all the old workings and drill logs as well as undertaking drill testing near mine, high-conductance borehole electromagnetic exploration targets, resource in-fill drilling, additional metallurgical testing, and early scoping studies."

PNRB has also been collecting new information, including initial metallurgical sampling of around 700 kg from fresh representative ore.

Recent metallurgical testing, carried out at SGS Canada of Lakefield Ontario, has corroborated the redevelopment plan for the Selebi Mine to produce separate copper and nickel-cobalt concentrates.

According to Ruptash, PNRB is using the latest technology to reinterpret data from old exploration drilling programmes undertaken by BCL just before the mine was placed on care and maintenance.

"The drilling data shows the BCL team mined to a depth of 1 100 m and had drilled several holes to explore the extent of the Selebi mine horizon down-dip. Our team modelled and interpreted the legacy data, completed additional studies and identified a large geophysical conductive electromagnetic plate target at depth. This anomaly is under further investigation and drill testing is currently being carried out. Our theory is that the area contains several such plates containing high-grade nickel and copper – but this is yet to be proved. Simply put, our ambition is to demonstrate the scale of these systems. We know how small they are, but we don't know how big they are."

To date, the company has invested $17-million to fund the project, which consists of ongoing due diligence, exploration drilling, borehole EM and metallurgical sampling. Surface and underground drilling will be ongoing through to September of this year.

PNRB began drilling in mid-March and plans to drill three holes directly into the geophysical anomaly and six additional surface holes to test the 3 km

PNR is will provide the necessary training and upskilling programmes to get the team up to speed.

The Metallurgical Project Team with product samples.

underground area between the Selebi and Selebi North deposits.

"PNRB is led by CEO, Montwedi Mphathi and we have employed about 30 local staff including managers, geologists, and administration employees with the expectation of growing the team as the project progresses. Prior to the mine shutting down, it had a highly skilled workforce. We have since identified key positions which we believe will be required in the near term and we are preparing to provide the necessary training and upskilling programmes to get the team up to speed and ultimately able to operate a proposed new modern mine," explains Ruptash.

Furthermore, the company is backed by a highly supportive and broad investor base and recently completed a $26-million private placement.

"Our ambition is to successfully create a rapid growth nickel, copper, cobalt and PGE sulphide mining opportunity and become a leading global supplier of these metals to the market. Importantly, our success will only be reached if we follow our corporate principals which include using best technical practices, minimising the impact on the environment, building a solid foundation of sustainability, including the transfer of wealth to local stakeholders through employment, job skills, ownership of housing and a diversified modern supply chain. Our vision is to participate in the restoration and development of a resilient and diversified local Botswana economy ultimately independent of the mines. In addition, one has to believe that the medium to long-term demand for these metals will continue to grow through global urbanisation and the increasing replacement of internal combustion engines with electric motors. These metals are key to a low carbon future," concludes Ruptash.

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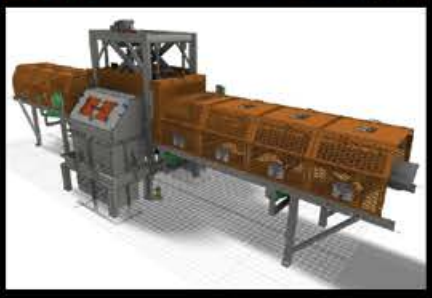

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Vedanta's heavy investment to increase production

Underpinning Vedanta Zinc International's significant investment in its South African and Namibian businesses, is a vision to create an integrated regional zinc complex comprising Black Mountain Mining (including Gamsberg) and the Skorpion Zinc mining and refining operations, Pushpender Singla, Vedanta Resources CFO and executive director tells *Modern Mining*. By *Nelendhre Moodley*.

Pushpender Singla, Vedanta Resources CFO.

Vedanta is a diversified mining company and a major producer of zinc, aluminium, iron ore, silver and copper. "As the world moves towards carbon neutrality and transitions to clean energy sources such as renewables, the demand for green metals continues to soar. Over the past two years demand for zinc has been surging at twice that of supply. Zinc demand currently stands at 2 – 2,5 times more than supply, which sits between 1% and 1,5% per annum," explains Singla.

To date, Vedanta has invested more than R21-billion in developing the Black Mountain Mining complex, with its most recent injection of R6-billion aimed at unlocking value from waste which will see the miner extract magnetite iron ore by processing Black Mountain's zinc plant tailings stream.

Black Mountain Mining (BMM) comprises the Deeps and Swartberg Shafts and the Gamsberg zinc mine and plant. The Deeps shaft produces copper, lead and zinc, with silver as a by-product and an annual production in the order of 102 000 tpa of zinc-equivalent metal-in-concentrate. The Swartberg shaft primarily produces copper and lead, with silver as a by-product and annual production of 13 500 tpa of metal-in-concentrate.

Plans are well advanced to deepen Swartberg, which will increase production to 1,6 mtpa of copper and lead ore and 60 000 tpa – 70 000 tpa of metal-in-concentrate. Further ramp-up is planned in the near future, which will take copper and lead ore production past the 2 mtpa mark.

Coupled with plans to increase production from its existing operations, the company has initiated processing of BMM tailings to extract magnetite iron ore.

The miner recently awarded contracts to the value of R620-million to a South African company to progress development of the magnetite project, which is scheduled to produce 1mtpa of magnetite iron ore in six months' time.

A pilot plant is operational and has already delivered two shipments of high-quality magnetite to China.

"With BMM producing tailings containing 47% of magnetite iron ore, the new plant will increase the content beyond the standard 65% to 67% magnetite iron ore thereby delivering a higher-quality product to the export market," explains Singla.

From its planned production of 1 mtpa of magnetite iron ore, Vedanta expects to realise in excess of R1-billion per annum in revenue.

A further benefit of the magnetite project is that it will reduce the environmental liability associated with the waste product, and create an additional 250 jobs.

As the miner paves its path towards being an ESG leader, moves are afoot to steer away from thermal energy and establish wind and solar power plants to power its operations in the Northern Cape.

Northern Cape Premier Zamani Saul with Pieter van Greunen chief operations officer at Vedanta's Black Mountain Complex.

Gamsberg project

Since acquiring the Gamsberg zinc project – located about 30 km from BMM in the Northern Cape – from Anglo American in 2011, Vedanta has injected around R6-billion in the development of Phase 1 of the project and recently invested a further R7-billion which will almost double the current production.

Vedanta began developing Gamsberg in 2014 with first blast initiated in mid-2015 and inauguration in February 2019. Gamsberg, which comprises an open-pit mine and a dedicated processing plant, has an estimated life of mine of 50+ years.

Black Mountain Mining Complex.

Phase 1 of the project produces 4-million tonnes of ore from its open-pit mine and 300 000 tpa of zinc-in-concentrate.

Following completion of the feasibility study of Gamsberg Phase II, which doubled VZI's Ore Reserves from 214-million tonnes to 525-million tonnes, the company is injecting a further R7-billion to take production from 300 000 tpa to 550 000 tpa, thereby positioning South Africa as a global zinc producer.

Dubai-based Onshore Construction, a construction company operating across Dubai, Zambia, South Africa and Namibia, was recently awarded the contract to construct the plant in Phase II of the project.

"In 2018, the Gamberg zinc project produced between 75 000 tpa and 80 000 tpa; today the mine produces around 300 000 tpa and the latest investment will take production to 550 000 tpa, almost eight times the initial growth, which will be delivered 18 months from now," says Singla.

Phase II of the project will see the miner construct

The Gamsberg project is equipped with modern infrastructure.

Above and right: Skorpion Zinc Refinery in Namibia.

a mining plant that will double annual ore capacity to 8 million tonnes and produce an additional 200 000 tonnes a year of magnetite iron content.

The Gamsberg project currently employs more than 1 200 permanent employees, of which more than half are recruited from the Northern Cape and over 25% from local communities.

Phase II will create another 2 500 jobs during the construction phase and 1 000 permanent jobs when complete, adding to the social and economic uplift-ment of the Northern Cape.

"For Vedanta it is not about profitability alone but also about improving the socio-economic environment. With ESG being a key focus for all companies, we are aiming to play a leading ESG role and set a benchmark for the industry to follow."

With a view to beneficiation, Vedanta is currently undertaking a feasibility study into the development and construction of a smelter-refinery complex.

Vedanta holds a 69,6% stake in BMM with Exxaro Resources owning 24,4% and ESOP the remaining 6%.

Black Mountain Mining Operations.

Zinc uses

- Zinc is one of the world's most versatile and essential materials.
- It is the fourth most used metal in the world behind iron, aluminum and copper.
- It plays a critical role in enabling green technologies such as solar and wind power.
- Zinc-ion batteries are also considered safer than lithium-ion batteries for use in electric vehicles.

Namibia

Vedanta recently proposed a NAD6,5-billion injection to expand refinery production at its Skorpion Zinc project in southern Namibia.

Comprising an open-pit mine and refinery, Skorpion Zinc is the largest integrated zinc operation in Africa. However, for the past two years the mine has been placed on care and maintenance, owing to safety issues.

"Due to unforeseen geotechnical pit instabilities that posed a risk to mining activities and employees, in May 2020, the mine and refinery were both placed under care and maintenance. Once the open-pit is safe to operate, we will begin mining again," Singla explains.

Vedanta's focus is currently on its refinery conversion project, which will allow for co-treatment of sulphides and oxides to produce refined metal. According to Singla, the company has already completed a bankable feasibility study on the refinery conversion project and, on completion, the refinery will process zinc concentrate from Vedanta's group of companies in South Africa and Namibia.

"Once in operation, the Namibian oxide refinery will be able to treat any impurity in the zinc concentrate and produce a high-quality ore metal. The investment will also create 1 500 jobs and deliver significant impact in an area highly lacking in resources."

According to Singla, Vedanta is awaiting a more competitive power tariff rate from the Namibian government, as the current tariff price is not economically feasible for the development of the refinery conversion project.

"As soon as an agreement suitable to both parties is reached, Vedanta is ready to proceed with construction of the project," he concludes. ■

BELAZ launches innovative dump truck

Equipment manufacturer BELAZ recently launched a 130-ton hybrid rigid dump truck, with an innovative drive system, which is the combination of a low-power diesel engine, battery bank and an energy recovery (re-gen) system, aimed at significantly reducing harmful emissions into the atmosphere and at reducing – as a result of fuel savings – the cost of operating a dump truck.

The BELAZ hybrid is equipped with a YaMZ-845 diesel engine with a power output of 537 kW instead of 1 194 kW in the standard specification, as well as a power storage battery pack consisting of several rechargeable lithium-ion batteries with a total power of 730 kW. Batteries combined with a diesel engine ensure that the machine runs smoothly throughout the work shift, without stopping to recharge batteries. If necessary, it is possible to charge the batteries from an external charger.

BELAZ-7513M is equipped with an energy recovery system that allows braking by both electric traction motors without the use of brake discs, brake pads and hydraulics. During the braking stage, the electric motors work as generators, adding energy to the traction batteries and thus, on a descent, re-generating energy back to the battery pack. During loading / dumping, the truck uses engine power to charge itself. As a result, a full replenishment of the energy consumed by the dump truck when moving uphill, is ensured. The dump truck is also equipped with a proven and very efficient AC/AC drive system.

Another important feature of the new development is the removable batteries, which can be easily replaced. At the request of the client, the dump truck can be delivered without batteries and, once on site, can be fitted with rented batteries, which makes the purchase of hybrid dump trucks even more affordable and attractive.

BELAZ plans to manufacture hybrid mining dump trucks in other payload classes, primarily in the popular segments of 90 and 220 tons.

Mynbou Rigs Afrika Pty Ltd

Menar benefits from robust coal prices

Menar's MD Vuslat Bayoglu.

In the midst of chaos, there is also opportunity, **wrote Sun Tzu in *The Art of War*. It is a quote that aptly describes the impact of Russia's invasion of Ukraine which has heightened the surge in demand for most commodities, in particular energy related commodities such as oil, gas and coal. This demand, which has continued to grow since Russia invaded Ukraine, is propitious for the South African coal and anthracite industry, says Menar's MD, Vuslat Bayoglu. By *Nelendhre Moodley*.**

Menar is a private investment company with investments in multiple commodities including anthracite, coal, gold, manganese and nickel. According to Bayoglu, energy demand has increased exponentially over the years, with analysts forecasting global energy demand to reach 830 quadrillion British thermal unit (BTU) by 2050 and coal expected to account for as much as 193 quadrillion BTU.

Even prior to the Russian invasion of Ukraine, analysts were predicting that global demand for coal would hit an all-time high in 2022.

In December 2021, the International Energy Agency (IEA) released a report stating that coal power was on track to hit a new global record owing to a global economic rebound that would drive worldwide coal demand to an all-time high in 2022.

According to the IEA's report, the amount of electricity generated from coal power plants increased by 9% in 2021 after a surge in coal demand to fuel the recovery from Covid lockdowns.

The global gas supply crunch in 2021 also helped to reignite demand for coal. The IEA found that global demand for coal, including cement and steel making, increased overall by 6% in 2021. Moreover, the demand for coal continues to soar as European countries avoid buying Russian oil and gas.

The buoyant demand for coal is also underpinned by robust appetite from China and India and is forecast to continue being strong in the foreseeable future.

"There are close to a thousand coal plants currently being planned or under construction worldwide. Additionally, there are over 6 500 operational coal plants worldwide that are dependent on coal. Coal demand, even in places like Europe where coal use has reduced in recent decades, is seeing a marked resurgence in light of energy uncertainty in

Zululand Anthracite Colliery.

ZAC is the sole producer of prime anthracite in South Africa.

Eastern Europe. We believe the war has heightened countries' awareness of the importance of diversifying sources of supply to mitigate risks of shortage and having security of energy supply," explains Bayoglu.

This is good news for South Africa as it is a major coal-producing nation with many coal mines.

"The country can easily service a portion of the global coal needs," says Bayoglu, adding that "several vessels from Europe have collected coal and anthracite from the Richards Bay Coal Terminal (RBCT) in KwaZulu-Natal, and more are expected to arrive in the coming weeks and months".

So important is coal as a revenue source to the country's coffers that, according to the Minerals Council South Africa, it was the highest revenue earner for the country in 2020, contributing 21,4% of the country's total mining revenue.

Wading through the challenges facing coal miners

Although South Africa has abundant sources of coal, the country remains challenged by a number of issues, including logistical and regulatory concerns which hamper the industry's ability to benefit fully from the surge in demand for coal.

Bayoglu explains that there are the massive bottlenecks in mining approval processes, ranging from the awarding of prospecting rights to water use licences and environmental authorisations.

"For the most part, the red tape delaying development of new projects is not the fault of the Department of Mineral Resources. The departments of Environmental Affairs and the Department of Water and Sanitation do not issue the necessary licences within the stipulated period and, owing to endless appeal processes, delay project development. These delays result in the state losing out on massive revenue sources in the form of taxes from coal miners, says Bayoglu.

The Minerals Council South Africa estimates that R90-billion in mining-related projects remains in the queue of log-jammed regulatory approval processes. Earlier this year President Ramaphosa appointed mining stalwart Sipho Nkosi to cut the red tape and stimulate new investment into South Africa and, like the rest of the mining industry, Bayoglu has welcomed this undertaking.

An additional challenge is Transnet Freight Rail, which is unable to satisfactorily ensure that products reach Richards Bay Coal Terminal (RBCT) within a reasonable timeframe.

"Transnet's inability to ensure the timeous delivery of products to the ports results in losses amounting to billions of rand. It is imperative that Transnet starts providing reliable logistical support to ensure on-time shipment. Not doing so delays current orders to clients and could cause major reputational damage to the industry. If South African coal suppliers become known as unreliable, coal users will likely to seek out more reliable sources of supply," says Bayoglu.

He adds that financial institutions are increasingly adopting a hostile attitude towards financing the development of new coal mines, with an increasing number of banking institutions deciding not to fund new thermal coal mines. This has forced coal miners to fund new project developments and

Canyon Coal's Khanye mine.

Canyon Coal's Khanye operations.

Canyon Coal's Phalanndwa Extension.

expansion initiatives from their own books.

"On a more positive note, though, there are still a few local and international financial institutions that are open to funding coal projects," says Bayoglu.

Menar eyes a diversified pipeline of projects

Menar's portfolio of energy metals projects include its Canyon Coal, Zululand Anthracite Colliery and Kangra operations as well as a line-up of new projects, some of which are in the starting blocks.

Canyon Coal's current operations include the Khanye Colliery, which is at steady state production and processing 200 000 tons per month; its Phalanndwa Extension project, located near Delmas in Mpumalanga, which has ramped up to mine over 120 000 tpm of run of mine (ROM) coal; Kangra which is producing 1.2-million tpa of ROM coal and Zululand Anthracite Colliery (ZAC) – the sole producer of prime anthracite in South Africa, which produces a high-ranking and low volatile anthracite with a main plant feed of 900 ktpa and discard plant feed of 600 ktpa.

ZAC has processing plants onsite which produce washed coal with an extremely low ash content ranging from 8,5% to 18%.

In the starting blocks

The company has a number of new projects in the early-stage development phase, including Kangra's Udumo adit, which commenced mining in February this year; Canyon Coal's fully licenced but yet to be developed Gugulethu Colliery, the company's Bekezela operation which is awaiting a long-overdue water use licence, and ZAC's Mngeni Shaft, which is gearing to commence operation.

Kangra's Udumo adit is an extension of the Kangra mine and allows for mining via the Kusipongo reserve. Kusipongo has a coal reserve of around 41,9-million tons and the potential to extend the life of the mine by more than 20 years.

Kangra is targeting production of 1,5-million tpa of coal from underground mining sections for the life of mine. Kangra mine is located in Saul Mkhizeville,

Benefits of coal

- Coal provides cheap and reliable energy.
- About 70% of South Africa's primary energy consumption comes from coal.
- Coal accounts for an estimated 75% of South Africa's electricity generation and 30% of petroleum liquid fuels.
- Coal is also an important component of the iron and steel production, cement manufacturing, ferroalloys, industrial and manufacturing sectors.

Mpumalanga, and employs 549 people including contractors.

According to Bayoglu, Kangra's life of mine extension offers critical support for the surrounding community as the mine is an important source of local employment and provides business opportunities to SMMEs.

Negotiations are also underway with stakeholders at Canyon Coal's fully licenced, but yet to be developed, Gugulethu Colliery.

"Through Canyon Coal, we are investing around R600-million in the development of Phase 1 of the Gugulethu project, located near Hendrina in Mpumalanga. The project has an estimated life of mine of more than 39 years based on a ROM production of about 200 000 t/m from opencast areas and 200 000 t/m from underground sections," explains Bayoglu.

Mining is scheduled to take place both underground and on surface. Phase 1 of the project will consist of opencast mining from a reserve of 14,3-million tons, with Phase 2 extending underground. Phase 1 of the project will consist of three pits, one of which has been designed specifically to gain access to the underground reserve.

Canyon Coal's Bekezela operation has long been in the queue waiting for a water use licence and remains hopeful that government's promise to cut the red tape will soon see the miner granted the licence. Once in operation, the project, situated in Springs Gauteng, will employ 320 people. The Bekezela Colliery will be an opencast mine, targeting run-of-mine (RoM) production of 600 000 t/m. Capex to get the project, which is scheduled for an LOM of 19 years (excluding construction), into production is pegged at some R1,5-billion.

ZAC's fully licensed Mngeni Shaft project has a resource of 1,2-million tons. The project has an anticipated life of mine of 3.5 years. ■

The Kangra Udumo project.

Nkwe Platinum donates shoes to

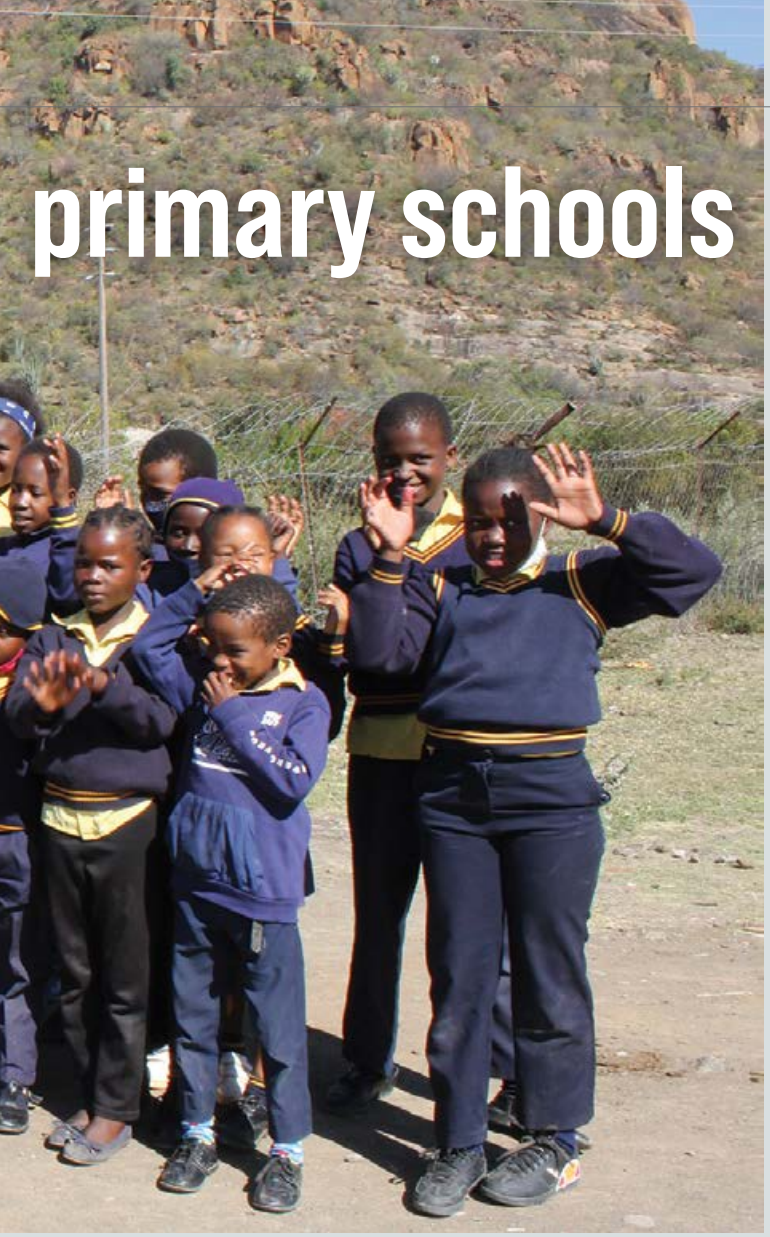
Platinum miner, Nkwe Platinum Limited, under the Zijin Mining Group, recently donated a total of 100 pairs of school shoes to selected primary schools within the communities around the Zijin Garatau Platinum Mine located on the Eastern Limb of the Bushveld Complex, in Limpopo Province. The school shoes were donated to the following primary schools: Setlopong Primary School in Maandagshoek, Ratau Primary School in Garatau, Lobamba Combined School in Hoepakrantz; as well as to disadvantaged children in the De Kom area.

This is the second time that school shoes have been donated to primary schools and underprivileged children in the mine's communities, since 2021.

"We are really happy to have received another batch of new school shoes for our learners. This donation really helps to restore confidence to our most disadvantaged learners to attend classes," said Mr. Mashoeu, head of department of Setlopong Primary School.

Commenting on this initiative, Mr. S.J. Malatjie, principal of Ratau Primary School in Garatau, said: "We are pleased to

primary schools



see that the school shoe donations have been implemented again this year. The recipient learners are so excited for the new shoes. It has given them hope to come to school and attend classes with dignity."

"Nkwe Platinum Limited, and the Zijin Mining Group, places high importance on the culture of learning. We are pleased to contribute to the empowerment of these learners, through the donation of school shoes, and improve their self-esteem," says Zhiyu Fan, MD and CEO of Nkwe Platinum Limited.

Kal Tire walks the ESG talk

Canadian company Kal Tire's giant tyre recycling facility in Chile, South America, is the first of its kind and has been in production since November last year, says Dan Allan, senior vice president of Kal Tire's Mining Tire Group. By *Nelendhre Moodley*.

John Martin, VP Southern Africa (left) and Dan Allan, senior vice president of Kal Tire's Mining Tire Group (right).

The initiative is underpinned by the Chilean government's legislative imperative, which comes into effect in January 2023 and requires in the first stage of its environmental legislative proposal that mines recycle a minimum of 25% of imported products.

Kal Tire's Maple Program.

Given that, traditionally, many mining houses dispose of old tyres in waste dumps or use them as back fill in mining operations, Kal Tire took a decision three years ago to offer clients a suitable alternative for disposing of used tyres and thus aligning with the proposed legislation.

Allan explains, "For years we have been looking for ways to help miners get rid of old tyres in a responsible manner and, three years ago, we initiated a project to identify the best way to dispose of old tyres in an environmentally friendly manner while meeting the legislative criteria.

"We have subsequently developed a suitable technology and built a prototype facility in Chile that can be replicated to scale. It is just as suitable for a small-scale operation as for a large-scale multifaceted operation."

The tyre recycling project involves the thermal conversion of the tyre from its current form to the fundamental elements of its make up.

"Pieces of the 4,5 t tyre go into a kiln and, using a combination of heat and friction, the tyre is reduced to its original state. The process breaks down the tyre into heavy oil, clean high tensile steel and recovered carbon ash," explains Allan.

The multimillion-dollar investment is capable of processing 7 500 tpa of tyres, from which about 2 500 t of carbon ash is recovered. The facility, located in the Antofagasta region, consists of two reactors and is scalable, as demand dictates, by adding reactors.

"We are offering miners a solution that solves their problem and the gate fee structure is within reason," says Allan.

According to John Martin, VP Southern Africa, Kal Tire's Mining Tire Group, customers have been extremely supportive and Kal Tire has found a number of great sources for the downstream application of the steel and oil.

Aside from the re-use of oil in the explosives industry, it can be repurposed for use in diesel trucks or to power a genset to produce electricity. Given that it is comparable to heavy crude oil number 6, it can also be sold to a refinery for further blending.

An aerial view of Kal Tire's Chile recycling facility.

Investing in Mining Indaba conference

A key attraction underpinning Kal Tire's attendance at the Mining Indaba was the theme 'Evolution of African Mining: Investing in the Energy Transition, ESG and Economies', with the conference interrogating key industry issues, including decarbonisation, technology and innovation and ESG-focused investment.

The tyre recycling initiative comes at a propitious time when miners are actively seeking solutions to their environmental responsibilities and the Mining Indaba was the ideal platform for Kal Tire to introduce its new recycling initiative and gauge the appetite for its offering.

Allan was part of the panel addressing the topic, 'Recycling in Mining: How mining and supply chain industries can work together to tackle waste and sector supply crunches through an ESG framework'.

With the recycling facility in Chile now operational, Kal Tire is able to validate the cost benefits of the project and provide customers with concrete figures of the $C0_2$ savings that can be achieved as well as illustrate the positive impact it can have on their carbon footprint.

The highlight for Kal Tire at the Mining Indaba conference was the interest it garnered for its new technology development. "We have since had numerous conversations with interested parties," says Martin.

Kal Tire's Maple Program

In a bid to advance the adoption of sustainable solutions, customers are increasingly turning to Kal Tire's Maple Program, which provides proven data on carbon saving initiatives such as retreading, UltraTread and Ultra Repair which target extending the service life of tyres – often by thousands of hours – and reducing the total cost of ownership.

"Carbon tax is not a reality in most African countries but it is in Europe, South America and Chile, which raises the significance of the Maple Program to our customer base," explains Martin.

While the environmental benefits of these offerings have been widely understood, there has previously been no proven way to quantify actual environmental savings.

Kal Tire's Maple Program, based on its custom-built carbon calculator, uses data related to carbon and oil savings achieved when using Kal Tire's sustainable tyre solutions to calculate the CO_2 savings.

Accredited and certified by SCS Global Services, a leader in third-party environmental certification, Kal Tire's carbon calculator calculates the oil and carbon emissions saved in raw material consumption and in production energy during re-treading when compared to producing a new tyre.

Launched in 2019, the Maple Program was first rolled out in Chile and is now being rolled out to other regions in which Kal Tire operates.

"Kal Tire issues customers with an annual certificate validating the carbon savings contribution. This becomes increasingly important towards Scope 3, which is only just beginning to be addressed. Scope 3 takes into account the downstream aspect of an organisation and includes the complete value chain including the suppliers used," explains Allan.

Creating an attractive investment destination

With Africa contributing roughly 25% in revenue to Kal Tire's global business, the continent remains an essential part of its business.

"The hurdle rate for doing business in Africa is being lowered, as we witness favourable changes to mining legislation in a number of African countries, allowing for significant investment into mining projects. It is encouraging to note the measures the President of Zambia is undertaking to address historical investment hurdles, as well as corruption in Zambia, and the subsequent upbeat atmosphere it creates. We remain optimistic that our President Ramaphosa will make good use of all these commissions of enquiry, including the State Capture Commission, to further improve business confidence in the South African economy," says Martin.

Kal Tire's Chile recycling facility.

"There is a lot more direct foreign investment going into other countries in southern Africa where South Africa should be attracting the bulk of it. According to the latest Fraser Institute's Annual Survey of Mining Companies 2021, South Africa ranks in the ten least attractive mining jurisdictions."

The challenge for an organisation such as Kal Tire, a "relatively small private business" looking for stable attractive investment destinations, is making decisions on where to invest, says Allan.

"Africa is a great market for Kal Tire because of the mineral rich nature of the geology. However, trying to work around legislative bureaucracy and licensing, and dealing with the potential for corruption, is a challenge." ■

Kal Tire Ultra Repair.

AECI Mining's CEO, Mark Kathan.

AECI drives the ESG agenda

JSE-listed explosives manufacturer AECI Mining's strategy remains firmly focused on step-changes aligned with meeting its environmental, social, and governance (ESG) initiatives, says newly appointed chief executive officer for AECI Mining, Mark Kathan.

By *Nelendhre Moodley*.

Last year, the explosives manufacturer's sustainability report outlined specific sustainability targets for 2025 including overarching goals for a better world focused on making mining safer; providing access to clean water and improving conservation; reducing the hazardous nature and effects of chemicals; reducing carbon intensity; and pursuing zero harm to people and the environment as well as effecting a culture of going green and being responsible.

Our carbon tracking initiative will track our carbon footprint over the next few years on an identified product range to illustrate to our customers the progress being made on our ESG drive – Kathan.

The six targets for 2025 are a 25% decrease in potable water consumption; a 20% decrease in discharge to sea or sewers; a 20% decrease in Scope 1 carbon emissions; a total recordable incident rate below 0, 25; a 24% decrease in environmental incidents and an 8% increase in electricity from renewables.

"As we transition over the next 2 – 5 years our core focus will be on supporting the environment and our people and dovetailing our initiatives to meet our customers' goals, Kathan tells *Modern Mining*.

Aside from adopting new measures to meet the new emissions criteria at its plants located at Modderfontein, Sasolburg and Umbogintwini, AECI Mining is rolling out a carbon tracking programme targeting the following product categories:

- ❑ Surface bulk emulsions
- ❑ Underground bulk emulsions
- ❑ Boosters/Primers

"The aim of our carbon tracking initiative is to track our carbon footprint over the next few years on an identified product range to illustrate to our shareholders and customer-base the progress being made on our ESG drive," explains Kathan, adding that while the move to align to the green agenda is expensive, it is nonetheless worth the price as it will transform the way AECI does business.

"In time, we will be adopting much greener solutions on more of our product ranges. For instance, given that ammonium nitrate is a key component in the manufacturing of explosives, we are exploring a pathway to greener ammonia and are considering potential partnerships with key industry players that will aid in this journey."

With AECI's drive to increase its renewable energy

AECI's technological transformation targets the roll-out of battery powered mobile charging units.

consumption to 8%, AECI Mining will be contributing by establishing two solar plants – a 13 MW and 8 MW plant to power its facilities in Modderfontein and Sasolburg. AECI expects to commission its first project in the fourth quarter of this year and the second solar plant in the first quarter next year.

The Gauteng-based explosives manufacturer's roadmap to technological transformation targets the roll-out of battery powered mobile charging units (MCUs).

In addition, AECI Mining Explosives has deployed its Emulsion Vertical Drop System (EVDS) on several mines on the continent, further adding to substantial savings in fossil fuel usage. The ethos of better blasting is engrained in AECI Mining's DNA and it believes that significant reductions in carbon emissions can be effected by blasting better.

The company also showcased its first EV explosive charging unit at this year's Mining Indaba.

"We recently collaborated with our technology partner, MacLean Engineering, to progress the development of battery powered technology for use on underground mobile charging units (MCUs). Currently, we have more than 250 MCUs deployed within the greater AECI Mining operational footprint. This development aims at contributing to ESG initiatives and addressing Scope 3 emissions. It is set to be a game-changer in the industry as it will replace diesel-powered units, currently operating underground, with battery powered units that are able to deliver significant safety benefits, including reduced noise levels and the removal of diesel fumes from the workspace," notes Kathan.

Looking ahead, AECI plans to adopt driverless technology and smart mobile manufacturing units.

Other programmes aligned with the green agenda include expanding its recycled oil initiative adopted on surface to underground mining operations.

AECI Mining has developed a process that allows the introduction of recycled oil (for areas requiring shelf life) into the bulk emulsion fuel blend instead of virgin oils. The advanced, robust surfactant technology permits the use of oil without treatment or recycling in load and blast models. Benefits include reduced diesel consumption and pollution risk, and a decrease in cost to the customer.

According to Kathan, the drive towards a more circular economy is being achieved by using waste as raw material and sees the explosives manufacturer collaborating with mining houses to recycle the "used oil that miners are looking to get rid of in the production of explosives".

The company has also been reusing water, having recently invested in a R30-million water treatment plant at the AECI Mining Explosives manufacturing facility in Modderfontein, Gauteng.

Entrenching a global footprint

Given AECI South Africa's roots and, despite already operating in Australia, Indonesia and South America, the company is largely regarded as an African continental player.

AECI Mining is well established in Brazil, having acquired the Dinacon business in 2018, and is setting up a bulk emulsion plant in Chile, which is scheduled to be operational by the end of this year or early next year.

"The aim is to grow the business to become a globally recognised brand. We would like our clients to view us as a global outfit rather than an explosives manufacturer with an African focus. Essentially, if there is work related to our field out there, we want to be top-of-mind for clients around world," explains Kathan. ■

Above: AECI's stand at the Investing in African Mining Indaba conference, held in Cape Town recently.

Left: AECI plans to adopt driverless technology and smart mobile manufacturing units.

Below: AECI's stand at the Exhibition Hall at the recently held Investing in Mining Indaba.

We would like our clients to view us as a global outfit rather than an explosives manufacturer with an African focus – Kathan.

Pump failure puts Eastern Basin at risk

Following the recent breakdown of all three motors pumping acid mine water from the Eastern Basin, the spotlight is once again on the challenges associated with acid mine drainage (AMD), writes *Nelendhre Moodley*.

Modern Mining caught up with the CEO of the Federation for a Sustainable Environment (FSE), Mariette Liefferink, to chat about the measures being implemented to address the breakdown of the motors pumping AMD from the Eastern Basin as well as the potential impact this will have on the environment and the surrounding community, should AMD decant onto the surface.

Providing background to the current situation, Liefferink explains that gold mining has taken place on the Witwatersrand for more than 120 years, with miners operating underground pumping the water to the surface; however, with subsequent mine closures, the pumping of underground water ceased and mine voids have been filling with water.

To meet the required short-term interventions aimed at handling AMD, government invested a total of R1 710-million.

"When AMD issues emerged on the West Rand in 2002, the Department of Water and Sanitation (DWS) undertook a feasibility study aimed at addressing the AMD challenges associated with the Western, Central and Eastern Basins. To treat the polluted water from old underground gold mines, which involves neutralisation of the acidic mine water and precipitation and removal of heavy metals, the DWS needed to upgrade the existing infrastructure at the Witwatersrand's three basins and construct three plants to treat the mine water to a level that was suitable for discharge into the environment," explains Liefferink.

Mariette Liefferink in front of a partially reclaimed mine dump in the West Rand.

To meet the required short-term interventions, government invested a total of R1 710-million, of which R553-million was allocated to the Western Basin; R436-million to the Central Basin and R721-million to the Eastern Basin.

However, just five years after the Eastern Basin plant was established, the pumps – which are key to addressing the AMD problem within the East Rand – ceased pumping.

According to Liefferink, although the three plants treating polluted water within the Western Basin have been operating well since 2012, the Eastern Basin since 2016 and the Central Basin since 2014, in April last year, the Trans-Caledon Tunnel Authority (TCTA) announced that two of the three motors at the Eastern Basin plants had experienced failures, with the result that only one was pumping AMD.

"When the first pump motor failed, a spare motor was sourced and installed, which enabled the plant to meet the planned draw down rate. Unfortunately, after two months the spare motor also failed, leaving the plant operating with only one motor. In February this year the last remaining motor also failed, leading to the complete suspension of operations at the plant."

In looking to fix the problem, the TCTA, which is the state-owned entity charged with financing and implementing bulk raw water infrastructure projects, contracted a local pump supplier which then called upon its German counterpart to investigate the problem. However, owing to the pandemic and Covid-related travel restrictions, the team was

# of flooding

delayed in getting to the country. Further to this, supply chain challenges also delayed the delivery of spare parts that would have enabled the recommissioning of the two pump sets, one in February and the other in March 2022. This meant that the planned re-commission dates were postponed to end March 2022 and end May 2022 respectively.

"The first batch of spares arrived in February 2022 and repair to one of the pumps commenced. Unfortunately, a further setback occurred when, during the pump testing stage, it emerged that the motor windings had failed, which necessitated a complete rewiring of the motor. Given that the copper wiring could only be delivered at end of April 2022, this again led to a postponement of the commissioning of the two pump-sets to June 2022, which meant that plant operations were suspended until June 2022," explains Liefferink.

"The breakdown of all three motors pumping acid mine water within the Eastern Basin will, if not contained soon, have serious negative impacts on the community of Nigel on the East Rand and mining operations in the area, and will pose a severe environmental risk to the major river systems," she says.

According to the TCTA, which was appointed by the DWS to operate the AMD Treatment Plants, the environmental critical level of the Eastern basin was placed at 106 m below ground level. The current water level stands at 62 m below ground.

The good news is that the water level in the Eastern Basin has not yet reached the danger zone of 25 m below ground level.

Based on the current rate of rise and if current conditions prevail, it is estimated that this level will be reached in December 2022.

Unfortunately, the TCTA has also announced that the pump motors at the Western and Central Basins are experiencing similar problems to those of the Eastern Basin.

Impact of pump failure on the Eastern Basin

"Initially it was found that if the situation were not addressed, AMD would continue to decant from the Western Basin and could also, in time, cause the water in the Central and Eastern Basins to rise until it discharged on-surface," explains Liefferink.

The water control level for the Eastern Basin was established at 1 280 m Above Mean Sea Level (AMSL) to allow for the protection of the dolomites and the dolomite aquifers (AMD dissolves dolomites) and 1 470 m ABSL to protect groundwater sources.

"It was recommended that pumping commence

Above: The DWS constructed three plants to treat the mine water to a level that was suitable for discharge into the environment.

Left: Acid mine drainage poses numerous negative environmental impacts.

Gold mining has taken place on the Witwatersrand for more than 120 years.

AMD treatment plant in the West Rand.

to initially maintain the water at 1 280 m AMSL and then gradually increase the levels in stages to a maximum of 1 450 m AMSL while adequately monitoring the process to ensure that the aquifer doesn't become polluted. The anticipated average volume of water required to be pumped from the Eastern Basin in order to maintain the environmental critical level and protect the dolomites and the groundwater sources, was established at between 70 and 100-million litres per day," she says.

Given that AMD contains a high level of dissolved salts, is acidic and comprises a wide spectrum of heavy metals in toxic concentrations, including uranium and its radioactive progeny, decanting of this polluted water will negatively impact the natural environment, in particular, in the vicinity of the discharges and over a large area downstream of the occurrence.

AMD contains a high level of dissolved salts, is acidic and comprises a wide spectrum of heavy metals in toxic concentrations.

According to Liefferink, the termination of pumping on the Eastern Basin could potentially result in the mine water rising to the decant level and decanting in or close to the CBD of Nigel on the East Rand, thereby negatively impacting the sensitive Marievale Bird Sanctuary, a Ramsar site within the Blesbokspruit Water Management Area. A *Ramsar site* is a wetland site designated to be of international importance under the *Ramsar Convention*, also known as The Convention on Wetlands.

Aside from the environmental risks which include serious negative ecological impacts, regional impacts on major river systems and localised flooding in low-lying areas, the termination of pumping and possible flooding of the Eastern Basin gives rise to the following concerns:

- AMD extensively contaminates surface streams and could incur devastating ecological impacts.
- Rising water levels could flood urban areas and result in geotechnical impacts that may jeopardise the integrity of urban infrastructure.
- Rising water levels in the mine voids may lead to an increase in seismic activity, thereby presenting serious safety risks to deep underground mining ventures and pose a risk to safety and property on the surface.
- Rising mine water levels have the potential to pollute adjacent groundwater resources.
- Flooding may result in inter-mine water migration and may threaten neighbouring operational mines, limiting access to economic reefs.
- Shallow groundwater resources required for agricultural use and human consumption can be contaminated.

"Apart from these negative impacts arising from the inability to contain the decanting AMD, there is also a very real risk to mining operations in the area, namely the Gravelotte Mine and Gold One mine, which are currently in operation. The decanting AMD will pose a challenge to these mining operations and affect the livelihoods of its employees."

Added to this, a recent Inter-ministerial Committee's Task Team Report has associated the flooding of the Central Basin with an increase in seismic activity in the area.

"A seismic monitoring programme has confirmed an increased frequency of earth tremors in the Central Basin following the cessation of pumping by ERPM in October 2008. This has established a clear cause and effect relationship between seismic activity and mine flooding. Given all these factors, it is imperative that the matter is resolved with haste," concludes Liefferink. ■

Witwatersrand

- It is estimated that up to 50% of the all the world's gold ever mined has come from Witwatersrand.

The quest for clean water in South Africa

By Howard Jones: Industrial Product Specialist

A typical example of fish dying in a once pristine dam due to sewage.

Historical references to clean water streams and rivers will remain historical unless drastic measures are taken to refurbish ageing water and waste-water treatment plants as a matter of urgency.

The problem

The rate of urbanisation in South Africa, currently around 63% of South Africans live in urban areas, is a major contributory factor to the inability of municipalities to cope with process and treatment demands. Other factors are the destruction of wetlands due to development and deforestation, industrial spillages, mining, agriculture and water pollution from dysfunctional municipal wastewater plants. These factors are drastically reducing our available water resources.

As young children we were able to swim in the river at the Irene golf course in Pretoria, our only fear was of being bitten by the large crab population. The sad reality is that no crabs have survived the onslaught of the raw sewage and litter that makes the water an extremely unpleasant feature in an otherwise magnificent part of nature.

In order to ensure that we as a country do not face total environmental collapse, we need to act now.

The initial focus needs to be on the re-establishment of the needs of each municipal district based on latest census data. With this information the high impact priorities can be established.

The identification and inclusion of all industrial players in each region, in conjunction with the local Government departments, is essential to ensure they contribute by means of technical expertise, funding and monitoring of the processes of refurbishment in their respective regions.

These industrial players need to understand the potential impact the loss of quality potable water would have on their production capabilities and the health of their workforces.

With a total of 257 municipalities in South Africa, this is a major task.

The solution

Modern technology has produced some outstanding products and systems that are not only effective in treating water but are also environmentally friendly.

One of these is the Vega Sewage and Fat Destroyer (SFD100), which uses the principle of breaking down vegetable matter of all descriptions into plant food using enzymes and bacteria. The product degrades human, animal and plant waste.

Large amounts of litter that ends up in our waterways.

SFD100 is non-toxic, does not create heat fumes and does not attack live tissue or inorganic waste. It has proven to be extremely efficient and simple to use in domestic and industrial applications.

The product has been used effectively in shopping malls and in rural areas all around Southern Africa where the wastewater works have become dysfunctional.

The most common applications are septic tank treatment, grease trap cleaning in food outlets as well as pit latrines in the surrounding areas.

At Axflow / AQS Liquid transfer we continuously look for new products in addition to our large range of pumps for all applications, to ensure that we can contribute to the maintenance, processing and supply of the most precious commodity on earth

AQS Liquid Transfer is part of the Sweden based Axflow Group of companies and has been serving the mining, industrial and agricultural markets for 19 years with a solution driven and collaborative approach to business.

With seven branches throughout South Africa and a staff compliment of 196 people, the company is able to support all industries.

Most of a mine's water will generally be used in the process plant, and these applications can usually manage with much lower qualities of water.

Quality 'cascade' can optimise water treatment on mines

Relatively little of the water used during mining and processing needs to be clean or potable, so mines can reduce both water consumption and treatment costs by understanding what water qualities are needed where.

Peter Shepherd, partner and principal hydrologist at SRK Consulting.

Bjanka Korb, principal environmental engineer at SRK Consulting.

According to Peter Shepherd, partner and principal hydrologist at SRK Consulting, the mining sector's drive towards ambitious water conservation targets means recycling more – so that less fresh water need be procured. There is also a financial benefit to recycling, as having to treat water before use or discharge is an expensive exercise. Shepherd highlights that treatment can be kept to a minimum if mines are clear about what level of water cleanliness is required by its different on-mine processes.

"Clearly, a mine does not want to be using potable water to mix with tailings for pumping to a tailings storage facility," says Shepherd. "Most of a mine's water will generally be used in the process plant, and these applications can usually manage with much lower water qualities."

That said, there are specific phases of the plant that require cleaner water – for the mixing of reagents and chemicals, for instance. There is also a need for water that is low in sediment particles for use in the gland seals of pumps.

Mines can therefore optimise the reuse and recycling of their water through developing a water quality 'cascade', explains Bjanka Korb, principal environmental engineer at SRK Consulting. This will detail the minimum water quality demanded by each process, so water is not treated to higher levels of quality than needed at the point of use.

"This approach opens the door to increasing the volumes that can be reused and recycled," says Korb. "The accumulation of water in the system and the resultant discharge of low-quality water into the environment is thereby also minimised."

An additional benefit is that the mine would be able to reduce its reliance on treated municipal water and therefore the operational cost to the mine would also be decreased. Where untreated dam

water can be procured from a municipal source, the mine could use this directly in the plant – and only treat water to potable standards that is used in bathrooms, kitchens and for drinking.

Korb points out, however, that with more extensive reuse of water, the water quality within the mine system can deteriorate to the point where regular intervention is required. This is a consequence that must be carefully managed. “Fortunately, most regions have seasonal rainfall which assists with keeping the water quality cleaner,” she says. “However, concentration of salts will occur over time regardless, and the reality is that mines may need to consider water treatment for recycled water in the later stages of the life of the mine”.

Developing the cascade approach requires a good understanding of the water and salt balance within the broader system – including the mine workings, the processing circuit, the tailings dam, the fresh water supply and the receiving water courses.

“By identifying the major drivers of water use, a mine can better target its recycling efforts,” says Korb. “For instance, if the water being returned from the tailings dam is sediment-laden or there are other elements within the water that do not easily settle out, then it may not be usable in certain key plant processes.”

Achieving the best results from a water quality cascade relies on good communication between the management of the mine’s process plant and its tailings facility. Plant managers, who know the water volumes and qualities required from day to day, are important players in determining whether the process water demand can be fulfilled by return water from the tailings dam. The communication is vital as the tailings return water dams are often where most of the mine’s water is stored.

“The process plant and tailings teams together can assist significantly in managing the mine’s water balance, and in helping to reduce the volumes of water being procured externally,” Korb says.

Shepherd notes that leading mining companies have recently begun appointing dedicated experts to focus on water stewardship, to ensure that strategies are implemented and coordinated mine-wide to conserve water use. This, he says, is a positive step towards balancing a mine’s need for optimal recoveries in the plant with the need to reduce water consumption from external sources. ■

Mines can optimise the reuse and recycling of their water.

Mining companies have begun appointing dedicated experts to focus on water stewardship.

Weir Minerals Africa opens labs for foundry and rubber plant in Isando

Global supplier of minerals solutions Weir Minerals Africa's Isando foundry and rubber plant, recently opened two laboratories at the company's facility near Johannesburg. According to Umar Smith, plant manager at Weir Minerals Africa's Isando facility, the two laboratories are an integral part of maintaining world class standards in its production processes. While much of the company's testing requirements were previously outsourced, these can now be conducted in-house for more rapid results, the company said.

Weir Minerals Africa opens labs for foundry and rubber plant in Isando.

"Building these laboratories and equipping them with the latest technology is further aligning our manufacturing operations with best practice standards," says Smith. "The quick results are allowing us to fine-tune our manufacturing processes to improve product availability and on-time delivery."

A range of testing is conducted on material samples from the foundry and the rubber plant, to assess their performance under various conditions. This verification ensures that the manufacturing process begins with good quality material, for optimal equipment performance.

"Getting test results quickly means that any deviation from our stringent standards is picked up and addressed immediately," he says. "This reduces the chance of products being held back at a later stage due to quality issues, making the supply line to customers more reliable."

This has an important impact on customer confidence, lead times and supply certainty, he notes. It also reduces the level of wastage and time lost, which occurs when manufacturing defects lead to work needing to be redone.

"Having our own testing facilities supports our research and development efforts as we evolve materials to improve our equipment's benefits to customers," he says. "By having the laboratories in-house, it is also easier for us to protect our intellectual property and take forward innovative ideas that add value to our market." ■

Integrated Air Solutions partners with a global piping and fittings specialist

Integrated Air Solutions recently signed a partnership agreement with Italian piping and fittings manufacturing specialist, AIRCOM Piping Systems, in a bid to offer Southern African customers best-in-class compressed air solutions.

"The greatest cost of ownership of an air compressor is not the machine itself; it is the process of generating compressed air which consumes a great deal of energy," notes Integrated Air Solutions general manager, Trevor Volker. "It is therefore crucial that an air compressor operates at optimal efficiency to ensure the lowest possible total cost of ownership over the machine's life cycle."

Integrated Air Solutions recently partnered with AIRCOM Piping Systems.

Escalating energy costs and a growing focus on health & safety and decarbonisation processes are key drivers behind a notable upswing in market demand for light-weight, energy-efficient, flexible and scalable compressed air piping solutions.

"This demand can be met by shifting from traditional galvanised piping to an advanced light-weight aluminium pipe system solution," explains Volker.

Owing to the strong light-weight properties of aluminium, wasted air and leaks are eliminated and so too are all the associated costs of increased energy consumption, product replacements and unplanned downtime to allow for repairs.

"Integrated Air Solutions decided to test AIRCOM's aluminium piping and fittings in a demanding mining application in the Northern Cape. The team was impressed by how the products performed under gruelling conditions. Equally remarkable was the ease and speed of the installation process. Recognising the significant time and cost related savings that this rugged aluminium piping and fitting systems will offer our customers, AIRCOM became the obvious supplier of choice."

In line with the partnership agreement, which was signed in May 2022, Integrated Air Solutions' team of service technicians will be trained by AIRCOM factory specialists to ensure a seamless customer experience. ■

Pilot Crushtec launches the Lokotrack® ST2.3™ scalping screen

Equipment supplier Pilot Crushtec International recently launched the Lokotrack® ST2.3™ scalping screen, a multi-use scalping screen well suited to heavy duty scalping, fine screening and recycling. Dubbed the 'Swiss Army Knife' of screening, the machine is designed to process a range of materials, from topsoil and recycled concrete waste, to road base material and fine aggregates. The machine can be used as a standalone unit or as part of a multi-stage crushing and screening process. Its versatility is enhanced by the various screen media options, including grizzly, punch plate, finger grizzly and wire mesh. Despite its compact build, the machine punches above its weight with a 4.6 m^2 screening area, the widest in its class. This is complemented by an aggressive stroke up to 13 mm with 5G acceleration, resulting in a high screening performance.

Given that contract crushing is a nomadic venture by its nature often calling for the movement of machines from one site to the other, Metso Outotec thus paid particular attention to ease of transportation during the development of the Lokotrack ST2.3 scalping screen. With its compact screen box size (3,040 mm x 1,520 mm) and optimised weight (17 000 kg), the machine can be moved from one site to another using a standard trailer, thus helping contractors to cut back on transportation costs.

Pilot Crushtec recently launched the Lokotrack® ST2.3™ scalping screen.

Amid record high fuel prices, fleet owners will benefit from the machine's fuel efficiency. Powered by a CAT® C3.6 diesel engine, the machine consumes as low as seven litres of fuel per hour, translating into lower total cost of operation.

With Metso Outotec's IC automation system, fleet managers can monitor, control remotely and automate the screening process for better performance. With information on upcoming maintenance needs, fleet managers can plan their maintenance breaks effectively to reduce machine downtime. IC automation also makes the work of operators safer with the remote-control features. ■

Prieska Power Reserve partners with the IDC

Emerging company within the green hydrogen arena, Prieska Power Reserve recently partnered with the Industrial Development Corporation (IDC) to advance its green hydrogen project in Prieska Northern Cape, South Africa. The partnership will bring together the expertise of Prieska Power Reserve and the IDC's investment platform and infrastructure financing, to deliver technologies to produce green hydrogen and ammonia.

The IDC's approval of a facility will ensure that the project reaches financial close in H1 2023, a significant achievement for a journey that began in 2018, the company said. The first phase will result in the production of 72 000 tonnes of green ammonia per year with a green hydrogen content of around 12 900 tonnes beginning in 2025, escalating to over 500 000 by 2030.

The project has met a number of critical milestones to date in order to achieve its targeted financial close of H1 2023.

"Some of the completed milestones include the chemical plant, and the wind, solar and micro-grid feasibility studies, which indicate a huge potential for the project," stated Martin Walzer, director of Prieska Power Reserve. The project is currently also in the process of finalising technical design work. ■

Prieska Power Reserve advances green hydrogen project.

Prieska Power Reserve partners with IDC.

Stark Resources to deliver chemical free fine mineral separation

Engineering solutions company Stark Resources has entered into a three-way partnership that provides African mine owners and operators with a novel integrated approach to achieving chemical free fine mineral separation.

The mineral processing innovator has aligned with distributor Quiver, which is the exclusive supplier of Australia-headquartered Mineral Technologies' spiral separator equipment in Africa.

Stark Resources partners to deliver chemical free fine mineral separation.

Stark Resources believes that combining its processing expertise with Quiver's access to the African mining market and Mineral Technologies' spiral separator technology will accelerate the achievement of chemical free fine mineral separation on the continent.

Commenting on the partnership, Stark Resources' co-founder and CEO, Geoffrey Madderson, said:

"By taking the world's best spiral separator equipment, utilising it within our mining process design and combining it with Quiver's deep market knowledge, we aim to transform the African mining industry. We see this as very much the beginning of our partnership and our ambition is to take our novel approach to achieving chemical free fine mineral separation worldwide as soon as possible."

Stark Resources is headquartered in England and has offices in South Africa, Botswana, Germany, Australia and Brazil. ■

Rand-Air takes its rental business underground

Rental specialist, Rand-Air, continues to invest in the expansion and renewal of its comprehensive hire fleet aimed at offering industry a wide choice of quality, reliable and efficient machines.

"In line with this core strategy, we have put in place a three-year plan which has already seen a significant investment in over 65 new rental machines this year," says Rand-Air fleet manager, Craig Swart. "This has boosted our total fleet of mobile oil-free and oil-injected air compressors, diesel- and electric-powered screw air compressors, diesel generators, lighting plants and pumps to over 1 000, comprising 755 machines and more than 350 ancillary pieces such as receiver tanks, dryers, etc."

Rand-Air has been converting its machines to suit operation in underground gold and platinum mines and recently bolstered its GA 160, 110 and 75 air compressors with the addition of another ten machines for underground applications.

"For large contract projects, we station underground a specialist three-man team, two operators and one technician, who are trained to work in this very different environment," continues Swart. "This enables us to service the machines on site and attend to any breakdowns immediately." Machines take a heavy pounding underground and small repairs such as panel replacements are done at Rand-Air's fully-equipped workshop in Jet Park, Johannesburg. Full machine rebuilds however, are done by the supplier. Inspection and commissioning are undertaken by technicians from both Rand-Air and the supplier. ■

Rand-Air expands it underground equipment fleet.

WearCheck acquires Set Point Water Laboratories

Condition monitoring specialist WearCheck has brought its sister company, Set Point Water Laboratories into the fold, adding a new division to WearCheck's scientific testing structure, the company said.

The water analysis company is now integrated fully into WearCheck and forms yet another area of expertise along with WearCheck's other services, which include scientific used oil analysis, asset reliability care, transformer oil testing and lubricant-enabled reliability services.

WearCheck acquires Set Point Water laboratories.

Set Point Water Laboratories is ISO 17025:2017-accredited, and tests water from any source – ranging from drinking water to factory effluent, among others, to determine the presence and levels of potentially harmful substances.

Set Point Water Laboratories was established in Johannesburg in 1998 as a mineral's laboratory, then known as Set Point Laboratories. The company introduced water testing in 2013 and expanded with the launch of a Cape Town water laboratory in 2019, achieving accreditation of the Cape Town Laboratory in 2020, and thereafter focusing only on water analysis. ■

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