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For people who are serious about mining

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ON THE COVER

A major mining contractor is taking delivery of a large fleet of Volvo A60H articulated dump trucks and Volvo EC950E excavators. **Pg 10.**

COMMENT

Business and Government Partnership Phase 2 – light at the end of the tunnel?

The optimistic sentiment following the launch of Phase 2 of Business and Government Partnership by President Cyril Ramaphosa earlier this month, was carried through to the 12th edition of Joburg Indaba, with participants and speakers alike buoyed and amped to move the dial to action.

Phase 2 follows on the successful implementation of Phase 1, which was launched in 2023, where organised business (comprising about 150 CEOs) pledged its support to the government, offering expertise and capital to help fix the country's problems in three key areas: electricity, transport and logistics, and crime and corruption.

Business contributed R250 million in cash and more than 350 subject matter experts to the three work streams, with 57 companies contributing more than 9 000 hours to Eskom alone.

As important was the R700 million in investments in key rail corridors and the deployment of more than 500 security personnel for Transnet Freight Rail, resulting in a 50% reduction in security incidents on the coal line to Richards Bay. A further R28 billion in private sector rail investment should see freight transport volumes increasing to around 193 million tons (mt) from the current 170 mt.

Another R57 million was invested in a forensic analysis centre to assist in the campaign to expedite SA's removal from the grey list, with business also aiding in establishing a digital evidence unit to assist the National Prosecuting Authority in its prosecution of state capture cases.

Phase 2 of the government and business partnership, which chases stretch goals for 3% GDP growth, aims to enhance long-term energy security by maintaining an energy availability factor above 64%, unlocking R23 billion in private investment, boosting renewable capacity to 4GW, and constructing 1 000 km of new transmission lines as well as adding a million new jobs to the economy through growth by 2025.

The push to get the economy back above 3% growth by the end of 2025 is well above the 1.2% touted by the IMF.

Joburg Indaba

Nico Muller, CEO of Impala Platinum and speaker at the Joburg Indaba, echoed the need to address key challenges, including crime and corruption, port congestion, rail infrastructure, illegal mining and, most importantly, creating an investor friendly jurisdiction. "We need to reduce the cost of listing for junior miners and attract venture capital. There are 1 600 junior miners listed in Toronto, we have less than 20 – with our minerals endowment this is inexcusable."

According to Bernard Swanepoel, chairman of Resources for Africa, event organiser of Joburg Indaba: "We are enjoying a moment of optimism, the government of national unity is not an opportunity to be wasted. If we create the right environment for capital, then capital will flow, both local and foreign. It will be self-fulfilling."

Swanepoel noted that work was already underway on crucial interventions the industry needed, including policy certainty and implementation, and rail and energy security.

Discussing policy related issues, Jacob Mbele, the Director General of the Department of Mineral and Petroleum Resources, said that the department's inability to deal with requests with speed, to enforce the law, and the lack of a reliable mining system was a key shortcoming.

Aside from laws being amended to close loopholes, the DMRE had initiated the review of the MRPDA to address the gaps and shortcomings.

> "We are enjoying a moment of optimism, the government of national unity is not an opportunity to be wasted."

In this edition

Our commodities outlook features lithium and critical raw material demand with Tom Price of Liberum explaining the reasons associated with lithium's shrinking market (pg 12) while CRU Group's Callum Ross says that faster capital deployment will be needed to service critical raw material demand (14).

For our Consulting Engineering feature, we speak to Bara Consulting, which remains upbeat going into 2025 (pg 18), while industry body, CESA, highlights talent development in consulting engineering as the key to unlocking mining opportunities (pg 20). Also of note is Lotus Resources, which is targeting production from Kayelekera next year (24).

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Giyani Metals demonstration plant **construction update**

Giyani Metals Corp., developer of the K.Hill Battery-Grade Manganese Project in Botswana (K.Hill), has advised that the construction of its demonstration plant (Demo Plant) is moving into the detailed fit-out phase, with all modular process skids (process modules) now installed.

Cabling and piping work has commenced to connect the Process Modules in preparation for commissioning.

Concurrent metallurgical test-work is underway at CM Solutions, a metallurgical consultancy and laboratory in Johannesburg, to optimise the flowsheet. Giyani is focused on reducing reagent use where possible and has evolved its process to remove hydrofluoric acid (HF). This is an important development, as it eliminates the requirement to store and handle potentially hazardous HF at both the Demo Plant and the planned Commercial Site. Simulation test-work continues on the Yokogawa Distributed Control System (DCS) software that will be used to control the Demo Plant, which will operate as a continuous process flow, rather than batch basis. The Demo Plant remains on track for commissioning and production of up to 600 kg a day of battery-grade manganese (HPMSM) in Q4 2024. HPMSM produced from the Demo Plant will be provided to off takers for testing and qualification. ■


Leach reactor installation.

Significant progress on Etango Uranium Project development


Bannerman Energy has made significant progress in the development of its Etango Uranium Project.

ASX-listed Bannerman Energy has advised on significant recent progress in the development of its Etango Uranium Project, including Front-End Engineering and Design (FEED) and Control Budget Estimate (CBE) completed in June; construction water supply and site access road early works completed in July; key 24-month bulk earthworks and construction power contracts awarded; tertiary crusher (HPGR) order has been placed and manufacture has commenced; plant detailed design work is advancing and ongoing advancement of early works construction and long lead items ordered. The Etango financing process is advancing across both project/corporate debt as well as potential offtake and joint venture opportunities with strategic counterparties. The window for targeted positive Etango Final Investment Decision (FID) has been expanded into 2025. ■

BME releases Innovex™ 300D emulsion **to deal with dynamic water**

Explosives manufacturer, BME, has developed Innovex™ 300D – a high-strength bulk emulsion explosive for challenging surface mining conditions, including dynamic water. According to Dr Rakhi Pathak, BME's Global Manager – Strategic Partnerships, dynamic water is a common issue for surface mines and leads to various operational and environmental challenges. "When there is excessive water flow in and around blast holes, emulsion 'run-off' often occurs due to cracks or fissures in fractured geology," Dr Pathak explained. "This is particularly problematic in conditions such as damaged ground, fractured or weathered rocks, sensitive geology and acidic mine conditions." To counter these challenges, BME's Innovex™ 300D offers enhanced resistance to dynamic water, reducing the likelihood of misfires. The product features an adjustable rheology, making it suitable for highly friable and fractured geological conditions. "Our solution allows the viscosity and flow behaviour of the emulsion to be adjusted to meet any blasting requirements," she said. "This ability to adjust the rheology makes a valuable contribution to optimising the material performance – improving handling, ensuring safety and achieving the desired blasting outcome." ■

BME has developed Innovex™ 300D – a high-strength bulk emulsion explosive for challenging surface mining conditions.

Innovation Hub and DRDGOLD **to advance innovation**

The Innovation Hub and DRDGOLD's Ergo Mining (Ergo) have signed a Memorandum of Understanding (MoU) to train 50 unemployed youth to advance entrepreneurship and create jobs in Gauteng townships. The Innovation Hub, the innovation agency of Gauteng Province, is a subsidiary of the Gauteng Growth and Development Agency. Ergo, a subsidiary of DRDGOLD, is a major surface gold tailings retreatment operation extending from central Johannesburg to Ekurhuleni. The training and business incubation programme is planned for Ekurhuleni (Duduza and Tsakane) and Soweto, and will focus on equipping 50 youth in the areas of mobile device repairs, data annotation and graphic design. These training courses will run for six to nine-months and will start in October 2024. The Innovation Hub will run a participant selection process, which will be communicated with the target groups soon. Through its social and labour plan, Ergo has committed R2.5million towards this programme. Stats SA's Quarterly Labour Force Survey for Q1:2024 reports an unemployment rate of 32.9% for South Africa as a whole, with an unemployment rate in Gauteng of 34.9%. Youth aged 15-24 years and 25-34 years continue to have the highest unemployment rates at 59.7% and 40.7% respectively. ■

Innovation Hub and DRDGOLD sign MoU to advance innovation.

Akobo Minerals reports good progress **in the Segele mine development**

First view between the Western and Eastern tunnels.

Akobo Minerals, a prominent gold exploration and mining company based in Scandinavia with operations in Ethiopia, has announced significant progress in the development of the Segele mine. The completion of the crosscut between the Western and Eastern tunnels marks a major milestone, paving the way for the commencement of first stoping activities into the richest part of the Segele ore body. In the recent development phase, the mining team successfully reached the orebody in both the Western and Eastern tunnels. The completion of the crosscut is a crucial achievement, as it connects the two tunnels and enhances several aspects of the mining operation. This crosscut not only provides a secondary exit, thereby improving safety, but also optimises ventilation and logistics, laying the groundwork for the transition from mine development to focusing on stoping.

Stoping is a critical process in underground mining, involving the extraction of ore from a series of large, inclined openings, known as stopes, which are created in the orebody. Essentially, stoping creates voids or spaces where the ore has been removed. The strategic positioning of the crosscut between the Trial Stope and Stope 01 provides the company with the flexibility to investigate both stopes in parallel rather than in sequence. This parallel approach allows for the possibility of prioritising Stope 01, which is located in the richest part of the ore body. The successful completion of the crosscut between the Western and Eastern tunnels is a key step forward, bringing the company closer to realising the full potential of the Segele mine. ■

Minergy's strategic turnaround plan **showing early signs of resilience**

Coal miner, Minergy, which released results for the year ended 30 June 2024, is in the midst of a significant transformation, strategically and operationally. "Previously, operational disruptions presented challenges, precipitating this new strategic and operational drive towards business improvement. The implementation of the strategic turnaround plan is well underway, showing a resilience backed by early signs of progress that are positioning the company for operational stabilisation and a successful turnaround," said Matthews Bagopi, Acting CEO of Minergy Coal.

Key focus areas, such as establishing robust strategic partnerships, improving efficiencies and production, strengthening customer relationships, and optimising the capital structure, are currently being actively addressed with a measure of vigour and persistence. ■

Minergy's strategic turnaround plan showing early signs of resilience.

The turnaround at Eskom has boosted investor confidence.

A real sense of optimism at Joburg Indaba

The first day of the 12th edition of Joburg Indaba ended with a real sense of optimism, according to Bernard Swanepoel, who led many of the discussions and 'interrogated' many of the key speakers and panelists.

"The growth of the mining sector in South Africa rests on the outcome of collaborative efforts between mining companies, state owned enterprises and government to attract investment and facilitate expansion and exploration. We are enjoying a moment of optimism, the government of national unity is not an opportunity to be wasted. If we create the right environment for capital, then the capital will flow, both local and foreign. It will be self fulfilling."

Crucial interventions that the industry needs include policy certainty and implementation, and rail and energy security – work which is already underway.

Jacob Mbele, Director General of the Department of Mineral and Petroleum Resources, said some of the main shortcomings have been the department's inability to deal speedily with requests to enforce the law. Mbele added that another shortcoming was that with every law there were unintended consequences, which companies exploited and why laws are amended to close loopholes. "Looking forward, we have started a review of the MRPDA to address the gaps and the legal shortcomings."

Roger Baxter, chairman of Southern Palladium said, "It is critical to have an online cadastral system, and to shorten licensing approval times to be competitive with our neighbours, such as Botswana, and to market South Africa better in order to attract venture capital funds. It's absolutely crucial to have a stable, predictable policy framework to attract long-term investment."

Baxter said to grow the economy meaningfully, the potential of the exploration and junior mining sectors needs to be unlocked.

To bolster growth of the mining sector, Nico Muller, CEO of Impala Platinum, said, "We have to start with crime and corruption, port congestion, rail infrastructure, illegal mining and, most importantly, an investor friendly jurisdiction. We need to reduce the cost of listing for junior miners and attract venture capital. There are 1,600 junior miners listed in Toronto, we have less than 20 – with our minerals endowment this is inexcusable."

The growth of the mining sector in South Africa rests on the outcome of collaborative efforts between mining companies, state owned enterprises and government.

Richard Stewart, Chief Regional Officer, Southern Africa at Sibanye-Stillwater, said to unlock value in the short-term, water, energy and logistics issues need to be addressed. "However, in the longer term we have to invest in the value chain, including beneficiation, for which we will need to find the right partners."

Work to repair Transnet's capacity and performance is underway.

The delegates learned that the turnaround at Eskom has boosted investor confidence, but challenges persist on rail.

Dan Marokane, CEO of Eskom, said the improvement at Eskom has been a country project, with government rallying and mobilising partnerships, the board framing the plans, and management focused on execution based on the resources at their disposal. He said the value of having the right people cannot be underestimated, from power station managers to technical capacity on the board.

On the issue of tariffs Marokane said, "Against the backdrop of the imperative to fix loadshedding, the tariff conversation will need to look at the choices we want to make as a country."

Michelle Phillips, CEO of Transnet, said Transnet "is a complex business, there is a lot to fix, after many years of not investing, many years of not renewing equipment."

Work to repair Transnet's capacity and performance is underway with the support of the Presidency and the National Logistics Crisis Committee. Part of the solution has been to work more closely with the private sector on key rail corridors to identify the problems and solutions.

"The network is deteriorating as we speak," said Phillips. "We are told by independent experts that it will take five years [to fix] and we don't have five years. We are trying to find a quicker route, [such as] through our annual shuts. Together with customers we are making sure those shuts count, so after the shut we get an uptick in volumes. We have embraced reform, we are implementing."

Commenting on private sector partnerships Phillips said, "Let the market come, but we need robust processes, we want to do it right the first time, we need to choose the right partners."

The panel on critical minerals was vocal about making sure the industry developed a strategy and seized the opportunities that existed outside of gold, platinum and coal, urging exploration into different metals and minerals.

Errol Smart, CEO of Orion Minerals, said that a critical mineral in South Africa was anything that created a new job. ■

Amid a tough year, South Africa's mining industry **sees significant uptick in M&A activity**

It's been a challenging year for South Africa's mining industry. Commodity prices, with the exception of gold, have been under pressure causing a significant drop in both revenue and profits. Mining industry headlines have also been dominated by retrenchments, falling stock prices, restructuring for efficiency and efforts to become more fit for purpose. "These companies have had to look beyond just mining to survive the downturn," says Andries Rossouw, PwC Africa Energy, Utilities and Resources Leader. "This past year, we observed that what was front of mind for many companies was safeguarding their balance sheets to survive the down cycle and to position them for opportunistic prospects."

Andries Rossouw, PwC Africa Energy, Utilities and Resources Leader.

Vuyiswa Khutlang, PwC South Africa Mining Assurance Partner.

Gold continues to demonstrate its store of value in times of risk.

The newly launched PwC SA Mine Report 2024 takes a closer look at the challenges faced by mining companies this past year, the spike in deals seen across the sector, and the survival mode adopted through these turbulent times.

Market performance, a surge in M&A activity and industry trends

In today's landscape, there is a global pursuit of a just energy transition. This, coupled with the need for efficiencies, diversification and strategic alignment, has resulted in the sector experiencing a hive of merger and acquisition (M&A) activity in the past year. "The quest for copper and other strategic minerals, broader consolidation and operational synergies, and diversification and strategic realignment to create shareholder value have been the main themes emerging from M&A transactions," Rossouw says.

"The increase in deal values aligns with global trends, and this is being driven by the quest for critical minerals," says Vuyiswa Khutlang, PwC South Africa Mining Assurance Partner. "Globally, the deal-critical minerals of focus were gold and copper—the prices of which performed exceptionally in the current year. For South African companies, it was no different. Copper and other strategic minerals have become increasingly sought-after as the world transitions to a low-carbon economy and the demand for clean energy solutions surges. Gold, on the other hand, continues to demonstrate its store of value in times of risk."

Building resilience through the balance sheet

South Africa's mining industry has not been spared the volatility of recent times, with many businesses facing challenges. The general commodity price downturn once again emphasised the importance of having a strong balance sheet. As businesses look to steer through today's tough operating conditions while sustaining investment and growth, the balance sheet can either be a drag or a key source of agility and strength.

"Unlike the previous downcycle, conservative capital allocation and rapid reaction on lower prices meant that balance sheets are still in relatively good shape despite a slight weakening in the past year," Khutlang says. "A strong balance sheet provides options in sourcing capital, which is critical for a cyclical industry. There are numerous capital sourcing options, but one of the trends we have noted is that mining companies are increasingly using green and sustainability loans to support operations that align with their own and global sustainability goals."

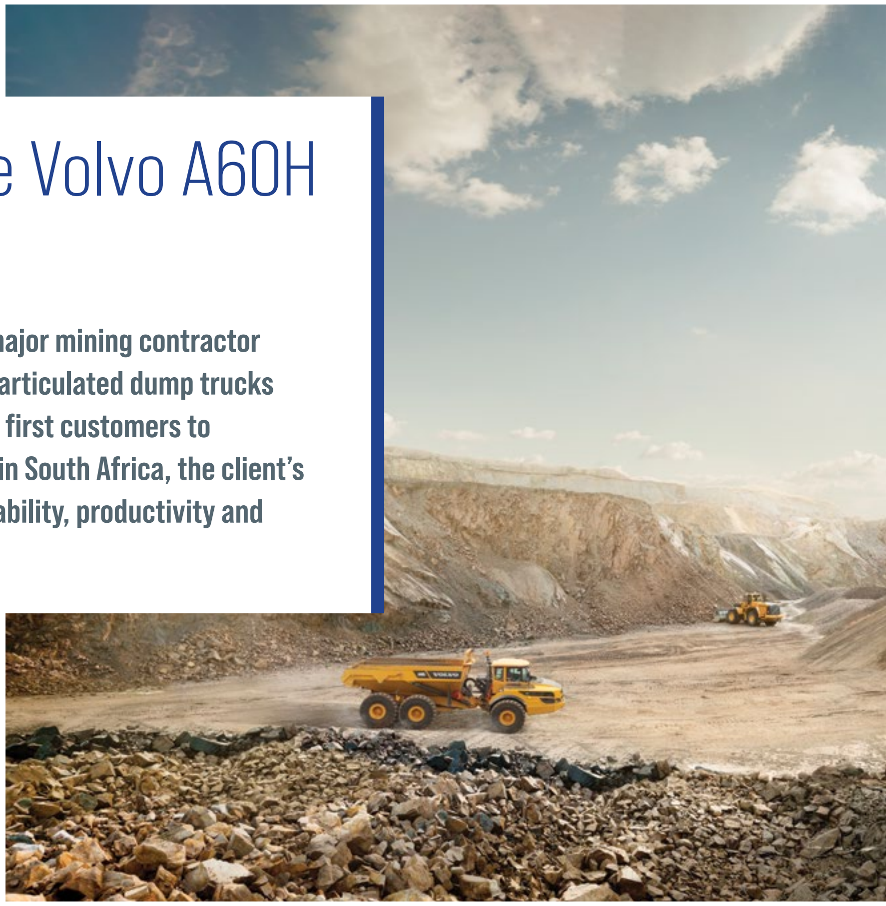
In the report, PwC looked at the balance sheets of large listed South African mining businesses to reveal what tactics they have used, or can use, to build resilience. What was evident is that resilient balance sheets had a fit-for-purpose capital structure that aligned with the business' strategic needs and direction. When companies are not proactive in managing their balance sheets, deteriorating or unhealthy balance sheets are often not diagnosed early enough. "These situations often resulted in short-term actions being undertaken to rectify the situation, including taking on more funding and selling assets at discounted value," Khutlang explains.

"Mining is key to the economy as these companies play a crucial role in the communities they operate in—not only as employers or as the engines for the economies around them, but through other services, such as the clean water they provide to their communities," Rossouw says. "It is therefore crucial to start thinking and planning for sustainable ecosystems once operations close. It is also imperative that, where possible, mining companies use available technologies to improve their safety, productivity and efficiency to extend the life of their mines." ■

Globally, the deal-critical minerals of focus were gold and copper.

Babcock delivers large Volvo A60H and EC950 order

In a massive fleet replacement programme, a major mining contractor is taking delivery of a large fleet of Volvo A60H articulated dump trucks (ADTs) and Volvo EC950E excavators. One of the first customers to purchase the A60H and the EC950 combination in South Africa, the client's buying decision has been reinforced by the reliability, productivity and efficiency of the machines.



David Vaughan, Managing Director, Babcock's Equipment business.

Following their Southern African launch in 2017, both the 55-tonne (t) Volvo A60H, the biggest fully articulated hauler in the world, and its capable loading tool, the 90-t EC950E, the largest crawler excavator in the Volvo Construction Equipment (Volvo CE) stable, have enjoyed great success in the region.

To provide context, 260 A60H and 75 EC950E units are now operational in the field, with some major fleets running in South Africa and Namibia, confirms David Vaughan, Managing Director, Babcock's Equipment business.

From the onset, the introduction of the two machines was marked by several global firsts for Babcock. The local launch on May 4, 2017, marked the official global customer-based launch of the machines. In another key first, Babcock was the first Volvo CE dealer in the world to place an order for the A60H when one of its long-standing customers ordered three units.

As an indicator of the continued success of the two machines in the local market, a major mining contractor, one of the very first recipients of the A60H and EC950E combination, has placed an order for 48 A60H and 12 EC950E units. With its existing 62 A60H and 21 EC950E units, the customer is currently running one of the largest A60H fleets in the local market.

The new fleet, which will be delivered over a period of six months, is part of a fleet replacement programme, with some of the A60H units having clocked 30 000 hours, and most of the EC950E's having surpassed the 20 000-hour mark.

Proven capabilities

According to Vaughan, the client's buying decision comes on the back of the machines' proven capabilities in heavy hauling applications at high production mine sites where the client operates. With its 55-t payload capacity, the A60H has proven to be the preferred hauling solution for the mining contractor. In fact, 12 of the new 48 recently ordered machines will replace an existing fleet of 12 60-t rigid haulers in the customer's fleet.

"The customer has found the A60H to be the perfect hauler for its applications. The replacement of existing rigid haulers is influenced by the fact that the 55-t hauler not only meets the production capacity required by the customer, but also that the ADT is versatile in all weather conditions, while rigids tend to struggle in tough underfoot conditions, especially now with the rainy season fast approaching," says Vaughan.

With its 55-t capacity, the Volvo A60H has helped the client keep a lid on high production costs due to its higher payload that significantly increases productivity at lower cost per tonne production. With its 34 m^3 capacity, the A60H delivers up to 40% more productivity than Volvo's previous largest hauler, the A40G, which comes in at 24 m^3. It is powered by a 16-litre D16 engine Volvo engine delivering 382 kW of power and 495 Nm of torque.

Some 260 A60H and 75 EC950E units are now operational in the field.

While it is a high production machine, it is not just the largest sites that can accommodate the 55-t hauler. Although the A60H offers 40% more capacity than the A40G, it is only 432 mm wider, 940 mm longer and 254 mm higher than the A40G.

"The A60H has also been designed with serviceability in mind. The front grill swings down, acting as a service platform with anti-slip steps. Its electric hood opens to 90^0, combined with electric belly plate, allowing for full access to the engine compartment," explains Vaughan. "With uptime in mind, the A60H's dump support systems, Hill Assist and load and dump brake, help operators stay in control at times when better productivity and safety are necessary."

The EC950E crawler excavator is the ultimate loading tool for the A60H. With its 90-t capacity, it is designed to load the 55-t hauler cost-effectively, achieving five to six passes per load. According to Vaughan, the rule of thumb is typically four to six passes or under 90-second loading. The goal is to maximise the total cycle time; fewer passes result in shorter cycle times, which in turn increase production.

"With over 424 kN of breakout force and 408 kN of tearout force, the EC950E offers a combination of power and stability to handle the high capacity duties in tough conditions such as hard rock mining, coal mining and big quarry applications," says Vaughan.

It is powered by a 446-kW Volvo D16 engine, the same motor driving the A60H, thus enhancing parts' commonality. The enhanced hydraulic system increases pump power for a fast, smooth and efficient operation, and places control in the operator's hands. Using intelligent technology, the system controls on-demand flow and reduces internal losses in the hydraulic circuit.

Combined with Volvo's ECO Mode, the hydraulic system reduces loss of flow and pressure to achieve greater fuel efficiency. The integrated work mode allows operators to choose the best work mode for the task at hand, from I (Idle), F(Fine), G (General) to H (Heavy) and P (Power max).

The EC950E features a wide track gauge, long track length, a retractable undercarriage and an optimised counterweight, resulting in a well-balanced, solid machine. All machine interfaces – including joysticks, keypad and LCD monitor – are ergonomically positioned and designed for optimum control and efficiency.

Service matters

To get the best out of its Volvo machines, the customer maintains a relentless service regime. This is done through a service contract with Babcock. One of the major benefits of Babcock's service contracts is that customers can save money in the long run by avoiding unexpected and expensive repairs.

Another big benefit of Babcock's service contracts is that Babcock service technicians are always up to date with the latest product improvements. As the authorised Volvo CE dealer, Babcock has access to all the latest product upgrades from the original equipment manufacturer (OEM), which is not the case with third-party service contractors.

"By using Volvo genuine parts and Volvo approved oils, we maintain the machines in peak operating condition. Our service contracts ensure that the customer's assets deliver the required productivity and availability, while optimising performance and efficiency of the equipment. In addition, the benefit of machine longevity cannot be stated enough. This customer's A60H units, for example, have already hit 30 000 trouble-free hours, and counting," concludes Vaughan. ■

Lithium's shrinking market explained

By Tom Price, Head of Commodities Strategy at Liberum

Things are getting tough for the world's lithium miners. In just 18 months, prices of their 1 mtpa global commodity trade have utterly collapsed. Down by over 80% in 2023-24, lithium's various product prices (hydroxide, carbonate) are now marking out unstable, low volatility US$10k/t-floors. We know that these prices have moved below our estimate of the global industry's marginal cost of production (US$15k/t LCE) – because the miners are now cutting loss-making production capacity.

What's going on? Basically, the once-unassailable demand growth story of Electric Vehicles (EVs) is faltering. Yes, most consumers still believe that the ESG-related push to electrify the world's transport systems must be done. Our best strategy to cut their emissions is to replace internal combustion engines with EVs. So why is the global EV-buying rate slowing? We see two reasons consumers are delaying purchases: on the moderating, uncertain economic growth outlook; and, they're waiting for improved EV 'value' (lower costs, longer range, more recharging options).

But for the miners, there is no more time to wait. For over a year now, they've been desperately managing the corporate hit of collapsing lithium prices. Until recently, they were largely focused on conventional margin protection. Now, at just US$10k/t for lithium, they're simply trying to survive.

Survival strategies of the miners

In any commodity market, when its price falls towards the short-term supply function (industry's 'cost curve') – most typically in response to a surprise weakening in demand growth – the miners-processors-exporters all respond in three basic steps, in this particular order: 1. cut operating costs (mining, processing, inputs/stocks, labour); 2. delay/terminate projects; and, 3. cut production and/or close assets.

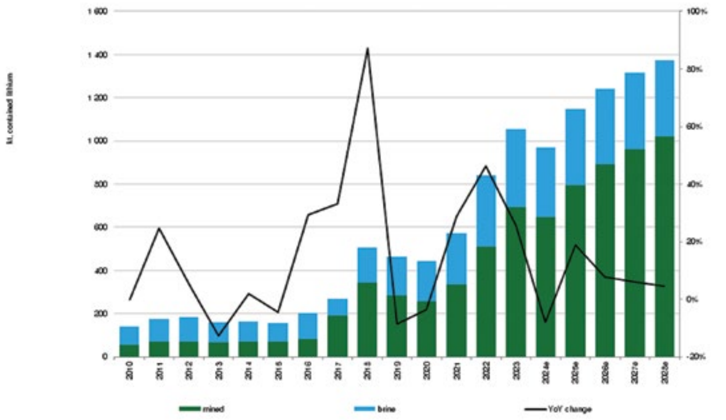
For most industries, Steps 1-2 typically play out over 6-12 months, depending on the scale and duration of the demand-price downturn. Step 3 is an economic recession strategy. Each successive step incurs a greater operating cost for the producer, undermining its ability to promptly restore overall production capability, if/when demand recovers.

A popular investor view is that a large, collective cut to loss-making output prompts a price recovery. But this alone can only remove a surplus, allowing a draw on supply-chain inventories, and perhaps eventually create new supply-related upside price risk. In a perfect competition market structure like lithium (many producers/consumers, no price-makers, etc.), the price typically only recovers once demand growth does.

Lithium mine supply: key events

Here, we list the significant announcements of the 12-months, reading the supply-side's responses to declining lithium prices:

- Dec 2023: Lepidolite mines of Jiangxi province (China) report multiple mine production cuts (incl. those of CATL, BYD, Zijin-Li).
- Jan 2024: Core Lithium places 20ktpa Finniss lithium mine (NT, Aust.) on care & maintenance.
- Jan 2024: IGO flags 7% cut to FY24 production guidance for 185ktpa Greenbushes (WA, Aust.).
- Jan 2024: Arcadium Lithium announces >20% cut to 30ktpa Mt Cattlin (WA, Aust.) 2024 output.
- Jan 2024: Mineral Resources pauses expansion plans at 50ktpa Wodgina (WA, Aust.).
- Feb 2024: Piedmont Lithium cuts workforce by 30% at 26ktpa



Core Lithium's Finniss Lithium Operation in Australia.

North Carolina (US; startup 2027e).

- Feb 2024: Further mine suspensions reported in Jiangxi province (undisclosed mines).
- Jul 2024: Liontown Resources sells 100kt spodumene to China-based Sinomine, at odds with its own strategy to sell only to western markets, to secure Inflation Reduction Act-related subsidies.
- Jul 2024: Albemarle announces cuts to growth projects in Australia; holding Kemerton's output capacity at 25ktpa; Phase 2 (+25ktpa) paused, responding to EV/battery demand weakness + Q2's 40% revenue slide.
- Aug 2024: US-based lithium major, Albemarle, urges western governments to challenge China's dominance of global EV/battery/raw materials trades.
- Aug 2024: Arcadium Lithium announces more operating cost reviews across all assets; halting investment in Galaxy (Canada); staggering deployment of its Argentinian assets (*Salar del Hombre Muerto*, paused).
- Sep 2024: CATL reported its closure of 60ktpa mine, and 1-of-3 of its LCE conversion lines, all located in Jiangxi Province.
- Sep 2024: Arcadium Lithium announces that Mt Cattlin will be placed on C&M by mid-2025.

Mine supply hits, summarised

Since the start of lithium's spectacular price decline of 1Q23, we have continually pared our quarterly forecast lithium mine supply (by asset/country), to rebalance our global lithium model. Here, we summarise our supply-side revisions for each major mining centre, Australia-Chile-China.

- **Australia:** Of these miners, three key cuts have been made: 1. Core Lithium (C&M, 20ktpa Finniss); 2. IGO (6-7% cut for 185ktpa Greenbushes = 10ktpa); 3. Arcadium Lithium (20-30% cut for 30ktpa Mt Cattlin = 10ktpa max.). Total estimated cut = 50ktpa; for 2024, we forecast Australia's total output to fall to 450kt (-2%; 7ktpa net-cut; i.e. the growth has been cut).
- **Chile:** This year there are no significant reports of production cuts at Chile's mines. Still, we do forecast a pullback in national output to 257kt (-15%YoY; 43ktpa), reflecting how at least some of its lower cost brine-sourced lithium (vs. Aust./China ores) is also exposed to relatively low US$10k/t prices.
- **China:** First mine output cuts announced (Dec-23), in response to lithium's price collapse, occurred in China. At the time, about 60% of China's total local supply (vs. 175ktpa of 2023's total contained-Li output = 15% global supply) was derived from high-cost (>US$20k/t), low-grade lepidolite ores (Li-bearing micas, Jiangxi) + lacustrine salts (Qinghai; Tibet). Individual asset details are unavailable, but if global Li-prices remain at US$10k/t-level, we expect China's total local mine supply to shrink to pre-2022's level of 60-70ktpa (7-8% of reduced global supply). For 2024, we forecast China's total output to fall to 97kt (-45%; 79ktpa cut).

Given these mostly supply-side changes, we summarise our demand-supply-price forecasts below, starting with the state of EV demand. For now, most mined lithium worldwide ends up in the relatively new global EV battery industry (78% total demand, 2024 vs. 2017's 45%). Other end-uses (remaining 22%) include e-bikes, consumer goods' batteries, primary batteries, glass, ceramics, greases, polymers, etc.

Global electric vehicle sales

For guidance on risks to total lithium demand growth, we track monthly-reported EV sales. Latest 2024 EV sales data (Jan-Jul) totals 8.4m, up 21%YoY (China, +31%; EU/UK, -8%; North America, +7%, Rest of World, +41%). And, of these total sales, 65% are battery electric vehicles (BEVs) and 35% are plug-in hybrid electric vehicles (PHEVs). Note, sales data this year confirm a China-led lift in demand for PHEVs (combination battery/conventional engine) over battery-only BEVs, on a rising preference for power optionality (given a lack of recharging points) and long-range outperformance.

For 2024, we now forecast global EV sales of 17 million vehicles (+20%yoy vs. 2023's 14.2m; 19% of total auto). Short-term, we forecast a slowing in the EV/inputs demand growth rate, on subdued global auto demand. Longer-term, our EV growth rate also moderates on multiple constraints (industry's access to raw materials; rising costs of implementing EV infrastructure; investment rate in EVs, etc).

Lithium's demand-supply-price outlook

For 2024's corresponding global lithium demand, we forecast a sharp slowdown in growth to +5%YoY, for total demand of 919kt (vs. 2023's +23%YoY to 873kt). Of this total, EV demand is 717kt (78% of total), also expanding 5% YoY, and still dominating total growth. For 2025, demand growth lifts 30% YoY to 1,193kt, on a forecast recovery in EV demand.

Meanwhile, 2024's global supply is expected to shrink 8% YoY to 968kt. This accounts for on-going cuts at mines across Australia, Chile, China – again, a cost-cutting response to persistent demand and price weakness. For 2025, we forecast an industry-wide recovery, as demand growth stabilises, up 19% YoY, totalling 1,150kt.

What does our revised demand-supply balance say about lithium's price outlook? Short-term, even with a very large collective cut to our forecast total mine production rate this year, forecast supply overwhelms moderating demand, delivering a price-dragging surplus for 2024. But prices then recover in 2025, on stabilising EV sales growth. This subtle demand shift is sufficient to expose stalled supply growth – lifting prices back above US$20kt-level.

Beyond this, longer-term bull factors for lithium's price include the delay of projects on lower spot prices (retards total supply growth), and the emerging geo-political push to secure strategic lithium reserves. ■

Faster capital deployment will be needed **to service critical raw material demand**

By Callum Ross, Consultant at CRU Group

Despite increased focus being placed on achieving global decarbonisation agendas, approximately 60% of the world's electricity is still produced using conventional fossil fuels. To facilitate a greater renewable energy component, a huge amount of capital needs to be deployed in a short space of time to ensure that the supply chains for the 'critical' raw materials required by these technologies remain robust. As things currently stand, investment in new critical raw material projects outside of China has been slow to materialise, leading to a widening of the gap between notional demand and plausible achievable supply. Failure to address this quickly will have a dual impact, simultaneously handicapping the West's ability to achieve sustainability objectives as well as increasing exposure to Chinese supply, which raises geopolitical over-reliance issues the world is trying to move away from.

Callum Ross, Consultant at CRU Group

The need to find sufficient financing solutions fast is emphasized by the fact that global primary energy consumption is anticipated to rise from around 175 000 TWh per year today to 187 000 TWh per year in 2040, with an increased proportion coming from electricity. This will inevitability lead to an increase in demand for the so-called critical raw materials used in solar and wind energy generation, as well as battery storage. A breakdown of the specific material requirements for each of these technologies is discussed below:

Solar: Solar Photovoltaic (PV) energy already accounts for ~5% of global electricity production, with CRU expecting that this will rise to ~26% by 2040. Substantial quantities of silicon metal are consumed in the manufacture of polycrystalline silicon, which is used in the production of semiconductors for the electronics industry and, importantly, in PV panels. To meet silicon metal demand outside China and the CIS by 2028, CRU forecast that 9-11 new projects will be needed in addition to supply that already exists or is expected to come online. However, the power requirements to run a silicon smelter are vast, with 12-15 MWh required per tonne of silicon. When powered by coal, this translates into 10-15 tCO_2/t of silicon, on top of the 5 tCO_2/t that is emitted from the use of carbon reductants in the smelting process. This makes attracting investments for greenfield developments problematic in regions that do not have access to cheap renewable power at a suitable scale.

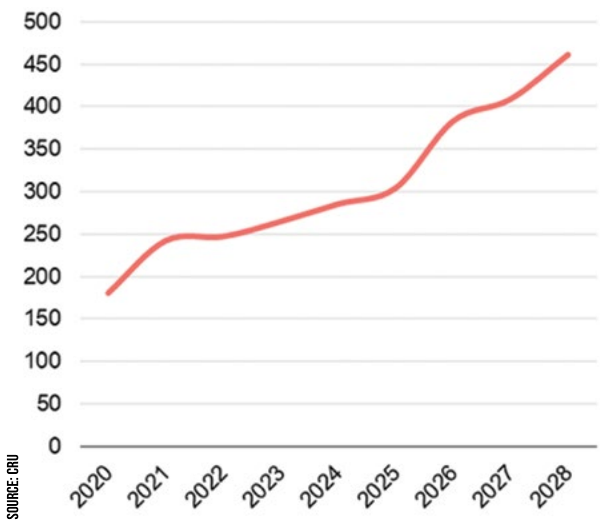
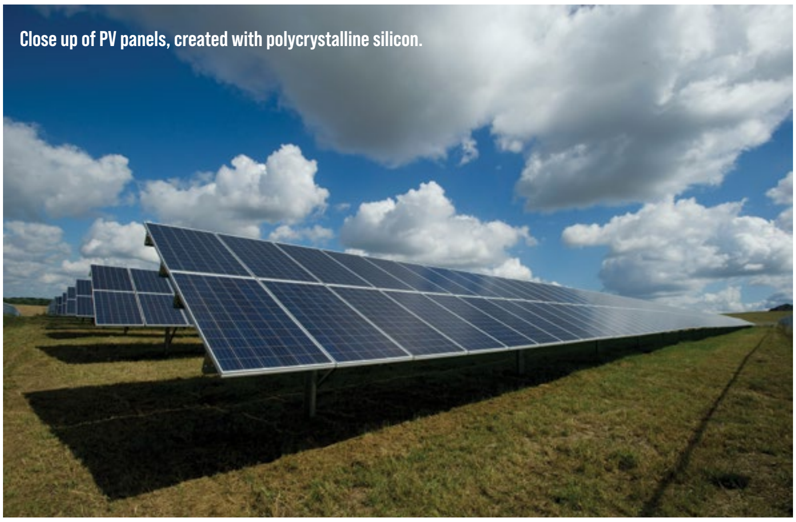


Figure 1: Silicon metal demand from solar PV manufacturing excl. China, kt/y, 2020-2028.

Wind: As with solar, CRU expects a significant rise



Close up of PV panels, created with polycrystalline silicon.

Wind power farm.

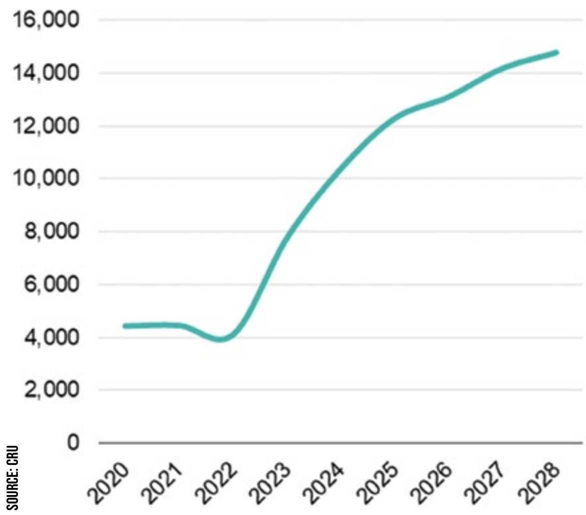


Figure 2: Global REE demand from onshore and offshore wind manufacturing, kt/y, 2020-2028.

in the adoption of wind generation in the coming years, with the share of global electricity production from offshore and onshore wind expected to collectively increase from ~8% to ~26% in 2040. Rare Earth Element (REE) demand, and specifically demand for neodymium, praseodymium, dysprosium and terbium (Nd, Pr, Dy and Tb), will rise in tandem due to their use in NdFeB magnets, which are a critical component of wind turbines. For this reason, there will be a sustained deficit in the market for these magnet metals going forward. This is worsened by the fact that most production and processing of REEs is concentrated in China. Given the low cost of Chinese production, investors have been hesitant to enter the market and compete with China on price, which has the potential to constrain Western-based material availability in the long-term.

The other element that needs to be considered with respect to REEs is that they are subject to the 'basket problem'. Since REEs are mined together, the market can be slow to respond to spikes in demand for any one element. This tends to lead to a surplus in less sought-after elements and deficit in less abundant materials, such as the magnet metals required by wind turbines.

Battery storage: The electrification of vehicles will similarly spur an increase in demand for batteries, with global requirements forecast to rise from 956 GWh in 2023 to 6 500 GWh by 2035. Consequently, demand for cathode raw materials such as lithium, graphite, nickel and manganese will similarly rise. However, the excess capacity that currently exists for these materials in China is subduing prices and, in turn, disincentivising new entrants to upstream production. Investors are also cautious of the fact that the rapidly evolving battery chemistries may reduce demand for some elements. We are already seeing cobalt demand growth slow due to a combination of thrifting and substitution with Ni-rich and LxFP batteries.

These issues are compounded by the fact that some large mining companies can be less inclined to commit capital to greenfield critical raw material projects, instead preferentially focusing on developing metals and minerals projects with a high industry value such as iron ore, copper, zinc and aluminium. For context, the

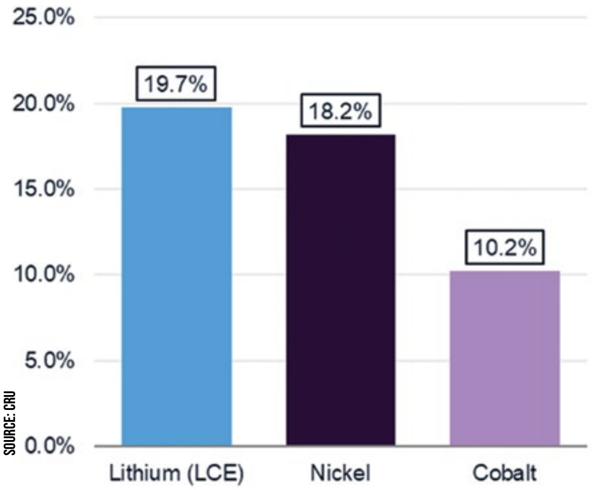


Figure 3: e-Transportation raw material demand compound annual growth rate, %, 2023-2028.

collective industry value of REEs, vanadium and graphite is less than half of BHP's annual revenue in 2023, which came to around US$54 bn.

Given these hurdles, government incentives are a crucial measure in supporting the development of sufficient volumes of critical raw material to enable the energy transition. To date, the U.S. Inflation Reduction Act (IRA) represents the single largest piece of legislation introduced to support miners and refiners in these industries. It has a goal to reduce emissions by ~40% by 2030 (versus 2005 levels). To do this, it has made US$369 bn available in subsidies and tax breaks for energy security and climate-related projects. This has worked to great effect, attracting significant investment across the supply chain. However, with the US presidential elections looming, the risk remains that a new administration may look to substantially strip back, if not completely abolish, these measures.

In response to the IRA, increased policy support has come from other jurisdictions such as the EU, albeit not to the same level as that afforded by the IRA. The EU's Temporary Crisis and Transition Framework has made it simpler for member states to provide subsidies to industries of strategic significance. On top of this, the Critical Raw Materials Act (CRMA) set targets for domestic production, refining and recycling of critical materials. However, to some degree this has served as a 'stick with no carrot'. The CRMA sets material usage obligations which are time consuming to enact, difficult to audit and, in a lot of cases, very costly, without offering significant financial incentives for consumers and producers that improve project economics in return.

Nevertheless, the CRMA does make provisions for speeding up the permitting of new mines and plants. This will be of huge importance, with the silicon industry being a great case in point. The average construction time for a silicon smelter is around 2-3 years. Meanwhile, the average construction time for a quartz mine to feed the smelter with raw materials is 3-5 years. Adding on feasibility and permitting time means that you could be looking at a lead time of at least six years for any new silicon supply. This is alarming given the immediate, and increasing, requirements for silicon from solar PV manufacturing. Consequently, Western developers have to build out these projects in a comparatively short period when referenced against a cycle that historically has taken far longer.

Specific short-term solutions to deploying capital fast will be required to achieve long term decarbonisation goals. Cooperation, coordination and consensus are needed to prioritise and then compress timelines for new project development, be that for mines or downstream operations and infrastructure. A careful assessment of the direct impact of the mining bottlenecks that remain, alongside additional support measures from governmental and multi-governmental actions (such as policy or financial support /guarantees), will then provide confidence in returns on investments made.

> "The electrification of vehicles will similarly spur an increase in demand for batteries, with global requirements forecast to rise from 956 GWh in 2023 to 6 500 GWh by 2035"

Managing this pathway to achieve the purpose of mitigating climate change whilst ensuring it is efficient, allocates capital effectively, and minimises the burden on the population will be a huge challenge. At CRU Consulting we are here to help you manage this pathway. With best-in-class commodity data and strategy experts, we can help to extract the most value from, and minimise the risk of, the race to securing critical raw materials of the future. ■

Field of PV panels for solar energy generation.

Bara Consulting optimistic heading into 2025

By Nelendhre Moodley

Underscored by strong demand for gold and copper is the emergence of junior miners in these commodity spaces in South Africa, the likes of whom include West Wits, Copper 360 and Orion Minerals – all of which is good news for the industry and consulting engineers, such as Bara Consulting, which is targeting robust growth in the next few years, MD Etienne de Villiers tells *Modern Mining*.

"The rise in junior gold and copper miners is driving growth in Bara Consulting's local business. We remain focused on supporting the junior mining sector and, as a small-to-medium sized consultancy firm, we believe we are a like-minded, entrepreneurial and agile company, and a good fit for junior miners."

As a result, Bara Consulting is now engaged in significantly more work in-country work than from the rest of Africa.

"2024 has, to date, been a good year for Bara Consulting; we are currently poised for growth through our continued offering of quality consulting services, mainly in respect to feasibility studies and technical due diligence. Additionally, we have grown our service offering by expanding into EPCM, mine closure and the geology consulting services space."

Given its strong work ethic, Bara Consulting has been receiving positive feedback on the quality of its work from clients, especially as related to studies and due diligence.

"Our core business remains the delivery of feasibility studies and, having recently gone through numerous peer review processes on several projects, the company has been receiving complimentary feedback on the high quality of its work".

On the back of positive reviews, clients have expressed an eagerness for the consulting firm to take early-stage projects through to the next phase of design and project engineering work.

"Following the completion of a feasibility study for a client in the junior mining space, the client subsequently asked us to transfer our project knowledge into the design and project implementation stage going forward."

De Villiers explains that with the conclusion of its feasibility

Langer Heinrich Processing Plant.

Portal at Heza Decline at Trinity Metal' Musha Mine

BV 22 Decline at Trinity Metal's Nyakabingo Mine.

Bara Consulting international

Aside from having opened its Canadian office recently (Bara Americas) to service the North American and South American region with business 'ticking over nicely", the company's strengthened geology abilities through Galen White at the UK office, see the UK branch of business tracking good growth overall to ensure international subsidiaries are performing well.

study work and the subsequent, often lengthy, fund raising phases for project development, Bara Consulting is not often afforded the opportunity to see the fruits of its labour going into the next phase, which is all the more reason the new turn of events of engaging in project design and development, "is really exciting" for the company.

"Apart from the traditional due diligence and feasibility study work, growth for Bara Consulting is emanating from environmental work, specifically related to mine closure, which has strengthened our workload."

Interestingly, Bara Consulting is also engaged in "several technical due diligence initiatives related to mergers and acquisitions (M&A)", specifically around gold investments, covering early stage to advanced stage projects and operations, including those on care and maintenance in South Africa, Southern Africa and West Africa.

"We continue to serve potential investors and lenders with quality technical due diligence to provide reassurance related to these investment decisions," says De Villiers, adding that the company has also recently established a mutually beneficial B-BBEE partnership to enable it to meet its transformation objectives.

> "Following the completion of a feasibility study for a client in the junior mining space, the client subsequently asked us to transfer our project knowledge into the design and project implementation stage going forward."

While demand for gold and copper is good news for business, platinum group metals (PGMs), however, have been experiencing weakened demand for its basket of metals.

"There has been a decided reduction in PGM related workload primarily driven by the commodity price and low investment appetite. We have seen lithium also come off its all-time highs; however, there is still interest in the other battery minerals, including copper, cobalt and graphite.

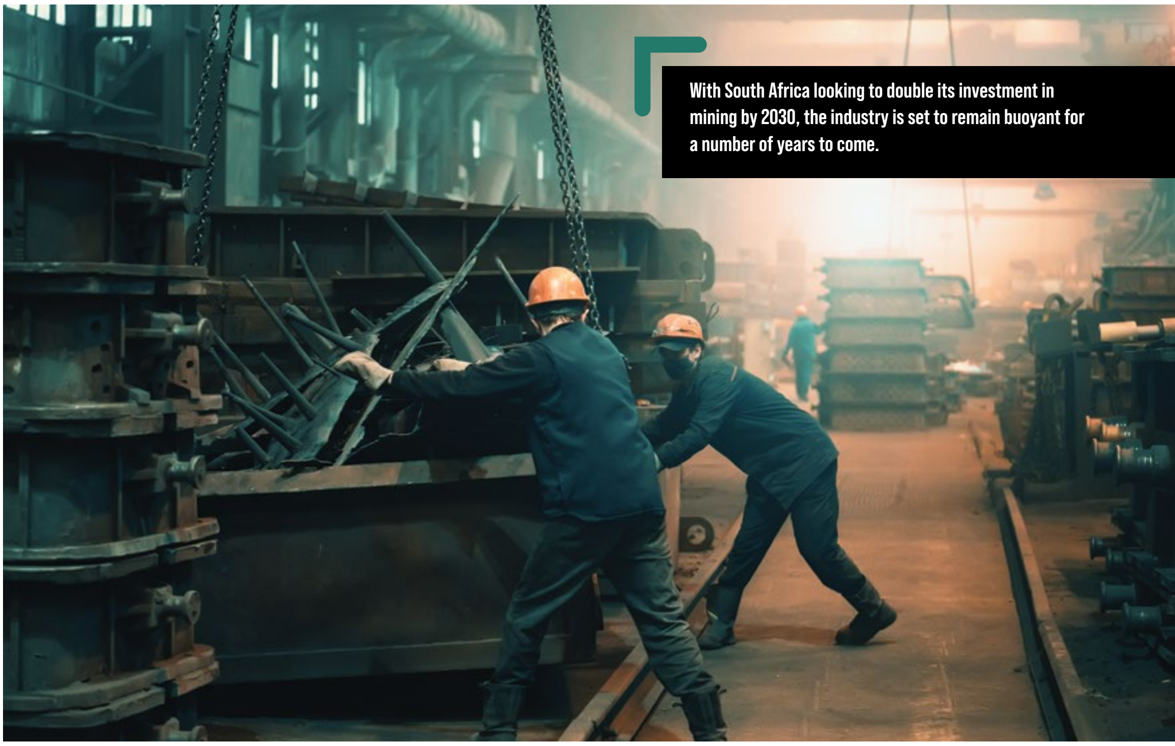
What is important to note though is that as a multicommodity consultancy firm, Bara Consulting can pivot away from commodities facing major headwinds in favour of those in demand."

Among the projects the company is busy with are a feasibility study for Harmony Gold, an EPCM contract involving detailed design work for the West Wits' Qala Shallows Project, mine design and planning (short medium and long term) for operations such as Paladin Energy's Langer Heinrich Uranium (LHU) mine in Namibia, Trinity Metals Musha, Nyakabingo and Rutongo mines in Rwanda and Alphamin's Bisie Tin mine in the DRC. ■

Talent development in consulting engineering key to unlocking mining opportunities – CESA

Consulting engineers have played an integral role in supporting the local mining industry for many decades, providing a wide spectrum of services from exploration to mining, due diligence studies, mining water studies and planning, rock mechanics and more.

CESA CEO Chris Campbell.



As the requirements of the mining industry increase in complexity, the role consulting engineers play in the research and development of innovative solutions needed for successful mining operations that meet the varying demands of all stakeholders, has become even more critical.

With South Africa looking to double its investment in mining by 2030, the industry is set to remain buoyant for a number of years to come. However, one of the most pressing issues confronting the South African mining and consulting engineers sector is the shortage of qualified professionals, due to the specialised nature of the industry and the notion that mining is a dirty industry, making it seemingly unattractive to young professionals. "Many young professionals are more drawn to modern, office-based roles that leverage digital technologies rather than traditional fieldwork," says Consulting Engineers South Africa (CESA) CEO, Chris Campbell.

To mitigate this, CESA is calling for a concerted effort from industry associations and government agencies to promote mining engineering as a dynamic and rewarding career path. This includes engaging with educational institutions to modernise curricula and create awareness about the diverse opportunities within the local mining sector.

"We need to be doing more to promote science, technology, engineering and mathematics (STEM) subjects, by starting to create an awareness among learners right from basic education through to high school levels, encouraging more young people to pursue careers in the engineering and technology fields.

"The quality of our country's consulting engineering industry relies on our next generation of engineers. We need to secure a competent workforce with the continued development of skills, and we must advocate for the mining profession and showcase its opportunities for innovation and impact on the development of our economy," adds Campbell.

> "We need to secure a competent workforce with the continued development of skills, and we must advocate for the mining profession and showcase its opportunities for innovation and impact on the development of our economy."

Factors such as limited career advancement opportunities, disparities in compensation, and a perceived lack of recognition for

The quality of a country's consulting engineering industry relies on our next generation of engineers.

expertise must also be addressed. The consulting engineering industry, Campbell notes, is losing talent to other industries. "We often see engineers completing their studies, working in the engineering sector for a few years, and then moving to the banking or financial services sectors, which offer more competitive salaries. It must be noted that the shortage of skills is not just a South African problem, it is a global one. We need to address the brain and talent drain leaving South Africa to more lucrative international destinations," he notes.

CESA believes that initiatives to create an environment that not only retains local talent but also attracts global professionals, needs to be prioritised. Strengthening ties with international engineering organisations, such as the International Federation of Consulting Engineers (FIDIC), can provide a platform for collaboration, knowledge exchange and networking, making South Africa an appealing destination for professionals seeking a dynamic and rewarding career in the engineering environment. "In earlier years, engineering was one of the most sought-after professions. We need to reignite that spark to keep the industry alive," he says.

> "In earlier years, engineering was one of the most sought-after professions. We need to reignite that spark to keep the industry alive."

Embracing technological advancements

"The integration of technology such as robotics and automation, data analytics and environmental management systems is transforming how we operate," Campbell notes, adding that these technologies are allowing mines to enhance their operational efficiency, safety and sustainability.

"Fostering a culture of innovation within our organisations will empower engineers to think creatively and push the boundaries of what is possible, ensuring that the South African industry remains a global leader in technology.

Technology also shapes how less experienced engineers can be mentored. For instance, remote guidance systems allow senior engineers to oversee operations from afar, ensuring that junior staff have access to expert advice. "This knowledge transfer is imperative with experienced professionals retiring or transitioning out of the workforce. Through hands-on training and guidance, senior engineers can help junior staff develop the critical skills necessary for navigating these complex mining operations."

Commitment to sustainability

The call for sustainable practices in mining has never been louder. As investor and public scrutiny intensify regarding environmental impacts, mining companies are expected to demonstrate their commitment to operating responsibly.

"Mining companies are paying more attention to their environmental footprints, looking to decarbonise their activities. Overall, we have seen how the industry has evolved to meet environmental, social, and governance (ESG) standards," Campbell asserts, adding that there is still work to be done in mitigating the effects mining has on the global carbon footprint.

"Consulting engineers are uniquely positioned to lead this charge by integrating sustainability into project planning, operation and closure. By developing strategies that reduce ecological disruption while increasing resource recovery, the consulting engineering industry can ultimately foster a more sustainable future," he adds.

"Our industry stands ready to work hand-in-hand with other parties to overcome any challenges. By fostering collaboration and maintaining a steadfast commitment to excellence, we can continue to build a pipeline of competent engineering practitioners for the benefit of generations to come," Campbell concludes. ■

BME's blasting science shared through high value technical services

Blasting and explosives specialist BME has launched its Global Blasting Technical Services (GBTS) as an external and standalone offering to customers.

AXXIS Silver and Titanium blast boxes.

Nishen Hariparsad, General Manager Technology and Marketing at BME.

Over the years, GBTS has added significant value by enhancing customer operations throughout Africa and globally, according to Nishen Hariparsad, General Manager Technology and Marketing at BME.

"We achieve this by unpacking the science of blasting, to enable advanced mining methods and to effectively apply the latest, state-of-the-art technologies," said Hariparsad. "By delivering these innovative technical services solutions, we help customers to drive efficiencies and unlock value at their operations."

While GBTS was previously part of BME's basket of solutions, the company recognised the importance of leveraging its skilled technical capabilities to benefit the market for several reasons, he said.

"As a dedicated partner to the industry, our commitment is to extend our technical services, capabilities and expertise beyond the communities and current customer operations we serve," he explained. "This initiative aims to provide significant value to the industry and elevate the market through the adoption of best practice systems, tools and measures. We believe it is imperative not only to set a world-class standard but also to lead by example, rather than merely benchmarking against existing standards."

GBTS includes a range of reactive, proactive and specialised technical services. Among the reactive services is BME's immediate on-site response to blasting issues, providing troubleshooting and resolving unexpected challenges. The team also conducts drill and blast audits and investigations, vibration and air blast monitoring, fragmentation analysis and blast video analysis. Support with reactive ground testing, 3G face profiling and unmanned aerial vehicle (UAV) analysis is also available.

"Our proactive technical services focus on regular monitoring and maintenance to prevent problems before they occur, as we continuously optimise blasting processes," he said. "This includes rock response testing, survey services, and blast design and predictions – as well as blasting impact and performance assessments."

The third area of GBTS's work – specialised technical services – comprises advanced solutions for complex projects. This utilises innovative technologies and tailored methodologies to meet unique project requirements. The interventions range from blast modelling and burden response analysis, to environmental services and mine-to-mill or even mine-to-metal projects. The team works with clients to optimise blast performance by addressing factors such as ore dilution, wall control and fragmentation. Training and improvement services are also offered.

"There are subject matter experts on hand to suit the demands of each project, whether this relates to blast analysis, fragmentation or another area of focus," he said. "Where special challenges such as reactive ground present themselves, for instance, our dedicated reactive ground experts are there to provide support both in the field and in the laboratory."

The GBTS teams create a core group of explosive application specialists, engineers and scientists with hundreds of years of combined experience in mining and explosives engineering. BME's rich history as a leading supplier of explosives means that it is well positioned to offer this broad range of technical services. ■

Kayelekera targets uranium production in 2025

Hot on the heels of signing a Mine Development Agreement with the Government of Malawi in July, ASX-listed Lotus Resources strengthened its commercial and technical team tasked to accelerate the restart of the Kayelekera project, Executive Director Grant Davey said in a webinar recently. The company plans to have the Kayelekera project up and running and in production by next year.

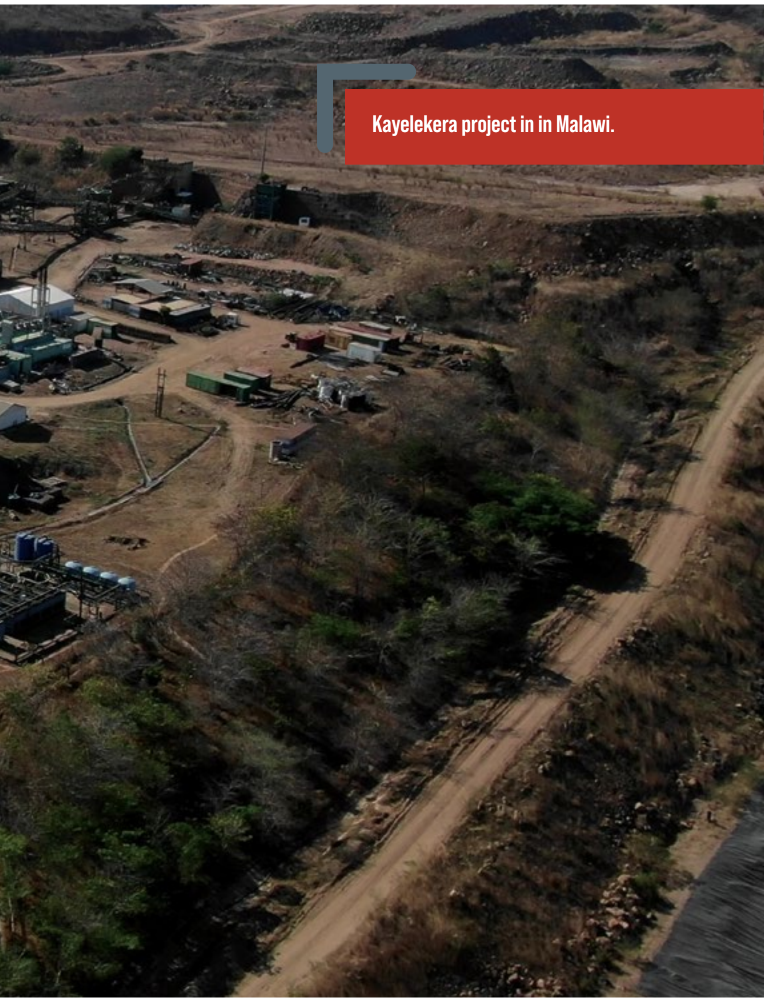
The drive by many countries to develop new nuclear generation capacity has resulted in a sharp uptick in uranium prices. Global uranium prices almost doubled in 2023 and have continued the upward trend with further price rises this year. This bodes well for project developers, such as Lotus Resources.

The uranium mine developer's Kayelekera project in Malawi, regarded as the fourth largest uranium asset globally by historical annual production, has been on care and maintenance for almost a decade following a decline in uranium prices.

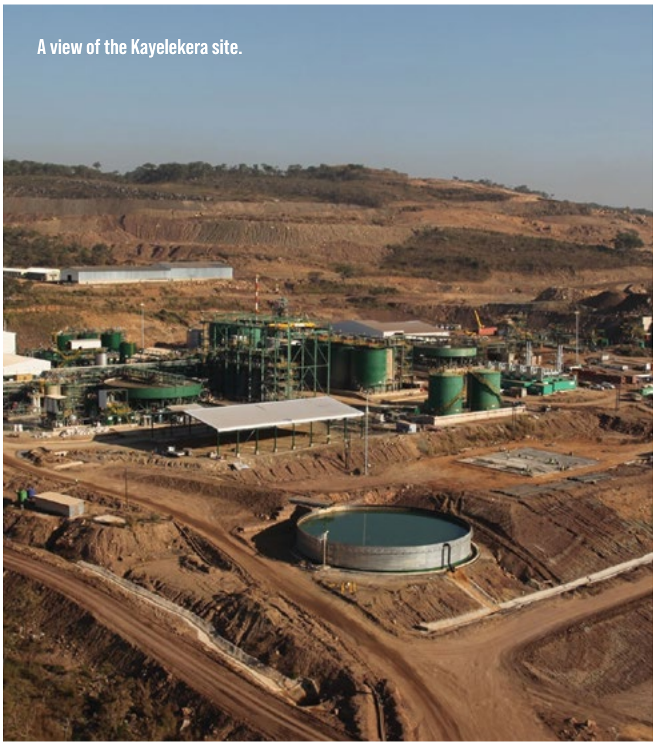
"Our vision is to have the cheapest, quickest project restart in the uranium industry. We are able to do this because Kayelekera is in a really good condition. We will be producing roughly 1.5 million tons of ore per annum from the open pit which, in relative mining terms, is easily achievable."

Lotus Resources founder Grant Davey, who has over 30 years of management, project development and operational experience, recently announced an enhanced team that includes Keith Bowes as Technical Director tasked to advise and support the management team in the execution of the Kayelekera Project and the development of the Letlhakane Project in Botswana.

Greg Bittar, who has been with Lotus Resources since the beginning of the year focusing on corporate development, principally offtake, financing and investor relations, assumes the role of CEO while Warren King, an engineer with 25 years' experience specialising in project execution, plant refurbishment and construction, project start up, commissioning and optimisation, takes on the role of Kayelekera Project Director – Execution. Lotus Resources COO Mike da Costa will focus on operational readiness, contract mining preparation and mining start-up



Kayelekera project in in Malawi.



A view of the Kayelekera site.

Aerial view of the Kayelekera project.

for Kayelekera along with government relations, occupational Health and Safety, ESG matters and development work at the Letlhakane project in Botswana.

"We have bought in Warren King as a project director - he has been instrumental in starting up several mines across the globe, including Asia and Africa. Mike De Costa is our Chief Operating Officer. He's worked in Africa for most of his life and understands what needs to be done in bringing Kayelekera to fruition."

According to Davey, as the project moves into development and production stages, it is the chairman, Michael Bowen's vision to further strengthen the team with more independent directors.

Taking Kayelekera up the value curve

Lotus Resources, which acquired Kayelekera uranium mine from Perth-based Paladin Energy in March 2020, owns an 85% equity interest in Kayelekera via its local subsidiary Lotus (Africa), with the remaining 15% held by the Malawi government.

While in production from 2009 to 2014, Kayelekera was Malawi's largest mine, producing 10.9 million pounds (mlb) of uranium oxide (U3O8). Kayelekera's current Mineral Resource Estimate (MRE) is 51.5 mlb U3O8 at 475 parts per million (ppm), sufficient for a minimum 10-year life-of-mine.

In August 2022, Lotus Resources released a Definitive Feasibility Study (DFS) for the restart of the Kayelekera Mine which demonstrated that the mine is able to support a viable long-term operation. The DFS also confirmed that Kayelekera ranks as one of the lowest capital cost uranium projects globally (initial capital cost – US$88m) and is able to recommence production quickly once a Final Investment Decision is made.

The proposed restart timeline towards the mid-2020s aligns with projected uranium market under-supply that is currently evidenced by strongly increasing uranium spot prices.

Kayelekera has its mining licence and environmental permits in place, access to a skilled local workforce who worked at the asset previously and strong support from the Government of Malawi. In July, Lotus Resources and the Government of Malawi signed a Mine Development Agreement (MDA) that guarantees a Stability Period of 10 years during which time the project will not be subject to any detrimental changes to the fiscal regime.

According to Davey, as the company restarts its flagship asset, it is keen to find ways to accelerate the project through

Drilling taking place at Letlhakane.

to production at the lowest possible cost.

"We are always looking for ways on how we can improve and add to shareholder return. At the moment, we are focused on understanding what capital will be required to bring Kayelekera into production. As it stands, the project is in great shape, certainly our strategy now is to switch it on and address the areas of challenge as they arise, which is normal for a plant that has been standing for the past 10 years. In my experience as a mining engineer and having restarted mines, the only way to find out what problems exist, is by starting up the plant. We have two engineers, Warren King and Stuart Watkins and, in South Africa, we engage with Senate, who've been instrumental in our feed study."

According to Davey, the strategy of breaking up the workstreams into segments will result in "the initial capex being a lot cheaper".

Lotus Resources' three key focus areas

In tandem with fast-tracking development of the Kayelekera project, Lotus Resources is also advancing its Letlhakane project in Botswana. Letlhakane's revised MRE establishes it as a large and attractive standalone development project – with potential for Lotus to become a globally significant U3O8 producer when combining both assets.

According to Bowes, there are currently three main activities underway, including an infill drill programme, which is more than half complete; updating a scoping study on the Kayelekera project Uranium Project; and improving on the original concept of the Heap Leaching and associated downstream processing of Letlhakane.

The infill drill programme continues to yield positive results including, in some instances, higher grades, with the company thus anticipating a positive impact on the updated resource once the infill drill programme is complete.

Bowes says that the infill drill programme also contains a component of exploration work on historical holes that fall outside of the resource parameters.

"We also have 10 to 12 holes of drilling to be done in the area and I'm fairly confident that through exploration drilling we will be able to include additional resources to our mineral resource estimate."

Secondly, Lotus Resources is busy undertaking a scoping study that will shed light on how best to mine the material, the throughput and associated costs, amongst others.

"We are getting pretty close to a final concept of how the mine will look and will soon be reporting the results of the study to the market."

Lastly, the company believes there exists an opportunity to improve on the original concept of the Heap Leach and associated downstream processing of the Letlhakane Uranium Project.

"Currently, there is significant metallurgical test work being undertaken which looks to identify opportunities to optimise the processing route, with some of the ideas set to be incorporated into the scoping study. However, some ideas still need to be refined further and will be incorporated in the updated study which will come out towards the end of this year or early next year."

"Currently, there is significant metallurgical test work being undertaken which looks to identify opportunities to optimise the processing route, with some of the ideas set to be incorporated into the scoping study."

The Letlhakane Uranium Project is one of the largest undeveloped uranium projects in Africa, with a resource base of 155 mt at 345 ppm U3O8 for 118 mlb contained uranium (RPEEE basis); 29% Measured and Indicated Resource.

Letlhakane was granted Mining Licence in 2016 and a Prospecting Licence in April 2023; water abstraction rights and provisional surface rights have also been granted.

Off-take agreements

Discussing off-take agreements, Bittar says that discussions have gained momentum over the last few months on the back of utilities' concerns relating to security of medium-to-long term uranium supply.

"There is a genuine series of discussions with a handful of utilities and some traders. Given our existing relationships with North American utilities, we have approached them first. Although several utilities remain focused on long-term supply and on larger quantities of uranium than we currently have, they are, nevertheless keen to see one or two new entrants to the market in the next three or four years. In fact, many utilities understand that there are two or three hoops that we've got to get through and are willing to give us time to develop," concludes Bittar. ■

Boost your business with best-in-class drilling

Powerbit Rocktools MD, Thomas Chao.

The global rock drill rig market was recently projected to grow at a CAGR (Compound Annual Growth Rate) of 5.5% during the forecast period of 2018-2028. The global water well drilling market size is expected to reach $4.12 billion by 2028 – CAGR of 5.20% from 2021 to 2028. Maintaining leadership in the water or rock drilling market is essential in keeping your company ahead of competitors in these rapidly growing industries and partnering with Powerbit Rocktools can help you maintain your competitive advantage.

The company is renowned for listening intently to its customers and cultivating an in-depth understanding of their challenges, problems and goals. And, with over 20 years of experience, Powerbit drilling products remain at the forefront of technology at affordable prices.

With a singular focus on customer needs and a passion for excellence, Powerbit Rocktools continues to innovate; empowering drilling businesses to conquer even the most challenging drilling operations with ease and efficiency.

As the industry rapidly adopts technological advances and mining and drilling operations expand to new frontiers, the need for robust and reliable rock drilling tools has become even more critical. In the face of extreme and challenging environments, businesses need cost-effective and enduring solutions to conquer the tough terrain they inhabit.

Powerbit has been a prominent player in the southern African mining industry since 1996, addressing the unique demands of drilling-related industries with unwavering dedication and a commitment to excellence.

The company's product range is extensive and purposeful, catering to various drilling needs across industries. The fit-for-purpose line-up includes DTH hammers and bits, RC hammers and bits, tri-cone bits, top hammer bits and rods, casing systems, grinding machines and more. Each tool has a proven history of enhancing drilling operations' efficiency and longevity.

One key factor that sets Powerbit apart is its focus on building long-term partnerships with its clients. Thomas Chao, MD at Powerbit Rocktools, emphasises the value of maintaining a reliable supply chain in the context of African industry, where drilling and geotechnical excavation operations form the backbone of resource extraction and optimisation, driving the continent's survival and progress.

"In the drilling industry, our clients can't afford downtime. We pride ourselves on being a partner who is always on hand to help our clients address their unique challenges. Our team is not just a supplier, we are a valued partner for our clients' businesses. And that makes all the difference.

"We consistently maintain and adapt to new quality standards by collaborating with our facilities offshore and continuously work alongside our clients to understand their needs and provide products that serve their specific requirements."

Powerbit collaborates with its facilities in Taiwan, China and Japan, where they have advanced research centres and applied technology experts in the rock drilling tools field working tirelessly to innovate new products and methods, cultivating a practical understanding of emerging engineering challenges to effectively tailor their products to meet clients' specific needs.

The value of economical, long-life rock drill bits, hammers and grinding machines in today's drilling operations cannot be overstated. Powerbit recognises these tools' pivotal role in enabling clients' success and driving infrastructure projects that underpin local economies.

The Powerbit Product Roundup is a testament to its commitment to empowering progress in drilling operations. From DTH hammers and bits to top hammer drilling tools and RC hammers and bits, each product is meticulously engineered to ignite the power of remarkable rock drilling. With a versatile range suitable for various working conditions and industries, Powerbit is well-equipped to serve diverse clientele with different drilling requirements.

Each Powerbit product is meticulously engineered for efficiency and longevity.

Reagent experts.

Axis House Group upbeat **going into next year**

By Nelendhre Moodley

Axis House Group continues to build on its momentum from a strong 2024, and the company is poised for significant growth heading into 2025. With a portfolio of innovative products and strategic expansions, Axis House Group continues to solidify its leadership in the mining sector. From overcoming logistical challenges with a sophisticated supply chain strategy to launching cutting-edge solutions for mineral processing, the company is setting the stage for a dynamic year ahead. CEO Justine Stubbs Hult shares insights into how Axis House Group is driving efficiencies, embracing sustainability, and expanding its global reach, all while maintaining its commitment to excellence in service and product development.

Justine Stubbs Hult - CEO Axis House Group.

According to Stubbs Hult, Axis House Group is experiencing a dynamic year in 2024, marked by new product launches and enhancements to existing ranges. "From a fairly depressed quarter three and four in 2023; 2024 is delivering quite an upswing in terms of business for Axis House Group."

While the reagent manufacturer and supplier to the mining sector continues to scope for new markets that could benefit from its innovative and technical product range, it remains upbeat going into 2025, with its focus firmly set on maximising efforts in North Africa, Middle East and Europe.

"Our aim is to grow the business in territories we recently entered and to increase stockholding in Turkey, while simultaneously growing our product offerings into Europe. There are several mines in and around Eastern Europe and Northern Europe that we believe will benefit from our technical expertise and product range."

Looking ahead, Axis House Group is committed to delivering innovative products that enhance efficiency, reduce costs, and provide excellent after-sales support, amongst others. Importantly, a key part of its strategy is to continue establishing production facilities closer to areas of operation, given the focus on lowering its carbon footprint and those of its clients. Moreover, having production facilities closer to its customers will assist in alleviating supply chain challenges which negatively impact business. This strategic positioning aims to address potential disruptions related to South Africa's rail and port capacities, ensuring a more reliable and streamlined service.

"In order to circumvent the logistical challenges at play, we have in place a multi-faceted supply chain approach that encompasses a multi modal tactic, which includes the use of multiple ports, both on the East and West African, as well as the South African coasts, and integrates road, rail, and air freight. This approach ensures that clients have quick turnaround on our products, whenever and wherever it is required."

Axis House Group supplies its range of products across key mining destinations in Africa and considers the Southern African region as an active territory. It remains well placed to service these markets either from its Cape Town or Johannesburg offices.

Aside from servicing the North African and Middle Eastern markets, the chemical's solutions provider established an office in Turkey in 2019, targeting Turkey, Lebanon, Morocco and Tunisia's industrial metals market as it sought to service the phosphate and fluorspar markets from its cadmium and de-cadmium product range.

At the same time, the company made a play for the European market, with an initial foray into Spain in 2019, just at the onset of the Covid-19 pandemic.

Axis House Group's lab facility in Cape Town.

Trends influencing the mining industry

Low costs and high efficiencies remain the mantra for the mining industry with the sector, particularly during bear markets, keen to secure highly effective products to enhance minerals processing – a space in which Axis House Group has long been a leader.

Stubbs Hult explains that highly efficient products are an imperative as they lower the overall cost of minerals processing.

"Products that are selective in nature and highly efficient work to negate the need for tailings retreatment, for instance. Furthermore, clients are penalised for sub-par products that contain impurities and so seek highly efficient reagents. Axis House Group prides itself on developing innovative products that work to minimise the existence of impurities and thereby increase value for our clients."

However, given that some of the chemicals used in minerals processing are extremely harmful, Axis House Group, on a drive to find alternatives to hazardous materials in its products, recently launched - VitriAX-E- an acid mist suppressant, which is less hazardous and much easier to dose than traditional sulphides. Moreover, the product is safer for use by employees and production teams.

New product ranges

Axis House Group's recent focus on product lines for industrial minerals, including lithium, phosphates and rare earth elements, has led to the development of new products, such as the TOFA type reagents, which are currently being rolled out.

"The new product targets selectivity, improved grades and mineral recovery, and has delivered superb results during laboratory testing. We also launched the UniQ and UniQ D5 range, which is well suited to the extraction process of copper and lead. Having been tested at lab-scale and pilot plant scale last year, the products are now being trialled in Turkey."

"The new product ranges have shown great selectivity with the removal of up to 99% of cadmium from cobalt solutions. They offer a much more efficient way of extracting cobalt hydroxide and ensure that the end product has a high purity level of close to 40%."

According to Stubbs Hult, with cadmium being a major concern for miners, the chemical specialist recently launched its CAD AX and CAD D products, which are being rolled out in various regions.

"The new product ranges have shown great selectivity with the removal of up to 99% of cadmium from cobalt solutions. They offer a much more efficient way of extracting cobalt hydroxide and ensure that the end product has a high purity level of close to 40%. For clients mining cobalt in the DRC, whose export licences require a 39% precipitation of cobalt, Axis House Group's product range is a game-changer. Products that are currently available in the market are only able to achieve between 27% and 35% cobalt precipitation."

Axis House Group has also been supplying frothers, specifically oxide collectors, into the platinum industry. "We have been supplying the oxide collectors – our old workhorse, the AM 810 – into the DRC and Zambia and South America for many years. However, we had not supplied them to the platinum industry until now. We have recently begun supplying the AM 810 to the platinum industry in both South Africa and Zimbabwe," concludes Stubbs Hult. ■

Africa's largest gold mine **probes significant new discoveries**

Highly significant near-mine discoveries within trucking distance of the plant are poised to keep growing Kibali – Africa's largest gold mine – well into the future, says Barrick chief executive Mark Bristow. Gold miner, Barrick Gold, is also consolidating new prospective grounds for both gold and copper to expand its footprint in the Democratic Republic of Congo (DRC).

Kibali gold mine in the DRC.

Kibali is securing its status as one of Barrick's elite portfolio of Tier One mines.

Kibali gold mine

- The Kibali gold mine is in the northeast of the DRC, some 220 kilometres east of Isiro, the capital of the Haut Uele province.
- The mine is owned by Kibali Goldmines SA (Kibali), which is a joint venture company effectively co-owned by Barrick and AngloGold Ashanti, with 45% each, and *Société Miniére de Kilo-Moto* (SOKIMO), with 10%.

The mine is operated by Barrick

Speaking to media and local stakeholders, Bristow said the newly defined ARK target located four kilometres from the processing plant had the potential to deliver, through additional exploration, a high-grade multi-million-ounce orebody. This, in addition to the KCD downdip extensions, supports Kibali's ability to continue replacing reserves depleted by mining with high-quality ounces going forward. The mine is currently on track to meet its production and cost guidance for the year and remains one of the most cost-efficient producers on the continent.

Bristow noted that Kibali was a frontier mine which, over 15 years, had catalysed and promoted the growth of a thriving regional economy in the country's remote Northeast region. This continues to be driven by its multi-stakeholder model of partnering with local businesses and communities. To date, it has spent $2.87 billion with local contractors and suppliers.

Kibali is currently collaborating with the government on a series of enterprises aimed at further enhancing its local content initiatives in the region, at this will benefit more than 500 local companies. In addition, 41 of the 44 projects targeted under Kibali's community development fund have been completed while nine of the 14 projects supported by the mine's *Cahier des Charges* initiative are nearing completion.

The mine's commitment to biodiversity preservation is set for its next stage as it fine-tunes plans to add 64 white rhinos to the 16 successfully relocated to Garamba National Park last year.

Kibali continues to contribute to the Barrick group's emissions reduction roadmap. When the commissioning of its new 16-megawatt solar plant and battery energy storage system, which augments its three hydropower stations, is completed, its renewable energy penetration will increase from 79% to 85% and, for six months of the year, its energy use will be entirely renewable. ■

Electra Mining Africa puts innovation in the spotlight and sets new records

Taking place at the Expo Centre in Nasrec, Johannesburg, from 2-6 September, this year's Electra Mining Africa was the biggest show in its history with 950 exhibitors occupying over 40 000m^2 of exhibition space across six exhibition halls and four outside exhibit areas.

Visitors were able to explore thousands of new products, ground-breaking machinery, latest innovations and world-class technologies, with the many live demonstrations giving them an opportunity to see products and machinery in action during the five days of the exhibition. The show also afforded visitors the opportunity to speak to the technical experts on the stands and compare products and brands.

"We have had excellent feedback from our exhibitors," says Gary Corin, MD of Specialised Exhibitions, a division of Montgomery Group, and organiser of the show. "Many of our exhibitors have been exhibiting with us consistently for many years whilst others were previous exhibitors who came back this year after a short break. Some were exhibiting at Electra Mining Africa for the first time. Those we have spoken to have met their exhibiting objectives, whether that's brand awareness or generating sales leads, or both."

By the end of the show, 39 883 visitors had attended this year's Electra Mining Africa, which was about 27% higher than the previous show in 2022.

"But it's not just about the numbers," explains Corin. "It's about the quality of the visitors that come through. And it's been impressive. Visitors were from across the industry sectors represented at the show, looking for the latest products, innovations and technologies relevant to them. And they weren't disappointed by what they saw. Electra Mining Africa has built its reputation as a platform for trade; the place where buyers and sellers meet to do business, contributing to the stimulation of trade in the industrial, manufacturing and mining sectors of the South African economy."

The New Products and Innovation Awards competition attracted entries from local and international manufacturers exhibiting at Electra Mining Africa, and the winners

"Many of our exhibitors have been exhibiting with us consistently for many years whilst others were previous exhibitors who came back this year after a short break. Some were exhibiting at Electra Mining Africa for the first time."

Just under 40 000 visitors attended Electra Mining Africa 2024.


Live demos with equipment in action across the halls and outside areas.

were announced at an exhibitor's function which took place on the Wednesday evening.

Charlene Hefer, Portfolio Director at Specialised Exhibitions says that the Awards celebrate remarkable ingenuity and outstanding levels of innovation. "The innovation displayed across the show was of a world-class standard and this was reflected in the entries received for the innovation awards competition. In the coming months, many of the products and innovations are likely to be exported into Africa and other parts of the world now they have been launched to market at the show."

On the Thursday morning, the Deputy Minister of Mineral and Petroleum Resources, Ms. Nemadzinga-Tshabalala visited Electra Mining Africa. The deputy minister said she was visiting the show to see what technology, innovation and investment was taking place in the mining industry. She was very impressed by what she saw. "From my walkabout it is clear that Electra Mining is booming and growing." She added that she would like to see the relationship between the expo and her department grow stronger.

Attributes of a successful 2024

Asked what made Electra Mining Africa the success it was this year, Hefer said it was all about collaboration. "We have a great team who have worked really hard to ensure the success of the show, but it's also the collaboration we have with the industry associations, the trade media, our suppliers, and of course, our exhibitors. We launched a brand-new exhibitor training programme this year and spent three days training just over 350 of our exhibitors, and we could see at the show how they implemented what they learned. From how they approached build-up and the effort they put into their stands, to the way they were interacting with visitors and how they embraced our theme days. It made a real difference. They took their exhibiting to the next level!"

Corin spoke about the collective when it came to the marketing of the show. "To achieve the number of visitors this year, yes, the marketing was good. But not just ours; it is the collective effort that makes a show successful. The industry really bought into this and I think that's what made the difference. No individual, no one organisation, can put an event like this together on their own. It was the collective effort of all stakeholders that ensured the success of this year's show.'

Looking ahead to Electra Mining Africa 2026

When asked where Electra Mining Africa goes from here and what it will look like in 2026, Hefer said the good news is they started planning for 2026 a couple of months ago. "There are many new initiatives in the pipeline and some areas we want to improve for the next show. We will engage with our exhibitors, visitors, sponsors, associations and media partners to get their input too. There's a lot in our planning mix already, but their input is also crucial for us."

Corin also reflected on what the industry might look like in 2026. "In two years', time new technologies and solutions will be out there, and our exhibitors will be showcasing and demonstrating these. Artificial intelligence is having a major impact, even in our business. How we communicate, how people register to attend, tools that help both exhibitors and visitors on site. We don't know yet what will be available in 2026. It will be an exciting couple of years as the unknown becomes known," he concluded.

Electra Mining Africa is the largest mining, electrical, automation, manufacturing, power and transport trade exhibition in Southern Africa and one of the largest global mining and industrial shows. It is recognised as a '5-in-1 Trade Show' with its five incorporated shows: Electra Mining Africa, Automation Expo, Elenex Africa, POWERex, and Transport Expo. Local manufacturing also played a prominent role at this year's Electra Mining Africa as, for the first time, the Local Southern African Manufacturing Expo

Communication is key. A state-of-the-art GPS antenna works in collaboration with a satellite modem and GPRS modem receiver to deliver repeatable high-quality information.

Smarter fleet management for Bell Equipment

Fleetm@tic®, Bell Equipment's South African-developed telematics solution, collects stores and communicates information in three key areas: machine productivity; machine utilisation; and machine condition to enable fleet operators to maximise the value of their assets and the efficiency of their operations. Bell Equipment product manager, Brad Castle, explains.

Bell Equipment's product manager for Fleetm@tic®, Brad Castle.

Fleetm@tic® is a purpose-designed telematics system for Bell Equipment machines that enables mining and construction operators to get the best value from their assets. "By using Fleetm@tic® to take ownership of the entire operational fleet on a mining or construction site, machine owners can keep projects on schedule, maintain machine health, reduce downtime and running costs, all while maximising productivity," says Bell Equipment's Brad Castle.

He says that today's earthmoving industry faces the challenge of improving efficiency: doing more with less. Information is critical to meet this challenge and Bell has harnessed technology to be able to offer customers the right information at the right time, helping them to manage their fleets with greater than ever precision and efficiency.

"Fleetm@tic® is designed to be the eyes on the worksite, keeping track of every Bell machine in operation on a continuous basis – a fleet management partner that never sleeps. The cornerstone of our company is to provide lowest cost per tonne equipment solutions to our customers. Fleetm@tic® adds this exciting dimension, enabling operators to maximise their return-on-investment," says Castle.

The appeal is that it is simple to use. Working machines can be watched via the Fleetm@tic® website or WebApp from the comfort of a home or office, or even while travelling abroad. A confidential login and password is used for secure access, and automated reports are emailed to authorised managers on a daily, weekly or monthly basis, depending on the need.

"This keeps Bell Equipment owners in touch with their machines at all times. Accurate, up-to-date operational data, production data, fault data as well as the machine's location and movements are all presented via user-friendly interfaces," he assures.

Key features include:

- Remote monitoring of Bell machines includes vital details such as fuel consumption, when and where a machine is operating, vehicle speed, all

Fleetm@tic® enables machine owners to keep projects on schedule and maintain machine health, while reducing downtime and running costs.

aspects of machine health, driver access and much more. From a reliability perspective, not only is the machine being continuously monitored, but the embedded service indicator ensures that the closest Bell Customer Care Centre automatically receives notice that a service on a specific machine is due, thus avoiding machines running over their service hours.

- The system is satellite based, driven by a series of satellites with worldwide coverage. Production, machine and precise location data is gathered and stored, then sent via a machine-mounted satellite modem to the Bell server. From there the raw data is analysed and compiled into reports that make it easy for users to access and understand.
- A selection of reports is available for each machine, ranging from shift, daily, weekly or monthly, and including loading and event reports, amongst others. These can all be customised and the automated system will ensure they are delivered promptly, providing detailed information that is always in time.
- Fleetm@tic® includes a Driver ID Access feature that enables productivity and the driving style of each driver to be tracked, building up a use history of how the machine is driven and used. This ensures that drivers take responsibility for the machines during their shifts, while also highlighting training needs and productivity enhancement opportunities.
- A significant differentiating feature of Bell's Fleetm@tic® system is on-board weighing, which has been a standard feature on all Bell ADTs for more than a decade. "With ongoing development to fine tune accuracy and reliability, our on-board weighing can now highlight exactly how much useful work a machine is doing and how much money it is earning," adds Castle.
- GPS tracking enables site machines to be configured for specific applications requiring extensive control. Sites can be segmented on Fleetm@tic®, with vehicles made aware of their current location. Speed limits can be activated based on the vehicle's current position, which ensures that the machine is driven at a safe and legal speed in specific areas. A warning and limp mode will also automatically be activated should the vehicle leave a predefined geofenced area.
- Fleetm@tic® software is integrated into the CANBUS system of each machine, which collects vital information from the machine's data receptors. GPS location and machine operational information from the CANBUS is stored in an onboard memory module ready for transmission.
- Communication is key. A state-of-the-art GPS antenna works in collaboration with a satellite modem and GPRS modem receiver to deliver repeatable high-quality information. The satellite communication capability provides true worldwide coverage while the global SIM card allows large amounts of data to be communicated over cellphone networks around the world when the machine is within range – via one service provider that delivers worldwide coverage.

"Ongoing developments to fine tune accuracy and reliability now enable our on-board weighing to calculate exactly how much money each machine is earning. This, along with idle and unladen time tracking and shift summary reports, offers managers insight into how to optimise daily production schedules, while offering a very clear perspective of operational costs," Brad Castle points out.

Bell offers three Fleetm@tic® packages, depending on the preferred level of fleet management required: daily, per shift, per cycle, or even per minute with the premium package.

- The Basic Package is available on all Bell-supplied machines and provides machine hours worked per shift, average fuel burn and a productivity report.
- The Classic Package is standard on all new ADTs for two years from the date of delivery to customers. Thereafter, it can be renewed at an additional charge. It supplies enough information to give a thorough understanding of how the machine is operating: measuring shift productivity, shift fuel burn, shift fault codes and numerous other metrics.
- The Premium Package is available as an upgrade at any time. Geared for customers who need detailed operational information, this package offers similar information to the Classic package but for each individual laden-unladen cycle. Live tracking is also available on the Fleetm@tic® website on a per minute basis. This function is used by some customers in their site control rooms to continuously track and manage their fleet operations.

"Fleetm@tic® is a definitive management tool that adds real value to mining and earth moving operations. It can be customised to suit the needs of fleets of any size and to ensure that machines are used effectively and safely, and that their asset value and operational life is maximised," Brad Castle concludes. ■

COLUMN

Botswana **losing its shine**

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

De Beers' partnership with Botswana has served the country immeasurably well since independence.

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

Botswana has long been held up as a rare example in southern Africa of a country that has escaped the 'resource curse' – the paradoxical nature of the relationship between abundant natural resources and underdevelopment in many weakly institutionalised countries. By and large, it has. Certainly, by the standards of Zimbabwe, Mozambique, Angola and the DRC, Botswana is a rare jewel in an apparently cursed region.

Its founding president, Sir Seretse Khama, ensured that the country's sub-soil wealth was held in custodianship by the state pretty much from its independence in 1966. The state entered a partnership with De Beers when diamonds were discovered, forming the 50/50 joint venture now known as Debswana. This took bold and visionary leadership. A model of what could be in respect of fair value between host countries and multinational companies was formed. It has stood the test of time.

While the terms of the current deal are not well known – I am told that they have not even been seen by parliament – it seems relatively accepted knowledge that the government's 50% stake in the company produces taxes, royalties and dividends worth 85 cents to the US$ of total diamond revenues. Funds of roughly (if you'll forgive the bad pun) US$250 million accrue to the state from the dividends of each diamond auction alone, ten per annum. This is significant revenue for a country with only 2.5 million people. US$2.5 billion per year is already an average of US$1,000 per person per year.

Indeed, Botswana's income per capita was US$6,708/year by 2023, substantially higher than its nearest regional competitor, Namibia, which shares a similar mining development model to Botswana in the form of Namdeb. Namibia's income per capita was US$4,511 by 2023. Much larger countries, like the DRC, with unspeakable sub-soil wealth, come in at a miserly US$555 GDP per capita per year. Botswana's people, on this metric, are about 12 times wealthier than DRC residents. This development differential is further reflected in under-5 mortality rates. Botswana and Namibia lost about 38 children per 1 000 live births in 2022 while Angola lost 67 and the DRC lost 76. The good news is that the trend on child mortality is downwards across southern Africa. But 76 is still heinously high, and it should be lower in Botswana and Namibia too.

What GDP per capita does not tell us is how income is distributed, nor about the underlying

Botswana is a rare jewel in an apparently cursed region.

institutional health of the country's political economy. The latest available World Bank Data (from 2015 unfortunately) tells us that 41.5% of Botswana's income share was held by the top 10% of earners. In Namibia, the figure was 47.2%. This is a substantially skewed income distribution, with a large portion of wealth concentrated in the hands of a small number of individuals.

In addition to concerning levels of inequality and a failure to diversify the economy as diamond rents are projected to decline, political risk analysts suggest that not all is well in the state of Denmark. (Well, it is ok in Denmark, being the happiest country in the world.) On the World Bank's control of corruption score, Botswana scored 74.1% in 2022, a world away from the DRC at 3.3%. Namibia came in at 60.8%. Similarly, on the rule of law score, Botswana outgunned the DRC by 66% to 4.2%. Of course, the problem with ranking instruments is that you can always be better than someone else, which may mask inherent deterioration within a country.

You might argue that the comparison is unfair – the DRC has a far more complex history, is physically much larger, more populous and is culturally and ethnically more heterogeneous than Botswana. It has also been ravaged by poor leadership and multiple wars since independence from a brutal colonial regime. It is currently experiencing a new wave of violent unrest in its eastern region, where Rwandan proxies rebel against the state, along with other militias, and extract natural resource rents.

But the DRC nonetheless stands as a warning to states that do not manage their resource wealth well. While Masisi, Botswana's current president, is hardly a kleptocrat in the mould of Mobuto Sese Seko, there are concerning signs. In The Economist Intelligence Unit's latest Democracy Index (2023), Botswana ranks as a "flawed democracy", scoring 7.73. Denmark scored 9.28, by the way (one of a handful of "full democracies"). Botswana scored a startling 9.17 on "electoral process and pluralism" but country observers have for many years been warning of a compromised 'independent' electoral commission. The state has also increasingly been abusing the intelligence services for citizen surveillance instead of security. These factors will play a role in determining the outcome of the upcoming 30 October election.

On the EIU's "civil liberties" score, Botswana scores 8.53 but the media is increasingly under pressure to be a mouthpiece for the ruling Botswana Democratic Party (BDP). And, as far back as 2005, academics like Kenneth Good who raised questions about the veracity of Botswana's academic credentials, were suppressed or kicked out.

Like seemingly healthy elephant populations with a high carcass ratio, precipitous collapse can happen 'overnight'. This is a sadly relevant metaphor for Botswana, as its populist president recently threatened to send 20,000 elephants to Germany – easy rhetoric that masks the fact that Masisi's government appears to be doing next to nothing about the poaching pandemic gripping the northern parts of the country (unlike his predecessor, Ian Khama, son of founding president Sir Seretse Khama).

Worse than that, Masisi's rhetoric against De Beers is extremely concerning (and has been since he came to power in 2019). A legal brief released as I write (7 October) records that Masisi "is threatening to walk away from a diamond mining deal with De Beers unless the firm offers better terms … if negotiations break down, then Botswana is prepared to pull out of the long-standing arrangement." Masisi claims to want Botswana to be entitled to purchase up to 50% of the stones sold on auction (up from 25% of the current stake renegotiated only a few years back). He has also been ratcheting up praise for private miner Lucara, which has a supply arrangement with HB Antwerp based in Belgium. Reuters reported in 2023 that Lucara had terminated this deal, citing financial irregularities, but the deal was renegotiated in February 2024.

Reuters then reported in August 2024 that Botswana was aiming to purchase 49.9% of HB for US$65.95 million. Masisi has been touting a deal (with different terms) since 2022, though nothing is yet finalised. But HB Antwerp is little known and was only founded in 2020. Oded Mansori, one of its co-founders, took his partners Shai de Toledo and Rafael Papismedov to court when they removed him from the company in September 2023. By October, he had been reinstated. Boaz Lev is now also a partner, responsible for new business development.

Africa Confidential reported in October 2023 that Rafael Papismedov was "diamond adviser to Congo-Kinshasa President Felix Tshisekedi". Anybody who has read The Looting Machine has seen this kind of movie before. A previous adviser to Tshisekedi was Dan Gertler, who held a "25-year stint at the heart of Congo-Kinshasa's mining industry". Gertler was reportedly paid US$260 million by the government "in exchange for giving up his mining concessions… and to help him lobby in Washington to have the sanctions [imposed on him by the US government] revoked".

Perhaps HB Antwerp is squeaky clean, and we should read nothing into Papismedov's vacuum-filling in the DRC. De Beers is no angel. But De Beers' partnership with Botswana has served the country immeasurably well since independence. Masisi would have to have populist carats in his head to walk away from the deal and stake the country's future on a deal with a start-up that has no track record. ■

TOMRA Mining XRT technology recovers exceptional diamonds from Karowe mine

One of the largest rough diamonds in recorded history, a 2 492-carat stone, was recovered last August by Lucara Diamond Corp. with TOMRA X-Ray Transmission (XRT) technology at the Karowe Mine in Botswana. This extraordinary diamond is the latest of many impressive record-breaking recoveries achieved at the mine's Mega Diamond Recovery Plant since the installation of the two TOMRA COM XRT 1200 / D 2.0 sorters in 2017, when Lucara Diamond Corp. initiated a revolutionary transformation in the diamond mining industry's recovery process. By integrating XRT early into the flowsheet, post primary crushing, it is possible to recover liberated and free exceptionally large diamonds earlier in the process, thereby extracting revenue from the flowsheet faster and safeguarding diamond value from potential downstream damage or breakage. The 2 492-carat stone is historically the second-largest diamond ever discovered, following the 3 106.75-carat Cullinan diamond found in 1905. However, it is the largest diamond ever recovered directly from run-of-mine ore. It was followed, just a few weeks later, by a 1 094-carat diamond – the sixth rough diamond weighing more than 1 000 carats to be recovered at the mine, and one of the top 10 largest diamonds in history. ■

TOMRA X-Ray Transmission (XRT) technology at the Karowe Mine in Botswana. Tomra 2: TOMRA Mining XRT technology recovers exceptional diamonds from Karowe mine.

Weir showcases all-of-mine capabilities at MINExpo

Exhibiting at this year's MINExpo, Weir showcased its marketing-leading brands and unveiled a range of new innovative technologies and solutions, including the ESCO® NEXSYS™ GET Lip System for rope shovel dippers and the new high-capacity ENDURON® ELITE screen. Weir's booth also featured the Digital Hub, which highlighted Weir's digital offering – MOTION METRICS® and Weir's new digital brand, NEXT™ Intelligent Solutions. Attendees had an opportunity to experience an interactive scale P&H 41000XPC shovel model demonstration of MOTION METRICS® ShovelMetrics™ Gen 3, as well as a ShovelMetrics™ model control station, featuring the same touch screen monitor and controller used by operators. Jon Stanton, CEO of Weir said: '...We've been doing a lot of work to expand our portfolio of innovative, end-to-end solutions to help our customers produce the metals and minerals required to transition to a low carbon economy and it's exciting to be able to show that off at the world's largest mining show." ■

Weir at MINExpo.

Maptek welcomes new members to prestigious Hall of Fame

Technology company, Maptek, has announced new members to its Hall of Fame – individuals, who have made significant contributions in their fields and have inspired others through their achievements. The following people have made it into the Hall of Fame:

Senior Mine Engineer at Freeport McMoRan, John Combs has led innovations in geomechanics and slope optimisation using advanced technologies like LiDAR and drone photogrammetry.

Bill Everett has championed the use of modern technologies in the iron ore industry, including computer-based truck dispatch and mine engineering, while CEO of Emperor Metals, John Florek brings over 35 years of expertise in geology and mining. As General Manager of Technical Services at Whitehaven Coal, Shaun Leary has over three decades of experience in leadership and technical roles across various sectors, including mining and finance with Vice President of Ontario Operations for Agnico Eagle, Andre Leite, equipped with extensive operational, technical and project management experience across various metals.

With nearly 30 years of experience in the mining industry, Toby Prior is a Resource Geologist and co-owner of Measured Group. Head of Mineral Resource Management at Nevada Gold Mines, Patrick Ruffridge brings a wealth of experience in resource geology and ore control.

With 25 years of experience in geology across gold, nickel and iron ore operations, Brent van Dijken is Principal of the Problematic Ore Project at BHP.

MD of AVCS, Andrew Vidale has nearly four decades of expertise in open pit mine evaluation, covering pit optimisation, design and cost modelling.

'These champions have set a standard of excellence by encouraging their teams to adopt the latest solutions. Future generations will benefit from their legacy,' said Maptek CEO Eduardo Coloma. ■

Maptek welcomes new members to its prestigious Hall of Fame.

Multotec exhibited innovative integrated solutions at Electra Mining Africa

The Tema Process dryer can operate at product temperatures up to 400 ˚C using various mediums such as air, steam, and inert gas.

In the evolving world of mining and mineral processing, Multotec remains steadfast in its commitment to driving innovation through research and development. This dedication was highlighted at Electra Mining Africa 2024, where Multotec unveiled a range of advanced products and solutions. These new advancements not only demonstrate Multotec's commitment to improving manufacturing capabilities but also emphasise its consistent backing of the industry with sophisticated customised technologies.

One of the key products displayed was the H450 Conturbex Centrifuge, a continuously operating filtration centrifuge. The centrifuge features a rotating assembly that generates centrifugal forces to separate solids from liquids using a screen element. Gerrit du Plessis, Product Specialist at Multotec, explains that this product is ideal for applications requiring the mechanical dewatering of process streams to produce a dewatered product or recover a liquid from solid waste. Another featured product was the Shaking Fluidised Bed Dryer, also known as the Tema Process Dryer. This unit thermally treats powders, crystalline products, and pelletised materials through fluidised air contact, achieving the desired final moisture content. Multotec also showcased the MA Oryx Pump, designed for the slurry industry with a focus on reduced wear, increased performance, and ease of maintenance. The new stainless-steel cyclone was another highlight at Multotec's exhibit. The cyclone, made entirely of stainless steel, is ideal for industries where contamination of processed slurry or liquid is unacceptable. By combining the H450 Conturbex Centrifuge, Shaking Fluidised Bed Dryer, MA Oryx Pump, and stainless-steel cyclone into an integrated solution, Multotec offers clients the ability to produce high-quality products that meet customer demands in terms of dryness, purity, and flow characteristics. ■

Xylem opens offices in Richards Bay

Xylem, a leading provider of pure water technologies and solutions, has opened a new office in Richards Bay, KwaZulu-Natal. Attracted to this ever-developing region for its growth in the water, industrial, and mining sectors, Xylem's presence near the new RBIDZ (Richard's Bay Industrial Development Zone) will ensure faster service delivery and help support economic development in the region. The RBIDZ is a new economic hub that encourages international export competitiveness and clusters smaller, downstream manufacturing businesses around existing major industries. It offers tax and duty-free incentives, world-class infrastructure and competitive input costs.
Opening offices in the region brings Xylem closer to numerous companies and trade opportunities. The offices also establish a direct relationship with Richards Bay, the third largest municipality in KwaZulu-Natal, and support modernising its wastewater and water delivery infrastructure. ■

Xylem opens offices in Richards Bay.

Special Steels **expands to Roodekop**


A 20-metre-span Condra crane refurbished for a mine.

Special Steels, a leading national supplier of certified steel round bar, hollow bar and plate to South Africa's engineering, mining and manufacturing sectors, is moving from Wadeville, Johannesburg, to larger premises in Roodekop. The move will provide much needed extra warehouse space to meet increased demand for the company's alloy and low, medium and high-carbon steels. Special Steels MD Byron Ferguson said the new warehouse floor area of 22 800 m^2 would provide more than three times the space of the company's current 7000 m^2 in Wadeville.

"At 23 000 m^2, Roodekop will accommodate increased stockholdings as well as the specialised equipment we use to cut, bore and finish steel to exact customer requirements," Ferguson said. Among the companies working closely with Special Steels to achieve a smooth transition is crane company Condra, which is to manufacture three new cranes and refurbish a further fourteen currently in use at the Wadeville warehouse. Each of these seventeen machines will be delivered, installed and commissioned according to a specific timetable dovetailing with the phased move. Special Steels ordered the new cranes in July, and the refurbishments in August. ■

Geobrugg: Safety is in our nature

Geobrugg is an independent company within the Swiss BRUGG Group. The South African production facility is based in Lanseria, Johannesburg. The factory in Lanseria was expanded this year to include two of the only machines producing high tensile mesh in Africa.

Geobrugg offers an alternative design solution to the mining industry with its light-weight steel wire mesh, MINAX, which offers superior strength qualities to other mesh types. Tests have shown that MINAX mesh used in combination with suitable anchors have offered a huge step towards solving situations where protection against dynamic loads is imperative.

The application of Geobrugg's MINAX mesh provides a solution for high energy demands up to 60kJ. Further advantages of Geobrugg mesh are the ease of handling and storage of the products.
The special coating of the mesh offers corrosion resistance of the products in the mining environment and ultimately a longer lifetime in comparison to welded mesh.
The use of MINAX mesh in underground operations have been shown to increase the productivity of mining development.
MINAX mesh offers at least three times higher tensile strength compared to mild steel wire. Our team of dynamic people can provide technical support on various flexible rockfall mitigation systems.
Not only does Geobrugg offer highly specialised know-how, but they rely on more than 65 years of experience in steel wire processing.

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