MODERN MINING
CROWN PUBLICATIONS
April 2022 | Vol 18 No 4
For people who are serious about mining

FURA GEMS eyes leading producer status

GIYANI METALS in the starting blocks

- **JUBILEE METALS** unlocks Zambian opportunities
- **KWATANI** expands international footprint

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CONTENTS

ARTICLES

REGULARS

MINING NEWS

EXPERT VIEW

SUPPLY CHAIN NEWS

ON THE COVER

To help create a sustainable future for the mining sector and its customers, AECI Mining Explosives focuses on continuous improvement throughout the value chain. See story on page 14.

COMMENT

Moneytalks – Let the 'gold diggin' begin

Nellie Moodley

Investing in African Mining Indaba 2022 is ready for you; are you ready for the world's largest in-person mining event? According to event director, Fred Noce, the highly anticipated conference is already tracking large numbers of visitors–with more than 6 000 attendees expected – so be prepared for an energy and vibe that only the Mining Indaba in the mother city can deliver.

This year's eagerly anticipated event promises to deliver an action-packed programme underpinned by the overarching theme: 'Evolution of African Mining: Investing in the Energy Transition, ESG and the Economies'.

Under this banner, the conference is set to interrogate key industry issues such as decarbonisation, technology and innovation, investment drivers and prevailing economic conditions.

Noce also promises a host of new features, including a stage dedicated to the Infrastructure & Supply Chain Forum, a Green Metals Day, and the first-ever Innovation Battlefield, which targets research innovation aligned to mining industry needs.

Also on the agenda is a new programme to support mining companies actively sourcing services such as airborne satellite surveys and ground-based geological and geophysical prospecting.

Promoting South Africa as an attractive investment destination

After two years of restrictions, the Mining Indaba is the long-awaited industry event for hopefuls looking to broker deals that will unlock investment opportunities for African economies.

How well the Investing in African Mining Indaba, touted as the place to meet with investors, mining companies and firms involved in the deal-making process, will be able to nail some much-needed investment deals, remains to be seen.

South Africa's struggling economy– evidenced by the latest unemployment rates, which record the highest ever unemployment figures at 34,9%– desperately needs a boost and the Indaba is just the platform for us to woo foreign investors and hopefully ink some deals.

To meet the healthy demand for commodities, there has been a robust pipeline of early-stage projects with explorers and brownfields project developers alike looking to take their projects up the value curve and jostling to get investors' attention. But given the country's challenges associated with water, power and rail, will cash constrained miners be able to convince investors to part with their money?

The commodities boom is certainly strong motivation for investors looking to invest, and South Africa has its fair share of solid projects waiting for that injection.

On the subject of investment, President Cyril Ramaphosa recently hosted the fourth South Africa Investment Conference, which is targeting domestic and inbound investment of R1,2-trillion over a five-year period.

According to the President, investment pledged at the fourth Investment Conference totalled R1.14 trillion, reaching 95% of its ambitious target in four years.

"What this means is that we are now only R60-billion short of our target. I expect that by next year we will not just reach our target – we will exceed it," the president said.

Fingers crossed that deal makers at the Indaba will be able to achieve the same levels of success as the South Africa Investment Conference.

In this edition

On the topic of investments, coloured gemstone miner, Fura Gems is looking to play an instrumental role in taking the coloured gemstone market from $2bn to $6bn in the next five-to-six years. In fact, the miner is already at advanced stages of inking deals to expand its global and African footprint.

"Fura Gems has been looking into different opportunities and plans to announce expansion initiatives into two more countries, one being in Africa," CEO Dev Shetty said (pg 33).

In line with unlocking African investment, Tsodilo Resources reports that the Final Feasibility Study for the Trans-Zambezi Railway Extension Grootfontein-Rundu-Katima Mulilo has been completed. The cross-border rail project aims to link new mines and mining activities to the railway network along the Walvis Bay – Ndola – Lubumbashi Development Corridor to enable transportation of minerals from the Copperbelt to Walvis Bay. This corridor will open the way for trade between the SADC region and Europe, North and South America and emerging markets in the East (pg 42).

Also looking to grow its international footprint is vibrating equipment specialist Kwatani, which was recently acquired by Sandvik Rock Processing Solutions – a company with an extensive global reach. (pg 44).

Our cover story, AECI Mining Explosives, which already trades across numerous geographies, unpacks for *Modern Mining* its commitment to continuous improvements and unlocking opportunities associated with safety and the environmental (pg14). ■

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P O Box 140, Bedfordview, 2008
Tel: (+27 11) 622-4770 Fax: (+27 11) 615-6108
e-mail: mining@crown.co.za www.modernminingmagazine.co.za

Printed by: Tandym Print

Average circulation
October-December 2021: 11 306

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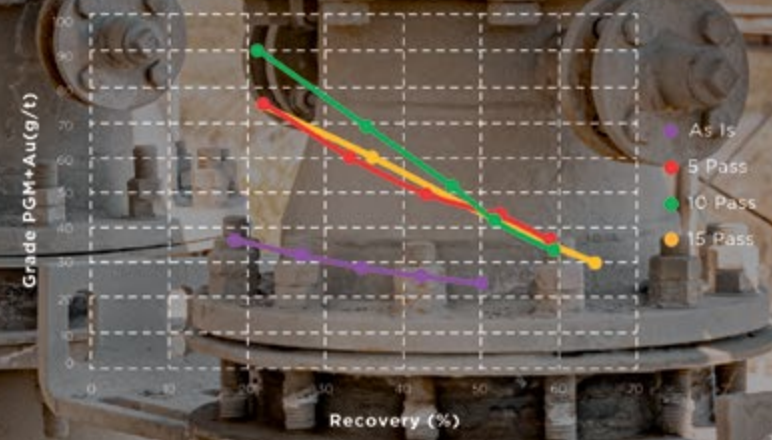

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Implats commits R50bn to a five-year capital programme

Impala Platinum Holdings (Implats) has announced that it will commit close to R50-billion to its capital investment programme over the next five years. The capital investment will be targeted at the group's mining and processing assets, across stay-in-business operations and new growth projects.

Implats CEO, Nico Muller said: "Southern Africa is the world's largest source of primary platinum group metals supply, and Implats' investment in increased beneficiation capacity and extended life-of mine development at several of our operations will position the country more competitively as a global mine-to-market PGM producer."

Increased beneficiation facilities and capacity

Implats has committed up to R12-billion to expand group processing facilities located in Southern Africa over the next five years. This investment into its South African and Zimbabwean smelting and refining facilities will benefit the region's production, reduce the environmental footprint of the group's beneficiation capacity and directly bolster and increase local beneficiation.

An initial $521-million (R8.2 billion) will be invested in the expansion of existing Zimbabwean smelting capacity and the construction of an SO_2 abatement plant to mitigate air quality impacts. Access to hydropower, supplemented by electricity provided by a 35 MW solar plant, which will be expanded to 185 MW in a phased approach, will result in an industry-leading environmental footprint for the Zimbabwean smelting facilities.

The expansion will accommodate an additional 600 000 6E1 PGM ounces per annum, which post-smelting will be transported to Implats' South African processing facilities for further refining and in support of local beneficiation.

20 Shaft at Impala Platinum's Rustenburg operations.

Mulller said: "This investment will benefit South Africa by opening additional smelting capacity at Implats' South African facilities to accommodate new production growth opportunities in the country. The extra smelting capacity will service new Implats projects and provide additional treatment capacity for third-party customer requirements. In addition, the increased concentrate production from Implats' Zimbabwean operations will be brought to South Africa to refine at the Group's Springs refineries, thus contributing to South Africa's beneficiation of precious metals."

Implats will invest another R4.4-billion into improving its South African processing facilities. R500-million has already been approved to expand treatment capacity by 10% in the medium term at its base metal refining facilities in Springs. In addition, feasibility studies into further capacity expansions at both its South African base and precious metals refineries are well advanced.

Life-of-mine extensions to support enduring benefits for all stakeholders

Implats will invest more than R8-billion across its South African mining operations over the next few years (including attributable capital at its joint ventures). This investment will extend the life-of-mine at existing producing mines and secure meaningful employment, entrenching South Africa's status as a stable and sustainable global PGM producer and supporting enduring benefits for all Implats' stakeholders.

In partnership with African Rainbow Minerals, Implats has committed R5.7-billion to the construction of a new Merensky Project at the Two Rivers' Platinum Mine. The company has a 46% stake in Two Rivers, but 100% of the 180 000 ounces of 6E PGM project production will be treated through the Groups' smelting and refining facilities.

A R5.1-billion investment at Implats' Marula Mine will increase the operation's life-of-mine by 17 years and expand capacity by around 40 000 6E PGM ounces a year.

Together, these projects will increase local beneficiation by around 220 000 6E PGM ounces per annum from 2028 onwards. ■

Minerals Council South Africa moves into new premises

The Minerals Council South Africa has relocated from Hollard Street in the CBD to modern premises in Rosebank. "The Minerals Council, formerly the Chamber of Mines, is synonymous with Johannesburg. We have promoted and protected our members' interests, while being mindful of the country's imperatives, for 132 years; mostly from our graceful, history-filled building in central Johannesburg. But the time has come to move to premises that are better suited to serving our members in a modern, easily accessible, and efficient environment," says CEO Roger Baxter, who joined the then-Chamber of Mines in 1992. ■

Minerals Council South Africa CEO Roger Baxter.

Sandfire Resources commences open pit mining at Motheo Copper Mine

Australian mining and exploration company, Sandfire Resources has commenced with open pit mining at its 100%-owned Motheo Copper Mine in Botswana, Southern Africa.

First pre-strip material was mined at the T3 Open Pit deposit in late March, roughly one week ahead of schedule against the project execution plan, with mining currently making excellent progress. The start of open pit mining by Sandfire's contracting partner, African Mining Services (AMS), a division of Perenti Global, marks an important milestone towards the start of copper production in CY2023, the company said.

Motheo is a substantial new long-life copper mine and one of few new copper mines under construction anywhere in the world. It is expected to become the cornerstone of a long-term copper mining hub for Sandfire in the world-class Kalahari Copper Belt.

Development is proceeding on schedule and on budget, with first production expected in the first half of calendar year 2023.

Sandfire CEO, Karl Simich, said: "The start of open pit mining operations represents another important step on the road to production, and to have achieved this milestone ahead of schedule is a testament to the hard work of our project execution team in Botswana, led by project director, Ian Kerr. In addition to the start of mining, we have also made important progress with construction of the process plant and other site infrastructure, putting us on track to deliver first production from Motheo in the first half of 2023. We're also nearing completion of the Feasibility Study for the 5.2 mtpa Expansion Case at Motheo, which is due for completion in the June quarter of this year. All infrastructure currently under construction at Motheo is being built to back this proposed expanded capacity, supporting Sandfire's plans for Motheo to become the heart of a major new processing hub in the Kalahari Copper Belt." ■

Sandfire Resources has commenced open pit mining at its Motheo Copper Mine, in Botswana.

Tharisa increases stake in Karo PGM project

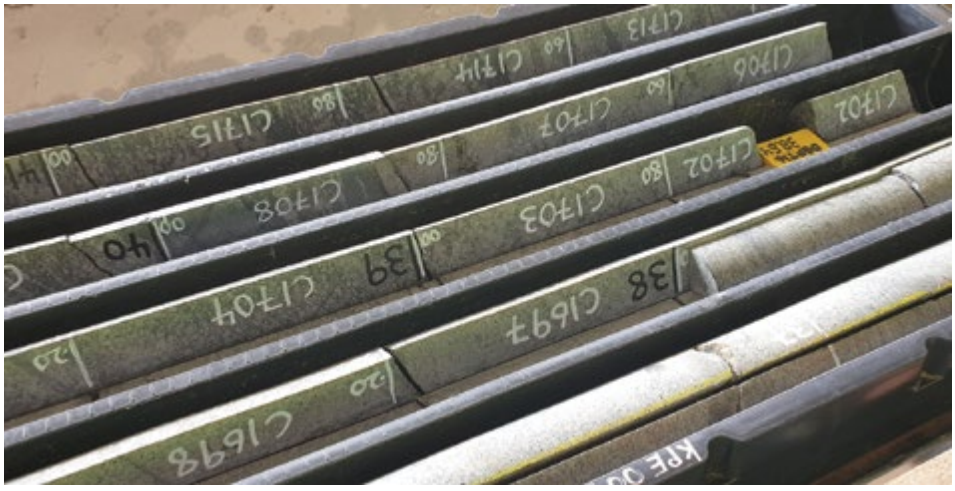
Platinum group metals (PGM) and chrome co-producer Tharisa, has exercised its farm-in option and acquired a controlling interest in Karo Mining Holdings for $27-million, increasing its shareholding in Karo Holdings from 26.8% to 66.3%. The Karo Platinum project is a long-life asset with an initial 20-year life of mine (LOM) and project post tax net present value (NPV) of $770.4 million at spot PGM prices.

It has initial probable reserves of 35.5 Mt at 2.31 g/t and 2.6 Moz (5PGE+Au) and a 3PGE+Au resource prill split favouring platinum (45%), palladium (42%) rhodium (4%) and gold (9%) with material base metal credits.

The Mining Lease area for the Karo Project is located within the Great Dyke in the Mashonaland West District of Zimbabwe. The Great Dyke is a PGM bearing geological feature that is second to the Bushveld Complex of South Africa in terms of its PGM resource base. The project is supported by good infrastructure, including road and power access in the project area.

Phoevos Pouroulis, CEO at Tharisa, said: "The development of a strategically significant tier one, high-grade, high-return, low-cost PGM resource is a natural evolution for Tharisa as it fulfils its strategy of becoming an integrated diversified developer of new metal assets.

Tharisa will develop and deliver its next PGM mine, Karo Platinum, in a world-class geological district that is supported by a pro-mining environment. The development of the Karo Project will significantly consolidate Tharisa as one of the world's most forward-thinking and low-cost producers of PGMs in Africa." ■



Tharisa increases its shareholding in Karo Holdings to 66.3%.

Anglo American partners with EDF Renewables for renewable energy supply

Anglo American CEO Mark Cutifani.

Anglo American has signed a Memorandum of Understanding with EDF Renewables, a global leader in renewable energy, to work towards developing a Regional Renewable Energy Ecosystem (RREE) in South Africa. The ecosystem is expected to be designed to meet Anglo American's operational electricity requirements in South Africa through the supply of 100% renewable electricity by 2030, thereby also supporting the resilience of the local electricity supply systems and the wider decarbonisation of energy in the country.

Anglo American has already secured 100% renewable electricity supply for all its operations in South America, resulting in 56% of its global grid supply expected to be sourced from renewables by 2023. In South Africa, while there is an abundance of renewable energy sources such as wind and solar, there is limited renewables infrastructure to harness it. As Anglo American progresses towards its 2040 target of carbon neutral operations, this partnership with EDF Renewables is designed to abate the largest single source of its Scope 2 emissions, being its current grid supply in South Africa. The RREE aims to support South Africa's decarbonisation ambitions and the country's Just Energy Transition, creating a sustainable and inclusive future.

Anglo American is targeting carbon neutrality across our operations by 2040

Mark Cutifani, CEO of Anglo American, said: "We are targeting carbon neutrality across our operations by 2040 and we are making good progress. This announcement is a further major step towards addressing our on-site energy requirements – the largest source of our operational emissions. Our partnership with EDF Renewables to address our Scope 2 footprint in South Africa complements our FutureSmart Mining programme's abatement of our Scope 1 emissions through low and zero emission technologies, including our hydrogen haul truck system, and the development of South Africa's Hydrogen Valley." ■

Drilling at K.Hill project.

Second rig accelerates drilling at Gogbala prospect on Napié Project

ASX-listed gold explorer, Mako Gold has commenced a 1,500 m diamond drill programme at the Gogbala Prospect within the company's flagship Napié Project in Côte d'Ivoire. Gogbala is located on the more than 23 km soil anomaly and coincident 30 km-long Napié Fault.

The diamond drill rig will supplement the RC rig which is currently drilling double shifts at Gogbala. This will accelerate drilling for the delivery of the maiden MRE for the June quarter 2022. The diamond drill rig will drill extensional holes below positive intercepts returned from previous drilling by the company, with the aim of extending mineralisation at depth and thereby adding ounces to the upcoming MRE.

Mako's MD, Peter Ledwidge commented: "We are pleased to be accelerating the drilling with the addition of a second drill rig at Gogbala. Our RC drilling to date has been relatively shallow, generally down to about 100 m vertical depth. The diamond drill rig will allow us to test mineralisation at greater depth, in order to show the potential to add ounces to the deposit at depth. In addition, the oriented core samples from diamond drill will unlock valuable structural and other geological information to better understand the deposit at Gogbala. We are also pleased to have recently completed over 11,000 m of AC drilling on the Komboro and Tchaga North prospects with the aim of making a new discovery at Napié." ■

Thungela delivers value for stakeholders

Coal miner Thungela Resources recently delivered a strong set of results transitioning to a profitable, highly cash-generative pure-play thermal coal business, the company said.

Thungela delivered adjusted EBITDA of R10bn (2021: R286 million); while net profit was R6.9bn vs a loss of R362 million in 2021. Favourable coal prices combined with a strong operational focus, resulted in a net cash position of R8.7bn at year end, the company said.

Demand for SA coal

Thungela exports most of its coal, and its revenue was positively impacted by the benchmark thermal coal price, which strengthened by 90% to $124 per tonne although the stronger Rand did offset some gains. The demand for high quality South African coal underpinned Thungela's performance. Developing economies in India, Pakistan, Sri Lanka and Vietnam are on a path of recovery, post Covid 19, and are experiencing an increased demand for energy, the company said.

Thungela reported export equity sales of 15mt, which reflected a decrease of 16% in 2021. Export sales and production were severely impacted by Transnet freight rail (TFR) constraints, and the company was forced to curtail lower margin production from late in the third quarter as stockpiles reached capacity.

"We remain committed to working with TFR, government and the industry to resolve the issues experienced in 2021 and at the start of 2022. We believe the challenges are transient and have planned our operational performance on a gradual, rather than an immediate recovery in rail performance. This is of national concern given that coal exports constitute one of the primary sources of foreign currency generation for South Africa," said July Ndlovu, CEO of Thungela Resources. ■

Thungela exports most of its coal.

Barrick expands global footprint in hunt for high-quality assets

Gold miner, Barrick Gold continues to invest in its future through the development of capital projects to expand and enhance an operating platform which already holds some of the industry's best assets, said CEO Mark Bristow.

Barrick is also expanding its presence into new prospective areas in its hunt for high-quality assets.

"A specialist Asia-Pacific team, set up to look at opportunities in the region, has acquired exploration permits in Japan and is hunting for additional opportunities in that region. We are also investigating projects across the Nubian and Arabian Shields in North Africa and the Middle East. We have put a particularly strong focus on exploration in Latin America, where our teams are testing a portfolio of targets on the El Indio belt along the border between Argentina and Chile. We have also added ground in Peru and started fieldwork on new projects in Guyana and Suriname.

"We are working on a well-defined strategy to grow our business in Canada where I believe we are under-invested. A significant exploration portfolio has been secured in the country's Uchi Belt and the team is also looking at other opportunities in the country," concluded Bristow. ■

SOLA Group and Tronox sign 200 MW of wheeling Power Purchase Agreements

Tronox Holdings, an integrated manufacturer of titanium dioxide pigment, recently entered into a long-term power purchase agreement with the South African independent power producer, SOLA Group, to provide 200 MW of solar power to Tronox's mines and smelters in South Africa. The company expects the project to be fully implemented by the fourth quarter of 2023.

The energy will be provided to Tronox through wheeling agreements, which allow Eskom to be paid for the maintenance and upkeep of its infrastructure to transport the energy.

SOLA Group and Tronox sign 200 MW of wheeling Power Purchase Agreements.

"Tronox's renewable energy project with SOLA Group will reduce our global carbon emissions by around 13% compared to our 2019 baseline and has the full support of our Board of Directors and senior management," commented Melissa Zona, Tronox Holding's senior vice president, external affairs and chief sustainability officer.

The project will be majority owned and operated by SOLA Group and will deliver around 540 GWh of energy to five mining operations through long term power purchase agreements. The developments make use of the government's recent relaxation of licensing requirements which exempt projects up to 100 MW in size from requiring a generation license.

"These types of projects are the fastest way to bring new generation capacity online and not only contribute to closing the electricity supply gap in our country, but also support the much-needed transition to clean energy and modernisation of our electricity grid," said Chris Haw, director at SOLA Group. ■

Economy sheds more than half a million jobs in Q3 of 2021

According to the Quarterly Labour Force Survey (QLFS), the number of employed persons declined by 660 000 to 14,3 million in the 3rd quarter of 2021, compared to the 2nd quarter of 2021.

South Africa's unemployment rate in Q3:2021 increased by 0,5 of a percentage point to 34,9%. This is the highest official unemployment rate recorded since the start of the QLFS in 2008.

These results are reflective of a struggling economy suffering high job losses and high levels of economic inactivity, exacerbated by the Covid-19 pandemic lockdown restrictions and, more recently, the July 2021 social unrest experienced in parts of the country , and which led to some businesses being permanently closed.

Between the 2nd and 3rd quarters of 2021, the number of employed persons decreased in all industries except finance, where employment increased by 138 000. The trade industry shed 309 000 jobs, followed by community and social services with 210 000. The formal sector was the most affected by job losses while job gains were recorded in the informal sector (an increase of 9 000). ■

Completion of Syama sulphide plant shutdown

ASX-listed gold miner, Resolute has successfully completed the Syama sulphide plant shutdown, which saw upgrades made to crusher liners, transfer chutes, mill cyclone feed pumps, flotation tailings pumps and roaster feed systems as well as the roaster primary cyclone and ESP. The shutdown commenced on 18 February with the comminution circuits fully recommissioned by 20 March 2022, ahead of schedule. First gold concentrate was fed to the roaster on 31 March, completing the restart of the entire sulphide processing circuit.

The performance of the sulphide plant is now expected to be more consistent and manageable, as measured by the overall plant availability, leading to improved production outcomes. Roaster capacity is also expected to increase which will effectively move the sulphide circuit 'bottleneck' from the roaster to the crusher. ■

Resolute's Syama Plant.

Minerals Council South Africa hosts a day of learning on FOG

Minerals Council South Africa recently hosted a day of learning on falls of ground (FOG) in underground mines in a bid to eliminate the risks from such incidents which are a leading source of mining industry fatalities.

The number of FOG fatalities has fallen to an average 24 a year in the 2016-2020 five-year period from an average of 111 a year in 2001-2005, a 78% improvement. Key interventions were the implementation of entry examinations and actively making working areas safe daily from 2009. In 2012, netting and bolting of tunnel roofs and walls was introduced.

From 2016, there were annual initiatives to address rock bursts and gravity-induced falls of ground. Technology has proved successful in significantly reducing human exposure to rock bursts, cutting rock-burst related fatalities to three in 2021 from 48 in 2003. Gravity-induced rockfalls remain an area of concern and are a key focus of work for the mining industry.

FOG fatalities have fallen to an average 24 a year.

"We've made the first desired step in arresting falls of ground incidents. Our day of learning is not only about sharing learnings from fatal incidents, but from the successes of our colleagues, and to explore further enhancements to make another major step change towards eliminating FOG fatalities," says Sizwe Phakathi, head of safety at the Minerals Council.

The Minerals Council's CEO Zero Harm Forum has agreed a six-pillar FOG Action Plan in conjunction with professional mining organisations for its members to implement to address these incidents. The action plan is a holistic approach that encompasses technical and human elements supported by the Department of Mineral Resources and Energy (DMRE), the Mine Health and Safety Council (MHSC), organised labour and suppliers.

The Action Plan, approved in July 2021, includes a financial investment of R46-million over five years. ■

First production from Elandsfontein

Emerging African phosphate producer and developer, Kropz has announced first production of phosphate rock concentrate from its Elandsfontein operation in South Africa.

Elandsfontein commenced plant commissioning in Q4 2021 and has achieved a concentrate grade of 31% P_2O_5, in line with management expectations. Concentrate samples will now be prepared for shipment to a number of potential buyers to confirm product specifications. Sales to smaller local customers in South Africa commenced in late March 2022.

The focus at Elandsfontein now shifts to increasing ramp-up of operations to achieve nameplate capacity and enable the first commercial large-scale shipment of concentrate while optimising process recoveries. All the required reagents have been received on site for the commissioning and initial ramp-up activities. Full production capacity is expected by early Q4 2022.

Mark Summers, CEO of Kropz, commented: "We are delighted to have reached this significant production milestone for the company. The interest we are receiving from the market and industry is positive." ■

Kropz Elandsfontein mine delivers first production.

Kore Potash signs MoU for financing Kola Potash construction

Kore Potash, which has a 97%-ownership of the Kola and DX Potash Projects in the Sintoukola Basin, in the Republic of Congo (RoC), recently signed a MoU with Summit on behalf of a consortium of investors and engineering firms, to arrange the total financing required for the construction of the Kola Potash Project (Kola).

The MoU outlines a roadmap to optimise the capital design to finance and construct Kola via a mix of debt and royalty financing. Under the proposed financing arrangements, the RoC Government will retain its 10% shareholding in Kola.

During the period, Summit and its technical partners SEPCO Electric Power Construction Corporation (SEPCO), signed the Optimisation Agreement to undertake a study to reduce Kola's capital cost with a target of less than $1.65 billion (Target Capex).

Under the Summit Consortium's proposed financing structure, the company will not contribute to the capital needed to build the Kola project and will retain a 90% equity interest in Kola.

In November 2021, the company received the Interim optimisation report on the Kola Project from SEPCO. The report covered 53 capital reduction opportunities for Kore Potash to evaluate for inclusion in the Optimisation Study Report.

Brad Sampson, CE of Kore Potash, commented: "Rising food prices and growing global demand highlight the importance of fertilisers, including potash, a vital agri-nutrient required for quality plant growth and crop yield to the global economy. With high grades, significant resources and a beneficial location, the Sintoukola Basin is one of the most promising potash deposits in the world." ■

Upgrade to station loading facilities.

Bernard Pryor heads up Karo Mining

Platinum group metals (PGMs) and chrome co-producer Tharisa has appointed Bernard Pryor as MD of Karo Mining Holdings. In March, Tharisa increased its stake in Karo Holdings to 66.3%. Karo Holdings holds an indirect 85% interest in the Karo Platinum Project in Zimbabwe. Pryor is a metallurgical engineer by background with over 35 years' experience in the international mining industry. His experience also includes international commercial and general management, most notably in Australia, Brazil, West and Southern Africa, the Middle East and Russia. Recently, Pryor was CEO of Alufer Mining where, under his supervision, its flagship Bel Air bauxite mine in the Republic of Guinea was developed and put into production. Pryor has also held positions as CEO of African Minerals and Q Resources. Between 2006 and 2010 he held senior positions within Anglo American as head of business development and was CEO of Anglo Ferrous Brazil. ■

Cora Gold commences resource drilling at Sanankoro Gold Project

Cora Gold, a West African focused gold company, has announced that further resource drilling has commenced at the company's Sanankoro Gold Project, in southern Mali. The company launched its 2022 drill programme at the flagship Sanankoro Gold Project, which is made up of five contiguous permits.

Drilling highlights include: a 7 500 m drill programme underway, which aims to enhance the current Mineral Resource Estimate (MRE) of 809.3 koz at 1.15 g/t Au. According to the company, there is a strong expansion potential that all deposits remain open at depth and along strike. Drilling is scheduled for completion in Q2 2022.

Bert Monro, CEO of Cora, commented, "We have multiple workstreams underway as we set our sights on delivering a definitive feasibility study in the coming months, alongside a resource expansion programme, which we believe will further enhance both the quantum and confidence levels of our MRE. We have consistently demonstrated Sanankoro's potential to become an open-pitable, free-digging oxide mine and work will accelerate throughout 2022 as we look to make this into reality." ■

Cora Gold launched its 2022 drill programme at its Sanankoro Gold Project.

Kamoa-Kakula's Phase 2 concentrator plant begins hot commissioning

TSX-listed Ivanhoe Mines co-chair Robert Friedland recently announced the start of hot commissioning of the Phase 2, of the 3.8-million-tonne-per-annum concentrator plant at the Kamoa-Kakula Mining Complex. In addition, the first filtered copper concentrate production from the Phase 2 plant also has commenced.

First ore was introduced into the Phase 2 milling circuit on March 21, and first copper concentrate was produced four months ahead of schedule. The Phase 2 concentrator plant is identical to the Phase 1 plant, with a design throughput of 3.8 million tonnes of ore per year. Over the last six months, the Phase 1 plant has consistently exceeded design ore throughput by about 10% to 15%, the company said.

Mark Farren, Kamoa Copper's CEO, commented: "We now have successfully built the first two concentrator plants ahead of schedule and on budget. Given the experience gained by our operations team during the ramp up of the Phase 1 plant, we anticipate the ramp up of the Phase 2 plant will go even smoother. In addition, since the Phase 2 plant has started earlier than planned, we now expect to achieve the upper end of our Copper production guidance for 2022, which currently is estimated at between 290,000 tonnes and 340,000 tonnes of copper in concentrate." ■

Kamoa-Kakula's Phase 2 concentrator plant begins hot commissioning.

Caracal Gold provides update on new heap leach plant

East African gold producer, Caracal Gold recently advised that construction of its new heap leach plant is on schedule and is expected to positively impact cash flow, in line with the company's projections. This underscores the company's commitment to increase production to 24,000 oz pa at its Kilimapesa Gold Mining and Processing Operations.

Construction of Caracal Gold's new heap leach plant is on schedule.

The heap leach process, with its operational efficiency gains and low operating costs, will enable Caracal to maximise the gold recovered from its Kilimapesa Gold Mining and Processing Operations.

The first 5,000 tpm pad for the heap leach operation has been completed, loaded with ore and is being commissioned. This first heap leach pad will act as a 'pilot plant', with the full heap leach plant operation to be expanded up to a capacity of 20,000 tpm.

The metallurgical test work completed for the heap leach plant showed excellent gold recoveries, and the initial recoveries from the first 5,000 t processed on site were firmly in line with this.

General manager of Kilimapesa Gold Mining and Processing, Riaan Lombard said: "The commissioning of this new facility enables us to treat the 40,000 t of low-grade material stockpiled over the ast few months and is another key milestone in the major expansion programme currently being implemented at our Kilimapesa Gold Mining and Processing Operations." ■

Gold Bar Integrity Programme launched

London Bullion Market Association (LBMA) and the World Gold Council (WGC) are collaborating to develop and implement an international system of gold bar integrity, chain of custody and provenance. Over time, this will help consumers, investors and market participants to trust that their gold is genuine and has been responsibly and sustainably sourced, the council said.

To deliver this industry-wide and ground-breaking development for the market, LBMA and WGC have brought together representatives from the global gold supply chain to launch a pilot phase of the project.

This initial phase will see two distributed ledger companies (aXedras and Peer Ledger) demonstrate how their technology can best deliver a global ecosystem that will create an immutable record of a gold bar's place of origin and chain of custody. This blockchain-backed ledger will register and track bars, capturing the provenance and full transaction history.

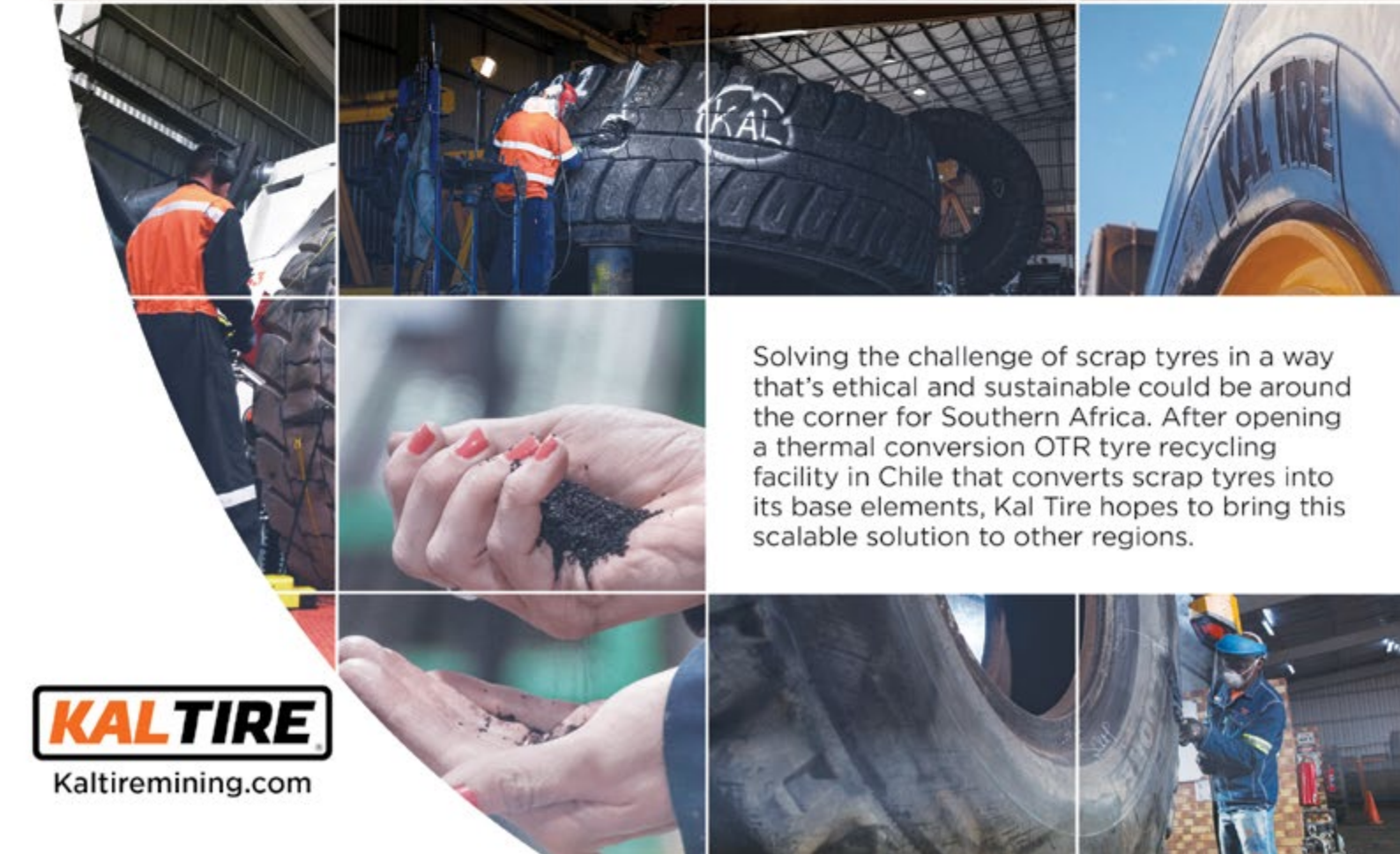
Over time, the plan is to encourage all major participants in the gold industry to adopt this technology, and add to the global ecosystem, so that all gold bars are registered and tracked across the entire supply journey from mine to vault, and ultimately to end consumers such as jewellery manufacturers. This will effectively digitise the global supply chain of gold bars, the council said. ■

WGC, LBMA and the WGC are collaborating to develop and implement an international system of gold bar integrity.

Sibanye-Stillwater closes €5-million of equity investment in Keliber

In line with the investment agreement, the final tranche of Sibanye Stillwater (SSW) investment in Keliber was closed with SSW subscribing 125,000 shares for €5-million. This increases SSW's shareholding to around 30%. It is SSW's final tranche of the €30-million phased equity investment the companies announced on 23 February 2021. SSW subscribed shares for a total of €15-million in March 2021 and for an additional €10-million in September 2021. Keliber is a Finnish mining and battery chemical company that aims to start the sustainable production of battery-grade lithium hydroxide, utilising its own ore, in 2024. ■

Expect **more** sustainability



Solving the challenge of scrap tyres in a way that's ethical and sustainable could be around the corner for Southern Africa. After opening a thermal conversion OTR tyre recycling facility in Chile that converts scrap tyres into its base elements, Kal Tire hopes to bring this scalable solution to other regions.

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AECI Mining Explosives – concentrating

To help create a sustainable future for the mining sector and its customers, AECI Mining Explosives focuses on continuous improvement throughout the value chain. Mining is necessary to supply the minerals required to create everything from roads to digital device screens and silicon chips. However, it needs to be undertaken responsibly. According to Franky Botha, product portfolio manager at AECI Mining Explosives, increased regulation in the sector over the past few years has improved aspects such as safety, governance, inclusivity, and sustainability.

Botha says the mining explosives industry has also evolved significantly over this period and the focus at AECI Mining Explosives is to improve efficiency at every stage of the value chain. This ensures a safer and more sustainable sector.

"I've been with AECI for more than 30 years and one of the biggest changes I've seen is the discontinuation of nitro-glycerine, which people know as 'dynamite'. While it was excellent from a blasting point of view, it was unsafe to handle and store. Many people don't know that more than 80% of our blasting products only become explosive once they are in the hole, whether for surface or underground blasting," Botha says.

Differential GPS.

Better Mining

While there's an ongoing race within the explosives industry to achieve better blasting performances and results, Botha says this is just one piece of the puzzle – the biggest gains (financial and environmental) are unlocked when focusing on continuous improvement at every stage of the value chain. For example, he says that improving blast design can cut down on everything from fuel usage to the number of truckloads required to move material (by up to 15%), resulting in cost reductions, lower carbon emissions, and time saving.

"Blasting is an art. If done optimally, it has the potential to create substantial savings throughout the downstream value chain, as well as major environmental benefits," he says. "We work with our customers to help them get the maximum return out of every blast. Achieving the ideal fragmentation directly impacts load and haul, and the dilution or loss of quality grade material, which needs to be managed to improve handling and processing time."

AECI Mining Explosives has developed several innovative solutions to help customers meet their operational and ESG goals. These include:

- Incorporating recycled oil into explosive formulations: AECI Mining Explosives embarked on an initiative to replace virgin oil with recycled oil in our manufacturing process and create a closed loop system. In recent years we took this initiative further and offered a value add to our customers where used oils from the mine trucks' gearboxes, maintenance yards, MMUs, tractors and forklifts etc., can be brought to the AECI site and reworked into the emulsion manufacturing process.
- Differential GPS (*d*GPS): This is part of the AECI Mining Explosives IntelliShot system. *d*GPS assists to eliminate the human element component in blast hole identification and delay assignment adding to blasting safety and accuracy. Incorrectly marked blast holes result in incorrect blast timing,

on continuous improvement

Recycled oils are incorporated into explosive formulations.

The biggest gains (financial and environmental) are unlocked when focusing on continuous improvement at every stage of the value chain – Botha.

which affects the results of the blast. By using *d*GPS technology, customers can enjoy faster blast deployment, greater accuracy and increased efficiency. While the system is currently semi-autonomous, AECI Mining Explosives is working towards fully autonomous deployment and tagging in the near future.

- Alternative booster / primer technology: AECI Mining Explosives is looking forward to launching its new, alternative booster technology in 2022. For decades, boosters (or primers) have been manufactured from Pentaerythritol Tetranitrate (PETN) and Trinitrotoluene (TNT). While performance is exceptional, the chemical make-up of these products has, until now, required sophisticated plants and specialised raw material facilities for their manufacture, and safety has been an ongoing concern. AECI Mining Explosives is developing an alternative booster, PowerBoost™, manufactured from non-explosive raw materials, which is being trialed in the field. The advantage of the PowerBoost™ is that it enables safe, containerised manufacture, which greatly reduces explosives handling and logistics risks to remote areas.

Collaboration is key

Botha believes that the future of mining is collaboration and big data. Working together with customers, AECI Mining Explosives hopes to collect data on each and every blast designed. Mining this data will allow for continuous improvement of field application, operational transparency and business intelligence.

"For me, the future is about partnerships and relationships," Botha says. "We always have the customers' best interests at heart." ■

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A golden decade ahead for South African PGM miners

By Pearson Mururi, Afriforesight's Head of Precious Metals and Related Commodities

South African platinum group metals (PGM) producers are awash with money and they might as well get used to it. The expected revival in platinum prices due to substitution in place of palladium, future demand from development in hydrogen economy and the limited potential for increasing near- to medium-term supply should usher in a golden era.

Platinum group metals are rare and mostly valued for their catalytic properties.

Platinum group metals are rare and mostly valued for their catalytic properties, which are useful in many industrial applications, with demand strongly focused on the manufacturing of autocatalytic systems to reduce harmful emissions from vehicles. The metals are found together in ores and significant volumes are mined in only five countries: South Africa, Russia, Zimbabwe, US, and Canada. South Africa hosts more than 80% of global reserves and is the largest overall producer. The platinum group metals consist of palladium, platinum, rhodium, ruthenium, iridium, and osmium. However, platinum is the most famous metal because of its use in jewellery and its investment pull as the metal is considered a viable alternative to gold as a store of value.

South African miners primarily target three types of ores which contain PGMs, namely the Merensky, UG2 and Platreef ores, the latter of which has almost an equal ratio of platinum and palladium while the other two have a higher platinum ratio. The UG2 and Merensky ores host high grades of rhodium and the other minor PGMs (excluding osmium) making South Africa the world's major source of the minor PGMs, accounting for about 80-90% of global production.

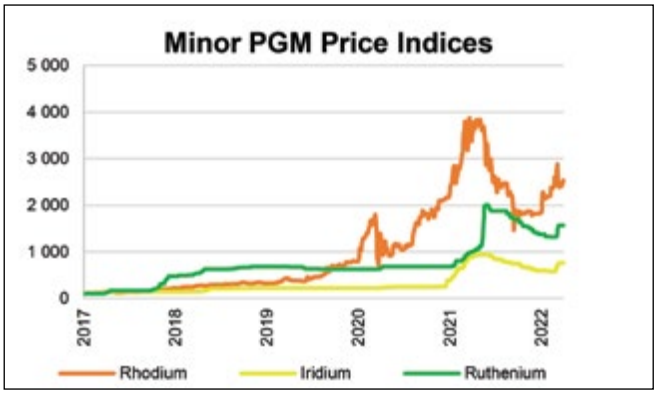
The South African PGM industry struggled for most of the past decade due to low platinum prices and industrial action by workers. This led to the closure of some mines and a general lack of investments. However, fortunes turned as tightening vehicle emissions standards in key economies – which required more advanced catalytic systems

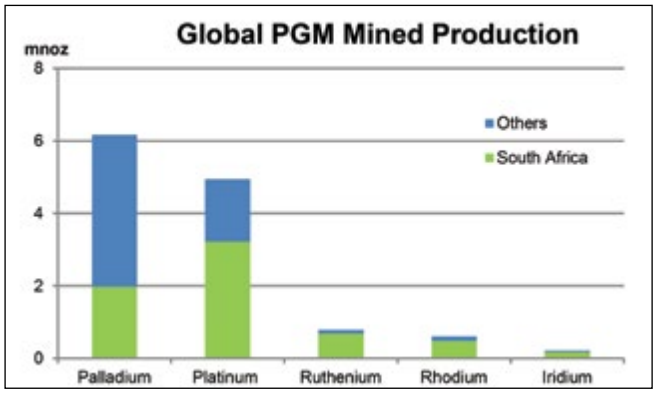
South Africa hosts more than 80% of global PGM reserves.

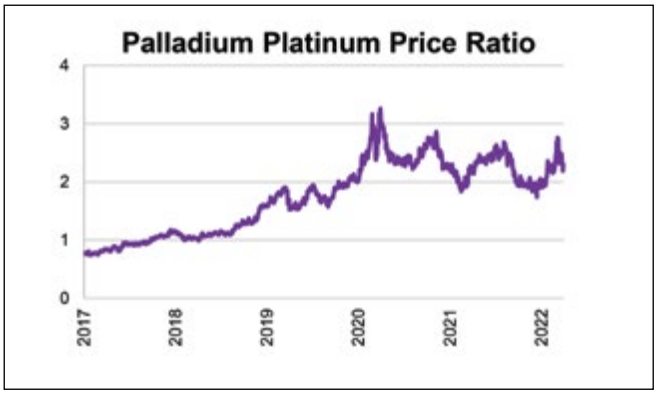
with more PGMs – caused a surge in demand and prices for rhodium and palladium, with the two metals now accounting for about 70% of PGM miners' revenue despite accounting for less than 50% of production/mined volumes. Platinum prices should also now be supported by a structural shift in demand as more platinum is used in place of palladium in petrol vehicle autocatalysts. The switch should be driven by the huge price differential between the metals (palladium is currently more than double the platinum price), recent palladium deficits, and by a drive by the EU and US to cut dependence on Russian commodities. These sharp increases in revenue and profitability in the industry have led many miners to pay off debts and increase cash reserves.

Despite high cash reserves, the major producers have remained disciplined and whilst a considerable number of potential capacity expansions and mine life extending projects are planned, only a few new projects are in the pipeline. Sibanye-Stillwater is investing in mine life extension and cost reduction efforts rather than new projects at its PGM operations, and instead is targeting additional capital expenditure to acquire battery metals projects. Anglo American Platinum is investing in mine life extending projects and mechanisation with the rest of the profit windfall used to pay huge dividends. The other big producers, Impala Platinum and Northam, are competing to acquire Royal Bafokeng, which has operating mines with modest production growth plans.

Current high prices should still incentivise some







Sharp increases in PGM prices are likely a start of a golden decade with platinum, iridium and ruthenium leading the charge.

new production, with African Rainbow Minerals planning to restart the Bokoni mine once acquisition from Amplats is complete. Wesizwe and Ivanhoe also aim to start up new operations within the next three years. However, this should largely be offset by depletion of resources at some of the old mines.

Outside of South Africa project delays persist, in Zimbabwe due to struggles with securing financing, in North America due to the lack of easily accessible resources and in Russia because of sanctions. Supply from Russia is likely to be disrupted to some extent in the short term due to sanctions, helping to keep PGM prices elevated as Russia is the second largest global PGM producer accounting for about 40% of palladium and 10% of platinum and rhodium. The consequences of Russia's conflict with Ukraine are expected to linger even after the war, which should lead to a preference of South African production over that of Russian.

Looking to the longer term: The development of the green hydrogen economy is expected to pick up significantly from the middle of the decade as plans announced by various governments over the past three years are realised and as the costs of manufacturing 'green hydrogen' (which is produced using renewables with zero carbon emissions) reach cost parity with hydrogen produced from natural gas. This should support higher platinum prices through 2030.

Russia's invasion of Ukraine has led the EU to reconsider its dependence on Russian natural gas and it has announced plans to more than triple planned green hydrogen use to 20 million tonnes by 2030. Given that the idea is to cut off imports of Russian natural gas eventually, the target should be revised up in the future.

An expected sharp increase in demand alongside slow supply growth should push the platinum market into deficit in the medium term and the metal is expected to remain in short supply into the longer term. This should support higher platinum prices and allow South African PGM miners to continue to have healthy margins as platinum accounts for more than 50% of domestic mined PGM metals.

South African miners should obtain an additional boost from the expected increase in demand for minor PGM metals, particularly iridium & ruthenium. Iridium has the potential to be the next rhodium and become a main contributor to PGM revenues because of its use in proton exchange membrane electrolysers which, if coupled with renewables can be used to make green hydrogen. Iridium is produced in smaller quantities compared to rhodium and any future surge in demand can lead prices to become super-charged.

Ruthenium is used in fuel cells and is also expected to benefit strongly from the development of the hydrogen economy. South Africa should gain from these trends in particular, as the country's UG2 ores contain at least double the grades of iridium and ruthenium compared to other ores mined around the world.

In summary, the recent sharp increases in PGM prices and high profit margins experienced by South African miners are likely a start of a golden decade with platinum, iridium and ruthenium leading the charge. The prices of these three metals have great upside potential due to expected future demand growth from the development of the hydrogen economy coupled with limited scope for significant increases in supply. ■

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What the 'beyond unprecedented' nickel

By Gary Peters, director at The Metals Warehouse

We have never seen or experienced anything like what is happening with nickel right now. In early March, the situation hit beyond unprecedented levels, with nickel increasing on the London Metal Exchange to a price never seen before, as a result of the war that is taking place in Ukraine. It led to trading being ceased and one of the biggest manufacturers of nickel reportedly recording an $8-billion trading loss.

With the future unclear, UK stockholders of products like stainless steel are wondering what will be next and how to react. There is no playbook for this, no previous experience to pull on in order to navigate the market that is in turmoil.

This article explores what is happening currently with nickel and what this means for businesses should it not be resolved.

What is happening to nickel right now?

Starting with context, nickel is traded, by the London Metal Exchange, as a commodity on the stock market. The highest price nickel has ever reached before this year was about $50,000 in 2007.

That was down to supply and demand. Since the recession of 2008, the price of nickel has ranged between $8,000 and $15,000.

With the emergence of the EV market, the price accelerated. It began with Covid, as nickel mines operated with reduced staff and capacities. This caused a huge supply and demand issue, which saw the price of nickel rise to $20,000.

The price of nickel continues to soar.

However, with the threat of the Ukraine invasion looming, that price began to creep up again, moving to $24,000 and then $27,000. Once the invasion took place and sanctions began to ramp up, the price jumped to $30,000 – as high as it had been since 2007 and a hike no one thought would happen again. On Monday (7 March), it leapt to $51,000. By 6 am on Tuesday (8 March), the price was up to $101,000. At that point, the London Metal Exchange ceased trading, reversed all transitions, and froze trading at $81,000.

On Wednesday (9 March), the nickel price was artificially reduced to $50,000.

On Monday (7 March), it was reported that one of the biggest producers of stainless steel, which also mines its own nickel, Tsingshan Holding Group, had a trading loss of $8 billion. Several banks have been on the end of the same loss and have, as a result, been given a boost to help them get back on track.

We have no idea what this means for businesses that buy products with stainless steel in them. The way the price of nickel works in reflection of the price of stainless steel is unbalanced.

One of the major mills declares what the surcharge is on stainless steel for the following month and even in a big swing, that price may inflate to £200 per tonne or come down by £200 per tonne.

However, based on what happened in March, the price of stainless steel is going to increase by thousands of pounds in April. As a world market, this is not sustainable.

Stainless steel touches multiple industries, including transport, food, refineries, as well as oil and gas to name a few. It touches everything.

To put this in context. If you spent £2,000 on stainless steel to refit a kitchen last year, that same stainless steel could now cost in excess of £6,000.

We will get to a point where no-one will buy it, things will grind to a halt and major construction budgets will be thrown out of the window.

What does this mean for businesses?

There is no playbook for where we are at the

crisis means for businesses

Above: With the emergence of the EV market, the price of nickel has accelerated.

Left: Nickel is not a rare commodity.

moment. The mills *The Metals Warehouse* purchases from – of which there are five across Europe and the Far East – are inflating their prices.

Everyone is in the same boat and we're all waiting for someone to make a move so the rest of us know where the starting point is. We're either going to be putting 5% or 100% on our prices. There is an argument for either of those outcomes.

Admittedly, short-term, that is good for our business. But it will only be for a short period. From the outside, it will look as though we're profiting but if we cannot replace the product, then we have to do something that will see us through over a longer-term period in which stock availability will be scarce.

We're a stockholder. Stock is the lifeblood of our company and without it, we don't have a business. We have no idea how this is going to play out.

I'm hoping they can come to some sort of agreement, but it doesn't feel like it could happen any time soon. When that does happen, commodity prices would plummet because the supply will be returning to the table.

We saw that with the oil price, which plummeted after Saudi Arabia opened up the market. At $50,000, this is not a true reflection of the demand for stainless steel. At some point, it has to fall and when it does, it's going to fall quickly.

Whether that is next week, next year or next decade is anyone's guess.

How our business is reacting

Our plan is to sell the minimum amount of stock possible so we can protect the stock. That's essential.

We're a business that makes money by selling stainless steel. We can't say we're not going to sell it. We still have salaries and suppliers to pay. We have to turn metal over, but we need to be structured with it and be sure that we can replenish what we sell.

A prediction on how the situation will unfold

My thoughts are that nickel will come back quickly if another country has the scope to fulfil the requirements.

Nickel is not a rare commodity. It's whether that country has the people to mine it. The European mills all rely on Russian nickel to make stainless steel. Indonesia is also a large exporter of nickel and if they increase their capacity over the next 12 months the price of nickel will fall back down drastically.

Nickel is traded as a commodity. However, the majority is not a tangible or real thing - you're buying something that goes into a product or sits in a warehouse. If the nickel that needs to be produced can be covered off elsewhere on the planet, the price will drop ignificantly.

It'll be a sharp drop when that happens and we're all eagerly waiting to see what happens next. ■

Timeline of events:

2007 – Price of Nickel reached $50,000
2008 (after recession) – price ranged from $8,000 to $15,000
2020 – the price of Nickel rises to $20,000 due to Covid
2022 (pre-Ukraine invasion) – prices steadily increase to $27,000
Invasion – price increases to $30,000
Monday 7 March – price increases to $51,000
Tuesday 8 March – price jumps to $101,000 – London Metal Exchange ceases trading and freezes trading it at $81,000

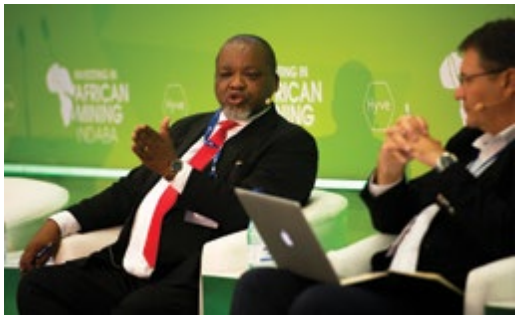
Mining Indaba 2022 promises a bigger and better programme

The recent easing of Covid-19 restrictions bodes well for attendance at the Investing in African Mining Indaba – the world's largest mining investment conference, which is scheduled to take place in Cape Town from 9 – 12 May 2022. By *Nelendhre Moodley*.

According to Investing in African Mining Indaba event director, Fred Noce, the overall response to the in-person conference has been extremely positive.

"The appetite to return to live events has returned as restrictions across many geographies are easing. With the vaccination progress in South Africa and around the world, we are excited to welcome back the world's largest African Mining Investment event, which provides a platform for deal-making, allows industry players face-to-face engagements on important industry issues, and creates opportunities for high-impact networking and capital raising. However, the health and safety of our attendees and delegates will continue to be a top priority so we have implemented various enhanced safety protocols, and will continue to monitor the Covid-19 situation throughout the event," says Noce.

Owing to travel restrictions and safety protocols related to the Covid-19 pandemic, the Indaba has taken a virtual format since the onset of the pandemic in February 2020, with organisers running the convention as a two-day, content-led event. Even as a virtual affair, the mining indaba secured over 6 000 registrations from around the world and had three African heads of state delivering keynote addresses.



Minister of Mineral Resources and Energy Gwede Mantashe at the Mining Indaba 2020.

"Mining Indaba Virtual Investment Programme in March 2021 allowed mining companies the opportunity to meet with global investors and continued to drive investment into African mining. However, there is no substitute for live events and we are delighted to be returning to Cape Town this May," says Noce.

Given the pandemic and the current state of flux, Mining Indaba event organisers initially estimated an in-person delegation of 5 000 for the 2022 Investing in Mining Indaba. However, Noce says this registration estimation is pacing well ahead, with organisers expecting to land significantly more people than initially expected.

A stellar programme in store

Event organisers promise a bigger and better programme underpinned by the overarching theme: 'Evolution of African Mining: Investing in the Energy Transition, ESG and Economies'.

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Above: Mining Indaba 2020 panel discussion.

Left: Mining Indaba business matchmaking interactions.

thought leaders in the industry, including various African heads of state, Barrick Gold CEO Mark Bristow, ICMM CEO Rohitesh Dhawan, Minerals Council South Africa CEO Roger Baxter and Anglo American SA Board Chair Nolitha Fakude among the contingent of speakers lined up. Mining Indaba is particularly excited to welcome new Chief Executive of Anglo American Group, Duncan Wanblad, who will make his world-exclusive debut at a major international event in his new role. There will also be a host of fresh features, including a stage dedicated to the Infrastructure & Supply Chain Forum, a Green Metals Day, and our first-ever Innovation & Research Battlefield with our partners Development Partner Institute, with a generous grant prize to the winner from BHP and University of Queensland" says Noce.

Speakers include Rio Tinto's new CEO of Minerals, Sinead Kaufman, Gold Fields CEO Chris Griffith, and Exxaro Resources CEO-designate Dr. Nombasa Tsengwa, as well as a main stage panel convened by Women In Mining. On the technology and innovation side, senior representatives from GE Africa, Siemens, Epiroc and Vodacom will add their expertise.

Mining Indaba 2022

- Mining Indaba has a core strategic remit focused on bringing mining-related investment opportunities into Africa.
- It is a content-led conference that addresses critical issues faced by the mining community.
- The conference provides a platform for mining majors, mid-tiers and juniors to discuss key industry issues on the same platform as government ministers and key industry bodies.
- It also creates opportunities for exploration companies to network and engage with important investment stakeholders and governments, under one roof.
- Mining Indaba remains especially important for Greenfield project developers looking for investment capital.
- The exposition component complements the conference and provides direct access to companies of the whole mining value chain.

In addition to representatives from the United Nations and the EITI, various African heads of state have signed up to give Presidential Keynotes at the conference, including the President of Zambia, H.E. Hakainde Hichilema, and the President of Botswana, H.E. Dr. Mokgweetsi Eric Keabetswe Masisi.

Under the theme 'Evolution of African Mining: Investing in the Energy Transition, ESG and Economies', the conference will interrogate key industry issues, including decarbonisation, technology and innovation, ESG-focused investment drivers and the prevailing economic conditions.

"This year we have a new programme called Innovation & Research Battlefield. It's the place for research innovation to be piloted at speed and targets the development of workable sustainable mining solutions to meet current market demand. The appetite from junior miners to attend the event is definitely there and nearly 90 juniors have already signed up with our 121 Mining Investments programme," says Noce.

Further to this, a newly hosted meeting programme to support mining companies actively sourcing services such as airborne satellite surveys, ground-based geological and geophysical prospecting and surveying and related services for mining projects, is also on the agenda.

Incorporating Covid-19 protocols

"Our exhibitors', visitors', and colleagues' health, safety and security remain our number one priority. We have developed safe and secure standards, including enhanced cleaning, social distancing, a robust communications plan and track and tracing. All rooms, including conference rooms, meeting rooms and rooms for social functions, will be set up according to the social distancing guidance. Gloves and masks will be offered to visitors, exhibitors, colleagues and suppliers, and hand sanitizer will be available in high traffic areas. We will continue to follow Cape Town's and South Africa's local and national government guidelines and laws," says Noce. ■

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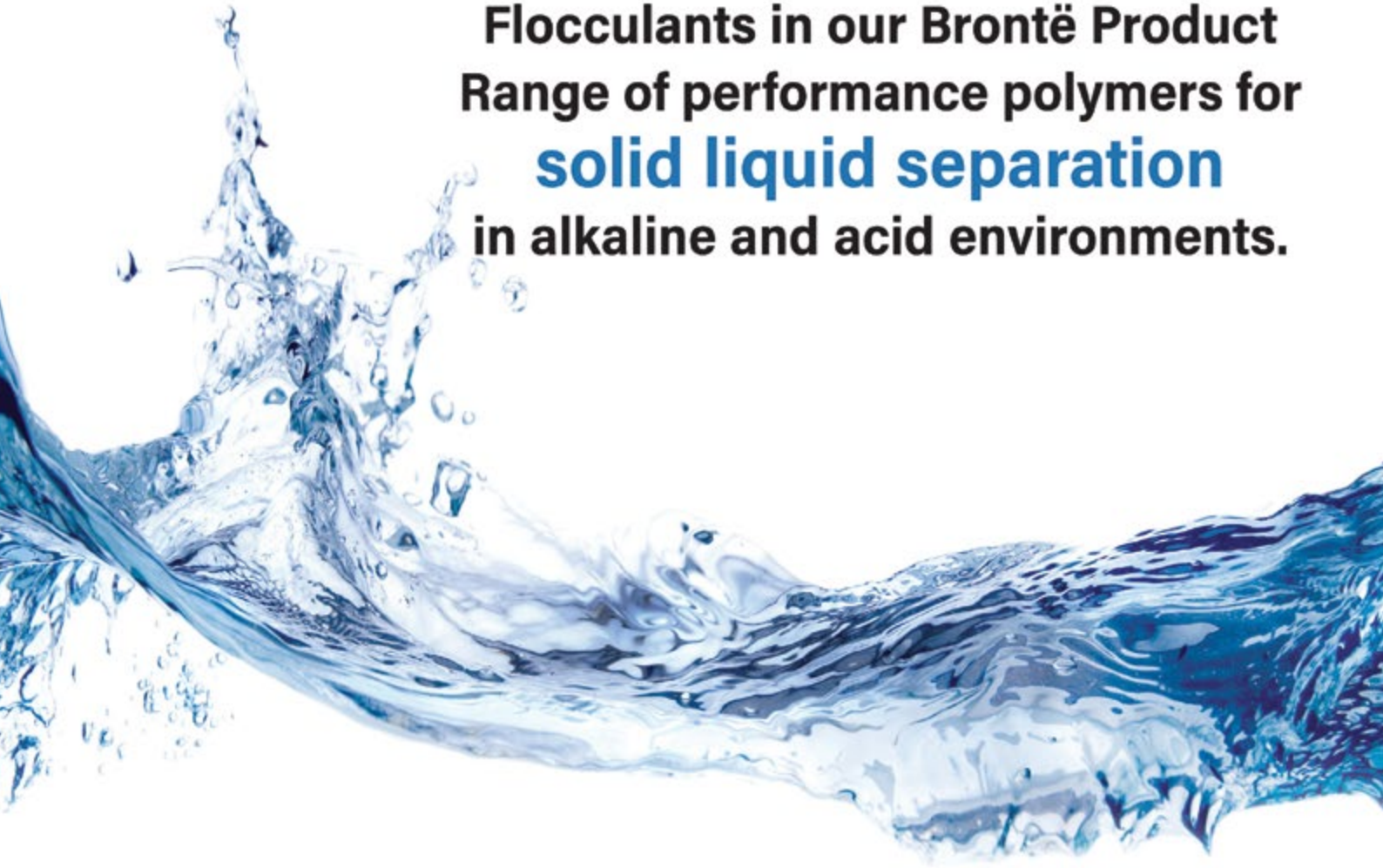

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BME Marketing Manager, Michelle Fedder.

BME highlights mining efficiency at Indaba

Getting behind the renewed enthusiasm of the upcoming Investing in African Mining Indaba in Cape Town, Omnia Group company BME will be face-to-face with the mining industry at its exhibition booth.

"Everyone is looking forward to the interaction at this year's Indaba, giving a boost to the positive momentum currently being experienced by the sector," said BME marketing manager Michelle Fedder. "Delegates, looking for the level of collaboration and information sharing that virtual communication platforms don't really allow, will be hoping to find exciting new partnerships and innovations."

This year, BME will be showcasing its breakthrough electronic initiation system, AXXIS Titanium – which was launched globally in November last year – and Fedder is certain that the wide international audience at the Indaba will be inspired by the advanced features of this electronic detonator system.

"Buoyed by strong commodity demand, mines in Africa nonetheless face a range of compliance demands in terms of sustainability – and are constantly in search of efficiency solutions," she said. "AXXIS Titanium, in concert with BME's ongoing innovations across its offerings, is helping mines drive down their energy costs and carbon footprints."

She said AXXIS Titanium boasts improved safety levels, enhancing communication with the detonator during manufacturing to avoid defects. Performance is raised through the increased blast duration per detonator, more units per blasting box and precise firing accuracy.

Safety remains BME's priority, with the incorporation of a Swiss-designed application-specific integrated circuit (ASIC) chip in BME detonators, delivering several added benefits. The ASIC gives the system more internal safety gates against stray current and lightning, enhancing safety levels and allowing for inherently safe logging and testing.

"With our sustainability-aligned offerings, we are feeling very enthusiastic about the mining industry and its prospects – especially as it forges the commodity path to a lower-carbon future," she said. ■

The AXXIS Titanium system was built for the blaster and blast engineers who work with the product every day.

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Operating Weight: 26 300 - 26 900kg
Bucket Sizes:
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- Heavy Duty: 1.3m³, 1.1m³, 1.4m³ & 1.5m³
- Severe Duty: 1.3m³ & 1.4m³

E300LC EXCAVATOR

Net Power: 159kW
Max Digging Depth: 7.30m
Operating Weight: 31 500 - 32 200kg
Bucket Sizes:
- General Purpose: 1.6m³
- Heavy Duty: 1.45m³ & 1.6m³

E380LC EXCAVATOR

Net Power: 232kW
Max Digging Depth: 7.66m
Operating Weight: 38 200 - 40 100kg
Bucket Sizes:
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Fura Gems eyes leading producer status

Fura Gems CEO Dev Shetty

On the back of the coloured gemstone market tracking strong demand with average price increases of 15% – 20% year-on-year for rough stones and 25% – 30% year-on-year for polished gemstones, gemstone miner Fura Gems is ramping up production to ensure increased supply of gemstones to a market with an ardent appetite, CEO Dev Shetty tells *Modern Mining's* Nelendhre Moodley.

Fura Gems mines emeralds in Colombia, rubies in Mozambique and, more recently, sapphires in Australia, as it looks to become the world's leading ruby, emeralds and sapphire producer by 2023.

While the US$23-billion gemstone industry is dominated by diamonds, accounting for $21-billion and coloured gemstones at just $2-billion, Shetty is optimistic that, given the growing demand for coloured gemstones, as evidenced by steady price increases year-on-year at various auctions, there is potential to triple the size of the current market over the next few years.

"There is certainly enormous opportunity to grow the gemstone market – which is predominantly led by emeralds, rubies and sapphires –from $2-billion per annum to as much as $6-billion – $8-billion over the next six years."

Diamonds occupy pole position in the gemstone market with jade, favoured by the Asian market (China, Japan and Korea) placed second, followed by the combined range of coloured gemstones, including the top three sellers – rubies, emeralds and sapphires.

According to Shetty, recent gemstone auctions – the Tucson Gem and Mineral Show, held in early February this year and the gemstone auction held in Sharjar in the United Arab Emirates (UAE) in early April – have both pointed to healthy demand for coloured gemstones.

At the auction in Sharjah, Fura Gems presented a selection of untreated natural Colombian emeralds of intense colour and flawless clarity as well as two rare emerald roughs weighing an impressive 81,2 carats and 83,8 carats each – all of which fetched better than expected prices. However, says Shetty, the challenge is ensuring a consistent supply of rough stones to the market.

"At every gemstone auction the price of rough gemstones keeps increasing; but the test remains in building confidence in the market's ability to deliver a steady stream of product," says Shetty.

"The auctions held this year have been a good indicator of demand for gemstones and have set the tone for the year ahead as they signal robust demand for our products."

Growing the coloured gemstone market

Despite being adored by queens, royalty and the elite for centuries, as well as the millennials of this generation, the coloured gemstone sector's growth has remained sluggish, largely due to its unorganised nature.

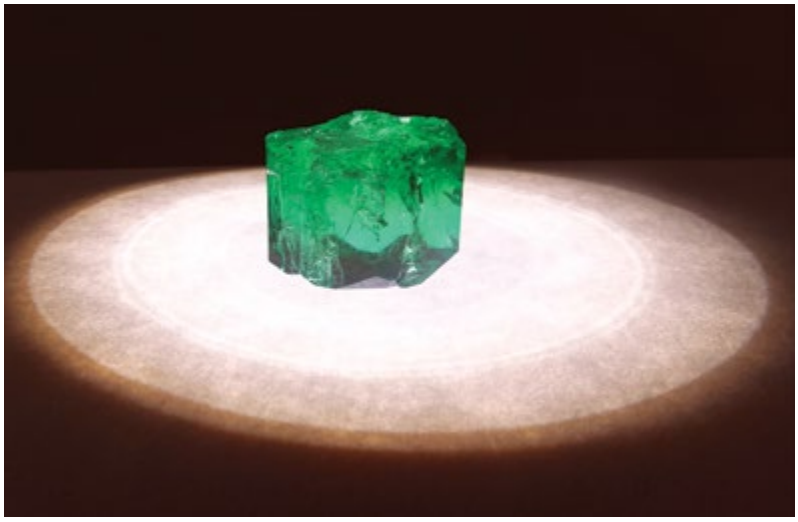
Organisation of the coloured gemstone industry began around 2007/2008, when global emerald and ruby supplier Gemfields realised the untapped potential of the market and began growing the sector.

There is enormous opportunity to grow the gemstone market from $2-billion per annum to as much as $6-billion – $8-billion over the next six years – Shetty.

Shetty, who at the time headed the operational side of business as Gemfields Chief Operating Officer, was instrumental in driving the growth of the sector by ramping up production of Gemfields' emerald and ruby operations.

In 2017, he founded Fura Gems and looked to replicate diamond miner De Beers' diamond market success by consolidating, growing and building confidence in the gemstone market through a steady supply of gemstones.

"De Beers' intervention during the 1960s and



By the end of 2023 Fura will be the largest supplier of Colombian emeralds.

Fura Gems mines emeralds in Colombia.

The largest suppliers of gemstones remain the pockets of small-scale producers, including artisanal miners and family-owned businesses.

1970s took the diamond sector, which was then trading on par on a dollar-to-dollar basis with the gemstone market, to the next level by creating security of rough diamond supply and promoting, through its marketing campaign, strong consumer demand for diamonds. A number of other diamond producers such as Alrosa, Gem Diamonds and Petra Diamonds followed suit, which led to the consolidation of the sector and its subsequent exponential growth."

Fura Gems is already making headway in growing the coloured gemstone market "in a much more organised manner", believing it "can easily take the sector to over $6-billion in the next five to eight years", explains Shetty.

"The outlook for coloured gemstones is extremely positive, as evidenced by jewellery manufacturers and consumers replacing coloured glass products and jewellery with emeralds, rubies and sapphires."

Owing to the constrained and unreliable supply of gemstones over the years jewellery manufacturers replicated coloured gemstones with coloured glass (red, green, blue, and others). But now, with more consistent coloured gemstone supply available, consumers are returning to gemstones.

Further to this, jewellery manufacturers are increasingly adding splashes of colour to diamond jewellery with the inclusion of coloured gemstones, thereby offering greater certainty for long-term sustainability of both diamonds and gemstones, Shetty says.

Ensuring a strong project pipeline

Fura Gems owns and operates the Coscuez mine, historically regarded as one of the world's most significant emerald mines, having been in operation for over 400 years and having produced some of Colombia's finest emeralds.

The company recently increased the footprint of its small-scale mining licence to a large-scale 30-year mining licence, allowing the miner to develop a large-scale underground mine.

Fura is in the process of developing a new decline and tunnel entrance at the underground Coscuez mine and is constructing a new washing plant and establishing a new waste dump. This will see the mine ramp up production from 500 000 cts rough emeralds in 2022 to 2 mcts by the end of 2023. The mine currently employs 450 people but this figure will increase as Fura starts construction of the underground decline later this year.

Fura Gems mines rubies in Mozambique.

In addition, Fura Gems acquired three mining licences in the Montepuez District of Cabo Delgado province in Mozambique in 2018 – this in a bid to progress its strategy of becoming a renowned ruby producer.

It has since consolidated its ruby licences and built two processing plants with capacity to mine some 30 mcts of rubies per annum.

"The past 18 months have been extremely busy for Fura Gems as we ramped up production at our Mozambique assets. Following construction of the first pilot plant in September 2020, we have subsequently upgraded the pilot plant and constructed a new, larger wash plant at the end of February 2022. Fura Gems now has capacity to wash 1,8 mtpa of ore, from which we expect to generate over 30 mcts of rubies," says Shetty.

Fura Gems' Mozambique operations employ around 400 people.

In line with completing its strategy of mining the trio of the top three coloured gemstones, Fura has replicated its Mozambique ruby success at its Australian sapphire project located in Central Queensland, and is now on track to produce some 10 mcts per annum of sapphires.

"By end of 2022, Fura will officially be the world's largest supplier of rough rubies and sapphires and, by the end of 2023, we will be the largest supplier of Colombian emeralds, cementing our vision of becoming a leading supplier of rubies, emeralds and sapphires," says Shetty.

By end of 2022, Fura will officially be the world's largest supplier of rough rubies and sapphires and, by the end of 2023, it will be the largest supplier of Colombian emeralds- Shetty.

The gemstone market is predominantly led by emeralds, rubies and sapphires.

Reinforcing this sentiment of being a leading supplier of gemstones, Fura Gems is already inking deals to expand its African footprint and expects to make further announcements before the end of the year.

Interestingly, Africa remains a significant driver for Fura Gems' revenue stream, contributing between 50% and 60% to its revenue base.

"We have been looking into different opportunities and plan to announce expansion initiatives into two more countries, one being in Africa. Our initiatives over the past two years have been hampered by the Covid-19 pandemic," Shetty says.

In line with its strategy to mine and sell rough gemstones, the miner also grades its coloured gemstones at its well-equipped grading facility in Dubai.

"Marketing remains a central component of our business and I am a firm believer in education and training in the coloured gemstone sector, which has only become more organised in the past decade.

"Fura Gems has a strong marketing focus and we liaise closely with retailers and jewellery manufacturers. In mid-2021, we launched the Fura Marketing Council which, in collaboration with jewellery manufacturers, retail chains and jewellery brands, promotes coloured gemstones," Shetty says.

Fura Gems will launch its marketing campaign after the Las Vegas auction, a high-end jewellery show which takes place in June. "Our marketing strategy aims to build awareness and demand for coloured gemstones and to build confidence in the sector. Our marketing campaign also outlines our ethical route to market – a key driver in building consumer confidence."

To ensure product traceability and an 'ethical route to market', Fura Gems recently partnered with the Gübelin Gem Lab's Provenance Proof blockchain system, which guarantees complete traceability and transparency of Fura Gems' entire auction lot of emerald roughs.

"We recently launched two projects – a partnership with Gübelin Gem Lab's Provenance Proof blockchain system, and we put in place a Nano-particle DNA project.

"The Nano-particle DNA project involves placing a coded liquid nano-particle into the rough gemstone which remains as a DNA molecule to ensure traceability of the gemstone. In addition to this, all our products are entered into the blockchain system which traces the coloured gemstone route from mine to end-consumer. In fact, the gemstones on auction at the Sharjah auction were tagged with the Nano-particle DNA molecule and entered into the blockchain system," Shetty concludes.

Gemstone industry

- Fura Gems is a gemstone mining company. It was established in 2017 and is headquartered in the UAE.
- The company, which has mining operations in Colombia, Mozambique and Australia, mines emeralds, rubies and sapphires.
- Although gemstone miners Gemfields and Fura Gems supply into the coloured gemstone market, the largest suppliers of gemstones remain the pockets of small-scale producers, including artisanal miners and family-owned businesses.
- The largest consumers of rough Colombian emeralds are Colombians, Indians and Americans, with rubies being purchased largely by clients from Bangkok and India, and demand for sapphires dominated by consumers from Thailand, Sri Lanka and India.

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The 2022 Junior Indaba, for explorers, developers and investors in junior mining, is brought to you by Resources 4 Africa, the organisers of the Joburg Indaba.

Giyani Metals in the starting blocks

Giyani Metals CEO Robin Birchall.

The shift to a low carbon economy is driving development in clean energy technologies and products such as electric vehicles which, in turn, is propelling demand for related minerals including cobalt, copper, lithium, rare earth elements and high-purity manganese. By *Nelendhre Moodley.*

A recent commitment by the Zero Emission Vehicle Transition Council to sell only zero-emission vehicles by 2040 – and earlier in leading markets – is a clear signal that the industry is serious about lowering its carbon footprint.

According to research agency Gartner, electric vehicles are an important power train technology in helping to reduce carbon dioxide emissions from the transport sector and it has forecast electric vehicle sales to increase by 35% in 2022 (around 6,4 million units), 1,6 million more than in 2021.

For Giyani Metals, a Canada-based mineral resource company which is targeting production of high-purity electrolytic manganese, a precursor material used in the manufacture of electric vehicles, 2022 is a milestone year as the explorer progresses the development of its flagship K.Hill manganese project in Botswana and courts investors and off-take partners.

According to CEO Robin Birchall, the appetite for high purity, or battery grade, manganese sulphate is set to rise exponentially over the coming decade.

"Current demand is less than 50 000 t (contained manganese)," he explains, "but this is predicted to rise to between 350 000 t and 900 000 t by 2030." At present, around 90% of production comes from China and so consumers – battery makers and automotive companies – have limited options for diversifying their supply chains.

"The high purity manganese sulphate industry is currently facing deficits as acute as those for lithium, nickel and cobalt, and prices have almost doubled in the past 18 months. Giyani Metals is one of a tiny number of developers outside of China rising to meet this demand, and 2022 will be a pivotal year as we move past the feasibility study stage on our K.Hill manganese project towards pilot production."

K.Hill manganese – a producer by 2023

Giyani Metals has an extensive land package covering 2,588 km^2 in south-eastern Botswana and is developing three manganese prospects in that country – Kgwakgwe Hill mine (K.Hill), Otse and Lobatse – all located within the Kanye Basin, which consists of 10 prospecting licenses.

The K.Hill Project is located near the town of Kanye, which hosts good rail and road connections, sufficient water supply and reliable power connectivity. According to Birchall, aside from having a highly-attractive high-grade resource, the K.Hill asset is located in a country with a supportive jurisdiction that is consistently ranked as the top mining location in Africa and benefits from strong support at both local and government level.

"As a result of its favourable tax regulations and

An outcrop at the K.Hill asset. Inset: K.Hill manganese core sample.

efficient government processes, Botswana is one of the most attractive African countries for supporting investment in mining," he explains.

Giyani Metals is busy advancing development of its flagship project, aiming for construction completion and production in the next two years as it targets production of some 120 000 tpa of high purity manganese sulphate monohydrate over a project life of 15 years. According to Birchall, the capital cost to get the project into production is pegged at $120 million.

In October 2021, the company announced an upgrade to the K.Hill resource, increasing the Indicated Resource by 30% and Inferred Resource by 120% with total manganese metal equating to 1,7 mt of high purity manganese sulphate monohydrate.

Giyani Metals is currently wrapping up the final test work on its process flowsheet, which will allow it to complete its feasibility study on K.Hill and start construction of a demonstration plant.

"During 2022, this will be our focus so we can ship sample product to customers," Birchall says.

As it progresses development on its demonstration plant, the company is considering the option of entering into conditional off-take arrangements with larger buyers and is already in early stage talks with a number of specialist and strategic finance partners who have expressed an interest in funding the project.

Expectations are that the talks will be advanced post-feasibility study stage.

"K.Hill offers a sustainable source of a critical battery material and will be a rare non-Chinese source of production. Along with our technical partners, we have had to work very hard to develop our production process, but we are now getting to the end of that phase of development," he says.

The company hopes to complete construction and commissioning of its pilot plant with sample shipments to prospective buyers in 2023.

Meanwhile, following its recent exploration successes at its Otse prospect, Giyani Metals is eyeing exploring options for increasing the resource inventory and expanding production capacity subsequent to pilot plant commissioning.

"As we progress our second prospect, Otse, we are considering options for plant expansion, but this is for some time later," Birchall says.

A green agenda

In line with its focus on keeping a low carbon footprint, Giyani Metals plans to mine ore from the K.Hill deposit and process it on site and will look at other 'green options', including building a solar plant to power the project.

"Since we are only looking to produce battery grade manganese sulphate, our process has a lower carbon footprint requirement than other projects that also produce electrolytic manganese metal. The K.Hill project will not require the addition of selenium, which is dangerous and expensive to remove and store," says Birchall.

Once in production, Giyani Metals will exploit its proximity to the major mining service centres of southern Africa and multiple export routes to key markets in Asia, Europe and the USA. ■

Chief Geologist Luhann Theron and team at K.Hill.

High purity manganese

High purity manganese sulphate monohydrate is a precursor chemical used in the manufacture of cathodes in rechargeable lithium-ion batteries, which power electric vehicles and some battery storage.

The drill site at Giyani's Otse asset.

Jubilee Metals unlocks Zambian opportunities

Leon Coetzer, CEO of Jubilee Metals.

By Tavistock's Jade Davenport (ESG Consultant) and Adam Baynes (Associate)

There are few instances in which the principal objectives of an international finance corporation and those of a commercial mining company overlap. And there are fewer still where those overlapping objectives are underpinned by the desire to improve the lot of society and the environment.

This is what makes the collaboration between Jubilee Metals Group and the World Bank, on a large-scale environmental remediation and improvement project in Zambia, unusual and highly compelling.

Jubilee Metals Group is a metals processing company with one calling – to remediate and extract value from the billons of tonnes of surplus ore and mine waste that are the legacy of historic mining practices.

According to Jubilee's CEO, Leon Coetzer, it was this mission that in 2018 compelled the company to investigate the possibility of expanding its footprint into Zambia, one of Africa's stalwart mining jurisdictions. In the hundred years since commercial mining activities began in that area, vast quantities of surplus ore and mine waste have been generated and deposited in tailings storage facilities across the country. In fact, it is estimated that there are around 1.9 billion tonnes of waste mine material contained in dozens of tailings dumps across Zambia, some of which hold economic potential for a company with the right skills and expertise to unlock that value.

"The timing of our entry into Zambia in 2018 was fortuitous as it was at roughly the same time the World Bank commissioned an investigation into a tailings rehabilitation and environmental project, valued at around $20-million, the principal aim of which was to reduce the environmental and health risks in critically polluted mining areas," explains Coetzer.

The project consisted of the remediation of contamination hotspots and the improvement of environmental infrastructure; and rehabilitation of tailings dam and mine closure in the Copperbelt.

The initial focus areas of the World Bank's project, the Zambia Mining and Environmental Remediation and Improvement Project (ZMERIP), were the Chingola, Kabwe, Kitwe and Mufulira municipalities, sites of Zambia's most intensive mining activities over the past century and, therefore, host to some of the largest tailings facilities in the country.

Given an historical lack of stringent environmental regulations and controls, or any real mine closure and rehabilitation requirements, much of the mine waste generated was deposited as cheaply and efficiently as possible. This inevitably resulted in considerable potential environmental and health complications for the communities living in the vicinities of those facilities, a fact illustrated principally in the Kabwe municipality.

Up until the mid-1990s, Kabwe was home to one of the largest lead smelters in the world and as a result high levels of lead are found in the

Jubilee's Roan processing plant, Zambia.

Mining of PGMs tailings.

surrounding water and soil. Quantities of lead have been absorbed by food grown on the land, leading to very high Blood Lead Levels (BLLs) in the local population, also caused by skin contact with lead, or inhalation of lead particles that are contained in dust in the air. Amnesia, seizures, neurological symptoms and developmental delays in children are some of the myriad diseases that high BLLs can induce. The World Bank estimates that 70,000 people in Kabwe have been impacted by lead pollution, not to mention the effect lead contamination has had on wildlife and the biodiversity of the Kabwe municipality.

In addition to water contamination, tailings dams, particularly those with poor engineering foundations, can fail suddenly and catastrophically. Historically, dam collapses around the world have caused many human and environmental casualties, and Zambia is no exception. One such Zambian example is the Mufulira Mine Disaster in 1970, where an unstable tailings dam collapsed, opening up a sinkhole which flooded the mine system, killing 89 miners on a night shift. When a tailings dam disaster occurs close to a developed area the effect on life, infrastructure and the environment can be grave and long-lasting.

When Jubilee began investigating economically-viable remediation projects on the Copperbelt its path inevitably crossed with that of the World Bank.

At the time, the World Bank was beginning to assess government-owned historical tailings dumps by their risk profile, in order to allocate funds for the targeted rehabilitation of the highest-risk dumps. In short, the risk profiles of the dams were graded, accounting for factors such as their mineral content, the way in which they were deposited, and whether there were water systems nearby, both surface and subsurface.

Given the company's extensive expertise and knowledge of tailings remediation, having successfully been recovering profitable minerals such as platinum group metals, chrome and copper from mining and processing waste since 2012, Jubilee consulted on the project. Leon Coetzer, explains, "It is important to separately review the structural

Opportunity exists to play a role in creating a safer and more sustainable environment for mining communities.

There are about 8,500 active, inactive and closed tailings storage facilities located across the globe.

integrity of the dam to determine what contained in the tailings dam could potentially be harmful to the environment and people, to better quantify the risk. Often step one is to reduce and isolate, where possible, the pollutants in the dam from its environment." For soluble minerals, like certain copper or cobalt minerals, which are prevalent in many of Zambia's tailings, this is particularly important. This effectively was Jubilee's role. During this consultation period, which spanned the next two years, Jubilee investigated a large number of tailings facilities, their analysis focusing on the environmental and health risks stemming therefrom, as well as the commercial viability of their remediation.

These investigations assisted Jubilee in prioritising approximately 14 tailings dams that held the potential to yield economic value as part of an integrated remediation process. It was on this basis that Jubilee secured a commercial transaction with the holders of the rights to the dams, who appointed Jubilee to extract the metal value and oversee the remediation of these tailings facilities.

Local partnerships are paramount to the success of this initiative. With communities often living very close to the tailings dams, their support and involvement in the project are fundamental, and the projects offer tangible near-term benefits to their various stakeholders. Upfront efficient communication between all parties is vital to the project success. Jubilee prioritises local sourcing of goods and skills and the support of local businesses in the implementation and operation of the projects, which often extend to entering into joint venture agreements with local stakeholders and government. The projects are used as incubators for local businesses to create new small and medium enterprises. Jubilee holds a proud record for the incubation and launching of several enterprises owned by local communities and stakeholders. The ideal outcome is to have a positive commercial impact on the community, while reducing the risk of contamination. In terms of economic gain and environmental regeneration, the communities on the ground are significant beneficiaries of Jubilee's operations.

Historical practices and their legacies, such as toxic tailings dams, are no longer acceptable.

Outside of commercially-viable tailings dams, the World Bank has progressed with rehabilitation of targeted tailings dams to ultimately fully secure and cap them by introducing vegetation to regenerate biodiversity.

For the tailings to be processed, Jubilee has built dedicated processing plants and re-commissioned mothballed refineries, creating local industries that employ hundreds of local staff, and has entered into commercial contracts with local support services. In a country like Zambia where, according to latest available figures, over 12% of the population is unemployed, the creation of jobs is key to local partnerships.

Of course, historic tailings dams are not only a Zambian phenomenon. The Global Tailings Review – a joint initiative between the International Council on Mining & Metals, the United National Environment Programme and Principles for Responsible Investment – estimates there are at least 8,500 active, inactive and closed tailings storage facilities located across the globe, weighing in at 282.5 billion tonnes. If all the tailings in the world were in one pile it would be 6 km high and growing at 12.3 km^3 per year. Mount Everest in 9 km high. These figures demonstrate there is significant scope for the work that Jubilee and the World Bank do to be replicated globally.

In many jurisdictions around the world environmental and social regulations have evolved, meaning that historical practices and their legacies, such as toxic tailings dams, are no longer acceptable. As Coetzer says, this presents a "significant opportunity for Jubilee and the owners of the tailings dams to jointly play a leading role in creating a safer, healthier and more sustainable environment for mining communities the world over." ■

Feasibility study for Trans-Zambezi Railway Extension completed

Diamond and metal exploration company Tsodilo Resources has been informed by the Ministry of Works and Transport (Namibia) that the Final Feasibility Study (FFS) for the Trans-Zambezi Railway Extension Grootfontein-Rundu-Katima Mulilo has been completed.

Magnetite Core from the Xaudum Iron project.

The study involves the construction of the Trans-Zambezi Railway extension from Grootfontein to Katima Mulilo via Rundu in Namibia and is part of a multinational railway line between Namibia and Zambia via the Zambezi region. The FFS was conducted by M R Technofin Consultants (Canada) and co-funded by the Government of Namibia and the African Development Bank. The FFS was submitted to the Ministry of Works and Transport, Government of Republic of Namibia.

The cross-border rail project aims to link new mines and mining activities to the railway network along the Walvis Bay – Ndola – Lubumbashi Development Corridor to enable transportation of minerals from the Copperbelt to Walvis Bay. This corridor is perfectly positioned to service the two-way trade between the SADC region and Europe, North and South America and emerging markets in the East.

"The proposed rail extension is an important development for Tsodilo as it opens up a proximate rail transportation system for the delivery of our Xaudum Iron Formation project's potential iron products, such as iron concentrate, iron pellets, potential direct reduced iron (DRI) products, and Ferrosilicone (FeSi), throughout central, eastern and southern Africa as well as international markets" and we are encouraged by the study's findings set forth in the report as the key conclusion of the assignment is that the proposed 772 km Greenfield line is viable from a technical, environmental, legal, financial, and economic standpoint and should move forward," says CEO, James M. Bruchs, citing the report.

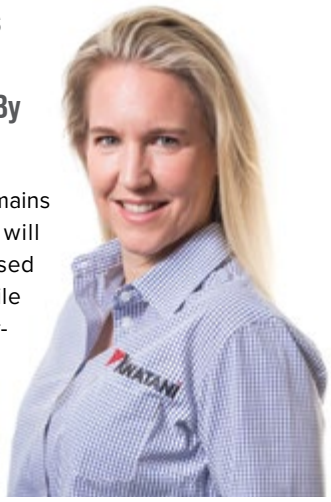
"The proposed rail extension between Grootfontein and Katima Mulilo is significant as the extension is planned to pass through Divundu in Namibia, which is located 35 kilometres from our license location in Northern Botswana."

Tsodilo Resources is exploring for economic diamond, metal deposits and industrial stone at its Bosoto, Gcwihaba and Newdico projects in Botswana. The company has a 100% stake in Bosoto, which holds the BK16 kimberlite project in the Orapa Kimberlite Field (OKF) in Botswana and the PL216/2017 diamond prospection license also in the OKF. The company has a 100% stake in its Gcwihaba project area consisting of five metal (base, precious, platinum group, and rare earth) prospecting licenses all located in the North-West district of Botswana. The company also has a 100% interest in its Newdico industrial stone project located in Botswana's Central District. Tsodilo manages the exploration of the Newdico, Gcwihaba, and Bosoto projects. ■

Tsodilo Resources Xaudum Iron project in Botswana.

Kwatani expands international footprint

Vibrating equipment specialist Kwatani's steady growth into international markets has been given a significant boost following its acquisition by Swedish multinational engineering company, Sandvik Rock Processing Solutions, a division of the Sandvik Group. By *Nelendhre Moodley*.



Kim Schoepflin, CEO of Kwatani.

Kim Schoepflin, CEO of Kwatani, tells *Modern Mining* that technology leader Sandvik was seeking a partner for its vibratory equipment business and showed great interest in Kwatani's technology, including its intellectual property (IP), local content offering and expertise while Kwatani was looking for opportunities to expand its international footprint.

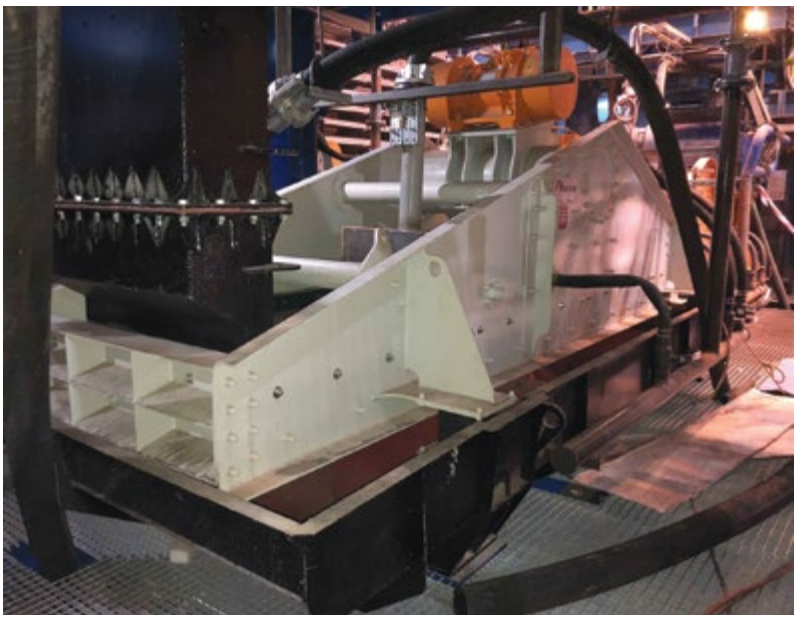
"Sandvik has a reach into 160 countries and this partnership offers Kwatani the opportunity to increase our reach even further," she says.

Kwatani's steady growth into international markets has been given a significant boost following its acquisition by Sandvik Rock Processing Solutions.

Aside from having a firmly established local and African footprint, Kwatani, the home-grown original equipment manufacturer (OEM), has been expanding its global market reach over the years and currently exports products to over 54 international destinations.

According to Kwatani GM Jan Schoepflin, the vibrating equipment manufacturer is establishing its footprint in key mining destinations, including Canada, Australia and North America, and recently supplied its first vibrating unit for a modular sorter plant to a copper operation in Brazil. Going forward, the company plans to leverage off its extensive reference base across blue chip mines and this initial foray into Latin America.

Even with the recent acquisition by Sandvik, the Kwatani brand remains unchanged and will continue to be used across Africa while products sold internationally will be sold through the Sandvik sales channels under the Kwatani product name.


A Kwatani screen operating in a modular plant.

Commodities boom – a driver for modular plant demand

The commodities boom is a key driver for modular plant demand, given the significant benefits they offer. They can be produced easily and speedily to meet production demands from mining houses looking to benefit from favourable commodity prices.

The vibrating equipment specialist reports an increase in its equipment demand across all commodity types including gold, diamonds and coal.

"Mining houses looking to take advantage of strong commodity prices have turned to Kwatani's vibrating equipment solutions to lift production capacity for their modular plants. When compared to traditional methods of increasing production, modular plants are ideal as they can be manufactured quickly to ramp-up to the upscaled production rate. Often modular plants are designed on portable skids as self-contained units that can be stacked or arranged in different formations to add to specific plants," explains Jan Schoepflin.

The development of new processing plants carries a hefty price-tag while modular plants on the other hand are more affordable, particularly for medium-to-small scale miners, as they carry lower capital costs and offer high returns on investment and improved cost to recovery ratios.

Aside from the faster lead times to production, modular plants are constructed off-site and do not interrupt or shut down existing operations.

As most mining operations are situated in remote and difficult to reach locations, a further advantage of modular plants is that they are designed to be transported and custom designed to meet the exact process requirements the plant will need to process.

"Providers of modular plants are able to customise the self-contained units easily, using in-house expertise and sourcing high-quality key equipment

Kwatani designs vibrating screens for modular plants to meet exact process requirements.

and components from OEMs such as Kwatani, at a much lower capital cost when compared to traditional processing plants. As an OEM with years of experience, we design vibrating screens and feeders for modular plants to meet the exact process requirements the plant will be processing. If a modular plant, for example, is designed to process 250 tph, Kwatani will customise all its required vibratory screening equipment to meet the required application by selecting the ideal screening parameters for efficient performance. The OEM tailors the mechanical structure of its vibrating unit, including drive size and isolation, while fitting seamlessly into the modular plant. Once we have designed the vibrating units, we are able to reproduce them in bulk and further reduce lead times," Kim Schoepflin explains.

Kwatani's 45 years of experience in the business has seen the company fine-tune its ability to speedily produce equipment to specification and dramatically reduce lead times. This is an imperative as new projects are often driven by commodity cycles and pricing.

"Projects are typically executed when product price is high and processing plants need to be supplied at highly expediated timelines," she adds.

Aside from meeting modular plant requirements for new mining projects, mining houses also turn to Kwatani's expertise for brownfield optimisation projects.

With the majority of modular mineral processing plants having been constructed well over a decade ago, brownfields optimisation projects are increasing in demand, driven by the need to keep up with changing mineralogy needs or the changing requirements of the mine. The latter may need an additional process step which it can achieve with an additional module or the mine may wish to perform a more strategic upgrade of the existing plant and equipment it is currently using.

"As mining operations progress through the ore, the minerology can change over time with some changes being significant enough for the original design of the plant to no longer meet the process requirements and a modular plant upgrade is needed. Based on our depth of mechanical and metallurgical expertise and on-site experience, Kwatani works closely with the mine and the supplier of the modular plant to assist with optimising the processing plant. We have, on several occasions, assisted mining houses to de-bottleneck such plants by implementing customised grizzly, screen or feeder equipment solutions aimed at increasing capacity," says Kim Schoepflin.

Multiple Kwatani screens operating in a modular plant.

Projects are typically executed when product price is high and processing plants need to be supplied at highly expediated timelines - Kim Schoepflin.

Top notch skills

Underpinning Kwatani's success and a key reason for the Sandvik acquisition has been Kwatani's IP, which is driven by is its dynamic, highly skilled workforce, including minerologists, metallurgists and mining engineers.

"The team is innovative and flexible, and adapts easily to meet the needs of changing times, as with the Covid-19 pandemic and supply chain constraints, which require that we work flexible hours to meet increased production demands," says Jan Schoepflin. ■

Plug and play doesn't always pay

For a mine looking to fast-track production, the modular process plant may seem to be the ideal solution – a pre-assembled unit means quicker delivery time, installation and operation, all which, in theory, result in a better and quicker return on investment for the mine.

Freddy Mahlare, Head of Process Engineering at UMS Group.

However, there are various engineering criteria that must be considered for an off-the-shelf process or materials handling plant, advises Freddy Mahlare, Head of Process Engineering at UMS Group.

Ready-to-use modular systems are generally skid-mounted onto portable platforms so the process equipment can be easily lifted, secured, transported and used as a unit. Mahlare says they are particularly useful at mines in remote locations, those with approximately five years life of mine or less, and various pit ore processing sites. Manufacturing and quality control is done offsite, everything is delivered to the site, pre-assembled, at the same time, they are easier and safer to install, installation time is reduced, and a smaller team is required during installation.

"Modular process plants may also be appealing to junior miners who have a desire to produce quickly and reduce the time spent on plant installation," says Mahlare. "While these units have often proven successful in various applications, there are several things to be considered to ensure the system will perform as intended.

"There is a misconception in the industry that modular systems are suitable for any processing application, but this is not always the case. The biggest consideration is that often standard design modular plants have a capacity limitation.

"For example, if a mine wants a 20 000 t/pm or smaller generic designed chrome process, a modular plant could be suitable for this application. However, if the same operation requires to operate at increased throughputs to this and processing/producing challenging ores/products, then it would not just be a case of replicating the 20 000 t/pm module. In such an instance a modular plant design might not be suitable, as it would be possible to overlook various engineering and process requirements, and the process operability could be compromised, resulting in increased operating costs and reduced efficiencies," says Mahlare.

He explains that the design of any process plant, be it modular or bespoke fixed, requires comprehensive engineering. Firstly, metallurgical test work is required to identify the type of ore, particle size, viscosity, whether the ore body is amenable or not, or if it is leachable if it is to be leached – essentially, to identify if the ore body can be economically processed.

The next step is to develop capital expenditure based on engineering process design criteria including the mass balance, water balance, sizing of the associated equipment, pipes and tanks, control system, etc. required for that specific plant.

As part of the engineering process, the plant is to be laid out on structural and 3D drawings so the owner can determine from an operability point of view whether staff can safely access operation positions, such as manual valves and sampling points,

and if they can maintain the specific equipment.

"If the engineering is bypassed, some of these steps can be missed, and the plant can then become inoperable and require excessive maintenance input with associated cost implications for the end user," says Mahlare.

He says that some modular plant suppliers have already undertaken the background engineering and test work required for specific mineral processing circuits. For example, the majority of coal and diamond ore sources are well defined and generic in nature in which case a modular plant within these base case parameters, or an off-the-shelf design, will fit the requirements. This is based on the fundamentals that the process has already been engineered for these parameters and it is possible to plug and play the equipment.

Nevertheless, Mahlare says that, from experience, plug-and-play plants don't always pay, even on smaller throughput targets, unless they have the engineering behind them to identify the key process design criteria. This must include the interfacing equipment since the modular plant design only deals with the specific desired operations and does not usually cater for related operational requirements such as raw material supply, stockpiling, waste removal, water supply, etc. all of which will contribute to the success or failure of the completed operation.

"In our experience, modular plants can be successfully installed if we work as a team with the client and the modular plant manufacturer from the onset. We can either design the plant or work with an established supplier who has already done the background engineering, then lay it out considering the interface and infrastructure requirements and work together with the supplier to manufacture it accordingly. If we have not been involved in the process design criteria, then we cannot guarantee the throughput of the overall operations, which is what the operator is effectively after at the end of the day," explains Mahlare.

He adds that UMS has undertaken many modular designs and peer reviewed several modular plant projects with modular suppliers.

The company also recently undertook a crushing and screening project for a client who wanted the plant installed quickly. "We formed a partnership with a supplier who had already done this type of plant. We engineered it for the client and produced the desired throughput. We also had success in installing a modular chrome plant that fitted within that client's specific criteria," says Mahlare.

"Modular plants can work if applied within the correct selection criteria for such a solution, the necessary engineering is taken into account, and if we work as a team with the client and supplier to ensure that the project is set up to succeed," he concludes. ■

Big data analysis key to meeting decarbonisation objective

By Manoli Yannaghas MD of Voltvision

Climate change is among the most serious threats modern humanity has ever faced. It is a 'crisis multiplier' phenomenon which will not just impact weather patterns, food security and access to basic natural resources such as fresh drinking water, but will likely affect international peace and security over the longer-term.

While the climate change debate has raged for years, if not decades, there is now at least consensus around the reality of the threat it poses, and of the broad action that is needed to limit its impact on ecosystems and humanity.

This consensus was cemented in November 2021 with the adoption of the Glasgow Pact, by agreement of 196 countries, following the COP26 climate change summit. This Pact, being the most significant milestone in the fight against climate change to date, aims to keep the goal of limiting global warming to 1.5°C alive by pledging to phase down the use of fossil fuels and commit to a common timeframe and methodology of reducing national greenhouse emission levels.

If the objective of the Pact is to be achieved, global emissions must be reduced by 45% by 2030 from 2010 levels, and the world will need to reach a state of net-zero emissions by 2050. According to the Science Based Targets Institute (SBTi), a global partnership initiative that aims to drive ambitious climate action in the private sector by enabling companies to set credible and science-based emission reduction targets, the pathway to achieving that target is stringent. Companies, particularly large industrial consumers of fossil fuel energy, will need to implement at least an annual 4.2% linear contraction rate in Scope 1 and Scope 2 emissions until 2035. This will not only facilitate a net-zero scenario by 2050 but, more crucially, will ensure that that the world does not overshoot the 1.5°C before 2035, which some scientists believe could have catastrophic consequences.

Founder Malcolm Evans.

Voltvision founders: Manoli Yannaghas and Malcolm Evans.

Taking on such an intensive greenhouse gas emissions reduction programme may seem a daunting task, particularly to those industrial consumers of fossil fuel energy, such as the mining sector, which are already tackling myriad other challenges.

In fact, it could be said that never has the confluence of challenges facing the industry been as profound as it is today. Mines are deeper and ore bodies far more complex; energy costs are rising as infrastructure and resources are becoming increasingly constrained; geopolitical tensions are increasing; and, of course, commodity price cycles are as fickle as they have always been. These factors are putting exceptional pressure on mining companies to control costs and enhance efficiencies, all while improving the safety and environmental performances of their operations. Such operational challenges are being compounded by increasing regulatory pressure for companies to transparently disclose non-financial related environmental, social and governance – or 'ESG' – metrics and information, a task which will inevitably further stretch the resources of individual companies.

In such a context, it is little wonder that mining companies could consider the drive to decarbonise their operations a significant imposition and a drain on financial and human resources. What few may

realise, however, is that, embedding a decarbonisation strategy, or an energy reduction mindset, in operational practices and the company culture more generally, can facilitate significant cost benefits, and improve operational performance and the safety and well-being of employees.

Studies conducted over the years, including a research paper by global auditing firm Deloitte titled, 'The bottom line: Driving value through energy management in mining', have estimated that, with the right management plan in place, mining operations may be able to reduce their energy consumption by between 15-20%. Needless to say, this will have a positive knock-on impact on the efforts to decarbonise. But to accomplish this will require a holistic approach to energy management encompassing baseline consumption measurement, advanced analytic applications to interrogate data, and the identification and implementation of specific energy efficiency initiatives.

Taking stock of this situation is a group of ex mining and electrical engineering stalwarts who understand the needs and obligations of mining companies. They have banded together under the umbrella of Voltvision, to offer the market an intelligent big data, energy and electrical asset management solution.

This solution extracts all power usage data generated by electrical equipment located on high voltage networks, even the power that is not used and, consequently, lost. This data is then cloud analysed and presented back to the mine operators to help them better visualise and understand how their power network and electrical machinery is behaving.

The plug-and play system has been designed to be cost effective and flexible. It requires no shutdown time for installation, nor does it require a visit from the Voltvision team as the system is simple and user-friendly for onsite personnel. As there are no limitations on existing software platforms or electrical equipment, the software can comprehensively collect up to 2,000 datapoints making it a valuable digital asset throughout the technical, operational and commercial spectrum.

Voltvision Processor in Operation.

The benefits are extensive. Primarily, the accurate monitoring of power quality and usage enabling unbalanced and inconsistent power, which leads directly to power losses and excess consumption to be corrected.

The efficiencies implemented on the back of such an analysis could reduce their Scope 1 and 2 power energy consumption by as much as 20% annually. This will not only result in significant cost savings, but will help to meet global greenhouse gas emission targets. As the data is time stamped it is compliant with all existing ESG frameworks so reporting reductions is accepted by investors and regulators

An equally important function of the platform is its predictive maintenance capabilities. The designers have teamed up with some impressive academic institutions to develop specific fault and machine-based algorithms. These allow for advanced warning as equipment faults develop, and maintain optimum energy output regardless of the age of the equipment or site. Not only does this feature enable precise maintenance planning but also the extension of maintenance and lifecycles, reducing the frequency of shutdowns and CAPEX requirement.

Examples of early adopters include Anglo American, where Voltvision is working to monitor the company's new hydrogen electrolyser performance at the Mogalakwena platinum mine, and Endeavour Mining, where power quality and electrical asset performance are being monitored at the Houndé mine in Burkina Faso. ■

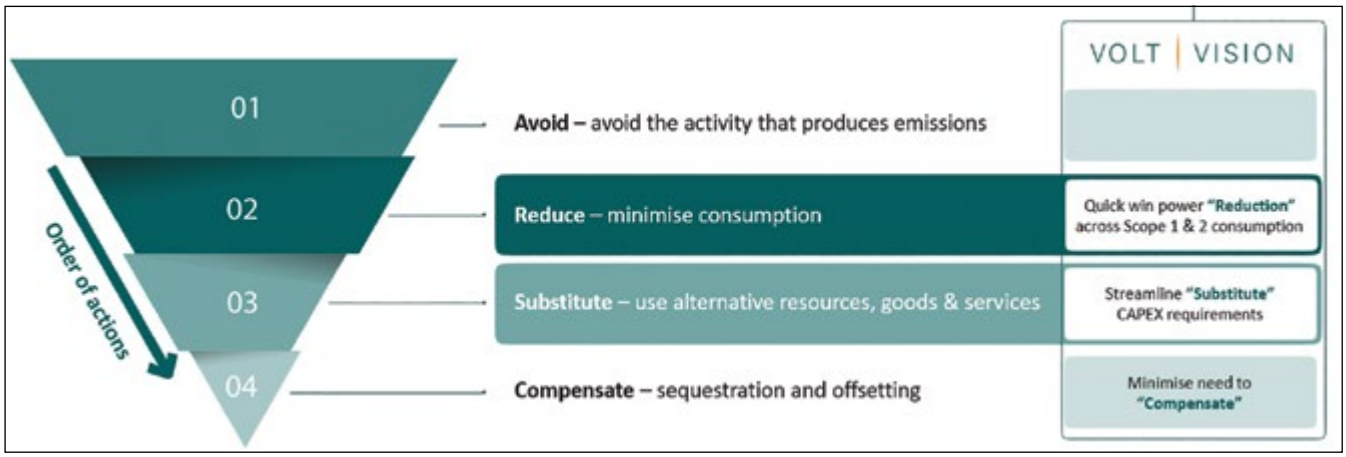


Diagram showing how Voltvision Reduces Power Consumption.

Viren Sookhun, managing director at Oxyon.

Achieving the promise of SA's green hydrogen

By Viren Sookhun, managing director at Oxyon

With the world looking to countries that have optimal renewable energy resources to provide clean energy of the future, South Africa has an opportunity to revolutionise its economy and supply green hydrogen to the world.

Growth in the hydrogen sector will result in a significant number of new job opportunities for which new skills, training programmes and qualification assessments will be required. Ensuring an adequate supply of trained and competent individuals for such a rapidly growing sector will become a priority as the hydrogen energy sector grows and we work toward decarbonisation commitments. Society's decreasing reliance on traditional energy sources such as coal and petrochemicals will result in an employment shrinkage, but reskilling the workers from traditional energy backgrounds to transition into the expanding hydrogen sector should be much easier with the training and skills already obtained.

South Africa has what it takes

In developing South Africa's green hydrogen value chain, we can become a key supplier to the global hydrogen market. Not only does South Africa have optimal environmental conditions, it is also rich in the natural resources required for the hydrogen economy, such as Platinum Group Metals (PGMs). PGMs are used in the electrolysers that produce green hydrogen as well as a fuel in hydrogen fuel-cell vehicles. South Africa holds more than 80% of the world's platinum reserves and has one of the largest platinum mining companies in the world. The country is guided by the Hydrogen Society's Roadmap which identifies the production, storage, and distribution of hydrogen, while highlighting the importance of research, development, and innovation, alongside the promotion of gender equality and social inclusion in developing the hydrogen economy. By implementing this roadmap, within a few years it is anticipated that at least 20,000 new jobs will be created annually as part of the adoption of the hydrogen economy.

Challenges to a growing sector

The main hurdle lies in the fact that this industry is new and, when something is new, it requires extensive research. Here, South Africa will be reliant on global players and multinational organisations to assist with research and feasibility studies through partnership initiatives that focus on upskilling. This will enable the skills transfer to happen locally and ensure that training takes place within our borders.

Labour and human resources are going to be an important part of growing the hydrogen and renewables economy.

economy will depend on a highly-specialised workforce

South Africa has the opportunity to revolutionise its economy and supply green hydrogen to the world.

Ultimately, more jobs will be created in renewable energy and hydrogen than what we will shed in traditional methods of energy so the net effect will be positive. However, this will require extensive upskilling and retraining for the future. Looking around the world, Japan is currently testing hydrogen-fuelled trains, while Germany has just procured the first hydrogen train with plans to pilot test on certain routes from mid-2023. Airbus is assessing the feasibility of converting its aircraft 100% to hydrogen fuel, and Turkey and other European companies have already launched hydrogen-powered ships. As for the potential hydrogen-fuelled vehicles, such as trucks and buses, these hold much more promise for South Africa from a cleaner mobility perspective as current limitations with battery storage and unreliable electricity supply may hinder the adoption of electric vehicles. Given the similarity in infrastructure requirements for transitioning from fossil to hydrogen fuels, this makes hydrogen a preferred candidate for mobility.

What's needed to grow the hydrogen economy?

Starting at the top of the value chain, South Africa will need scientists, researchers and highly-specialised individuals who can produce green hydrogen by electrolysing water. Further down the chain, we need to start training and upskilling people, particularly young, unemployed people, through health and safety courses to enforce the Occupational Health and Safety Act. This will become increasingly important as the hydrogen industry is regarded as high risk owing to the nature of fuel and gas.

Building the hydrogen economy is going to require cooperation and coordination between many stakeholders, particularly in education and training. Government entities, educational institutions and the private sector must collaborate to handle the increased demand for skills and qualifications in this industry. To make the most of these opportunities, industry would benefit from the assistance of Temporary Employment Services (TES) partners, particularly during the recruitment, upskilling and training processes.

New skills for a new industry

Given that labour and human resources are going to be the most important part of growing the hydrogen and renewables economy, the value of using a TES provider lies in its extensive resources, such as training companies, healthcare facilities, and staffing and outsourcing, including recruitment. With all the necessary accreditations, a TES partner can handle the entire labour component, from community stakeholder engagement, to creating training programmes and reporting back to client partners and government to ensure transparency in achieving the desired outcome: an inclusive, sustainable, and competitive hydrogen economy by 2050. ■

PGMs are used in the electrolysers that produce green hydrogen and a fuel in hydrogen fuel-cell vehicles.

National Treasury launches the Green Finance Taxonomy Paper

By Patrick Heron and Joon Chong from Webber Wentzel

National Treasury has launched South Africa's first Green Finance Taxonomy, which will help investors and financial institutions make more informed decisions on 'green' projects.

Webber Wentzel's Patrick Heron.

Webber Wentzel's Joon Chong.

National Treasury (NT) launched South Africa's first Green Finance Taxonomy (GFT). This is an official classification that defines a minimum set of assets, projects, and sectors as eligible to be defined as 'green' or environmentally friendly. The taxonomy also lists the standards that define economic activities as 'green'.

The Green Taxonomy followed NT's publication in 2021 of the technical paper Financing a Sustainable Economy, focusing on climate risks and the opportunities for the financial sector to make a positive contribution to green objectives and facilitate the transition to a low-carbon economy that is socially inclusive and sustainable.

National Treasury launched South Africa's first Green Finance Taxonomy.

The following are the main points made by key speakers at the event.

Climate change is recognised as the biggest threat the world faces today. In the wake of the Covid-19 pandemic, the rebuilding of society not only needs to be done in a sustainable manner, but also in an equitable manner. Investors and institutions are, therefore, becoming increasingly concerned about the environmental impact and sustainability of their investments. This has resulted in a shift in global finance and capital flows towards projects that are sustainable, and which embody the principles of Environment, Social and Governance (ESG). Examples of this trend that were mentioned in the meeting include:

- The JSE observing that sustainable finance is one of the fastest-growing forms of finance on the international stage.
- The success of and significant increase in green bonds, especially on the African continent. This has resulted in a surge in the issuance of other types of sustainability-focused bonds, such as blue bonds, social bonds and gender bonds.
- The rise in investment in sustainable equity.

The EU Sustainable Finance Taxonomy served as the foundation for the development of the GFT due to its technical content and how it has influenced the expectations of international investors. The focus of the first edition of the GFT is climate change, but it is intended that it will extend to further issues in the future, such as issues concerning biodiversity and effective land-use. The objectives of the GFT are to:

- Support a future economy reference.
- Be a tool to drive change.
- Be a communication enabler.

These objectives have been established without requiring any trade-offs and the GFT is not intended to be a replacement for ESG management, due diligence practices and fiduciary duties or investment and finance strategies.

The GFT was described by the key speakers as being "incredibly important" for South Africa. It will be critical for attracting future international investments and capital flows into the country and providing access to a deeper pool of liquidity at competitive prices. It will also provide a foundation on which the financial sector can develop financial instruments that will complement the GFT framework.

The GFT will be critical for promoting transparency and accountability in the market. It will allow investors, lenders, financial institutions and other participants in the financial sector to demonstrate their green credentials and practices and will provide participants in the financial sector with a standard against which they can test these credentials. The GFT will, therefore, serve as a robust bulwark against the risk of greenwashing and will help boost investor confidence and certainty by allowing them to make more informed investment decisions.

The launch of the GFT represents an important step for South Africa towards a more sustainable future. It demonstrates that South Africa is committed to developing an economy that is environmentally sustainable and socially inclusive. The GFT and its future iterations will, therefore, serve as a critical component to South Africa's transition to more sustainable and socially inclusive economy. ■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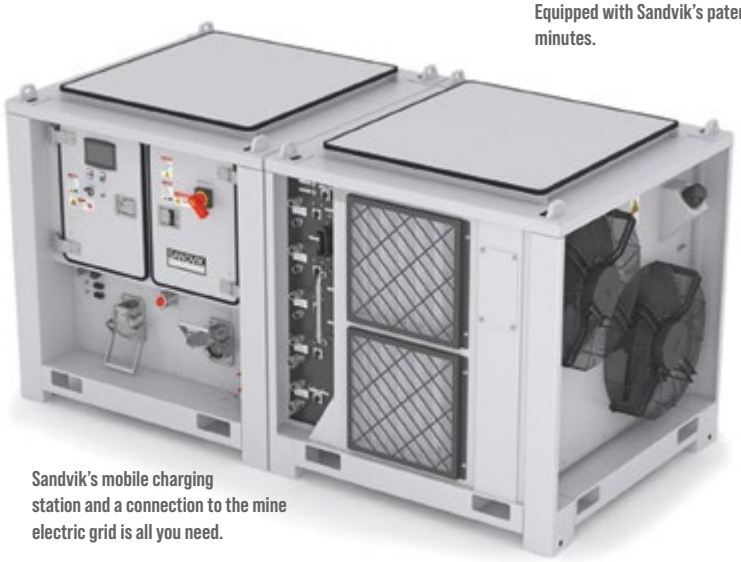
Sandvik Mining and Rock Solutions drives uptake of BEV technology at mines

In the mine of the future, battery electric vehicles (BEVs) are poised to play a leading role in improving health and safety, boosting efficiencies and achieving sustainability goals.

With BEV technology at their disposal, Southern African mines are now able to consider how to prepare themselves to best advantage, argues Deon Lambert, business line manager for load and haul at Sandvik Mining and Rock Solutions.

"For mines that are working towards carbon neutrality, there are options to combine on-mine renewable energy generation with BEVs," says Lambert. "In countries where grid power is unreliable, this strategy also holds the promise of more streamlined and uninterrupted operations."

Equipped with Sandvik's patented AutoConnect and AutoSwap functions, the loader can change batteries on its own in just six minutes.



Sandvik's mobile charging station and a connection to the mine electric grid is all you need.

Sandvik Mining and Rock Solutions has made considerable progress in introducing BEV technology into mines. From 4 t LHDs in 2 to 3 m tunnels to 65 t trucks in 5 to 6 m tunnels, the BEV proposition is well-proven.

"An advantage of our technology and design is that we minimise the new infrastructure mines need to put in place to run our BEVs," he says. "Our LH518B underground loader, which will soon be introduced to this region, needs no cranes or forklifts to change the battery, for example."

Equipped with Sandvik's patented AutoConnect and AutoSwap functions, the loader can change batteries on its own in just six minutes. Similarly, the battery charging facilities can be readily moved and installed to suit the location of the fleet. The charger is also designed to have only a light impact on the mine's electrical network. ■

New shareholding for BB Cranes

Cape Town crane manufacturer BB Cranes has upgraded its manufacturing capacity as part of a transition to becoming a wholly-owned subsidiary of the Condra group of companies.

The acquisition is expected to substantially increase BB's share of the Western Cape market over time, became effective on March 1st.

Johannesburg-headquartered Condra is a manufacturer of custom-designed overhead cranes, portal cranes, jib cranes, hoists and general crane components for countries throughout central and southern Africa, as well as for specific countries in North America, South America, Asia and Eastern Europe.

BB Cranes is a subsidiary of the Condra group.

Commenting on the new shareholding, BB Cranes director Barry Brink said the additional resources of the Condra group would expand his factory's manufacturing and refurbishing capabilities, increasing capacity and improving productivity.

"We will be able to manufacture more cranes more quickly and efficiently than before, and we will be able to more energetically serve the Western Cape market," Brink said.

Brink said that the first of the factory upgrades resulting from the changed shareholding, a girder jig, had already been installed and commissioned to enable quicker, more efficient manufacture of cambered girder box sections, reducing production time by some 75%. ■

Caterpillar autonomously hauls over 1 billion tonnes with Cat Command

For the first time in mining history, trucks equipped with Cat MineStar Command for hauling have autonomously moved more than 1 billion tonnes of material in less than a year. Roughly 1.2 billion tonnes (1.3 billion tons) were autonomously hauled in 2021 using Command for hauling.

In total, Command for hauling trucks have autonomously and safely hauled more than 4 billion tonnes (4.4 billion tons) of material since 2013. To date, trucks equipped with Caterpillar's autonomous haulage system (AHS) have travelled more than 147 million km with zero loss-time injuries, the company said.

"Safety and sustainability continue to be top values in the mining industry. We are entering our ninth year with zero loss-time injuries with Command for hauling, a testament to its safety record," says Marc Cameron, vice president, Caterpillar Resource Industries. "A recent five-year study by one of our customers autonomously hauling iron ore reported an 11% reduction in fuel usage – resulting in a 4 300 tonne-per-year (4,740 TPY) CO_2 emissions reduction – 11% increase in hourly production, 50% higher maximum truck travel speed, and 35% improved tire life."

Autonomous trucks equipped with Command for hauling are operating at 18 mine sites by 10 companies across three continents. Commodities autonomously hauled include iron ore, oil sands, copper, coal and gold. Spanning the 190- to 360-tonne (210- to 400-ton) class sizes, the portfolio of Cat mining trucks capable of fully autonomous operation include the 789D, 793D, 793F, 797F and 794 AC with electric drive.

"We continue to explore new avenues with Command for hauling to make strides towards the fully autonomous mine site and recently surpassed a major milestone of more than 500 autonomous trucks. Our previously announced collaboration with Newmont will introduce up to 16 autonomous trucks through 2023 at the company's Cripple Creek and Victor mine in Colorado, with plans to transition to haulage fleet electrification, supporting Newmont's target of reducing greenhouse gas (GHG) emissions by more than 30%," says Sean McGinnis, general manager for Cat Mining. ■

Cat Command hauls more than 1 billion tonnes of material in less than a year.

TOMRA Mining's technology unlocks value at Mt Cattlin mine

Galaxy Resources Mt Cattlin mine, located Western Australia, uses a 2-stage crushing system followed by Dense Medium Separation (DMS) gravity recovery as the primary spodumene concentration process. The operation faces the challenge, typical of lithium mines, of dealing with basalt contamination – due to its high density this high-iron, barren material is also concentrated by the DMS, contaminating the final product.

Galaxy Resources has been stockpiling this material since 2016, while searching for an effective solution. Test work at the TOMRA Test Centre revealed that the TOMRA PRO Secondary Laser sorter would be an effective solution, TOMRA said.

Galaxy Resources Mt Cattlin mine.

The sorter has been operating since 29 September 2021 sorting the contaminated low-grade ore. GM at Mt Cattlin, Keith Muller, explains the process: "The ore is screened into two size ranges: 14 mm to 25 mm and 25 mm to 75 mm and then fed into the sorter. The sorter product is recirculated into the crushing circuit, crushed down to a -14 mm particle size and fed into the wet plant and DMS."

Since the first day of operation, it has met and exceeded expectations. Matthew Bateman, principal metallurgist at Galaxy Resources says: "We have 1.2 million tonnes to treat, and we will have treated the best part of it in 9 to 12 months. With the TOMRA sorter, we are using far more contaminated ore than we would previously have processed." Galaxy Resources has since acquired a second unit to expand secondary ore sorting capacity. ■

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CDE launches new AquaCycle A2500 thickener

CDE, a supplier of wet processing solutions for the natural processing and waste recycling sectors, recently launched its new AquaCycle A2500 thickener, the latest addition to its top-of-the-line water management and recycling systems.

With a capacity of 2500m^3/hour, the new A2500 is CDE's largest and most advanced water management system to date. It has been developed in response to calls from materials processors operating in high tonnage markets for water management solutions equipped to supply their operations with sufficient water supplies while ensuring optimal production efficiency, minimum loss of fines and maximum water recycling.

CDE new A2500 Thickener.


CDE new A2500 Thickener.

Darren Eastwood, strategic development director at CDE, says: "The continued advancement of our pioneering wet processing solutions and leading-edge water management systems is supporting operators working in the natural processing and waste recycling sectors worldwide to overcome the challenges of washing in water-pressured or water scarce areas today."

Where CDE bridged the gap in 2018 with the launch of its A900 and A1500, providing a median alternative to its 600m^3/hour and 1500m^3/hour models, the new A2500 expands the range with a 2500m^3/hour option to fit the requirements of sites processing high tonnages. The increased capacity also provides a lower rise rate, enabling operators to process challenging, harder to settle materials.

Designed for easy use and safe access for efficient maintenance, it boasts the first lattice bridge structure on any CDE thickener. ■

Booyco Electronics inks collaboration agreement with Wenco

Booyco Electronics will quickly transition into a fully-fledged international service provider of proximity detection systems (PDS) in 2022. This follows the conclusion of a collaboration agreement with global smart technology solutions specialist Wenco International Mining Systems (Wenco).

The agreement will see both companies work in partnership to deploy Level 9 PDS systems throughout the global mining industry – as part of their objectives to enhance safety and production efficiency across the sector. Through Wenco, Booyco Electronics is immediately exposed to Wenco's global distribution network, with customers in 40 countries and offices supporting those customers in every major mining jurisdiction.


Booyco Electronics' PDS system assembled and tested locally at its head office in Jet Park.

"The benefits to both companies are significant," says Anton Lourens, CEO of Booyco Electronics. "Wenco is an internationally recognised and leading supplier of mining technology solutions and fleet management systems which truly understands open pit mining and operations. This affords our business the opportunity to enhance our existing PDS solution footprint and track record through its network. Wenco now has a reference point in assisting its clients to reach Level 9 PDS status through a well reputed service provider. Together, we can collectively offer a safety system in both open pit and surface mines for PDS solutions for optimal personnel tracking as well as fatigue management." ■

Multotec's SA-made pumps delivered to Kazakh mine

The global reach of mineral process equipment specialist Multotec has been highlighted by the recent supply of its South African-manufactured slurry pumps to a chrome project in Kazakhstan.

According to Gerhard Hendriksz, general manager responsible for slurry pumps at Multotec, an order of 38 slurry pumps was delivered in mid-December 2021 through a collaboration between Multotec's international business team and the company's distributor in Kazakhstan.

"The pumps were produced according to the specifications provided by Multotec's distributor, ensuring the units will deliver the required duty for the end-customer," says Hendriksz. "This includes being designed to withstand highly abrasive operating conditions."

Certain chrome deposits in Kazakhstan boast some of the world's highest concentrations of chrome oxide (Cr_2O_3) – up to 62% content – making the slurry particularly abrasive. The pump range that Multotec delivered includes models from the HD25 to the MD300, in metal and rubber-lined configurations to suit their respective duties.

Multotec supplies a complete range of pumps for medium and heavy-duty slurry applications, including cyclone feed, spirals feed, mill discharge, tailings disposal, filter feed, effluent discharge and spillage. The range caters for flow rates from around 15 m^3/hr up to 2,000 m^3/hr. ■

Above: Multotec's pumps were designed to withstand highly abrasive operating conditions.

Right: Multotec recently supplied SA manufactured pumps to a chrome project in Kazakhstan.

Epiroc introduces DM30 XC Blasthole Drill for maximum productivity

Equipment manufacturer, Epiroc recently introduced the DM30 XC blasthole drill, which is suitable for a variety of multi-pass rotary and down-the-hole (DTH) drilling applications. Built off the same platform as the Epiroc DM30 II, the new DM30 XC offers 33% more power and many benefits to customers, the company says.

The DM30 XC is designed for maximum productivity and efficiency due to increased rotary torque, increased pull-down, and a larger hole range capability. The DM30 XC is built to handle a 4- to 6¼-in (101 – 159 mm) drill pipe and has a weight on bit up to 44,000 lb (20,000 kg). The heavy-duty, crawler-mounted, hydraulic top head drive drilling rig features a 30 ft (9.1 m) drill pipe change and a standard carousel.

EpirocDM30 XC drill-rig.

"The DM30 XC is built tough for the most demanding jobs, and high quality at an excellent value is what sets it apart from other drills in its class," said Mark Stewart, regional business manager, Epiroc surface division. "The drill is designed for mining so the structural components will hold up to the heavy-duty cycles required in a mining drill. The robust frame and tower weldments are manufactured to last the lifetime of the machine."

The smaller, compact footprint of the DM30 XC makes it easy to manoeuvre on tight benches and simple to transport over between pits.

The DM30 XC is equipped with an Electronic Air Regulation System that provides low load start up and easy adjustment of bailing air to save horsepower and lower fuel consumption, extending power component life and decreasing total cost of ownership. ■

SKF MUDBLOCK seals the deal

SKF recently secured an order for 600 MUDBLOCK cassette seals after the products delivered excellent results during a punishing underground mining field test over a three-month period, the company said.

SKF was asked by a customer and leading supplier of braking systems for underground mining equipment, to identify particular seals. "Having identified the products as cassette seals, we referenced them to our newly developed SKF MUDBLOCK (MUD11) cassette seals and received a quote from our customer for 300 pieces in Q3 2021," says Andre Weyers, SKF product manager: seals. The cassette sealing solution has been specially engineered for heavy-duty jobs in the most stringent and demanding environments.

Above: SKF MUD11 seals engineered for heavy-duty jobs to deliver reliable performance in gruelling environments. Right: SKF MUDBLOCK cassette seals delivered excellent results during a three-month underground mining field test.

The punishing wet, muddy, dry and dusty conditions so typical of the underground mining environment proved to be no match for the four 165x190MUD11 sample seals and SKF received an order in March 2022 to supply 600 cassette seal units scheduled for delivery during April 2022.

In addition to benefitting from a quality, competitively priced product supplied by an OEM, our customer now conveniently has access to SKF technical support and spare seals in stock," says Weyers. ■

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