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# FOREWORD

## **WELCOME TO THE** April issue of Mining Global Magazine,

Coal is here to stay. That's the message from Andre Boje, CEO of the emerging coal miner Minergy. Through its flagship Masama Coal Resource in Botswana, Boje believes that South Africa will play a key role in the future of coal.

What role will automated drones continue to play in the evolving mining landscape? From easy of surveying to emergency response, we examine how drones could revolutionise the entire industry.

Chile can be the Saudi Arabia of lithium as Wealth Minerals President Tim McCutcheon walks us through the company's key acquisitions in South American country, as it plans to harvest resource from a quintet of lithium-rich salars.

We also look at the emerging trend of carbon optimisation, as Rio Tinto looks to achieve carbon neutral mining in just five years' time - what are the implications of such a ground-breaking promise?

Be sure to further look at the top 10 copper producing mines in the world, calling at Chile, Russia and Peru.

*Enjoy the issue!*



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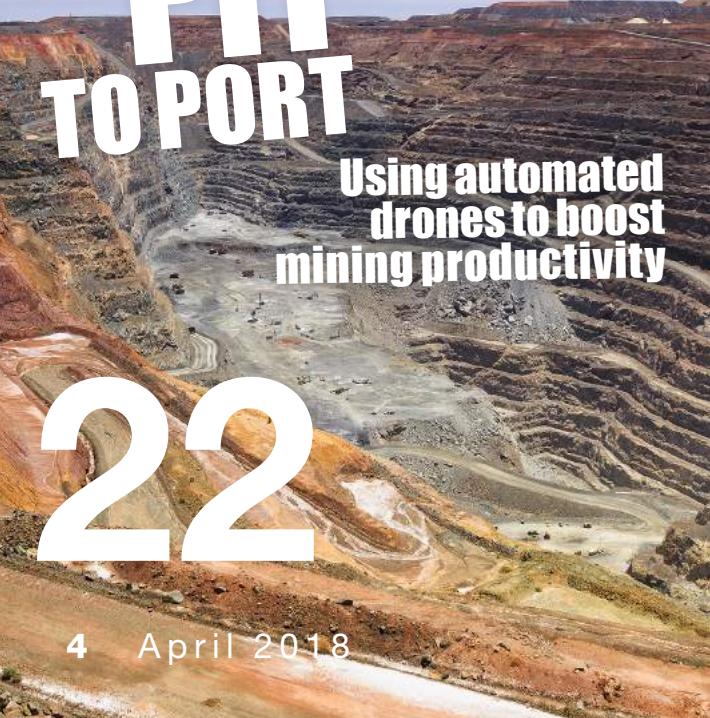


## The future of coal in the heart of Botswana

MINING STRATEGIES



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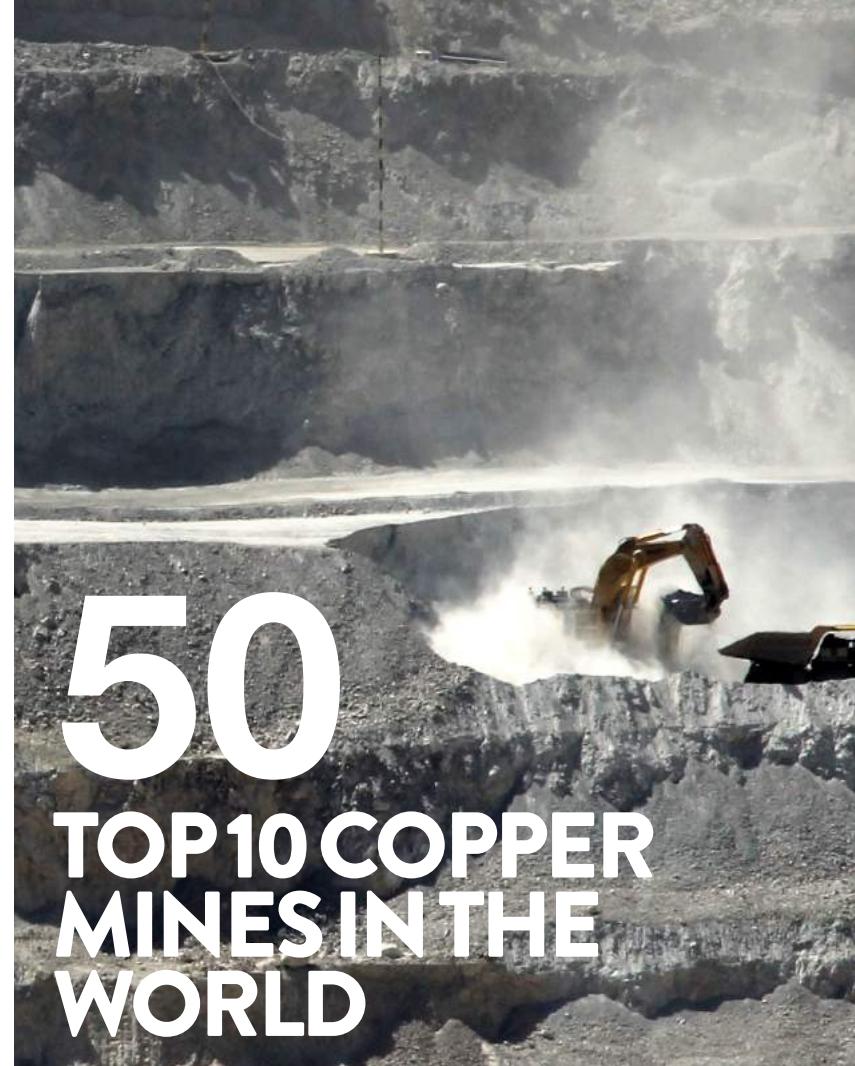
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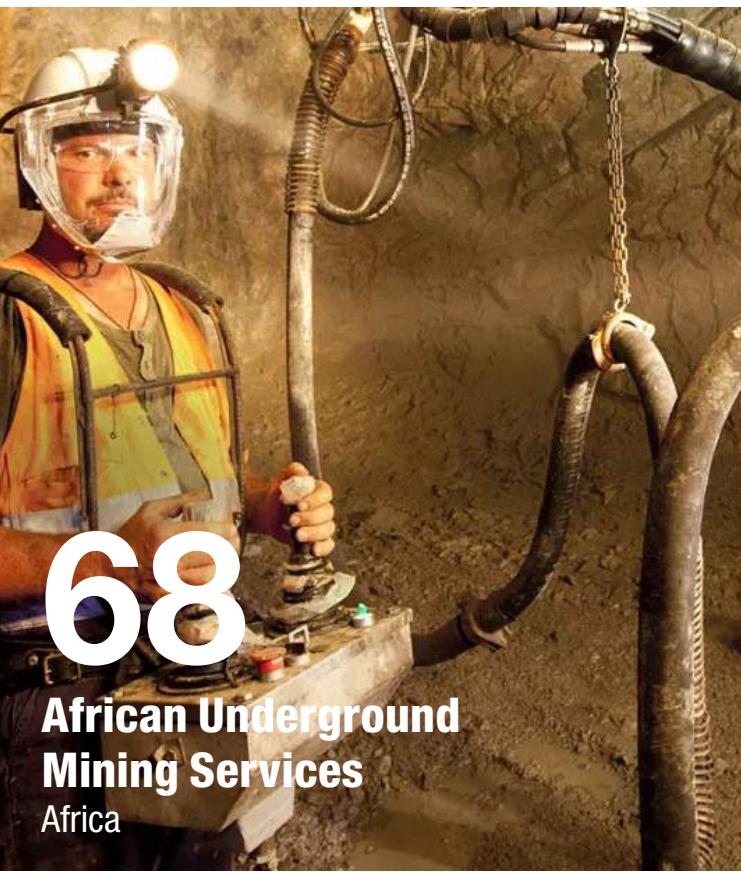
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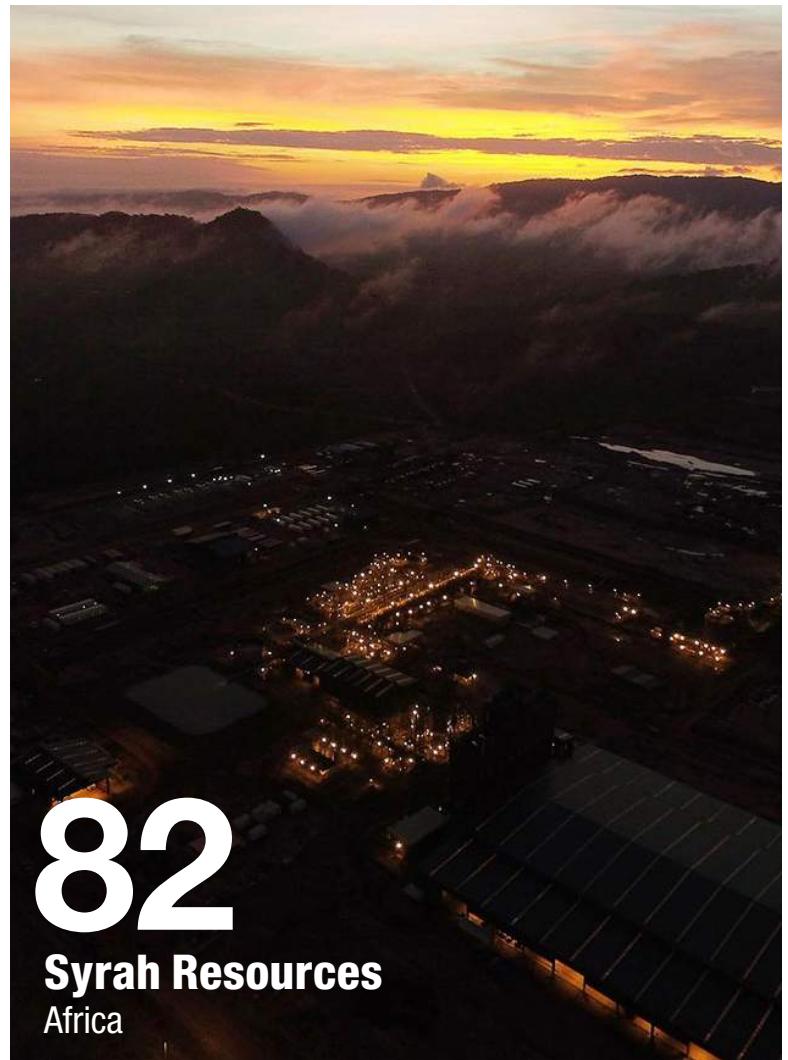
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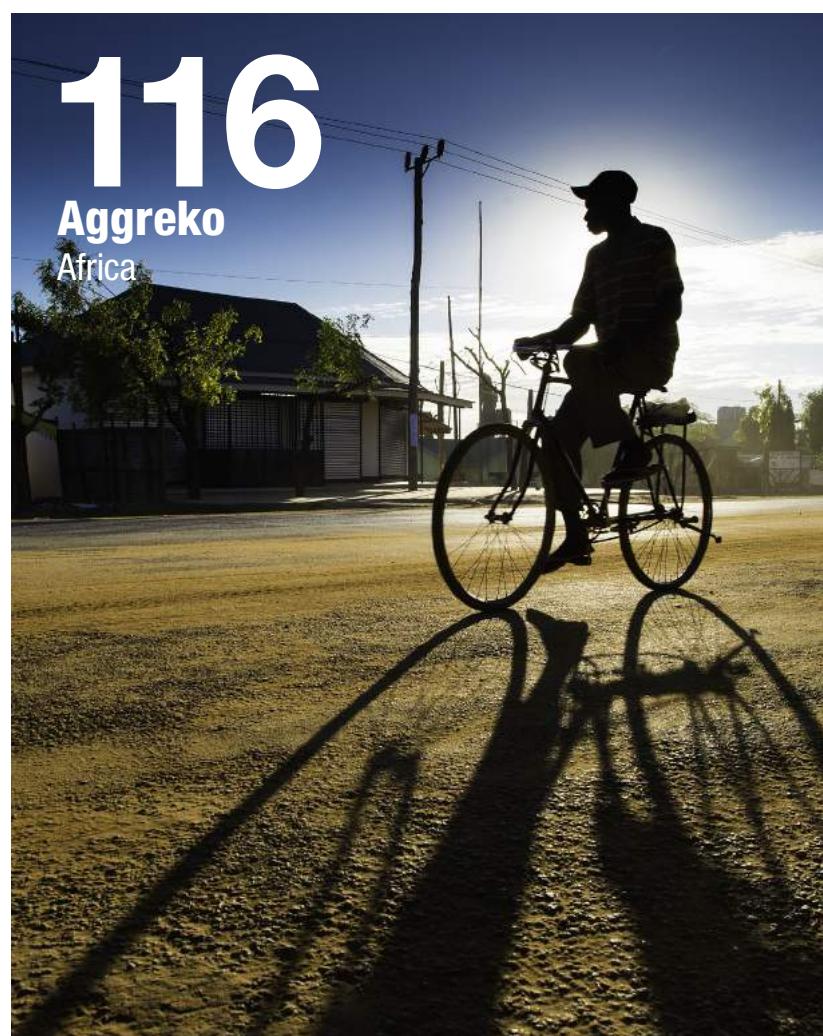
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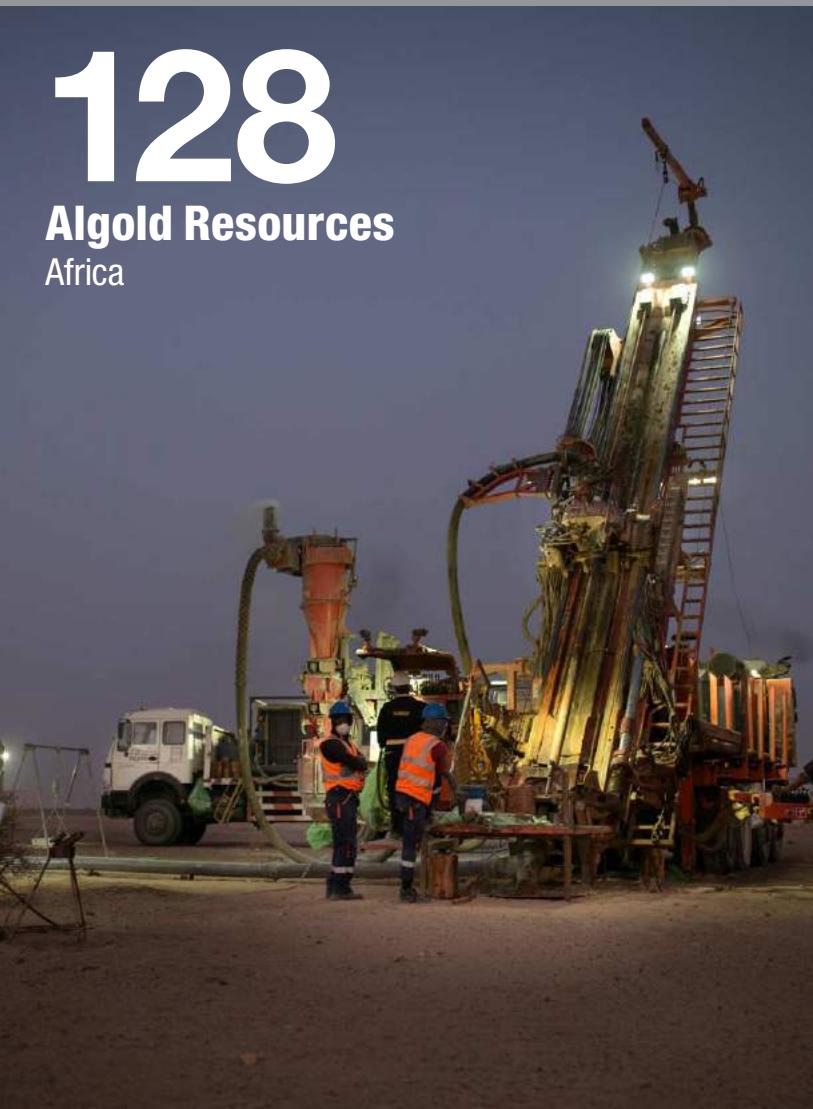
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A close-up photograph of a woman's face and hands. She has long dark hair and is looking down at a smartphone she is holding in her hands. The background is blurred, showing what appears to be a city street at night with lights.

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# MINING STRATEGIES



# The future of coal in the heart of Botswana

Through the 380Mt Masama Coal project in Botswana, emerging coal miner Minergy looks set to pioneer the future of Southern Africa's coal industry

Written by DALE BENTON

# MINING STRATEGIES



**OUTSIDE OF GOLD**, coal is arguably one of the first mineral resources that springs to mind when the conversation turns to mining. Coal has been mined as a resource for energy for decades, and as with any commodity, there has and will always be a suggestion that it's on the decline and mine operators and explorers should be seeking alternative opportunities.

This conversation is largely stimulated by the majors of the world, such as Rio Tinto selling all of its coal assets as it seeks to "streamline its portfolio".

While this is very much the case, Rio Tinto believes that its other metals-based assets are much more viable and profitable than coal – a major mining operator exiting one of the most profitable



mineral sectors speaks volumes as to its position in the current mineral market. Couple this with the news that China is continuously seeking more alternative renewable energy sources, being one of the largest consumers and producers of coal, what does the future hold for coal mining?

To Rio Tinto, coal may very well have lost some of (if not most of)

**“We are working with a whole lot of different people because not only do we want to see a Botswanan coal industry, we want to see a thriving coal industry. Minergy can be the flagbearer, the pioneers, the torch bearers”**

**– Andre Boje, CEO,  
Minergy Limited**

# MINING STRATEGIES

its sparkle, but some of the biggest players are still very much alive and kicking in the coal market. Glencore remains the largest exporter of coal globally and has invested billions of dollars in purchasing those Rio Tinto coal assets, but it's not only the larger players that are defining the industry of today and, more importantly, the industry of tomorrow.

One company in particular is embarking on an ambitious growth journey in Southern Africa.

“Coal is here to stay for the foreseeable future,” says Andre Boje, CEO of Minergy Limited. “There is high demand for coal in Southern Africa, and it is likely to remain the most affordable fuel for power generation in many developing and industrialized countries for decades.”

The International Energy Agency forecasts that coal will remain among the largest single sources of electricity generation for another 30 years, with it currently accountable for 41% of global generation and 29% of all primary energy demand.

As a further testament to the high demand for coal in Southern Africa, in 2017 Botswana was listed as the highest ranking African country for investment attractiveness by the Fraser Institute of Mining. Running alongside this is the small fact that there are estimated coal reserves of up to 200bn tonnes in Botswana. Needless to say, the country certainly has the resources to meet the growth in demand anticipated across Africa, which is where Minergy comes in to play.

**“There is no such thing as the demise of coal, and we want to grow Botswana’s coal, not just for Minergy, but for Southern Africa”**

– Andre Boje, CEO, Minergy Limited



**Andre Boje, CEO,  
Minergy Limited**

Minergy is an emerging coal mining and trading company, based in Botswana, with the one true goal of becoming the supplier of choice to industrial customers and power utilities across Southern Africa.

Boje has operated in the coal mining industry for more than 20 years, trading coal to industrial users across the region with Chandler Coal, and it is this experience first-hand of the Southern African coal market that presented him with a key understanding of how

to succeed in this space.

The secret to success as a coal trader in the growing energy power generation market across Africa is a simple one – logistics.

“In the power industry, the only real money makers are the guys that build the power stations,” he says. “So, I started to look at how we monetise the coal in Southern Africa and it’s through logistics. It’s not rocket science, the guy who can deliver the coal to the end user at the cheapest price is going to get the order, and



**minergy**  
coal and energy

Masama Coal Project  
Medie



that's what we do with Minergy."

Minergy has a core focus, to develop its flagship Masama Coal Mine located on the Southernwestern edge of the Mmamabula Coalfield in Southern Botswana. Through its wholly owned subsidiary, Minergy Coal, the company is sitting on top of a 380Mt coal resource and, given its location, it can reliably deliver a steady stream of coal product to the local, regional and international markets.

As Boje noted, the company plans to achieve this growth and become the coal partner of choice through an unrivalled logistics network.

It is not uncommon to hear from mining operators working throughout the African continent highlighting the logistical challenges that come with it. Working in remote locations with limited infrastructure can sometimes be the difference between a potential world class deposit developing into exactly that, or being left behind due to the challenges and, ultimately, the cost of handling the logistics of the operation.

But this is not the case for Botswana.

"We ship the bulk of our coal into

the regional market by road and there are a dozen truckers who will supply you with the necessary logistics to get the coal out of Botswana," says Boje, "and the road infrastructure in Botswana is really good.

"The government is committed to developing the coal industry, so we do not face the logistical challenges in the domestic market. Internationally, that's where it becomes a little more challenging."

Earlier in 2018, the rail logistics provider Transnet Freight Rail entered into a memorandum of understanding with the government-owned Botswana Railways to build a 123km rail line connecting Waterberg coalfield in Limpopo and Botswana.

This will go a long way in enabling Minergy to connect with international markets and play a key role in the export of 10-12mn tonnes of coal per year. Described by Boje as a "game changer," this network will not only significantly boost Minergy's growth but be a driving force in the growth of Botswana, Southern Africa and the continent at large.

"All of Botswana, not just Minergy, can contribute to African growth," he says. "And utilising the Southern

# MINING STRATEGIES

African logistical infrastructure will be the key force in enabling that growth. By connecting us with wider markets, it will only serve to cement Botswana's status as an attractive mining jurisdiction for both operators and investors."

For any mining operation, having a strong, supportive relationship with the government or a government body is something that cannot be taken for granted. Across the African continent, particularly in the mining industry, there are a number of areas where political instability has historically proven to be a major hurdle in the development of the sector.

Once again however, this is an area where Botswana can be proud.

"Read a newspaper and you'll see stories of political turmoil, resource nationalisation, corruption and poor mining environmental standards," concedes Boje. "But here in Botswana the government has truly embraced us and given us as an industry every assistance to get our mining licence, and they continue to actively encourage our operations."

Boje continues: "It's absolutely vital that you have

a good relationship with the government otherwise, quite frankly, you're never going to succeed. It's as simple as that."

Minergy Coal was listed on the Botswana Stock Exchange (BSE) in April 2017, and Boje highlighted the listing as the "beginnings of a resurgence in the Botswana coal industry".

But it's not just the Botswanan space where coal is resurgent, and it's not just the development of a coal resource like Masama that Minergy sees as the endgame.

"Never before has coal been more investible than it is right now," says Boje. "But there is no coal industry in Botswana without the government, without local partners, without local skillsets.

"We are working with a whole lot of different people because not only do we want to see a Botswanan coal industry, we want to see a thriving coal industry. Minergy can be the flagbearer, the pioneers, the torch bearers.

"There is no such thing as the demise of coal, and we want to grow Botswana's coal, not just for Minergy, but for Southern Africa." ■



**“All of Botswana, not just Minergy, can contribute to African growth. And utilising the Southern African logistical infrastructure will be the key force in enabling that growth. By connecting us with wider markets, it will only serve to cement Botswana’s status as an attractive mining jurisdiction for both operators and investors”**

**- Andre Boje, CEO, Minergy Limited**

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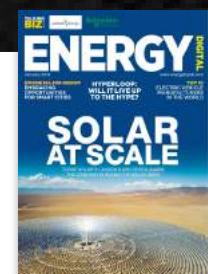
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*“We recently worked with BizClik Media on an article which characterizes and explains the total value that Kudu Supply Chain has on company growth plans. From start to the finish, it was a pleasure working with the BizClik team. The feedback we have received from different audience groups on the article was phenomenal. It has attracted a lot of interest and attention to our company, our growth plans and has definitely created additional value to what we are trying to achieve.”*

*– Murat Ungun, Senior VP Supply Chain Kudu Corp*

## VIEWs: EXCLUSIVE COMPANY REPORTS

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MINING 4.0



# FROM PIT TO PORT

Using automated  
drones to boost  
mining productivity

**From ease of surveying to emergency response, automated drones could play a revolutionary role in the mining industry. Patrick Vernon investigates the uses of the technology**

**Written by PATRICK VERNON**



## WITH MANY MINES

maturing and productivity decreasing, the companies behind them are trying increasingly hard to maximise the value of their operations. It's not an easy thing. It requires efficiently combining people, processes and equipment – and mining companies have been scrambling to improve operational efficiency. However, it's possible many of them are looking in the wrong place.

While many are perhaps understandably focusing on what they could do better on the ground as well as below the surface of the earth, not nearly enough of them are looking to the sky. They should, though. Automated unmanned aerial vehicles (UAVs), or drones, offer a versatile set of productivity advantages that are poised to revolutionise the mining industry.

## A MILLION USES FOR AUTOMATED DRONES

Automated drones, such as those that have emerged thanks to leading manufacturers like Airobotics, boast a variety of impressive uses and are able to complete an entire mission, entirely by themselves. They can take off and land – without the intervention



of a human pilot, both scheduled and on-demand – yet precise flying missions are just one feature of these automated drones. They can be equipped with a portfolio of sensors, cameras and corresponding analytics software in order to inspect assets, identify risks like gas or



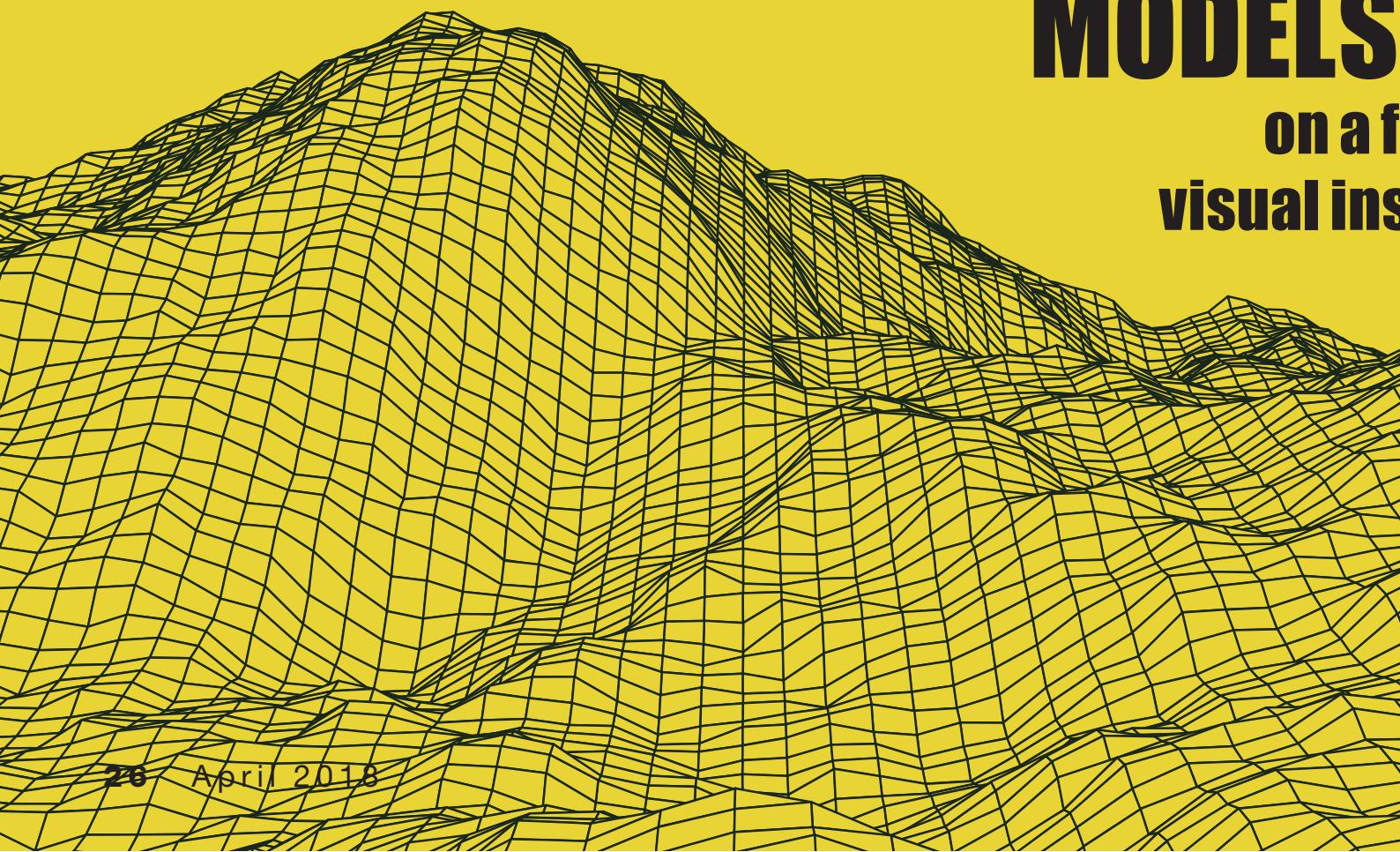
chemical leaks, create 3D maps of their environment, and even perform hands-on (rather, robotic-pincers-on) work in the field. All data capturing and processing can be completed without the requirement for human operators.

Further, leading automated drones can charge themselves, swap

batteries if necessary, and even swap payloads and sensors, eliminating much of the maintenance work that goes into having an on-site drone. All told, automated drones eliminate the significant expense of human pilots as well as the delays associated with waiting for human operators when



**“DRONES**  
are increasingly  
being used for  
**SURVEYING and**  
**TERRAIN MAPPING,**  
as they can automatically render  
three dimensional maps and  
**MODELS**  
on a f  
visual ins



a drone needs to fly on demand – precious minutes that are not only costly but can present a risk to human life. This advanced technology offers benefits to a wide range of industries, very much including mining.

## DIGGING DEEP ON DRONE CAPABILITIES

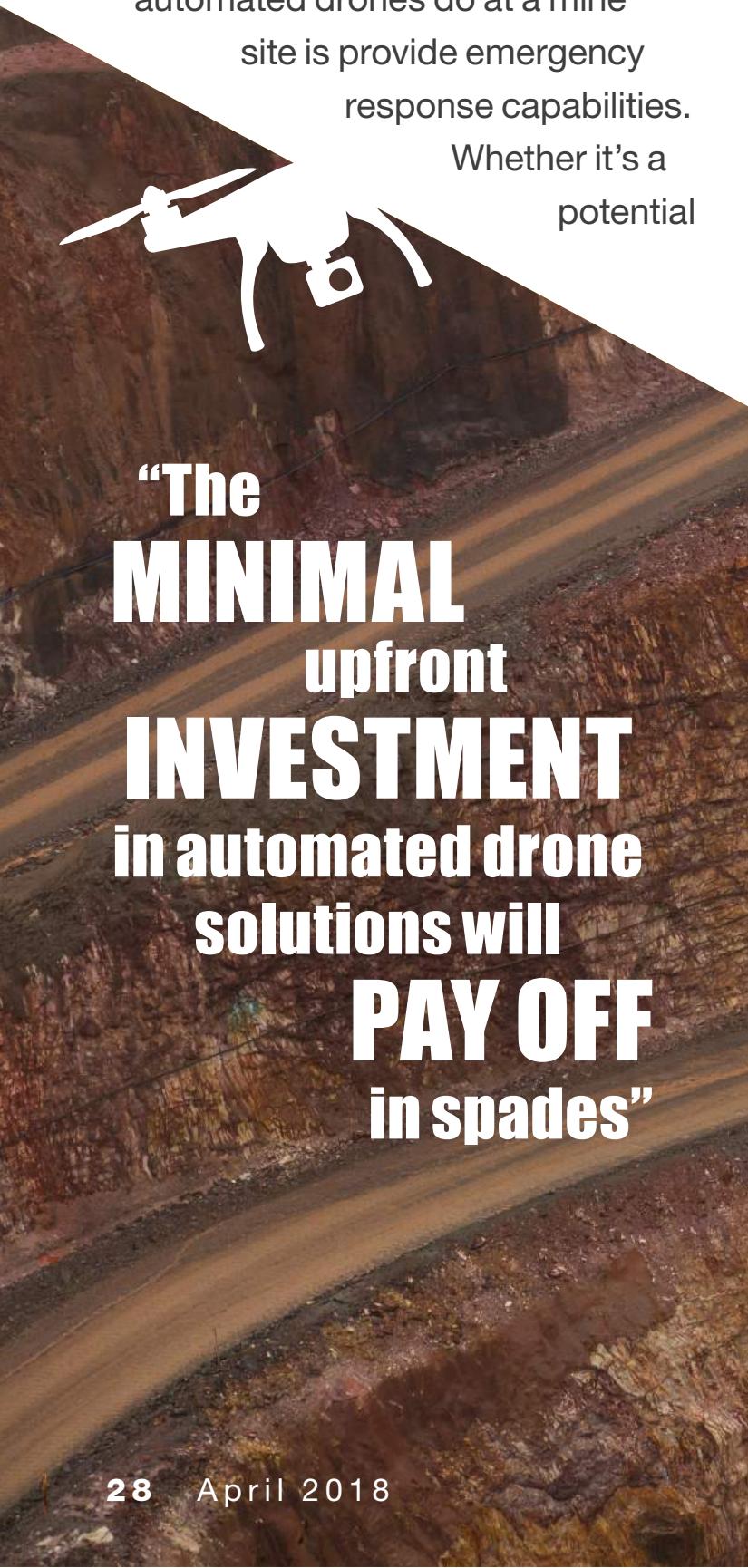
In the mining industry, automated drones provide more efficient alternatives to traditional human-based approaches. For example, they can be deployed to conduct asset inspections, as they can quickly and safely reach areas that are difficult for humans to access. Automated drones can

also be used to quickly complete surveying or take measurements of stockpile volumes, to ensure a blast plan is being followed precisely, and to conduct essential inspections of haul roads.

However, beyond replacing traditional operations, automated drones also offer unprecedented opportunities to the mining industry. For example, drones are increasingly being used for surveying and terrain mapping, as they can automatically render three dimensional maps and models based on a fly-over visual inspection. The simplicity of obtaining such detailed models surpasses anything that was previously

based  
fly-over  
inspection”





possible, opening the door to unforeseen productivity solutions.

As important as improving business processes is for mining companies, perhaps the most important thing automated drones do at a mine site is provide emergency response capabilities.

Whether it's a potential

incident at a blast site, a haul road or elsewhere, an automated drone can immediately launch and begin transmitting live footage of the incident, providing essential information to responders.

### **THE ADVANTAGES OF AUTONOMY**

Mines and other industrial sites can be dangerous places, and human fatalities are not unheard of. Using automated drones for

**"The  
MINIMAL  
upfront  
INVESTMENT  
in automated drone  
solutions will  
PAY OFF  
in spades"**

### **IN FOCUS**

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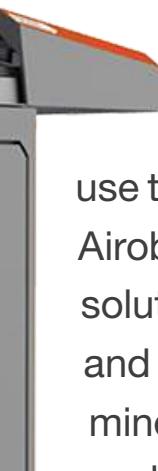


the most dangerous of tasks eliminates personal risk, and the possibility of emergencies and other productivity delays.

Further, the minimal upfront investment in automated drone solutions will pay off in spades. Drones can quickly collect a virtually unlimited amount of data from around the mine, stopping only when they need to recharge. With the right analytical tools, this treasure trove of data can

be used to obtain actionable insights into a mining operation, begetting further productivity advantages.

Boosting mine productivity isn't a goal to be taken lightly. Research has revealed a [global decline in mining productivity over the past 10 years](#), meaning mines must find a way to increase productivity or risk falling behind. Now may be the best possible time for mining companies to start looking up and aiming high. ■



Airobotics is a company producing industrial, automated drones. With a presence in the US, Australia and Israel, the company provides

end-to-end automated solutions for collecting aerial data. Companies can use this on-site and on demand. Airobotics' surveying and mapping solutions promise to improve safety and ease in surveying areas like mines by automatically deploying and landing drones across a site. The drone can then create "highly accurate, best-in-class

orthophotos and digital evaluation models" which will help surveyors. In addition, Airobotics promises mining companies that it can help provide critical information for: terrain mapping and change detection; stockpile volumes and end-of-month reconciliation; asset management and scheduling; situational awareness and emergency response; infrastructure and equipment inspection; and security and surveillance.



OPERATIONAL EXCELLENCE

WEALTH M

“CHILE”

*Laguna Verde, Chile*

# MINERALS -



can be the  
**SAUDI ARABIA**  
of lithium”

Wealth Minerals President Tim McCutcheon talks about the company's key acquisitions in Chile, where it plans to harvest resource from a quintet of lithium-rich salars

Written by **DAN BRIGHTMORE**

## WEALTH MINERALS WAS

born in late 2016 when CEO Henk van Alphen got together with Chilean businessman Marcelo A. Awad, a former director of the London Metals Exchange and long-time CEO at Antofagasta (one of the world's largest copper mines).

The pair noticed an ongoing paradigm shift in the world regarding the consumption, use and storage of energy and that Chile, as a huge supplier of lithium to the markets, had an important role to play. The first step was to put together a platform and the right team to boost its capabilities. Wealth Minerals became that platform, and the hunt for lithium assets in their natural home of Chile began in 2016 with an acquisition vector which saw the company pick up the Trinity project, Atacama, Laguna Verde, the Five Salars and the Seven Salars

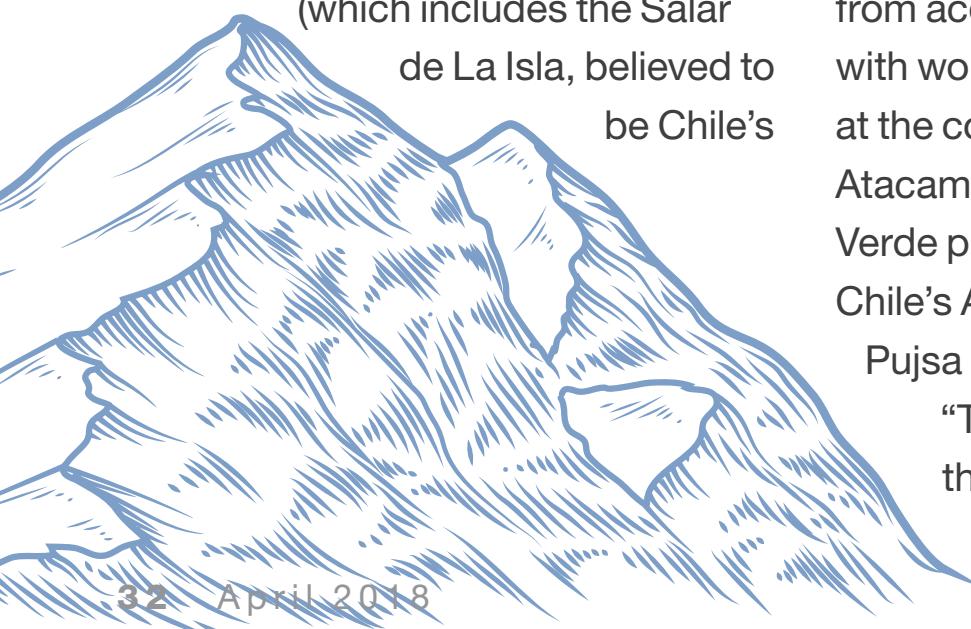
(which includes the Salar de La Isla, believed to be Chile's



second largest lithium deposit) within the space of 10 months.

Wealth's focus has now shifted from acquisitions to development, with work programmes underway at the combined 46,000 hectare Atacama site, Trinity and Laguna Verde projects, with plans to develop Chile's Aguas Calientes Norte, Pujsa and Quisquiro Salars.

"The truth of the lithium space is that 50% of the world's resource



# OPERATIONAL EXCELLENCE

**“50%** of the world’s lithium resource comes from hard rock deposits and 50% from dried salt-lake beds, which in Spanish are known as **SALARS**”

TIM MCCUTCHEON,  
President of  
Wealth Minerals



comes from hard rock deposits and 50% from dried salt-lake beds, which in Spanish are known as Salars,” explains the President of Wealth Minerals, Tim McCutcheon. “Salars are a type of geological formation visible from outer space. They’re all at surface, nothing is hidden. You’re never going to discover a new one, so the entire world knows where these things are and certain salars have a tendency to yield lithium. By

recognising the paradigm shift before others and by recognising Chile as the premier jurisdiction to be involved in, Wealth was able to make up a lot of ground in a short space of time. By securing title to land up front and then using the equity platform to spreading out the payments, we’ve lowered the burden on the company and punched above our weight. If we’d had to borrow cash to do this in one go I don’t think it would have happened.”

# OPERATIONAL EXCELLENCE

Argentina also boasts considerable lithium activity, though McCutcheon asserts the benchmark his company needs to beat is far from onerous. “Grade is always very important to any mining operation,” he says. “There’s been a lot of market excitement about some of the recent results from Argentina, but the grade is at a level we feel very comfortable meeting or exceeding, even at this early stage. A key issue of processing lithium from

salars is the use of solar evaporation to dry out the lithium-bearing salts from the brine water extracted.

“This process happens a lot faster when you’re at lower elevation,” maintains McCutcheon. “Our Atacama Salar is the lowest altitude salar in production today, so when we look at the investor enthusiasm in Argentina it makes us very optimistic about our project because we think our grade and faster process will translate into profitability.”

Wealth Minerals is also committed to risk management and reduction achieved through data points and statistics gathered through sampling, trenching and drilling. “Geologically, salars are relatively young and because of their nature with sediments deposited over thousands and millions of years, they’re fairly predictable,” explains McCutcheon. “With hard rock deposits containing the likes of copper or gold, you’re dealing with several billion years of faulting, thrusting and subduction. The data points are required to have a reasonable level of statistical confidence that your resource actually exists. With a salar, the number of points you need to have at a very high statistical confidence

**Wealth Minerals President  
Tim McCutcheon**



level is actually quite low, which means less drilling and less of a burden to show what actually exists underground because of the nature of the geological unit. It's sedimentary which means a uniform process is happening throughout the entire geological feature."

McCutcheon is particularly excited about the company's project at Laguna Verde because as well as the presence of above ground brine, its density below ground is going to show a lot more volume and a higher grade, hence more lithium. "We're going to be drilling on that," he confirms. "It's the same at Atacama and then 80km to the east at Trinity we will piggyback the mobilisation effort. So, Wealth Minerals will have three projects with fresh data points for the market to digest. The key thing is that because all three have uniform geological features, and though a couple of data points might not be a resource, it will become very clear that the risk has been significantly removed."

Mother Nature has provided Chile



with some of the largest salars on the planet, with grade consistently shown to be higher on average than similar assets in Bolivia or Argentina. "Chile is essentially the 'Saudi Arabia of Lithium,'" reveals McCutcheon. "Chilean mines feature the largest confirmed lithium reserves in the world, with over 7.5mn mega tonnes. The lithium produced from the Atacama Salar in Chile is the highest grade produced from brine in the world."

From a jurisdictional point of view, McCutcheon believes the industry is keen to choose Chile because it's very stable. Since the mid-70s it has gone through peaks and troughs with



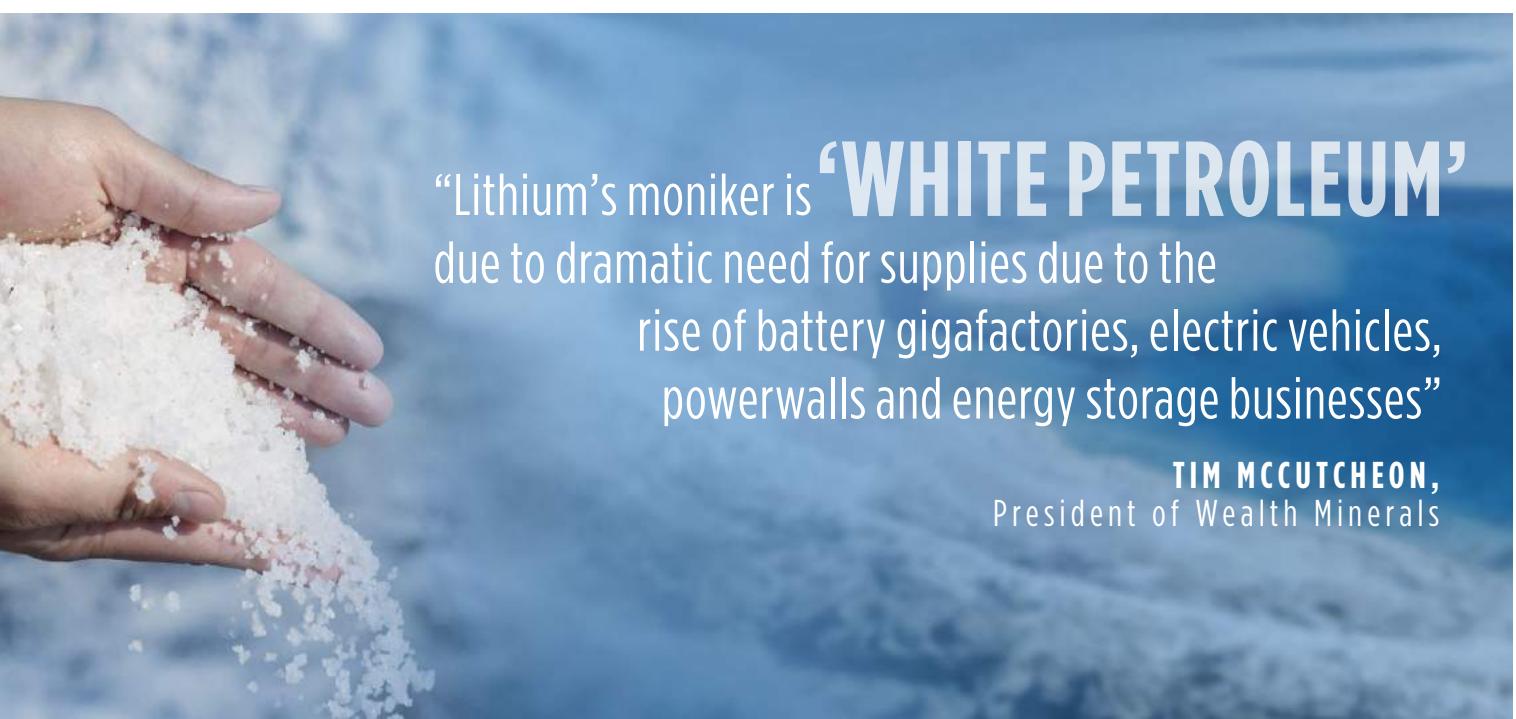
# OPERATIONAL EXCELLENCE

copper prices, world expansions and contractions, but despite global swings, Chile has stood out as a place where companies can feel comfortable about their property rights, the rule of law and the local fiscal regime. This guards against the kind of budgetary issues that cause debt problems and defaults in other parts of South America.

“Lithium’s moniker is ‘white petroleum’ thanks to a dramatic need for supplies due to the rise of battery gigafactories, electric vehicles, powerwalls and energy storage businesses,” notes McCutcheon. “As a country, Chile recognises its well-endowed with lithium and the press is highlighting the need to ramp up

activity and allow investment into its lithium sector. It’s their chance to have two legs to stand on. Right now, Chile stands very much on the copper leg, but having lithium is going to be very complementary to that.”

To ramp its own operation, McCutcheon aims for Wealth Minerals to team up with one of three state-owned Chilean companies in the mining space – CODELCO (the copper giant), CORFO (the Chilean Economic Development Agency) or Enami (copper processing). “So far, we have managed to raise money from the capital markets to fund our activities and our acquisitions,” he explains. “As we enter the development phase the numbers are getting much bigger.



“Lithium’s moniker is **‘WHITE PETROLEUM’** due to dramatic need for supplies due to the rise of battery gigafactories, electric vehicles, powerwalls and energy storage businesses”

**TIM MCCUTCHEON,**  
President of Wealth Minerals

## **A Wealth Minerals drilling operation**



The key thing now is to remove the perception of financing risk. I don't think we'll have a problem raising money, but the general investor public would like to see bigger capital raises, which means it would be better to have a strategic partner in the shareholder structure to help us push everything forward and put people at ease with the knowledge that money is going to be available when we need it."

In 2018, Wealth Minerals is targeting a data set for two of its assets that will have a resource as a foundation to begin engineering work. McCutcheon

hopes to then be commissioning a preliminary economic assessment that would serve as the basis for moving towards a feasibility study.

So, where does McCutcheon see the industry heading in the next five years and what are his hopes for Wealth Minerals? "It doesn't take a genius to look at the sector and see a big gaping hole in the pipeline of what's happening in the world today," he notes. "In any commodity, usually you have a fairly robust pipeline from projects being wound down, to projects at the

# OPERATIONAL EXCELLENCE



## Wealth Minerals and the rise of electric vehicles

peak of their production, projects being commissioned, projects being developed, projects being explored and projects being staked. Companies tend to allocate capital to respond to demand from world markets.”

However, in McCutcheon concludes with words of warning for the energy sector and a clarion call for investment: “If you’re going to spend \$5bn on a lithium-ion battery factory and then have it stand idle because you didn’t spend \$100mn on scooping up a resource project, that’s just stupid, and a lot of the players are starting to realise that. Elon Musk made the comment that

lithium’s not a big element – it’s ‘like sprinkling salt on a salad’. That’s a totally erroneous analogy because if you don’t have the salt, there is no salad. Lithium-ion batteries de facto must have lithium in them – it doesn’t matter how small the amount.

“If you look at the announced plans from auto manufacturers alone – Mercedes, Volvo, GM, Ford – across the board, there’s going to be massive demand for lithium well in excess of where we are now. We’re a little over 200,000 tonnes of lithium into carbon equivalent a year and looking in the next seven to 10 years at more than double that – that’s a conservative



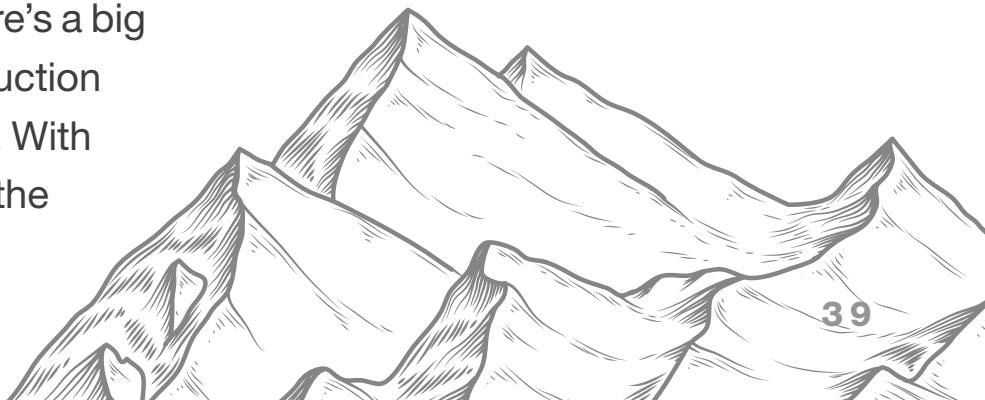
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estimate. When paradigm shifts happen, they happen exponentially, not incrementally. People are already allocating capital to make it happen because they've been trained that commodities are available at any price, it's simply a question of supply and demand curves. They need to understand the supply curve can just end, so will need to start investing in their supply chain for raw materials or the capital investments they're making into everything else will be for nought." the lithium space there's a big hole between projects in production and projects being developed. With very few set to come online in the

next five years McCutcheon sees an opportunity for his company. "If you look top down there are plenty of projects out there that have more than enough potential to supply demand in the long term – I don't see a situation where because we run out of lithium we don't use lithium-ion batteries anymore. It's very clear there's plenty of lithium for everyone to consume, but in the medium term there will be a big scramble to find this resource." ■



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SUSTAINABILITY & CSR

# THE CAR QUESTIO

Written by MATT HIGH

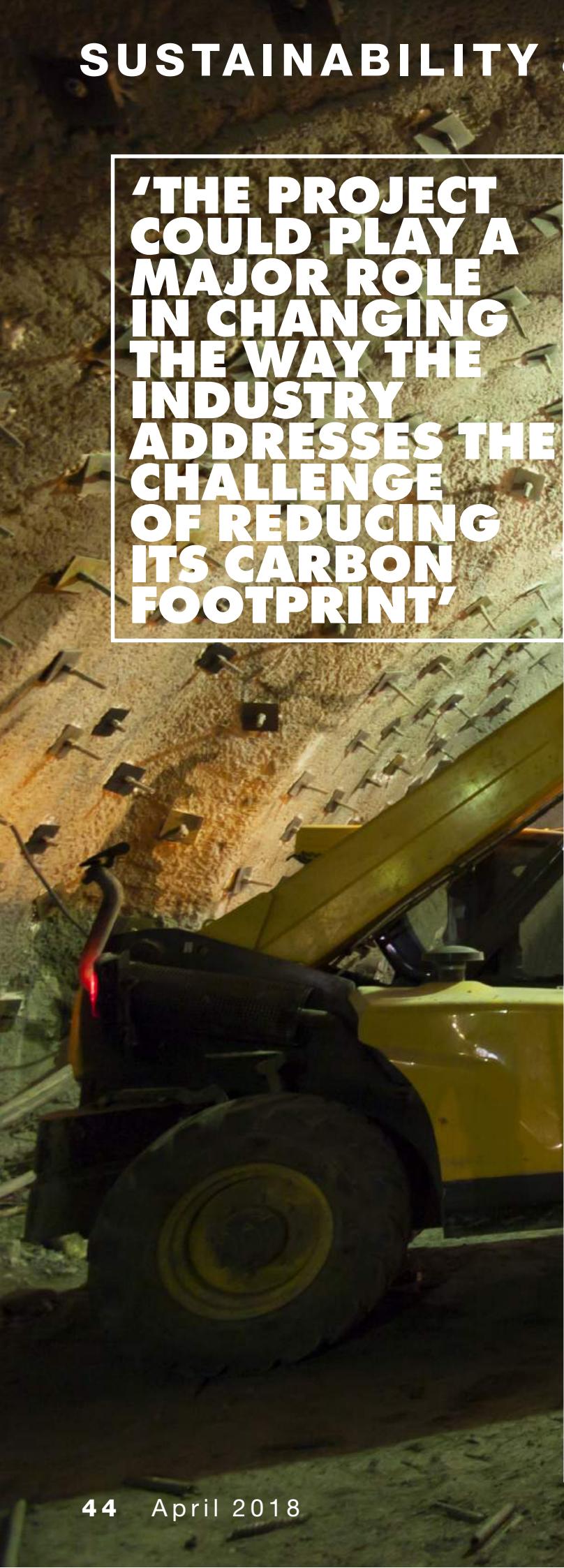
# CARBON ON

An aerial photograph of a large-scale mining operation. In the center, several orange haul trucks are lined up, their beds filled with dark material. A massive piece of mining equipment, possibly a mobile jaw crusher or a conveyor system, is positioned between the trucks. The ground is covered in deep, dark tracks from heavy machinery, creating a textured pattern across the landscape.

WITH CARBON EMISSIONS NOW A KEY DRIVER IN STRATEGIC THINKING FOR MANY MINING COMPANIES, A NUMBER OF INNOVATIVE METHODS ARE BEING EMPLOYED TO OPTIMISE CARBON EFFICIENCY

# SUSTAINABILITY & CSR

**'THE PROJECT COULD PLAY A MAJOR ROLE IN CHANGING THE WAY THE INDUSTRY ADDRESSES THE CHALLENGE OF REDUCING ITS CARBON FOOTPRINT'**





**WHEN DE BEERS** announced last year its aim to achieve carbon neutral mining in just five years' time, it was undoubtedly a ground-breaking statement – particularly in an industry that has, in the past, faced scrutiny for its environmental legacy. However, this direction for De Beers was hardly a surprising one.

Indeed, in light of COP21 targets, carbon pricing in many major mining sectors, regulatory targets from key industry bodies and an increased pressure from investors to actively demonstrate a commitment to low-carbon operations and footprint, the optimisation of carbon emissions is a key strategic driver for global mining companies.

Whilst there's little doubt about the industry's progress in terms of productivity and efficiency, it remains both energy and carbon intensive, particularly with respect to a continued reliance on traditional fossil fuels for power and electricity. For example, a mere 2.5% of the sector's electricity currently comes from renewable energy.

Further evidence of the necessity for optimised carbon efficiency is demonstrated in the Carbon Disclosure Project's (CDP) mining report, which highlights the preparedness of leading mining organisations to adapt to, and play a role in, a low-carbon environment.

"As a sector with a significant carbon footprint and that supplies the economy, mining is faced with the reality that a low-carbon transition will impact many of the industries that currently demand its commodities," says Tarek Soliman, Senior Analyst, Investor Research at CDP.

# SUSTAINABILITY & CSR



According to Soliman, mining companies should “adjust their long-term strategies to reflect the changing ground in carbon regulation and commodity consumption trends in light of events such as China’s proposed carbon pricing scheme. Some companies are doing more than others to ready themselves for transition, and investors will want to know what the potential implications are for their portfolios. Companies can,” he adds, “cut costs

by getting carbon under control.”

When it comes to carbon, mining companies effectively face a twofold challenge. In the first instance, it’s a given that a focus on ‘carbon optimisation’ in terms of output and emissions is a prominent concern. Yet, in applying various methods of achieving this, companies must make a wider transition to adapt to a low-carbon economy whilst still meeting an ever-increasing demand for energy and resources.

De Beers, which touts a 100% carbon neutral target and the ultimate offsetting of more emissions than it produces, stating that a typical mine has the potential to offset 10 times its annual emissions, isn't alone in its focus on decarbonisation.

Bethwin Cowcher, Legal Manager for Energy and Power at leading iron ore mining company Fortescue Metals Group, says: "Carbon is a key strategic concern globally and therefore it translates into a key driver for Fortescue to ensure that we play an appropriate role in efforts to reduce emissions.

"Carbon is a cost to our business that can be mitigated in a number of ways," she adds, "whether via different technology choices for electricity generation, which are growing rapidly, or through alternative fuels such as hydrogen or innovative mining methods." The latter can certainly be applied to De Beers' innovative project, which has the very real potential to change the wider industry and its approach to the issues of optimising carbon efficiency.

In 2017, the business reported that it was investigating the carbonation potential of Kimberlite, a naturally

occurring rock found in its diamond mining operations that can store carbon emitted directly from the company's mining activity, as well as absorbing it directly from the atmosphere. The latter in particular would, if successful, effectively offset the emissions of a mining project as much as tenfold and could completely offset carbon emissions from all De Beers operations.

Research into the project is still ongoing, with De Beers' Dr Evelyn Mervine stating last year that "research is in its early stages and it may take some time before it is economically or

**'BY USING SOLELY BATTERY-POWERED UNDERGROUND VEHICLES AND EQUIPMENT, AS WELL AS DIGITAL AND SMART TECH, GOLDCORP HAS ELIMINATED THE EQUIVALENT OF 5000 TONNES OF CO<sub>2</sub> PER YEAR'**

# SUSTAINABILITY & CSR

practically achievable to tap into this full storage potential. However, even just tapping into a small amount could greatly reduce the net emissions at many of our sites in the near future, and possibly lead to carbon-neutral mining at some sites within the next five years.”

The projected figures are currently hypothetical, with scant updates available on De Beers work, other than it remains ‘ongoing’. However, company CEO Bruce Cleaver is confident of the broader implications of such a development for the industry, particularly as the storage capabilities of Kimberlite are reported to be replicated in rocks and minerals mined for other resources. “By replicating this technology at other mining operations around the world,” he says. “This project could play a major role in changing the way not only the diamond industry, but also the broader mining industry, addresses the challenge of reducing its carbon footprint.”

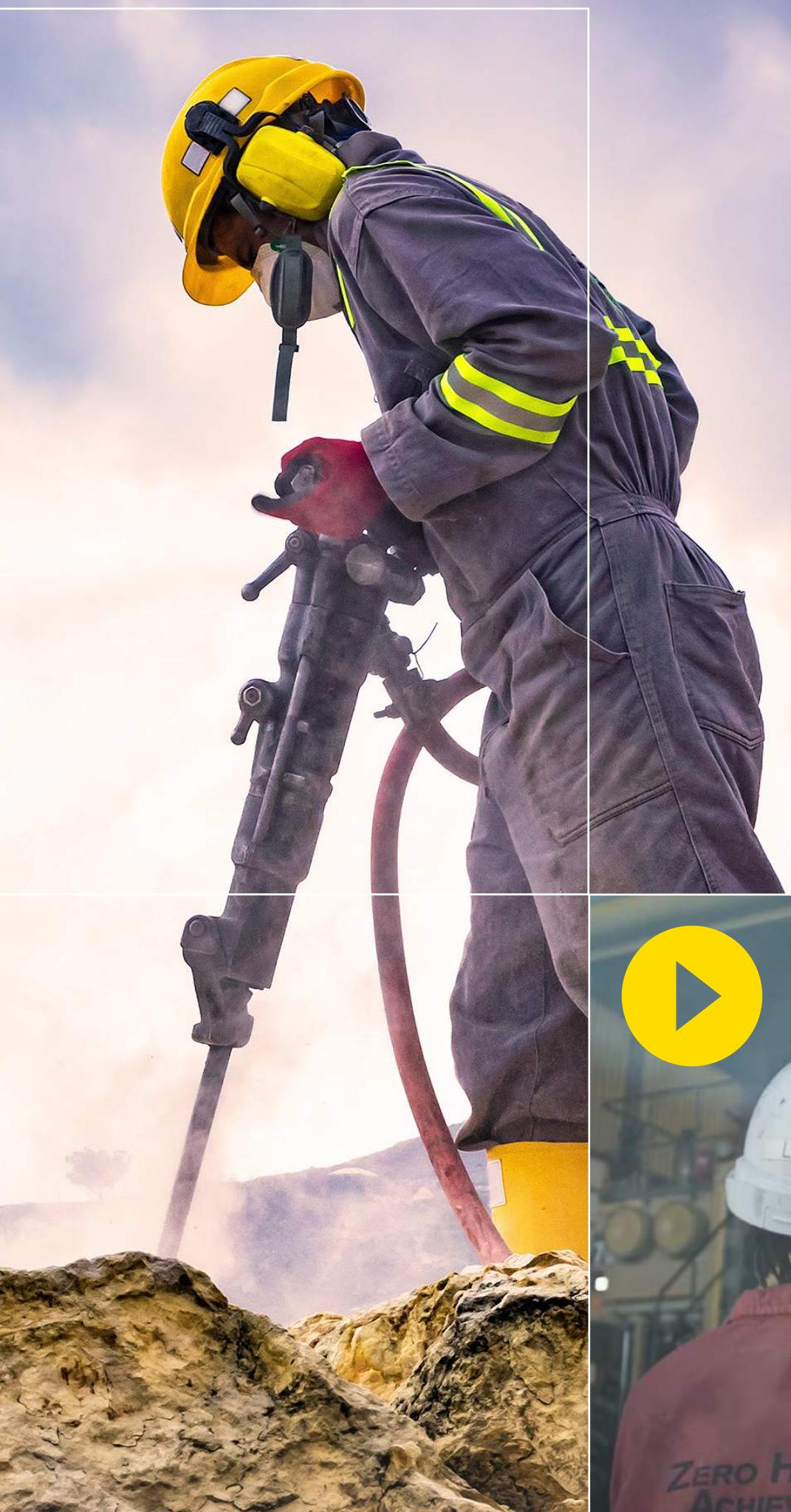
If De Beers’ project represents the sharp edge of the carbon optimisation sword, a plethora of companies are already utilising more proven, and indeed readily available, methods. Renewable technologies – predominantly solar, but also wind

and water where terrain permits – are being used as an effective and more efficient replacement for fossil fuels such as diesel.

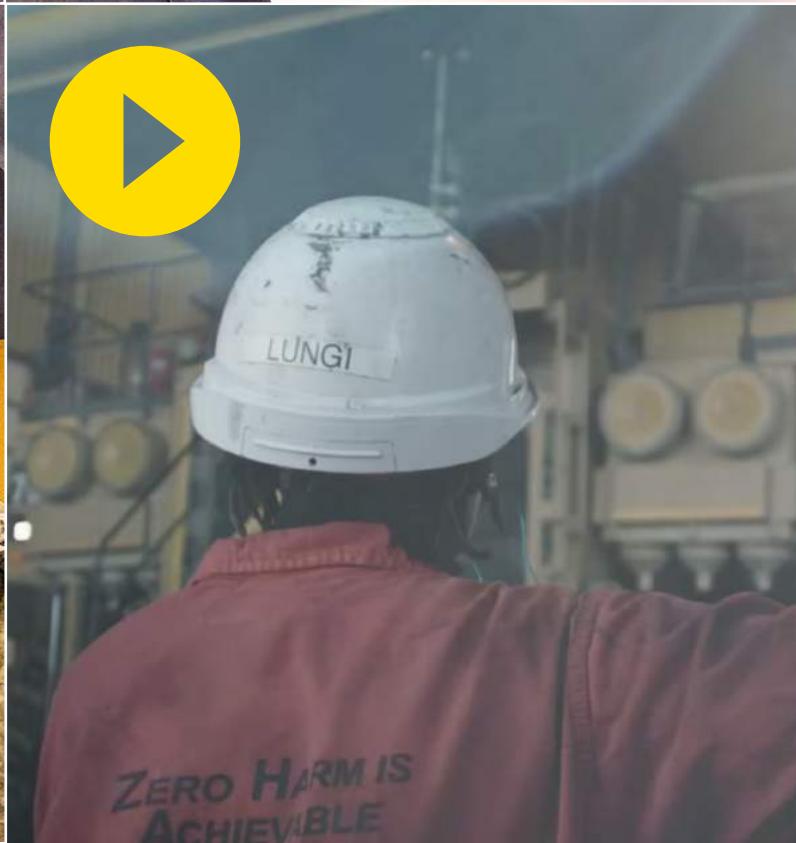
An example of this is gold mining business, Goldcorp: the company’s Borden mine in Ontario is the first all-electric mine to become operational. Using solely battery powered underground vehicles and drilling/blasting equipment, as well as digital and smart technology, the company has successfully eliminated the equivalent of 5,000 tonnes of CO<sub>2</sub> per year.

Similarly, digital technologies are being exploited. Leading consultancy, Deloitte, points to innovations in digital mining technology such as 3D mapping that negates the need for land travel, or drone exploration in order to minimise emissions in the early stages of a project and more as methods of decarbonising the industry.

Carbon, therefore, is a leading strategic driver for many mining businesses. As the world shifts to a low-carbon future, mining companies must explore methods of carbon optimisation and decarbonisation in order to efficiently and effectively fulfil the growing demand for resources. ■



**VIDEO: BUILDING  
FOREVER - DE BEERS  
GROUP REPORT TO  
SOCIETY**



**TOP 10**

# **TOP 10 COPPER MINES IN THE WORLD**

According to the ISCG, world demand for copper has steadily increased, having more than tripled over the past 50 years, impacting the mining industry greatly. Mining Global looks through The Balance's "The World's 20 Largest Copper Mines", highlighting the top 10 copper-producing mines by annual output in kilotons (kt)

Written by **SHANNON LEWIS**





**TOP 10**



**10**

## **EL TENIENTE**

Located in the Andes mountain range of Chile, El Teniente produces 432kt of copper annually, according to The Balance, making it the world's largest underground mine, and sixth largest copper mine (by reserve size). It is approximately 80km south of Chile's capital city, Santiago and was found in the early 19th century by its current owner company Codelco and has been in business since 1905. The company is currently undertaking a \$3.4bn expansion product on the mine, with the intent of expanding production life by 50 years. The project was begun in 2011 and is scheduled to be finished this year, ultimately having created 3,500 construction jobs.

## **POLAR DIVISION (NORILSK/ TALNAKH MILLS)**

Polar Division is a Russian copper mine located on the Russian Taimyr Peninsula, near several other copper and nickel mines, all owned by the same company: Norilsk Nickel. According to The Balance, it produces an annual output of 450kt from what is the company's largest deposit of ore. Polar Division was opened in the 1930s as a nickel mine, before becoming a mine of several different types of metals: cobalt, gold, silver, platinum and, of course, copper.



**9**





8

## LAS BAMBAS

Las Bambas, located in the Cotabambas, Apurimac area of Peru, produces 450kt of copper. A joint venture by three companies: MMG (a majority shareholder at 62.5% ownership), Guoxin International Investment Co. Ltd. (22.5%), and CITIC Metal Co. Ltd. (15%), only 10% of the mine's property has been developed. MMG's company website states that when the mine is in full production, it will be the largest copper mine in the world, placing Peru as a global leader in the copper industry.

## ANTAMINA

Antamina is a copper mine located 170 miles north of Peru's capital, Lima. It is a joint venture by BHP Billiton (33.75%), Teck (22.5%), Glencore PLC (33.75%), and Mitsubishi Corp. (10%), according to ICSG. It produces 450kt of copper, and is scheduled to cease production in 2019. As well as copper, Antamina is a source of production of silver, bismuth, molybdenum, and lead. According to its company website, it was one of the largest mining investments in the history of mining, with \$3.6bn backing.



# TOP 10



6

## COLLAHUASI

Collahuasi is Chile's second largest copper mine, producing 454kt in output annually. Located in the Pica, Tarapaca Region of Peru, it is one of the largest copper reservoirs in the world, with 9.964mn tons of copper available. It is co-owned by Anglo American (44%), Glencore (44%), and Mitsui + Nippon (12%) and sells most of its copper to China to be smelted. It has been open since 1999, and in 2012 provided 5.1% of Chile's gross copper output.

## CERRO VERDE II

Located 32km southwest of Arquepica, Peru, Cerro Verde II is an open-pit copper mine with a surface area covering about 157,007 acres, making it the second-largest copper mine in Peru, based on reserves. Its annual output stands at 500kt. It is owned by a consortium consisting of Freeport-McMoRan (the mine's operator at 53.56% ownership), SMM Cerro Verde Netherlands, a subsidiary of Sumitomo Metal (21%), Compañía de Minas Buenaventura (19.58%) and public shareholders (5.86%).





## BUENAVISTA DE COBRE

Buenavista de Cobre, also known as Cananea, is a copper mine located in Sonora, Mexico. The world's second-largest copper mine by reserve and with an annual output of 510kt, it is one of the oldest open-pit mines in North America, having opened back in 1899. It is owned by Southern Copper Corporation (SCC), a subsidiary of Grupo Mexico.

## MORENCI

Morenci is a copper mine located 16km south of Silver City, Arizona, in the United States with a copper output of 520kt. Open for operations since 1872, it is currently operated by Freeport McMoRan, which also owns 85%, while the remaining 15% belongs to Sumitomo Affiliates. Morenci is the largest producer of copper in North America





## GRASBERG

Located in the Papua province of Indonesia, Grasberg is not only the second-largest copper mine in the world, but also the largest gold mine in the world (by reserve). A joint venture between Freeport McMoRan (90.64%) and the Indonesian government (9.36%) and run by PT Freeport Indonesia Co, it produces an annual output of 750kt. Discovered in 1988, with operations beginning in 1990, Grasberg is one of the largest open-pit mines in the world.



# ESCONDIDA

Named after the Spanish for ‘hidden’, Escondida is a copper mine located Atacama Desert in Northern Chile and is the world’s largest copper mine by output. Open since 1990, it is one of the deepest open-pit mines in the world, with its output at 1,270Kt of copper, accounting for 5% of the world’s supply. It is co-owned by BHP Billiton (57.5%), Rio Tinto Corp. (30%), and Japan Escondida (12.5%).

1



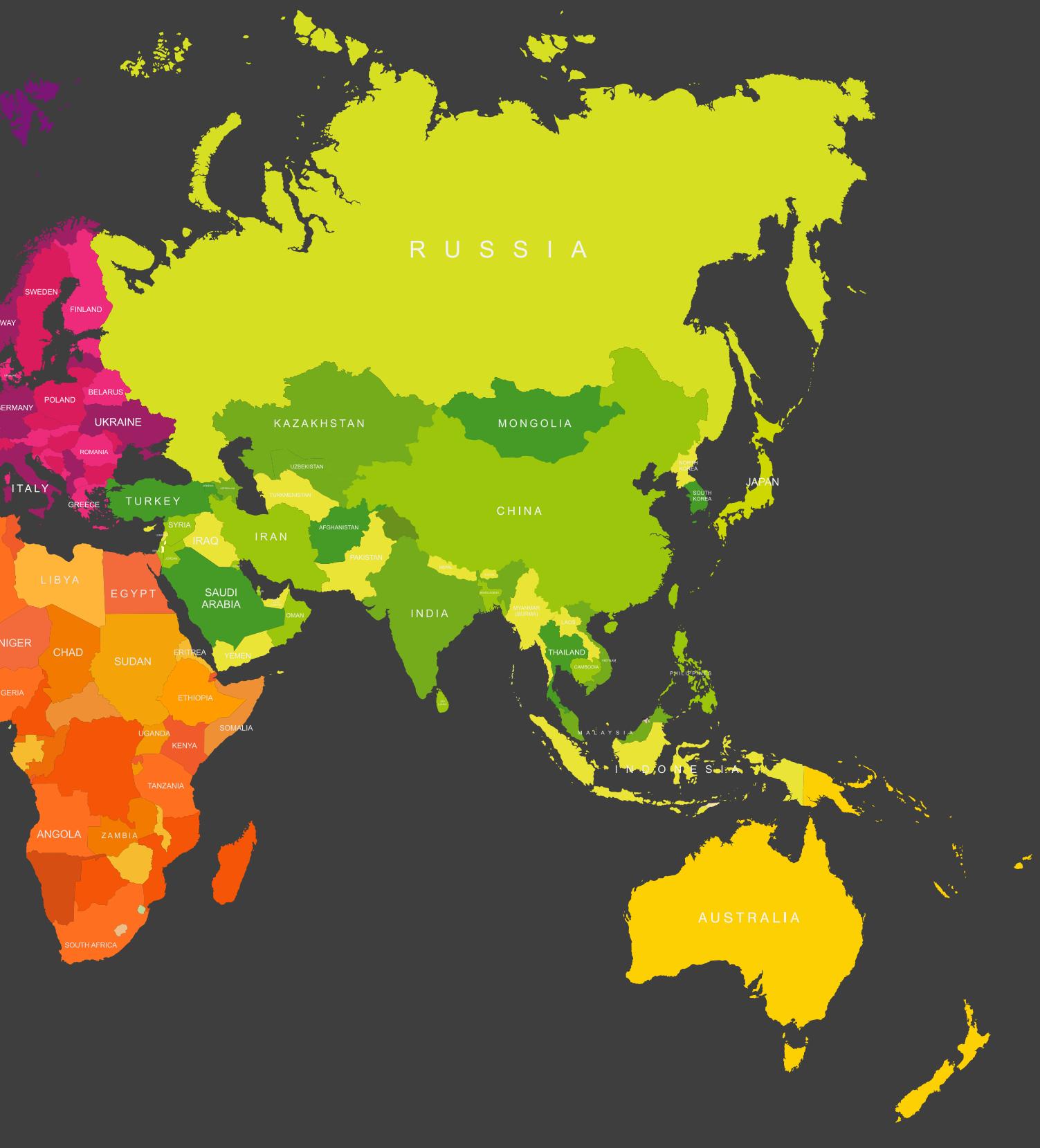
# EVENTS & ASSOCIATIONS



# Events

*Mining Global* looks at the key industry events for this calendar year

Written by ANDREW WOODS



# EVENTS & ASSOCIATIONS

## Mines and Money Asia

Hong Kong, China

4–6 April

With an impressive history of generating business, deals and opportunities, Mines and Money is now Asia's largest mining investment conference and exhibition.

Now in its 11th year, this year's event will bring together over 1,500 global mining leaders and 600 investors from 40 countries.

Organisers say: "The programme will include over 150 speakers covering the favourites including gold, precious and base metals; as well as battery metals that are driving the future of energy; while also looking at the carbon to electron revolution taking place."

"The two-and-a-half day exhibition will feature over 80 mining and energy companies who will be showcasing their latest exploration projects to prospective investors.

"With majors looking at replenishing their resources, explorers once again raising money, and M&A deals on the rise, Mines and Money is still how and where deals get done."

<https://asia.minesandmoney.com>





# Mining Investment, Botswana, South Africa

Cresta Lodge,  
Gaborone, Botswana  
**10-11 April**

**Mining Investment (MI)**  
Botswana has been at the forefront of mining forums in South Africa for some time. A strategic mining conference and exhibition for the leaders of the mining, quarrying and construction materials industries, MI brings together 250 attendees from 15 countries. Ministers, mining companies, investors and service providers travel from all over Africa, Europe, Asia, North America and Middle East for three days of partnering, networking and business matching.

[www.infomine.com/  
events/Mining.Investment.  
Botswana--IM43135.aspx](http://www.infomine.com/events/Mining.Investment.Botswana--IM43135.aspx)

# **Strategic Mine and Planning**

**St George's Terrace,  
Perth, Australia  
16-20 April**

The Strategic Mine Planning and Optimization course is a comprehensive five-day course designed for mining and resource industry professionals including directors, project managers, mine planners, mining engineers, geoscientists, geologists, managers, metallurgists, financial analyst, and decision makers from exploration to operations. “It is ideally suited to those from industry who wish to gain a more in depth and hands-on knowledge of modern strategic mine planning and optimisation software tools and theory.”



## Smart Materials Meet 2018

Dubai, United Arab Emirates

19–20 April

The Smart Materials Meet 2018, or more formally, the 5th World Congress on Smart and Emerging Materials, will see professionals, industrialists and students from research areas of materials science, physics, chemistry, nanotechnology, environmental science and biomedicine share their research experiences and indulge in interactive discussions and technical sessions.

The event is designed to bring forth the most up to date information for the development of smart materials. Key aspects will include nanotechnology, chemistry, physics and marketing considerations, as they relate to what it will take to bring these material-altering products to the highly regulated western markets.

<https://smart.materialsconferences.comw>



# Mines and Money New York

New York Hilton, Midtown, New York, USA | **2-3 May**

Now in its 2nd year, Mines and Money New York has 1,000-plus meetings and attendant investors representing \$1.8tn in assets under management, this event is making a real name for itself. Speakers include representatives from Denham Capital Management, The Electrum Group and Paulson & Co. among many more. This year's key themes are exploration, innovation and collaboration. "New York has been without a major mining investment show for too long. Now in its 2nd year, Mines and Money New York is that event."

## Symposium 2018 on Mines and the Environment

Rouyn-Noranda, Canada | 17-20 June

The Université du Québec en Abitibi-Témiscamingue (UQAT) and the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) are hosting the 'Symposium 2018 on Mines and the Environment', which is the result of a collaboration between the Research Institute on Mines and Environment (RIME) UQAT-Polytechnique, the Unité de Recherche et de Service en Technologie Minérale (URSTM), and many governing individuals and bodies and mining companies.

The organisers say: "The objectives of the Symposium are to share recent knowledge and research developments and to discuss common practices to find solutions that reconcile profitability and environmental protection."

Registration for the event opened in February 2018.

<http://rouyn-noranda2018.cim.org/en>

# EVENTS & ASSOCIATIONS

## 2018 Energy Conference

Las Vegas, USA

16-17 July

At this event, researchers and experts from different areas of the mining landscape come together to give a global overview of the latest progress on renewable and non-renewable energy. The 'Energy Workshop' is a platform for academicians, researchers, engineers, as well as industrial professionals from all over the world to exhibit their research results and development activities in energy.

The Energy Conference, meanwhile, will be focused on new green technologies to establish clear, reliable and affordable renewable and non-renewable energy supplies. It also facilitates an opportunity to exchange information, experiences and best practices by making together adept, investors and other multi-stakeholders.

Organisers say: "Deliberating the world, global warming suppression is a compelling matter. Coping with these issues, we are developing new projects involving renewable energy using innovative ideas in the renewable and non-renewable energy conference and by open presentation and discussion in the Energy Meeting about ongoing research."

[www.meetingsint.com/conferences/energy](http://www.meetingsint.com/conferences/energy)



# EVENTS & ASSOCIATIONS

## Mining the Territory 2018

Darwin, Australia

5–6 September

Going down under now to Australia for Mining the Territory, which is Northern Australia's leading mining conference held annually in Darwin as a part of the Regional Resources Week.

The event brings together key industry decision makers, opinion leaders and experts to provide you with up to date information on the current mining exploration, investment and development opportunities at the top end of the mineral industry.

The event is noted as the leading educational and networking event in the region, and one of the most important in the continent of Oceania.

[www.ntresourcesweek.com.au/mining-the-territory-conference](http://www.ntresourcesweek.com.au/mining-the-territory-conference)





# SEG 2018: Metals, Minerals, and Society

Keystone, USA  
**22–25 September**

The SEG 2018 Conference looks ahead at the metals and minerals required to meet the demands of society. This year's event will feature some fascinating plenaries on breakthroughs in economic geology; integrating geology, geochemistry, and geophysics; integrating mineral and petroleum systems approaches to sedimentary basins; and the implications for society. The wider focus of the event, which also incorporates field trips, technical sessions and workshops is on the state of knowledge in important ore deposit types and the future of research, education, and exploration.

[www.seg2018.org/](http://www.seg2018.org/)





# THE UNDERGROUND MINING PARTNER OF CHOICE

Written by **Dale Benton**  
Produced by **Arron Rampling**



**AFRICAN  
UNDERGROUND  
MINING SERVICES**

## THROUGH THE SUBIKA PROJECT, AND OTHER SUBSTANTIALLY SUCCESSFUL MINING PROJECTS IN AFRICA, AUMS CONTINUES TO BE AN INDUSTRY-LEADING UNDERGROUND MINING CONTRACTOR

Since 2007, there has been a leader in providing mechanised underground mining services in Africa – African Mining Underground Services (AUMS). The company prides itself on its ability to outperform the owner-operator underground mining operations tonne for tonne, all the while improving the overall profitability of mining projects, with the first priority on the well-being of its personnel.

As the partner of choice to some of the world's leading mining operators, including Roxgold Inc, AngloGold Ashanti and Newmont Ghana,

delivering on that promise is essential.

The recently launched Subika Project, located in the Brong-Ahafo Region of Ghana, West Africa, is a highly significant gold project in which Newmont has partnered with AUMS to develop it into a mine that will ultimately see it rank as one of the highest producing underground operations on the continent.

Blair Sessions, AUMS' Chief Operating Officer, is looking forward to delivering safe and efficient production at the Subika Operation, as the company has delivered on other





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projects and in different jurisdictions throughout continental Africa.

Sessions joined the company in 2014, having extensive experience in various mining operations across Australia, many while General Manager of one of AUMS' parent companies, Barminco. Sessions believes that the key to the success of the AUMS business has and will continue to come from the transfer of skills, maintaining the high standards and experience from within the Australian underground mining sector.

"Our joint venture owners are two Australian contracting companies in Ausdrill and Barminco," he says. "Essentially, what AUMS is accomplishing in Africa is effectively the same deliverables as what is being achieved in Australia, if not better in some areas. It's about bringing every facet of operational excellence to the African continent, transferring and enhancing those necessary skills, aiming to leave a robust and positive company legacy."

While it is admirable, and results have proven that it has been a successful integration, what is

an effective and profitable model in Australia may not be the case in Africa. No mining operation is without its challenges, so to move from one geography to another and experience zero hurdles along the way is almost unheard of.

"In the quest to deliver the Australian safe production model into Africa, naturally we have a strong emphasis on the training and transfer of skills utilising technology wherever possible to our national workforce," Sessions says. "A core foundation of our business plan is that AUMS has the right people and the right systems in place to consistently deliver a safe, high quality product to our business partners. AUMS prides itself that local businesses within the surrounding and broader communities that we operate in, will also benefit from our operations".

This is something that Sessions feels is one of the many reasons that partners such as Newmont Ghana choose to work with AUMS.

AUMS' strategy is to continue to develop its people in every country in which it operates with a view

## AFRICAN UNDERGROUND MINING SERVICES

to generating long term success in knowledge transfer, personnel development and financial growth for individuals and the community.

The company is proud of its training success, both in Ghana and across Africa.

To date, AUMS has trained well in excess of 1,000 Ghanaians, and close to 3,000 Africans in its short history in the skills required for large scale mechanised, safe and productive underground mining.

“When we started with Subika, we had a core group of both Ghanaian operators and expatriates who were known to us and who we could rely on,” he says. “We have implemented training systems that are comprehensive and well developed as they have been established and further improved for over 25 years at Barmac.”

The purchasing of fit for purpose specialised equipment simulators is another area that AUMS has invested in for the growth and development of its employees.

AUMS recommenced work at the Subika Underground Project in

- AUMS has trained more than 1,000 Ghanaians to date



May 2017, following the successful contract award which saw an initial five-year contract put in place to “effectively establish underground capital infrastructure, and continually drive for steady state production”. The ultimate vision for the Subika Underground Project is a +20 year high-production underground mine with a robust business case



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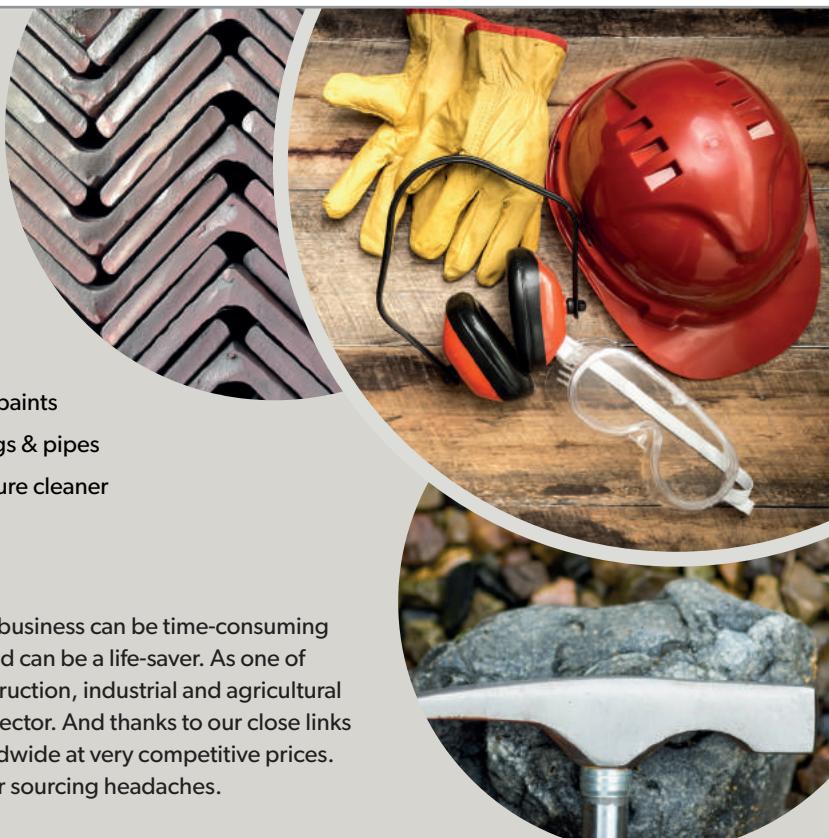
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for future growth, that has a long term production output delivering of over 2m tonnes per annum”.

“The Subika Underground Project is very exciting. It has plenty of scope for future expansion, and with further exploration drilling I am sure Newmont will see growth in their projected mine life and production continuing,” he says.

“We are fortunate to be involved with some fantastic projects within East and West Africa, all with expansion opportunities and we believe strongly in our business partnership with all our clients. AUMS aim to ensure a cohesive and aligned strategy in not only developing each operation, reaching its full potential, but also driving the benefits for the local communities and broader regions in which we operate”.

As a contracting company, it is essential that AUMS establishes key strategic relationships with all mine operators and continues to foster its existing and potential business relationships, not only to deliver on the project expectations, but exceed them.

All clients AUMS work with have exceptional CSR activities, and the company ensures that it makes a significant contribution towards them as well as establishing its own. Working with local communities, enriching the lives of those communities, providing infrastructure and investment to local areas are attitudes and beliefs that are at the very core of the company’s business strategy.

To this end, Sessions can point to the way in which AUMS truly exceeds what the commonplace expectations of what a business partner can be.

“AUMS has an extensive history of involvement in every community we operate in, investing in schools, recreational facilities and organisations as well as charitable works. We drive local employment and transfer of business skills and opportunities by the sub-contracting and development of as many local businesses as possible. Our employment is obviously a key focus – in Ghana nearly 50% of our employees come from the immediate surrounding areas of

operations, whereas another 40% comes from the surrounding mining areas within Ghana” says Sessions.

Since beginning work at the project in 2017, it didn’t take long before AUMS began to grow and success began to materialise.

“Within the first three months, we had 300 people working on site,” he says. “As an underground mining solutions provider, state of the art technology with our mining equipment is crucial in the delivery of a project.”

Historically, the mining industry has been recognised as one that lags behind others with regards to technological innovation, relying on traditional mining methods that has a strong history of proven success. But for AUMS, the company utilises advanced technologies in underground mining, technologies that are not spoken about as frequently as they should be.

AUMS has partnered with Sandvik Group and implemented an underground remote loading system. This is fully autonomous, controlled remotely and ultimately will be operated from the surface,



which is the first of its kind in the African mining industry.

“We have a number of remote technologies and automatic production drilling technologies which will streamline production activities. In addition, AUMS has adopted machine learning and collision avoidance systems to further improve our critical safety systems – all of this being powered through underground wi-fi.”

This wi-fi connectivity in underground mines allows for



a centralised control room that facilitates cross communication between the various automated machinery and equipment, providing Sessions and the onsite staff access to information and data “second-by-second” in real time.

Currently, as part of a wider African portfolio, the company works with Roxgold in Burkina Faso and Anglo Gold Ashanti in Tanzania. Across each of its projects, Sessions believes that AUMS

**“AS AN  
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WITH OUR MINING  
EQUIPMENT IS  
CRUCIAL IN THE  
DELIVERY OF  
A PROJECT”**

– Blair Sessions, COO, AUMS

# AFRICAN UNDERGROUND MINING SERVICES



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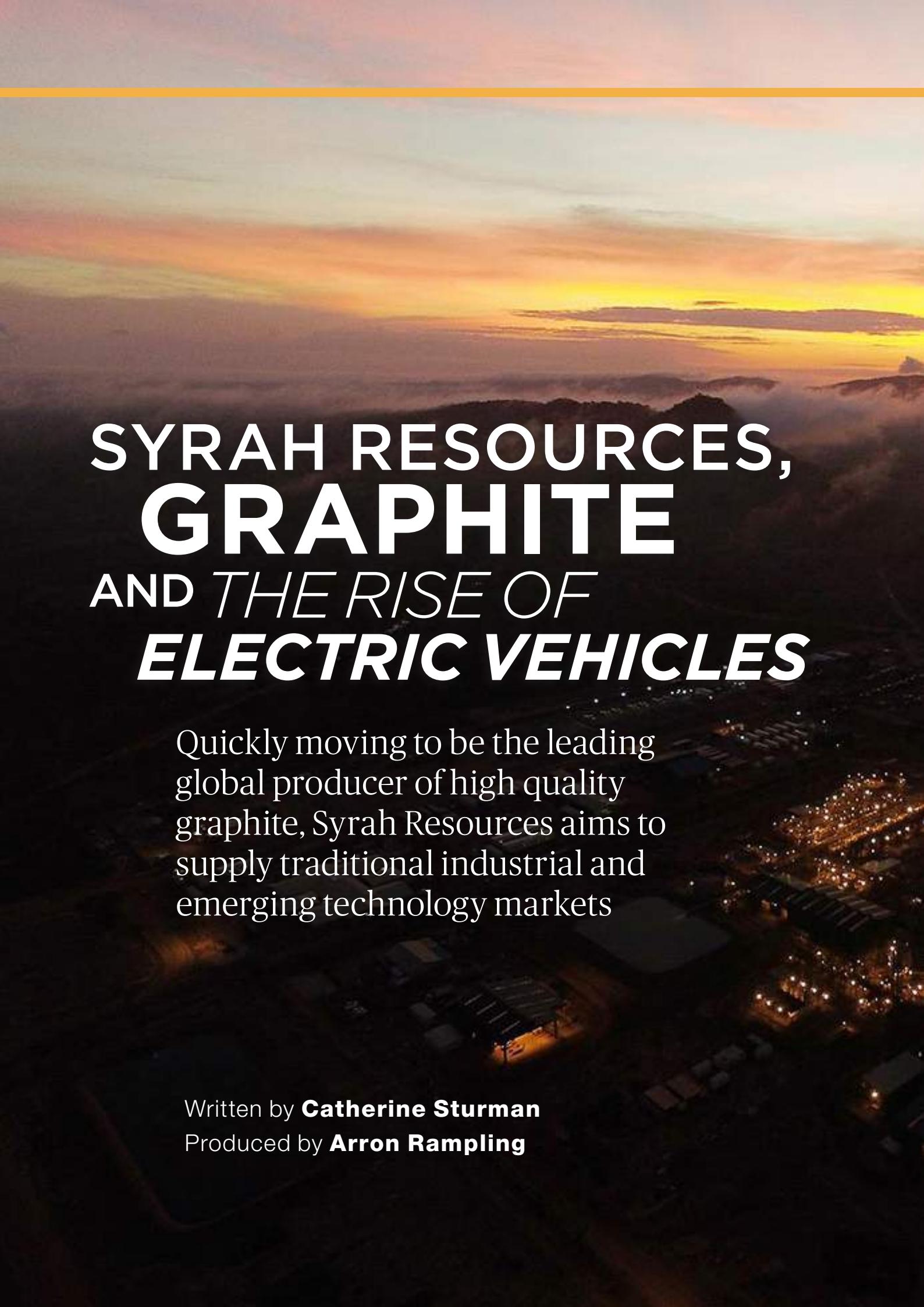
“We take the same systems of work and the same processes and training systems to all our operations, whether it’s in Australia, Tanzania, Burkina Faso or Ghana,” he says.

“It’s a matter of ensuring that we tailor our safety, operational and maintenance systems and optimise wherever possible to ensure that we provide our clients with the best end product.”

AUMS extends well beyond simply delivering a successful mining operation and profitability. Like any company, growth and a diverse sustainable portfolio are key business goals, but Sessions stresses that there is a legacy that AUMS wants to leave.

“An integral component of AUMS’ vision is to develop the national workforce to the level where we expand the foundations of our national skill base and essentially nationalise the workforce to the point where senior management and executive management roles are filled by that national workforce.

“We can ensure that we impart the necessary and required skills into the African underground mining community as a wider skill base and provide real value to that community as well, leaving a long lasting legacy.” ■



# SYRAH RESOURCES, **GRAPHITE** AND *THE RISE OF* **ELECTRIC VEHICLES**

Quickly moving to be the leading global producer of high quality graphite, Syrah Resources aims to supply traditional industrial and emerging technology markets

Written by **Catherine Sturman**  
Produced by **Arron Rampling**



SYRAH RESOURCES



Dawn breaking over  
Syrah Resource's Balama  
plant in Mozambique

**T**HE ELECTRIC VEHICLE (EV) market is growing apace, leading to a growing demand for raw and processed materials needed to drive future technologies. Forecast to more than quadruple in size between 2017 and 2025, the market for lithium-ion batteries has led to the launch of new mining projects to cater to the accelerated demand for natural graphite, an essential element required within the creation of EVs.

Situated in Cabo Delgado province of northern Mozambique, the Balama Operation is the largest natural graphite project in the world, with over 50 years mine life, and an expected market share of around 40% by 2020. With more and more electric vehicles sold each year, and larger batteries required in these vehicles to increase range, CEO of Syrah Resources, Shaun Verner, predicts the natural graphite market will grow by an average of 12% per annum to 2025.

"We're extremely excited to be able to support an industry which is focused on emissions reduction globally and also efficiency of energy use. We feel really motivated by selling into that industry," he says.

"There's a very strong traditional graphite industry built up around steel-making, and that is still an important part of our business, but the majority of growth over the coming decade is driven by lithium-ion batteries."

## THE BALAMA GRAPHITE OPERATION

Exploration of the Balama site in Mozambique commenced in 2011, and Syrah Resources broke first ground in 2015. Construction was safely completed in 2017.



Natural graphite is an essential component of electric vehicle batteries





**650+**  
**Employees**  
90% of whom  
are Mozambican  
nationals

**2007**  
**The year**  
in which Syrah  
Resources was  
founded

**3,000**  
**Tonnes**  
The amount of  
graphite Syrah  
Resources produced  
in January 2018



"The board took the decision in 2015 to commence building under an owners' team what was, and still is, the world's largest graphite operation. It's seven times larger than the next largest natural graphite operation in the world," notes Verner.

"It was clearly an aggressive investment decision based on the very attractive demand outlook for graphite

**"At the forefront of our minds is the transparency and reliability of the Balama Graphite Operation, combined with a focus on exceeding the standards of customers in the battery supply chain"**

– Shaun Verner, CEO, Syrah Resources

use in electric vehicles and lithium-ion batteries."

"The construction took a little longer than originally envisaged. The flow sheet for the operation was adjusted through the period of construction based on product testing feedback and further refinement of processing to achieve higher grades."

With first production in November 2017, ramp-up activity is now fully

underway at Balama with the company focused on plant optimisation. Syrah completed construction at the end of 2017, with capital costs totaling US\$215mn. The operation is targeting at least 160,000-180,000 tonnes per annum this year, before ramping up to its goal to reach 350,000 tonnes per annum dependent on market demand.

"Right now, we are in the 'ramp up'



phase. Our first production of coarse flake graphite was in November 2017, and first fine flake graphite in December 2017. Our ramp up process will continue throughout 2018, where we aim to be at 70% capacity by the end of the year," adds Verner.

"Another goal of ours is to achieve a unit cost of less than \$400 a tonne by the end of 2018. Long term, we want to approach \$300 a tonne in cost."

Throughout its development in Mozambique, the company has adhered to international governance and compliance standards and has built processes and systems with this in mind. It has also received all the required regulatory approvals relating to its operations in the country, including an initial 25-year Mining Concession, with a 25-year extension available.

Additionally, Syrah Resources remains committed to the sustainability of its operations and has aligned with international standards across a number of areas including people, health and safety, community and environment. Safety remains the highest priority and the company's commitment is reflected in the outstanding safety performance record at Balama, ending the 2017 year with a total recordable injury frequency rate (TRIFR) of 0.8, a significant improvement over 2016.

The Environmental Monitoring Programme (EMP) established by the company includes measurement of surface and ground water quality, ambient noise, dust levels and air quality to ensure a wholistic approach is taken to mitigate risk to the host



**Syrah's EMP ensures minimal impact to the local community and environment**



**Balama plant thickener**



Dr. Christina Lampe-Onnerud (l)  
and Shaun Verner (r)



Syrah's EMP includes the measurement  
of water quality







- The Balama Graphite Operation will support the ongoing demand for natural graphite, an essential element in the development of EVs
- Exploration of the Balama site commenced in 2011. Construction completed in 2017.
- Syrah completed first production at the end of 2017, with capital costs totaling \$215mn.
- Balama's production goal is to reach 350,000 tonnes per annum within two years.
- First production of coarse flake graphite (Nov 2017) and first fine flake graphite (Dec 2017)
- Its Environmental Monitoring Programme (EMP) ensures that the company mitigates and reduces any impact on the surroundings throughout the project's lifecycle
- 90% of its workforce are Mozambican nationals with 50% residing in the eight (8) Host Communities.
- Syrah Resources is building the Balama Training Centre which deliver training to 500 local people in the next five years.



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## ***Efficient sizing of graphite critical for production of premium quality flakes***

Efficient particle sizing is critical for the production of high quality graphite flakes. Syrah Resources had a need to classify their flotation concentrate into distinct coarse and fine graphite flake products. After contacting Derrick® Corporation, full-scale screening tests were conducted with results superior to those from alternative suppliers. Syrah subsequently purchased and installed a two-stage wet screening system consisting of 8 primary and 4 secondary Derrick Stack Sizer® high frequency screening machines.

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 SYRAH RESOURCES



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communities and to minimise the impact to the local environment.

## STAKEHOLDER ENGAGEMENT

Verner is keen to stress the importance of the Balama Graphite Operation, not just within the lithium-ion battery and traditional graphite markets, but also to the local community. Approximately 90% of the company's workforce are Mozambican nationals, with 50% sourced from the eight local host communities, with immediate plans to increase these numbers further.

"One of our initial goals is to see our employees successfully develop in their roles and directly contribute to ramp-up efforts. We're now seeing that occur and have also started to observe some of the economic benefits associated with employment and local procurement flow through to the local communities," he explains.

Syrah Resources has partnered with the local communities from the beginning of the resettlement process and has closely aligned its activities with applicable international standards, at all stages, to ensure the company maintains genuine credible relationships

Approximately 90% of Syrah Resources workforce are Mozambican nationals



with its stakeholders founded on mutual respect.

The company has also strived to provide full transparency to its downstream customers and promote visibility throughout its supply chain regarding its production capabilities and its commitment to the ethical supply of graphite to the global market.

A clear example of this is the recent work performed in partnership with the provincial government and the local communities to rehabilitate the Chipembe Irrigation Scheme. This



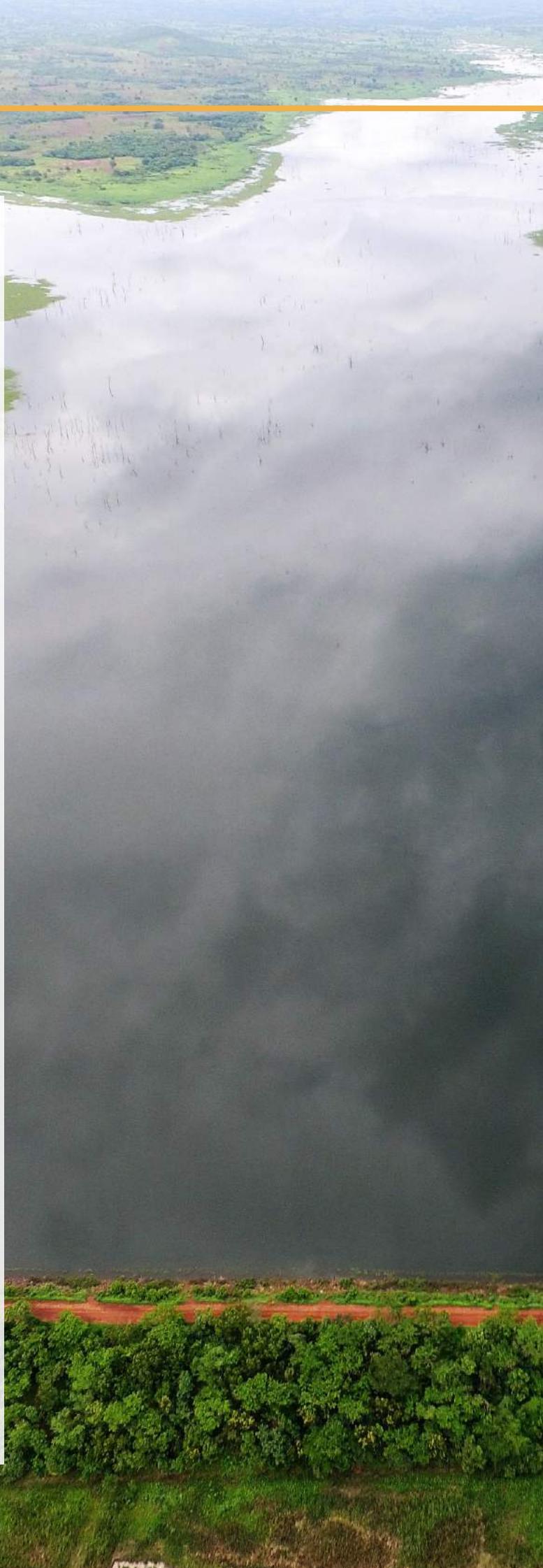
work included repairing the valve system on the Chipembe Dam to stop the uncontrolled discharge of 50,000 cubic litres of water per day, rehabilitating 4.5km of irrigation channels and the preparation and cultivation of 600 hectares of land for agricultural use.

“It’s been at the forefront of our minds to ensure that the benefits that the Balama Graphite Operation can bring to the local community are visible, and that we meet the standards held by customers in the battery supply chain. More than that however, it is aligned with our values and it is simply the right thing to do and the right thing for our business,” adds Verner.

## TRAINING AND DEVELOPMENT

The Balama Graphite Operation is playing a pivotal role in driving local economic development in the Balama District through a strong commitment to local employment. Syrah Resources is also focused on training and development, and health promotion as part of its local development agreement (LDA).

“In addition to the extensive onsite training and development work already undertaken, we are building a training





Chipembe Dam

centre in Balama. This will provide a curriculum that not only provides skills-based training relevant for our operation, but also looks at a number of other curriculum items for general development and trade skills which will help to establish livelihoods in the local communities that are complementary to, yet separate from, the Balama Graphite Operation,” explains Verner.

Whilst many companies have supported Syrah Resources, its partnership with Tayanna provides a great example of what the company wishes to achieve to fully support employees with the required training.

“Tayanna are our mining contractor, but they have also taken a long-term approach through the way that they have worked with us at Balama,” comments Verner.

“Right from the very start, they were committed to source employees from the local community. We have a number of truck drivers and mobile equipment operators who have been trained for over 12 months before starting operations, some having never had even a driver’s license before.

“It’s been an enormous ground-up

“We are building the Balama Training Centre which will see a minimum of 500 people from the local communities trained in mechanical and electrical skills in the next five years. The aim of this facility is to create local livelihoods that are complementary to, yet separate from, the Balama Graphite Operation”

– Shaun Verner, CEO, Syrah Resources





Natural graphite

effort from Tayanna, where they have sourced as much of their labour as they could from the local communities to ensure that level of support," he continues.

"With that goodwill and big commitment to the community, both from us as the project developer and operator, and from a number of our contractors, we feel that we've set up relationships locally really well for the future."

Such partnerships remain essential for Syrah Resources to operate in Mozambique, where it will aim to employ further national citizens throughout the life of the project.

"We would also like to see the suppliers of services and goods to the Balama Graphite Operation continue to develop in the local community so we can increase local content in our sourcing, and we can start to build a vibrant services community in the Balama district," notes Verner.

## MAINTAINING ITS POSITION IN THE MARKET

The company's long-term vision to become the premier supplier of natural,

**“We are now in the process of developing a downstream processing facility in Louisiana, which will take materials from Balama and undertake value-added processing before the material is sold into the lithium-ion battery markets”**

– Shaun Verner, CEO, Syrah Resources

high-quality graphite globally from the Balama Graphite Operation, both in fines and flake, is fully in motion. In January 2018, the company produced 3,000 tonnes of graphite, leading to a rise in sales across geographies, where demand has grown rapidly. It has also set to become the first major importer of natural graphite into China.

“We are now in the process of developing a downstream processing facility in Louisiana, which will take materials from Balama and undertake

Part of the Balama team



value-added processing before the material is sold into the lithium-ion battery markets,” says Verner.

“We aim to sell our materials direct to other battery anode material producers, but we will also produce that higher-quality battery anode material from Louisiana. Our longer-term vision is to sell that high-quality product to all relevant market segments and geographies over the coming years.”

Whilst the technology and end-user market in the lithium-ion battery and electric vehicle space continues to evolve, Syrah Resources is using the opportunity to further develop and transform its technology capabilities, partnering with external service providers to ensure that it stays at the forefront of market developments.

“We will also continue our focus on local stakeholder and government relationships in both Mozambique and the USA, ensuring that we add value to the local communities where we work, as this underpins our license to operate,” concludes Verner. ■



## Syrah Resources Limited

(ASX code: SYR) is an Australian-based industrial minerals and technology company. Constructing and commissioning activities of the Balama Graphite Project (Balama) in Mozambique are essentially complete. Syrah produced its first saleable flake graphite product in November 2017 and transitioned into operations on 1 January 2018. Balama will be the leading global producer of high purity graphite. Balama production is targeted to supply traditional industrial graphite markets and emerging technology markets. Syrah is also developing a downstream Battery Anode Material plant in Louisiana, USA. Syrah has successfully completed extensive product certification test work with several major battery producers for the use of Balama spherical graphite in the anode of lithium ion batteries. For further information, visit [www.syrahresources.com.au](http://www.syrahresources.com.au)



# METOREX

A SUBSIDIARY OF THE JINCHUAN GROUP



***LHD operating underground  
on the Chibuluma South Mine***



# UNEARTHING THE POTENTIAL OF THE **COPPER-COBALT** **MARKET**



WRITTEN BY **LAURA MULLAN**  
PRODUCED BY **ARRON RAMPLING**

# Balancing innovation and sustainability, **METOREX**'s wide-ranging mining portfolio is going from strength to strength

With its distinctive grey-green sheen, one mineral in particular is taking the mining world by storm. From phone batteries to electric cars, cobalt is becoming an invaluable necessity for our ever-digital world and, in the sun-scorched, rain drenched south of the Democratic Republic of the Congo (DRC), Metorex is set to tap into what Tim Williams, the company's Mineral Resource Management Executive, describes as the "heartland of global cobalt and African copper production".

Metorex has steadily continued on an upward trajectory since it was first founded in 1975, but the African mining firm's achievements didn't come easily. The company's successes are, by all accounts, a testament to its meticulous approach and diligent commitment to efficiency.

## A STORY OF GROWTH

With assets in the DRC and Zambia amongst a growing portfolio, Metorex

has weathered the global financial crisis, fluctuating mineral prices, and a series of management changes in the last 10 years. In doing so, it has reassessed its strategy and continually learned from its experiences to become a recognised player in the African copper-cobalt mining space.

Following its takeover by Chinese mining company Jinchuan in 2012, and the reverse listing of the Metorex assets into Jinchuan Group International Resources Co. Ltd on the Hong Kong Stock Exchange, Metorex has also seen a new management team put in place, which has helped the company focus on its ambitious vision: to become a competitive and sustainable base metals mining company which will act as the growth platform for the Jinchuan Group in Africa.

"We have consistently picked ourselves up by our bootlaces and positioned the company for growth," observes Williams. "When the global



## EXECUTIVE BIO

**TIM WILLIAMS** BSc (Hons) (Geology), PrSciNat (SACNASP), Fellow (SAIMM)

Tim Williams is a geologist with 27 years' experience in exploration, resource estimation and mining geology in gold and base metals throughout West, Central and East Africa. Prior to joining Metorex, he worked in various roles for Anglo American, Konkola Copper Mines and TEAL Mining and Exploration. Williams joined Metorex in January 2007 and took responsibility for Group Mineral Resources Management in May 2009, covering exploration, mineral resource and reserve estimation, and compliance with the SAMREC/JORC mineral resource reporting code. Williams is also involved in Business Development for the Metorex Group and identifies and follows up on new mineral project opportunities across Africa. He is both a member of the Metorex Executive and Technical Executive Committees.

“

**WE'RE  
ALWAYS ON  
THE LOOKOUT  
FOR NEW  
OPPORTUNITIES**

**TIM WILLIAMS**

Mineral Resource Management  
Executive, Metorex

”

financial crash hit in 2009, the Ruashi Project was nearing completion but it had overrun its budget. The banks were decidedly risk averse and were not keen to provide additional funding and operations became significantly tighter as the copper price tested lows of \$3,600/t Cu.

“We went into a regrouping period of about three years where we focused on strengthening the balance sheet and selling non-core assets in South Africa to set up Metorex as a copper-cobalt focused



*Geologists inspecting core in the Musonoi Project coreyard.*

**Geologists Dr Yulong Tian (left) and Celestin Lubale (right) presenting Musonoi core to Jinchuan Group CEO and President, Mr Dexin Chen (centre)**



business. We also strived to drive efficiencies in the remaining operations in Zambia and DRC, culminating in the acquisition of Metorex by the Jinchuan Group for US\$1.3bn, in what was the largest inward investment into South Africa in 2012.

Metorex's focus on copper and cobalt in the last decade has been, without a doubt, the reason for our continued growth trajectory," Williams continues. "Cobalt plays an increasingly important role in this strategy, and with cobalt prices over US\$40/lb (or US\$91,000/t) we will continue to monitor the

growth of electric vehicles and use of cobalt in lithium ion battery technologies very closely.

"China has arguably made the most significant commitment to reducing pollution in its major cities and the Chinese EV market is expected to grow from 700,000 units in 2017 to more than a million units in 2018.

"As a nation, it has set tight targets to achieve this objective, and is actively driving the application of these new age technologies, whilst de-incentivising sales of internal combustion engine motor vehicles. Our parent company, Jinchuan



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Group, is the second largest producer of cobalt products for the battery market in China and this puts us in a very favourable position to create depth in our production pipeline.”

### THE MUSONOI PROJECT

Located on the northern outskirts of Kolwezi – what Williams describes as the “cobalt capital” of the world – Musonoi is the latest development project in Metorex’s portfolio.

Adjacent to the Kamoto and KOV mines operated by Katanga Mining Limited, and the Roan Tailings Retreatment (RTR) Project owned by Eurasia Resources Group, the Musonoi Project has been extensively drilled and has a SAMREC/JORC compliant mineral resource of 32.1mn tonnes at a grade of 2.8% copper and 0.9% cobalt across the Measured, Indicated and Inferred categories. The resource has been extensively drilled, with M&I

# 1975

## The Year that **METOREX** was Founded

The Kinsenda project currently ranking as one of the world's highest-grade copper deposits with declared mineral resources of 20.7mn tonnes at a grade of 5.5% copper

The Musonoi project has a declared mineral resource of 32.1mn tonnes at a grade of 2.8% copper and 0.9% cobalt.

The Chibuluma mine in Zambia, which began production in 1955, currently produces around 10,000 tonnes of copper a year.

resources constituting 83% of the resource base.

A Techno-Economic Update to the Feasibility Study was completed by Worley Parsons in Johannesburg in November 2017, and has been approved by Metorex and its partner Gecamines. The Front End Engineering Design (FEED) phase has been awarded to China ENFI Engineering Corporation (ENFI), based in Beijing, with completion scheduled for Q4-2018. The project's construction should commence in early 2019.

Once in production as an underground mine, the Musonoi project will produce roughly 30,000 tonnes of copper and 4,800 tonnes of cobalt in concentrate per annum, says Williams.

The financial viability of the Musonoi Project has been improved in the latest feasibility study iteration by mining oxide ore from the upper levels of the underground operation in the early years, to be treated through a low-cost leach plant producing a copper-cobalt carbonate intermediate product.

Mining of sulphide ores will progressively ramp up as the project is developed deeper, with copper and cobalt to be recovered as a combined copper-cobalt sulphide concentrate. At this stage, the project has been conceived on the basis that both oxide and sulphide concentrates will be transported by road and rail to Lubumbashi and treated at a new roaster facility to be constructed at the company's Ruashi mine.

“

**WE HAVE  
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FOR GROWTH**

**TIM WILLIAMS**

Mineral Resource Management  
Executive, Metorex

”





***Chibuluma South  
concentrator plant at night***

## A ‘MODEL MINE’

On top of this latest endeavour, Metorex also owns three operating mines through a number of operating subsidiaries in Zambia and DRC.

Chibuluma Mines plc in Zambia was established in 1955 and bought by Metorex in 1996 as its first operating mine in Central Africa, and produced 10,962 tonnes of copper in concentrate from the Chibuluma South mine in 2017.

Often referred to as a ‘model mine’ operation in Zambia, the Chibuluma operation clearly underlines Metorex’s success story. Boasting significantly high copper grades, Chibuluma has been integral to the company’s success; however, now that the mine is in its final years, Metorex is keen to explore new opportunities in the region.

“Chibuluma is our only operating asset in Zambia at the moment,” says Williams. “For many years it’s been a steady producer and important contributor to the group’s cashflow but unfortunately all good things come to an end.

“Production from the Chibuluma





**Mining operations in the Ruashi open pit**

South mine is winding down, and mining activities in the next three to four years will focus on recovery of the crown pillar at Chibuluma South, and mining of the lower grade Chifupu deposit which is 1.7km to the south of Chibuluma South.

"We are actively looking for new projects in Zambia and that's certainly part of my role – looking at new acquisition targets and potential synergies that may exist with other operators. We're always on the lookout for new opportunities."

### **STRONG YIELDS**

In a parallel story of success, Williams highlights the strong performance of Metorex's Ruashi mine. Ruashi Mining SA operates the Ruashi copper-cobalt open pit on the outskirts of Lubumbashi in the Haut Katanga province in the DRC, and produced 31,546 tonnes of Cu cathode and 4,915 tonnes of cobalt contained in an intermediate cobalt hydroxide product in 2017.

"We've had a great start to 2018 with production at Ruashi reaching a record cobalt production tonnage in January 2018 of over 600 tonnes of contained cobalt for the month. This has mainly been through processing our high-grade cobalt stockpile, of which we have about 900,000 tonnes on surface running at a grade of approximately 0.7-0.8% cobalt," he says.

Expecting to finish mining Ruashi's oxide open pits within the next few years, Metorex has now turned its attention to the region's sulphide deposits with

“

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Mineral Resource Management  
Executive, Metorex

”



*Final cobalt hydroxide product ready for shipping to Jinchuan's cobalt plant in Lanzhou, China for processing into cobalt sulphates and other battery products*

the Ruashi III expansion project.

"We are in the process of evaluating the process flowsheet at our Ruashi operation where the intention is to add a sulphide concentrator, roaster and tie-in to the existing base metal refinery," explains Williams. "This will allow us to not only expand our current open pit mining operation and process sulphides from both the Ruashi and the Musonoi Project, but it will also allow us to purchase third party sulphide ores to produce a copper-cobalt concentrate, and ultimately take that through the roaster to create copper cathode and cobalt hydroxide as a final product."

## COMMERCIAL PRODUCTION

As well as keeping its finger on the booming cobalt market, Metorex has successfully brought the high grade Kinsenda copper mine into commercial production during 2017. Operated by Kinsenda Copper Company SARL (KICC), and located at the northern end of the Pedicle region in Haut Katanga Province close to the border town of Kasumbalesa, the Kinsenda underground mine recently achieved

nameplate capacity of 50,000 tonnes per month following completion of the project construction and build-up phase. Commissioning of the differential flotation concentrator plant, designed and built by DRA, went very smoothly with only minor debottlenecking required during 2017.

The Kinsenda mine ranks as one of the world's highest-grade copper deposits with a declared mineral resource of 20.7mn tonnes at a grade of 5.5% copper. The mine is currently producing a high grade copper concentrate of over 50% contained copper, which is being transported across the border into Zambia by road and rail, and treated at Chambishi Copper Smelter (CCS) and at the Konkola Copper Mines (KCM) smelter in Chingola.

KICC is also evaluating the viability of mining the lower grade, bulk tonnage Lubembe deposit which is located 30km south of Kinsenda, and a revised feasibility study is expected to be completed in 2018.

## CONTINUOUS IMPROVEMENT

Despite its promising yields, Metorex



**Dried cobalt hydroxide bagging area in the Ruashi cobalt drying plant**

is not one to rest on its laurels and continues to improve the operating efficiencies on its operations.

"As you can imagine, one of the big problems we have mining in the DRC is the logistics of moving large volumes of inputs into, and finished products out of the DRC , " Williams says. "In recent months, there have been lengthy delays in moving trucks both in and out from the Kinsenda mine to the various smelters that we've contracted to in Zambia and this can be time-consuming and costly. We're therefore looking at a number of transport options, and we feel that rail transport has the largest chance of success, so that's something we're exploring right now."

## ABOVE AND BEYOND

In the mining industry, navigating the challenges of safety is a mammoth task, but it is one which Metorex has taken in its stride. Metorex adopted the Isometrix web-based reporting system in 2010, and the company records every single incident, whether it's a reportable incident, a lost time incident or a non-lost time incident.



"The intention of that is really to identify trends before they become a problem and then to manage those risks," notes Williams. "It's a very serious consideration and it's not something that we take lightly. As far as safety is concerned, it's one of our core values and our top priority."

Through the continued support of Jinchuan, Metorex has gone from strength to strength over its 43-year history. It's promising mining portfolio, commitment to corporate social responsibility, and focused management team, has helped

position the company as a significant player in the Central African mining industry. Now, searching for new opportunities in the continent, Metorex is set to continue on this rapid upward trajectory in the future. ■



**METOREX**  
A SUBSIDIARY OF THE JINCHUAN GROUP





**aggreko**

**POWERING  
— AFRICA'S —  
MINING  
INDUSTRY  
WITH  
PASSION**

WRITTEN BY DALE BENTON  
PRODUCED BY ARRON RAMPLING



# For more than 50 years Aggreko has helped the mining sector around the world improve productivity and manage power demands through a commitment to the customer like no other

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In the mining industry, it is often forgotten or overlooked how important power generation and the supply of long term power truly is in determining the success of an operation. Be it at the planning, exploration or even production stage of a project, power generation is crucial.

This is what Aggreko prides itself on. After all, the company's own motto reads: "We're with you from start to finish."

But, as Brano Kollar, Area General Manager for South & East Africa points out, the company promises much more than that.

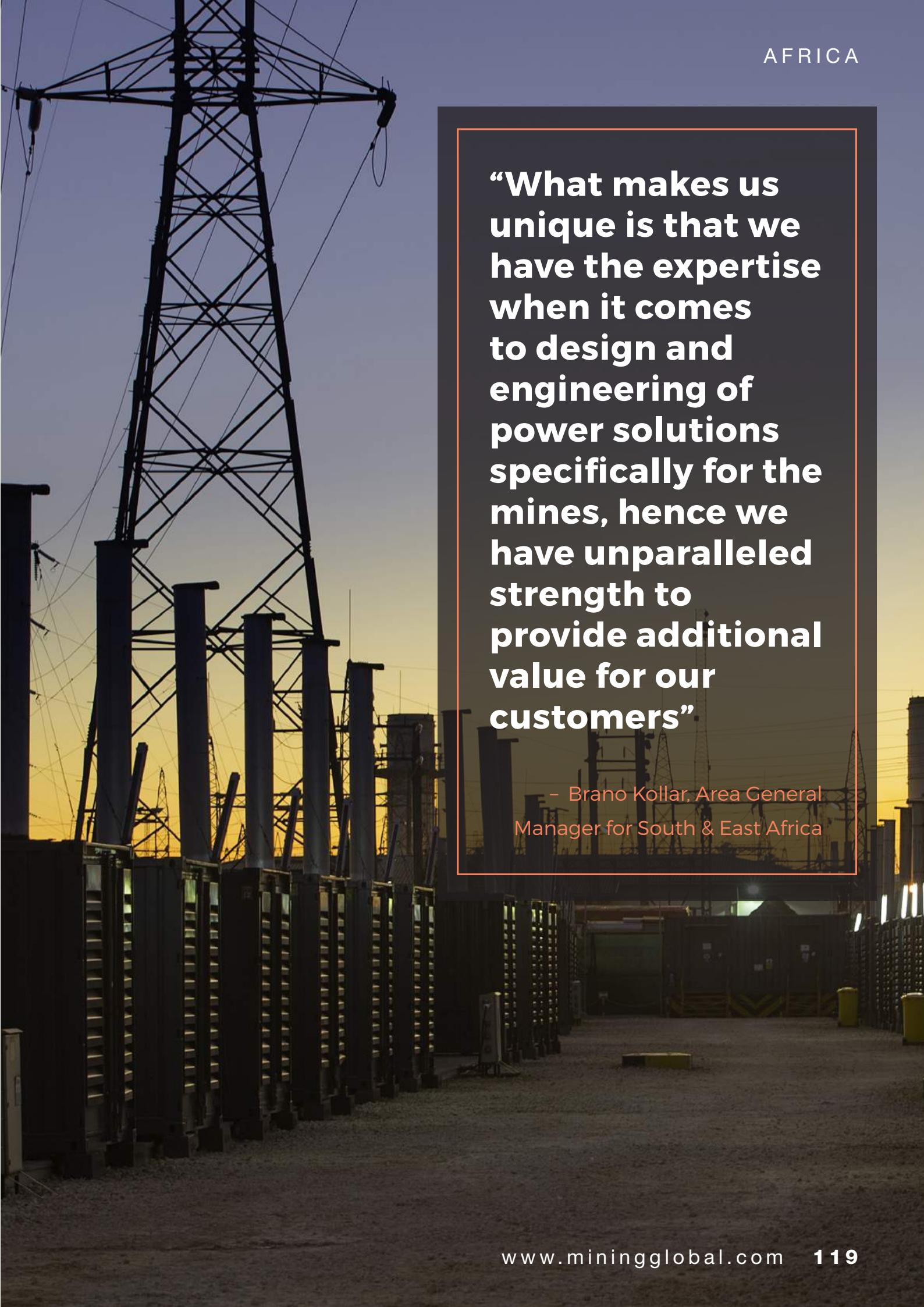
For Kollar, it starts with a simple belief that the true value of power generation extends well beyond the realms of profitability and efficiency.

"As a company we believe in the positive impact of power and the ability to control temperature," he added. "We believe it opens up opportunity, and creates potential for individuals, communities, industries and societies all over the world.

"Together and over time, we believe that our services make a massive difference."

Through his role, Kollar oversees the company's footprint across 20 countries in South and East Africa.

Currently, Aggreko has active projects in six of those 20 countries but the company has ambitions to expand its project portfolio further. The African mining industry of 2018 is an industry full of hope. Over the last two years it has witnessed a significant increase in foreign investment into



**“What makes us unique is that we have the expertise when it comes to design and engineering of power solutions specifically for the mines, hence we have unparalleled strength to provide additional value for our customers”**

– Brano Kollar, Area General Manager for South & East Africa

the sector, with commodity prices increasing alongside this investment.

Kollar, having worked with the company since 2007, has seen first-hand this shift and feels that right now is a very exciting time for South and East African mining.

"It is true that we are seeing a positive trend in the sector from commodity prices," he says. "South and East Africa has a huge potential for mining and we are already working on some very interesting projects in countries such as the DRC, Sudan and Zimbabwe to name a few."

Aggreko's portfolio has seen the company deliver an 8MW power

plant to Banro Corp in the DRC as well as designing, mobilising and commissioning a 28MW power package for Bisha Mining in Eritrea.

In late 2017, Aggreko entered into a partnership with Hummingbird Resources to fully commission a 7.4MW diesel power facility on site in Mali, where Aggreko will complete turnkey solutions as part of a full operations and maintenance team on site. Kollar points to the company's generators and indeed their flexibility and efficiencies which will provide a "seamless supply of power".

As the company promises, Aggreko works with the partners until the very

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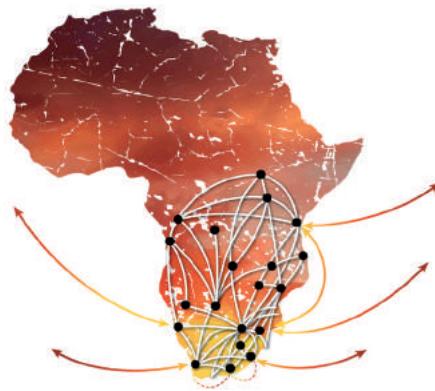
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end and Kollar believes that to achieve and deliver on this promise is to foster and develop partner relationships with a long-term view in mind.

“Our role is to ensure that customer needs and contractual obligations are met throughout the operational period, of course,” he says. “But beyond that, we are firm believers in building a positive and long-term partnership with our customer and their satisfaction is our upmost priority.”

In the journey of delivering large scale power generation services to an industry that can sometimes be volatile and often unstable, it is not without its challenges.

Kollar concedes as much, alluding to the timeline from the initial feasibility stage to financial close right through to breaking ground providing a great deal of uncertainty. But where Aggreko stands tall is in that customer and partner relationship.

“We are ready to work along with our customers to support them in these various phases,” Kollar says. “What makes us unique is that we have the expertise when it comes to design and engineering of power solutions

**“We believe it opens up opportunity, and creates potential for individuals, communities, industries and societies all over the world”**

– Brano Kollar, Area General Manager for South & East Africa

specifically for the mines, hence we have unparalleled strength to provide additional value for our customers.

“They can truly rely on Aggreko during any challenge and difficulty that comes as part of a project.”

Aggreko has been the power industry leader for over 50 years, giving the company that reputation for unparalleled strength. This is a reputation that is built upon high reliability and flexibility, being made up of a team of highly skilled and experienced people that Kollar believes really makes a difference in the overall value proposition.

As with any mining operation, a

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commitment to safety, responsibility and ethical standards are essential, and for as much as Aggreko prides itself on delivering a service to the customer that is unrivalled in the industry, Kollar understands this importance.

"We actively engage in supporting the local communities we work with," he says. "We recruit, train and develop local people and provide them with the skills to really enrich their lives."

This extends beyond developing a workforce. Aggreko is an

active participant in the local community and ensures that for as long as the company works in a particular geographical location, it does whatever it can to leave a lasting legacy of change. "Our local workforce helps us build relationships in the local community which are very important to us as a company," says Kollar. "Our charitable donations are largely focused on the education and wellbeing of children, such as our support of the Book Aid International programme."

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donations are largely focused on the education and wellbeing of children, such as our support of the Book Aid International programme."

Aggreko has worked closely with and been a strong advocate of the Book Aid International programme for more than 10 years. It has seen Aggreko donate more than 150,000 books to 10 African countries. The company has also partnered with Ethik Investment to supply solar panels and IT equipment to a local school and neighbouring villages.



Aggreko has been a power industry leader for 50-plus years



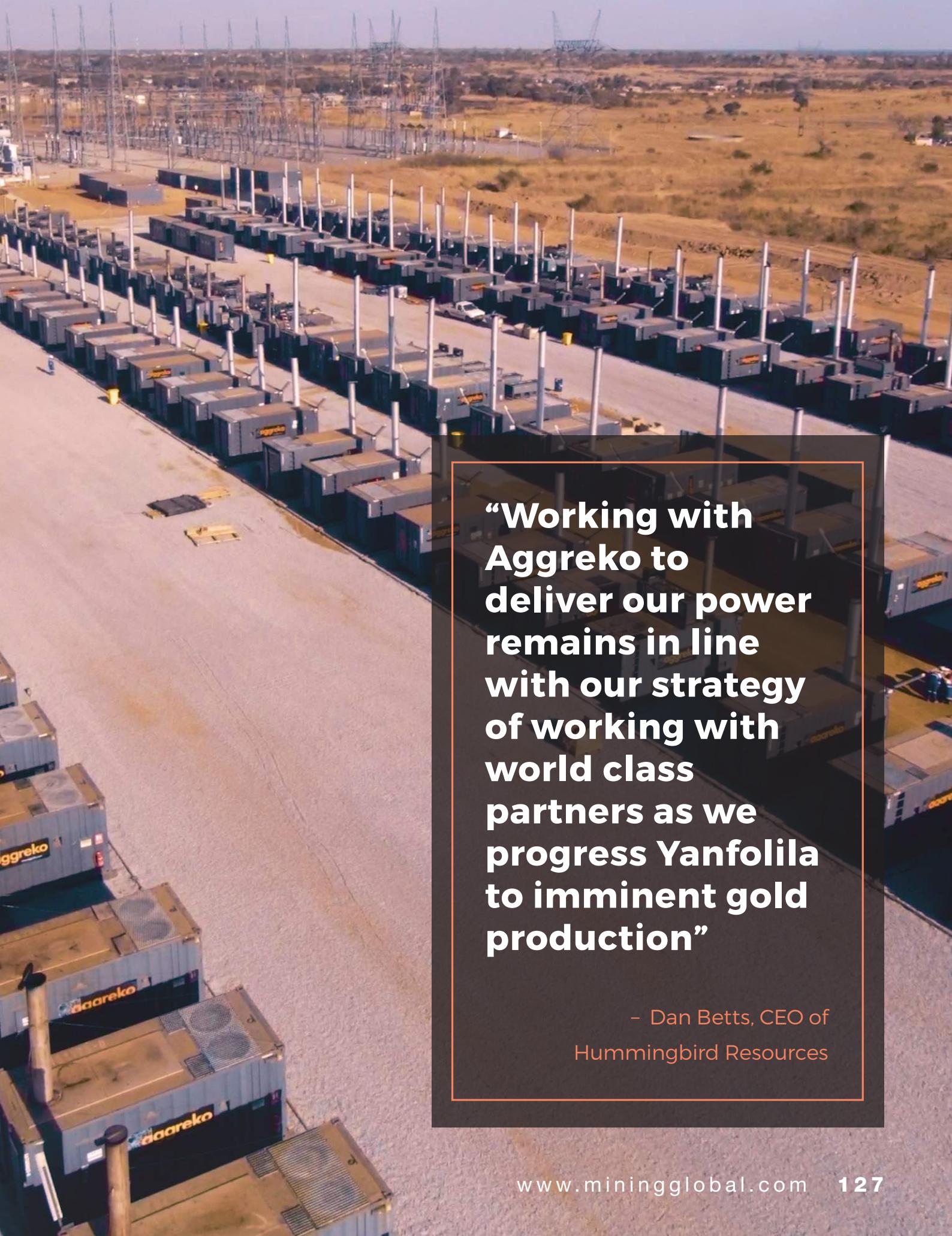
Aggreko has worked closely with and been a strong advocate of the Book Aid International programme for more than 10 years. It has seen Aggreko donate more than 150,000 books to 10 African countries. The company has also partnered with Ethik Investment to supply solar panels and IT equipment to a local school and neighbouring villages. This, Kollar feels, is further example of how Aggreko not only stays with the customer throughout a project but goes above and beyond in order to add true value to a local community.

As Aggreko continues to deliver market leading services, as it has done for more than 50 years, the company continues to invest in cutting edge technologies. With plans to expand and develop its portfolio with projects in more African countries, Kollar is keen to stress that for Aggreko the focus will always remain on one important thing.

“We remain focused to serve our customers in the best possible way whilst continuously working on our key strategic objectives,” he says. “2018 provides significant opportunities across Africa and we want to further expand our operations and continue to build sustainable and long-term relationships with our customers and our strategic partners alike.” ■

# aggreko





**“Working with Aggreko to deliver our power remains in line with our strategy of working with world class partners as we progress Yanfolila to imminent gold production”**

– Dan Betts, CEO of  
Hummingbird Resources

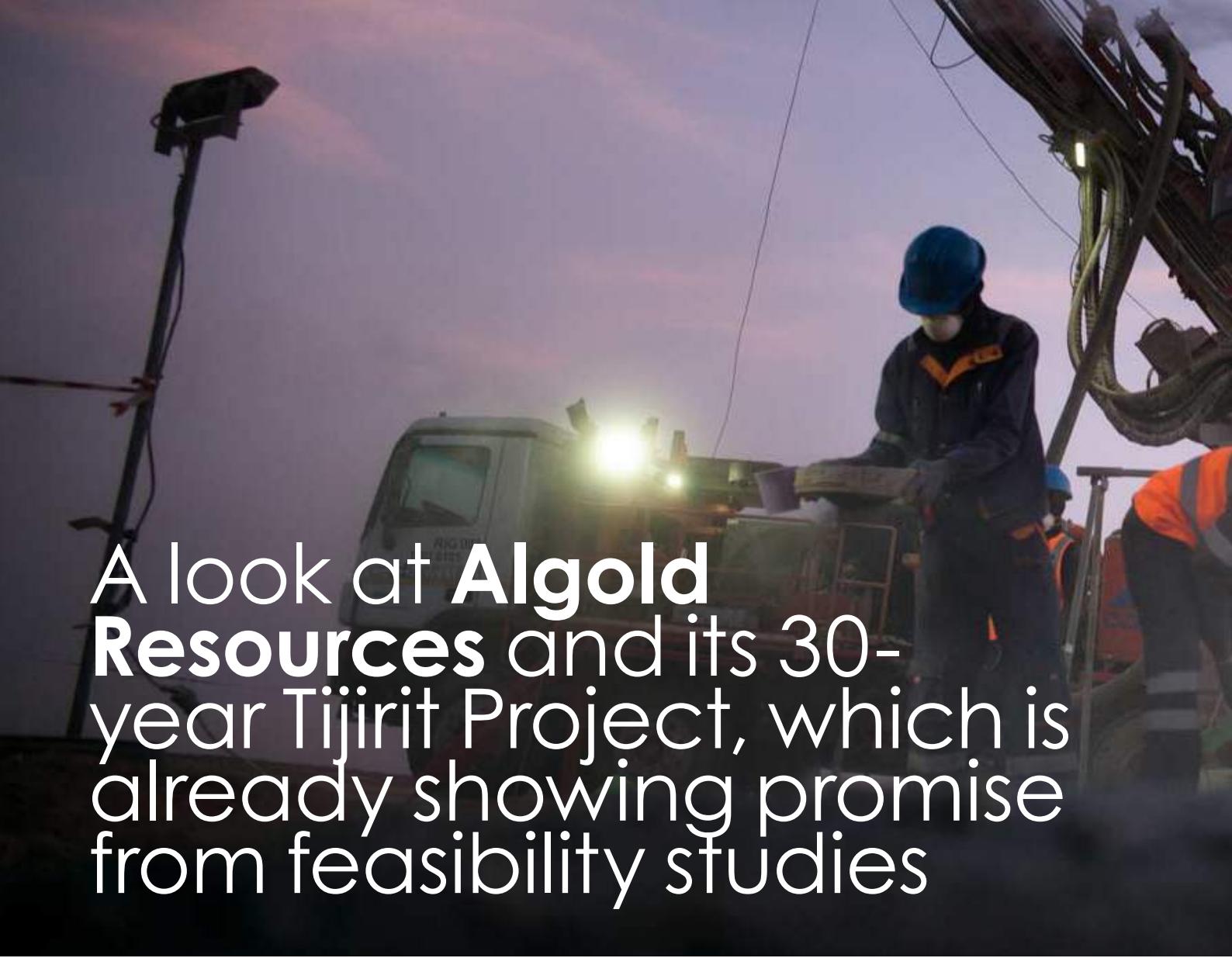


# STRIKING GOLD IN MAURITANIA

Written by **Dale Benton** Produced by **Richard Deane**







# A look at Algold Resources and its 30-year Tijirit Project, which is already showing promise from feasibility studies

In the mining industry, there are some geographies and provinces that are quite literally gold mines for exploration and development.

For Algold Resources, an emerging gold explorer and developer, that key location is Mauritania.

Located in the Maghreb region of north-western Africa, Mauritania is the 11th largest country in Africa. Where Algold is concerned is the country's high potential for iron, gold

and copper, something that has already been recognised by other leading players including Kinross, Xstrata and First Quantum.

Algold has a significant mining licence, which encompasses three major projects across Mauritania. These include the Tijirit, Kneivissat and Legouessi projects.

It is the company's Tijirit Project that Algold is currently investing significantly into. With a



*'Located in the Maghreb region of north-western Africa, Mauritania is the 11th largest country in Africa'*

30-year mine licence, the company has outlined its plan for the project, with Phase IV drilling anticipated to begin in Q1 2018 and an updated feasibility study targeted for December 2018.

The project is made up of four major targets, which include the Eleonore, Sophie and Lily targets. But what is it that makes Tijirit a world class project?

The prospects already outlined by Algold are significant and highly attractive for investors, but Algold believes that it offers tremendous potential for gold mineralisation outside of those already defined prospects.



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It's all well and good sitting upon an incredible discovery, something that Algold can proudly boast, but the true value comes from the way in which the company can extract that mineral potential, deliver true shareholder success and define itself as a true gold mining operator of force – not just in the African space but the world.

No company can grow and achieve success without strong management. Even some of the largest players in the mining world rely on incredibly experienced management, steering the ship towards exponential growth and world class operations.

Algold can boast an impressive leadership team, recently appointing the highly experienced Benoit La Salle as Chief Executive Officer. La Salle brings with him over 20 years of experience in the development and operation of mining projects in West Africa.

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One of the more notable experiences La Salle brings with him is his role in the founding of SEMAFO Inc. Throughout his time there, the junior explorer grew exponentially to become a 250,000-plus ounce-per-year gold producer in West Africa. He also has a proven strong relationship in working with NGOs in Canada and Africa, which in the modern mining world will prove crucial in not only delivering success but delivering sustainable ethical success.

La Salle is but one of many on the management team, which

collectively boasts handling excess of \$5bn in mining transactions in equity and debt, taking technology startup companies to \$40mn IPOs and working with the leading geoscientist organisation in Canada.

Over the past two years, Algold has recorded some key practical success. Expanding the gold resource mineralisation at Tijirit, extending the high grade salma vein to 3km strike and intercepting 6.84 g/t Au over 15m at the Eleonore project have all come following the granting of that 30-year mining licence in August 2017.



***'Algold can boast an impressive leadership team, recently appointing the highly experienced Benoit La Salle as Chief Executive Officer'***

But it's not just practical tangible successes. In February 2018, Algold Resources successfully completed a private placement and royalty financing totalling \$4.8mn with Osisko Gold /Royalties. The deal saw Osisko enter into a strategic partnership with Algold and welcomed two new board members from Osisko onto the Algold board.

The ambition? To capitalise on Osisko's strong financial resources and industry leading technical expertise in the continued development of Tijirit and the company's other development and exploration projects.

Algold Resources is only at the beginning of a remarkable growth journey but can look back on an incredibly strong few years of operating. As the



*'Algold can boast an impressive leadership team, recently appointing the highly experienced Benoit La Salle as Chief Executive Officer'*





company looks ahead to 2018 and beyond, it stands at a key turning point in the company's history.

In March 2018, the company successfully announced the closing of \$1.2mn private placement to list on the Toronto Stock Exchange, subject to final approval of the placement. Should the company receive this, and successfully list on the stock exchange, it will represent a real mark of intent.

Across the mining industry, junior miners like Algold Resources are often sitting on some incredible resources and operations but they

fall by the wayside due to a lack of funding, which the stock exchange can truly enable and empower.

Algold can rest assured in this respect. Under the guidance of an incredibly experienced management team, the company can turn the incredible potential of Tijrit into a real-world class operation.

Algold Resources, despite not being the only player in the market, will go a long way in placing Mauritania on the map. ■



# A NEW DAWN FOR JAGUAR MINING

Written by **Laura Mullan**  
Produced by **Richard Deane**



Based in the highly coveted Iron Quadrangle, **Jaguar Mining** has seen a root-and-branch transformation of its operations and, in doing so, is set to become a major player in the gold mining sector



“The Iron Quadrangle in the State of Minas Gerais, Brazil, is ranked as one of the top five gold producing areas in South America,” explains Rodney Lamond, CEO of Jaguar Mining – and it is here where the Canadian firm is beginning a new chapter in its transformation journey.

Located in central-eastern Brazil, the Iron Quadrangle is a prolific greenstone belt with a gold producing history dating back to the 16th century.

It is an attractive area for any leading mining company, and it's the centre of Jaguar Mining’s refocusing to its original vision – to be a specialist underground mining company – and become one of the leading gold miners in South America.

“Our portfolio currently produces 100,000 ounces of gold a year, with our key operational mines being the Pilar and Turmalina gold mines,” Lamond notes, “but we also have a



**CORPORATE VIDEO:**  
Jaguar Mining presentation

third mine called Paciência that's on a care and maintenance programme.

"Our aim is to become a 200,000 ounce producer and, to do this, we want to bring the Paciência mine back online," he adds.

Created by consolidating a wide range of neglected assets from other companies, Jaguar Mining has consistently revitalised its portfolio by focusing on the fundamentals: investing in plants,

exploration and mining.

This vision has been integral to Jaguar Mining's growth, and it is clear that the Canadian firm's resolve, and subsequent successes, has been by all accounts well earned.

## FOCUSING ON THE ELEMENTALS OF MINING

Like many in the sector, it has been a rocky road for Jaguar Mining, but it is one which the company

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has tackled head-on. The firm is zeroing in on perfecting the basics of mining and, in doing so, it has evolved to become more resilient than ever, according to Jonathan Hill, Jaguar Mining's Geology and Exploration Senior Expert Advisor.

"In previous years, Jaguar Mining was diverted by projects elsewhere in Brazil that became capital intensive, and then the economic crisis came," explains Hill. "The price of gold dropped and companies could no longer afford these high-capital, long-life projects.

"Jaguar Mining has now refocused on its original vision to be a long-life, sustainable gold mining company, and that's what is cementing the future of the company," he adds.

Tasked with restructuring and refocusing the company's vision, it was this challenge which first attracted industry veteran Lamond to become CEO at Jaguar Mining.

## RESTRUCTURING AND REVITALIZING OPERATIONS

With a wealth of hands-on experience running mining

"We're generating significant operating cash flow, which allows us to continue investing capital in sustaining and growth projects and reducing debt"

**RODNEY LAMOND**  
CEO, Jaguar Mining

operations, the company's boss has spearheaded a root-and-branch transformation of the firm.

In doing so, he has helped to build credibility and land Jaguar Mining back on the Toronto Stock Exchange, and has also helped to revise its capital structure.

"Our debt to revenue ratios are second to none," Lamond says. "We've currently reduced debt since I've started from \$36mn to \$16mn. We're generating significant operating cash flow, which allows us to continue investing capital in sustaining and growth projects and reducing debt."

## JAGUAR MINING INC.

Jaguar Mining is also bolstering its operational excellence by meeting ambitious key performance indicators (KPIs) and using technological innovations.

Identifying the main KPIs for success, the Canadian firm has developed ‘excellence groups’ which monitor these goals. Through a ‘Plan-Do-Check and Act’ analysis, the groups eliminate any issues so that productivity and efficiency remain at the forefront of its agenda. To meet such demanding targets, the company is also investigating in the use of technological innovations, such as automated underground drilling equipment.

By all accounts, the latest chapter in Jaguar Mining’s story has been one defined by its refocused vision and its emphasis on what matters: the primary mining operations. To achieve this, it has reduced costs in non-critical areas to lower debt and boost its operational cash flow.

### STEADFAST EXPLORATION

Traditionally, many mining operations have been characterised by short

life spans; however, Jaguar Mining is challenging this convention.

The company hasn’t lost sight of the importance of exploration, and its commitment to it is elevating the firm to new and exciting heights.

Moving forward, Jaguar Mining’s main focus is to continue drilling at its core operating assets. It is going to explore and drill down-plunge extensions of main orebodies and intends to increase the life of mines.

So far, the firm has had impressive results at both the Pilar and Turmalina mines, recently reporting approximately one million ounces of gold (532,000 oz. in M&I and 433,000 oz. in Inferred) at Pilar alone.

“The mines have a fairly small footprint at the surface, but they go down to great depths,” explains Hill. “There are many examples of historical mines continuously going deeper and deeper, at good grades.

“We believe our principal mines have got these long roots, and that’s where we’re focusing now and where we’re getting good results,” he continues. “We’re demonstrating that these older properties have

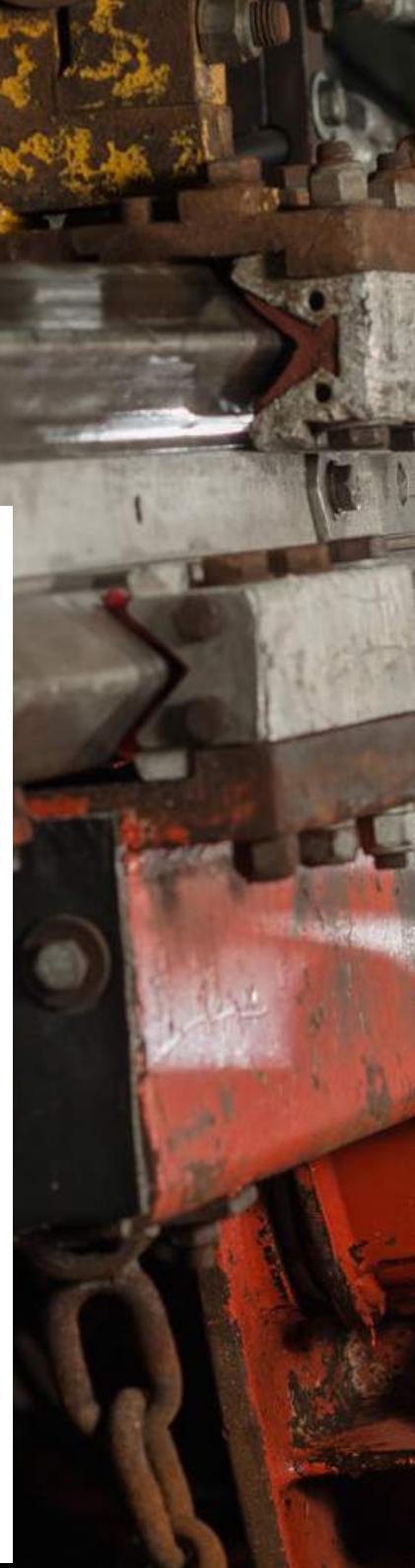


“Jaguar Mining has now refocused on its original vision to be a long-life, sustainable gold mining company, and that’s what cementing the future of the company”

**JONATHAN HILL** Geology and Exploration Senior Expert Advisor, Jaguar Mining

## PILAR GOLD MINE MINERAL RESERVES AND MINERAL RESOURCES HIGHLIGHTS

- Total Measured Resources increased 277% to 317,000 ounces of gold, net of depletion, grading 4.47 g/t.
- Total Measured and Indicated (“M&I”) Resources increased 10% to 532,000 ounces of gold, grading 4.37 g/t.
- Inferred Resources increased 104% to 433,000 ounces grading 5.69 g/t, reflecting a successful growth exploration drilling campaign in 2017 targeting high-grade deeper extensions to the principle banded iron formation Orebodies (BA, BF, and BFII) below current mine production levels.
- Total Proven and Probable (“2P”) Mineral Reserves of 125,000 ounces of gold, grading 3.99 g/t reflecting two-year replacement of mineral reserve depletion through production and addition of new mineral reserves, confirming over three years of future production at current production levels.
- Higher quality and increased grades of newly added mineral resources facilitate resource to reserve conversion drilling to be prioritized in 2018 and scheduled as per the mine plan while ensuring financial discipline.





“We’re demonstrating that these older properties have more than a few years ahead of them. Instead of having a one-year runway or 18-month runway, which is typical for these types of mines, we can start to see beyond the five- to 10-year period. That’s what’s consolidating the future of the company”

## JONATHAN HILL

Geology and Exploration Senior Expert Advisor, Jaguar Mining



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more than a few years ahead of them. Instead of having a one-year runway or 18-month runway, which is typical for these types of mines, we can start to see beyond the five- to 10-year period. That's what's consolidating the future of the company."

## VITAL INDUSTRY PARTNERSHIPS

Thanks to its innovative, unilateral thinking and its refocused operations, Jaguar Mining is set to bolster its position as a leading gold miner in South America. However, it is keen to highlight the strong strategic partnerships that have helped it on this transformative journey.

"Companies such as the Aquila Group have really helped us put modern measurement techniques in place," notes Hill. "That's helping people understand the key ingredients needed to run an operation, understanding what the costs associated with those are and the responsibilities of the people involved in this."

"Another key partner is Major Drilling, who uphold high safety,

health, environmental and community standards that equal our own values, so we are excited to work with them," he continues.

"Laboratories such as ALS have also provided excellent services for us and these partnerships are so important because mining isn't about the parent company, it's about the partnerships. Everyone's part of the team."

Lamond agrees with this sentiment, also highlighting the strong relationships the firm has forged with local universities and communities.

"Getting people exposed to the industry, whether it's through their PhD or undergraduate study, is



## TURMALINA GOLD MINE MINERAL RESOURCES HIGHLIGHTS

- M&I Resources of 420,000 ounces of gold reflect full replacement of 45,000 ounces of 2017 mining depletion for Orebodies A, B and C.
- Measured Resources increased 8% to 265,000 ounces with a 6% increase in grade to 5.7 g/t.
- Inferred Resources increased 158% to 305,000 ounces of gold with a 14% increase in grade to 5.49 g/t, reflecting successful growth exploration drilling campaign in 2017 targeting high-grade deeper extensions to the principle Orebodies A and C below current mine production levels.
- Focused on completing growth exploration and resource conversion drilling program throughout the first half of 2018 to further update Mineral Resources and Mineral Reserves at mid-year 2018.
- Interim update based on drilling results from growth exploration, mine resource conversion and grade control drilling completed on Orebodies A, B and C to November 30, 2017, compared to Mineral Resources as at December 31, 2016.





“We’re in an area of Brazil that is a prolific gold-producing belt. It provides a tremendous investment opportunity for those who have the appetite to invest in Brazil”

## RODNEY LAMOND

CEO, Jaguar Mining





allowing us to better understand the area and our property,” comments Lamond. “At the same time, it’s about providing opportunities to students who are either in the geology or engineering fields. As the knowledge of our deposits grows, our perceptions change, so these partnerships are very important.”

## A NEW CHAPTER AHEAD

With the aim of doubling its production on the horizon, Jaguar Mining is confident that its operational excellence and impressive location has positioned it to tap into any escalation in gold price.

“We’re in an area of Brazil that is a prolific gold-producing belt,” concludes Lamond. “It provides a tremendous investment opportunity for those who have the appetite to invest in Brazil and who want to watch a company grow—a company that has been successful over the past several years and continues to be so.”

While the past few years have been focused on the firm’s survival, it seems it is a new dawn for Jaguar Mining, one where the company is set to thrive. ■





**GOLD FIELDS**

# The best is yet to come

*South African mining company Gold Fields owns and operates a number of assets in Australia: its vision is to be the global leader in sustainable gold mining, with its Granny Smith operation leading the way*

Written by **John O'Hanlon**





“TECHNOLOGY ALLOWS US TO  
CONTROL A MACHINE A KILOMETRE  
UNDERGROUND FROM SURFACE”

– Andrew Bywater, General Manager: Granny Smith Mine





Granny Smith mine near Laverton in Western Australia, had been transferred between a number of owners before it was acquired from Barrick Gold by Gold Fields on 1 October 2013 as part of the purchase of the Yilgarn South operations. The deal included two other gold mines, Darlot and Lawlers. It may not have looked it at the time, given the slump in gold prices, but this has turned out to be a great deal for Gold Fields, which has been able to add significant value to the mine, aided by a gradual recovery in gold prices.

### **Granny's promises**

As part of the Granny Smith deal, Andrew Bywater joined Gold Fields with a brief of turning around the Darlot operation to deliver a profitable operation. Darlot has subsequently been purchased by Red 5 and just under a year ago Bywater became General Manager of the Granny Smith mine, where he has been busy working with fellow leaders and employees.

The main Wallaby deposit was discovered in 1998, with open pit mining commencing in 2001 and Underground mining commencing in 2004, generating over 3.8Moz of recovered gold. Since purchasing the mine, Gold Fields has produced over 1.2M ounces of gold and is spending in the order around \$25m a year on exploration in the area to further extend the life of the mine.

Reserves have grown year-on-year and production efficiency continues to improve. "Granny Smith has gone from strength to strength" says Bywater, speaking about



## “WE WANT TO KEEP SUPPORTING GRANNY SMITH AS A GREAT PLACE WHERE PEOPLE ENJOY WORKING”

– Andrew Bywater, General Manager: Granny Smith Mine

extensions to the Wallaby ore-body, increased mining physicals and improvements to the processing plant. “A feasibility study has recently been completed with board approval to develop what we call zone 110 - 120. This is our next mining area beneath

current workings at a depth of 1200m, a block of ore covering a 900m by 600m area with an Indicated Resource of 6.2Mt @ 7.3 g/t for 1.46M oz’s. This will provide Granny Smith with a great mine life of close to ten years.” And that’s not all. A pre-feasibility study

will take place this year on further depth extensions to the Wallaby ore-body. There are strong signs that another block of mineralisation at zone 135 can be mined below planned infrastructure he says, adding that the focus this year will be to maximise Wallaby's potential, thereby maintaining Granny Smith as a world-class asset. Seven underground drill rigs, operated by Barmimco Drilling, are working round the clock to achieve this and advance other targets.

The extended Granny Smith tenements also

holds great potential for future ore deposits. This is not just prospective close to the current workings, but also beyond the main ore body at a newly mineralised zone called Blurry BIF. This project is located within 10km of Wallaby and contains significant gold intersections extending over a 1km strike extent. Bringing in more production makes sense as the processing plant has additional capacity available.





## Improved Productivity

Meanwhile, productivity improvements to the current mining operations are taking up much of Mine Manager Mark Glazebrook's time. The latest Atlas Copco 65 tonne trucks have increased the payload capacity underground, while future technology opportunities include a staged programme being introduced with the aid of the mining technology specialist Newtrax. Apart from trial technology to gather and store data from mobile equipment, this system will enable other productivity initiatives

such as monitoring the whereabouts of underground personnel in real time. That will be a further safety advance for the operation.

Automation of heavy equipment is perhaps even more exciting from both a productivity and a safety point of view. From a small control room on the surface mining administration building at Wallaby, it is already possible for an operator to remotely control some loaders that take the ore from the face to the underground stockpile. Cameras give the operator an all-round view and



the team is establishing technology that will enable remote operating of two loaders at the same time.

Scheduling is constantly monitored and improved through the application of advanced software solutions, such as Deswik OPS, the mine's latest project planning software. "By catching up with other industries in IoT, AI, analytics and other advanced automation practices, mines will be able to extend operations faster and become safer and more efficient places to work," Bywater insists.

A paste plant is also being installed

during 2018 which will support back filling of stopes at depth in the mine. Back filling is essential for rock stability and improved extraction rates and is another important enhancement of Granny Smith's capacity, says Bywater.

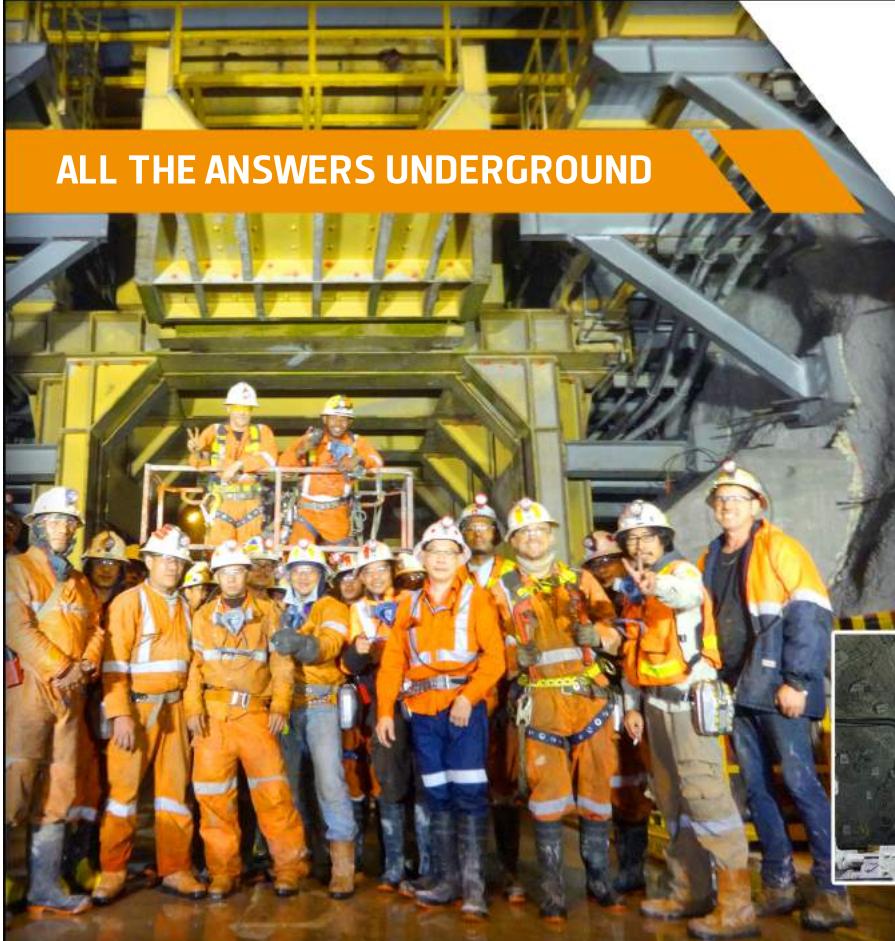
### **Looking after Granny's family**

Granny Smith is on target to produce 275,000 ounces of gold at an All-in Cost of around A\$1,240/oz in 2018. That said, the goal is to achieve this in a safe and enjoyable workplace for the 720 people who work at the

**GOLD FIELDS**



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mine. In previous roles, Bywater has a reputation as a champion of equal opportunity for women and true diversity in mining. Much of this can be achieved via the company values and this includes a respectful workplace for everyone on site. Women make up 10% of the workforce at Granny Smith, which he strongly believes can be improved on. Further work will include advancing the One-Team approach and continually promote Safe-Production. One-Team means breaking down silos across departments and groups and moving away from the old ‘us and them’ mindset.

In the previous 12 months site has facilitated a traineeship scheme for truck drivers and other roles which has seen a number of local Aboriginal people progress to full time jobs. There is also a cultural partnership with Aubrey Lynch, an elder of the Wongatha, the traditional owners of the mine land, to make employees

aware of the native flora and fauna, and the Wongatha’s relationship to the land, their laws, customs and history.

The mine is a popular place to work, with shift employees typically on an 8 days on 6 days off, 7 nights on 7 days off roster. The camp is continually being upgraded and has a fully equipped gym, squash and tennis courts. “We want to keep developing Granny Smith as a great place where people enjoy working,” Bywater enthuses. On top of the facilities mentioned, there is a social committee that organises guests, comedy acts and open performance nights for employees, bringing a bit of fun to the outback.

Miners, just like the rest of the population often face family, friendship and financial challenges. “We have increased the accessibility to face to face counselling,” Bywater says. “As well as responding to personnel challenges, our Employee Assistance





Programme provider is on site regularly to spend time with the workforce in a proactive way. They have established a very good rapport with employees." By also participating in initiatives such as 'R U OK day' the company encourages employees to be aware of the physical and mental wellbeing of their colleagues, to start a conversation if they have any concerns and know when to ask for support.

## A Strong Safety Culture

Looking out for each other is central to Gold Fields' values and one of the best ways to show respect in the

workplace.  
"Employees  
are the best  
safety advocates  
we have at Granny

Smith. Behaviour-based safety programmes and cultural change are the way forward," Bywater believes. "We encourage and support an independent workforce through the Gold Fields behavioural based safety program. The key behaviours include assessing risk, following procedures, managing fatigue and above all, Speaking Up to improve safety. When these behaviours become ingrained in the business, incident rates can reduce by up to 80%." Opinion Leaders are nominated by the workforce to drive programs such as bringing in external speakers to share safety-related stories and other



campaigns to help make good safety choices. "This is a very immediate way to personalise our key safety message 'If we cannot mine safely, we will not mine,'" Bywater states.

Improving safety and employee engagement at Gold Fields includes another important process, Visible Felt Leadership. "This involves supervisors getting into the workplace with employees as they complete tasks, to share conversations about safe work processes and outcomes"

He says. When done right, Visible Felt Leadership makes a difference by reducing recordable injuries and also provides an opportunity for employees to give feedback, share experiences and speak up. A recent safety challenge involved many supervisors completing 100 safety interactions in 100 days. During this time leaders and the workforce stepped up to deliver the mine's best 100 day safety performance for the year. Bywater doesn't think that was a coincidence! ■



# Sustainable value in mining, sustainable development for Oman

Written by **Dale Benton**  
Produced by **Robert Gray**





كونوز عمان القابضة  
Kunooz Oman Holding





## Following consolidation and incorporation in 2014, Kunooz Oman Holdings Group is aiming to establish itself as a key player in Oman's mining market through creating sustainable value

**K**unooz Oman Holding's vision and mission is simple – to bring natural resources to the world to support the sustainable development of Oman by creating sustainable value.

In 2014, Kunooz was incorporated following the consolidation of five subsidiaries and two associates within the mining, quarrying, transportation and construction materials sector. The ambition? To become a public company.

"The strategy involved ramping up and optimising our current operations

and balance sheet," says Dean Cunningham, CEO of Kunooz.

"We will identify new opportunities and new acquisition targets in order to become a key player in the bulk commodities sectors in Oman."

Cunningham, whose career has taken him through the South African investment banks, private equity with a focus on the mining industry through to joining Kunooz in 2014 as the company, considered list on the Muscat Stock Exchange.

Over the course of his career,



he has worked extensively on the preparation for divestment and listing, mergers and acquisitions, organisational change and most importantly, risk management and problem solving. This, he feels, is key as the company continues to diversify and become that major market player.

"I think my experience has influenced my understanding of project management, building financial models, budgeting, and understanding local and global markets and how to strategically position the company for expanding and contracting cycles," he says.

"The combined skillset of mining and project management has

**"We will identify new opportunities and new acquisition targets in order to become a key player in the limestone, gypsum, marble and gabbro sectors in Oman"**

*- Dean Cunningham, CEO*

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**“Centralising will get us better pricing as we can then begin to leverage off the volumes required, specifically in transportation costs such as diesel and tyres. It is a key part of maintaining and managing our cost structure going forward”**

*- Dean Cunningham, CEO*

influenced my management of greenfield or brownfield projects right through their various phases to commercialisation.”

In the quest to become a fully public company, the founding Al Rawas family members have disinvested 20% of their shareholding to the Oman Investment Fund (OIF). Cunningham believes that having OIF as a significant shareholder will increase investor confidence in the company, lend credibility to the company’s ambition and only prove to strengthen this transition.

Currently speaking, close to 60% of Kunooz’s revenue is contributed by subsidiaries and associates that are operational with export activities.

“Our business is currently export-driven and is aided by both global urbanisation and infrastructure development,” he says. “Given that we operate in related industries and sectors, our businesses are able to benefit from substantial synergies.”

Kunooz is currently looking at a potential dolomite project, with scoping studies to date showing great potential. The firm is planning an

exploration campaign with the hope of moving further into a feasibility study and then commercialisation but all this will be based on the outcome of a bankable feasibility study, fingers crossed that we can get there.

This is a key development for the company as, through its mission of bringing natural resources in order to support the sustainable development of Oman, Kunooz is aiming to diversify away from low price high volume products – with dolomite falling into this category.

This diversification however, does not strictly mean moving away from existing projects. Cunningham sees it more as a case of adapting to the market, becoming more vertically integrated by pushing out to into a diversity of products based on our raw materials pool, which combined would create what he describes as a “number of high value products”.

“It’s a difficult balance,” he says. “Diesel, for example, makes up 50% of our costs, but over the last 18 months we’ve seen the price of diesel rise around 70%. This has really forced us to look at our cost

and restructure our business, and I’d consider the last 18 months to be a real achievement for us.”

Add to this that the company is targeting projects and exploration developments that are incentivised by being located strategically in order to reduce those costs associated with transportation.

“We really are looking at minimising the expenditure costs like diesel and placing ourselves as close to the market and to the customers as we possibly can,” says Cunningham.

As part of his role as CEO, Cunningham works closely with the management team to seek out and implement solutions with the various subsidies and companies that work under the Kunooz umbrella, in order to deliver on the strategic vision of the company and continue to drive down costs. This provides its own unique challenges that are, again, driven by the current market.

“High quality skills are expensive and getting more expensive as commodity market starts to perform, so we try and maximise these skill sets across the group through internal



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Processing a Kunooz marble shipment

engagement between subsidiaries on a regular basis,” he says.

This collaboration proves key for Cunningham.

“It allows us to look at the detail, apply a long-term view and take a collective approach to maximise the opportunities for all stakeholders,” he says. “As a company, we look at ways of supporting the industries as a whole, training, educating and improving skills. In doing this we increase the skills pool which will over time uplift the entire market here in Oman.”

Operating across multiple

sectors and industries requires a significantly robust and agile supply chain and logistics model in order to succeed and deliver on the company’s promise. Per year, Kunooz invests heavily in consumables and services across all of its sector activity and hence the creation of a centralised procurement function.

“Centralising will get us better pricing as we can then begin to leverage off the volumes required, specifically in transportation costs such as diesel and tyres,” says Cunningham. “It is a key part of maintaining and managing our cost structure going forward.”

As one of its core values, Kunooz

**“It’s probably the strongest marketing team that anyone has in Oman for any one commodity. It’s a small team that is dedicated to engaging with partners and customers, confirming and providing the required product both in product and to the highest of quality”**

– Dean Cunningham, CEO

aims to create sustainable value for its investors, for the people it invests in and the environments in which it works. This extends to the partnerships that the company creates, develops and fosters in order to successfully service its customers.

This is an area that Cunningham plays an active role in – working closely with the Group General Managers to establish relationships that will deliver true value for both the partner and Kunooz itself.

Cunningham points to the company’s Gypsum business as a strong example of how Kunooz engages with its partners to better serve its customers.

“The Gypsum business extends as

far as India to New Zealand and down the east coast of Africa,” he says. “It’s probably the strongest marketing team that anyone has in Oman for any one commodity. It’s a small team, but it is one that is dedicated to engaging with partners and customers, delivering what the customer requires and to the highest of quality.”

Over 600 people are directly employed across the Kunooz Group, stretching from a mining workforce to middle management and finance teams right up to head office. As the company seeks to enrich Oman, it looks far and wide for talent.

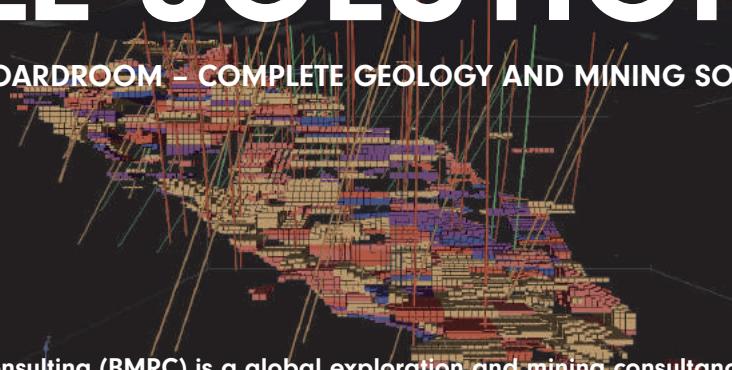
“Our employment strategy looks for people across all cultures and from different geographical

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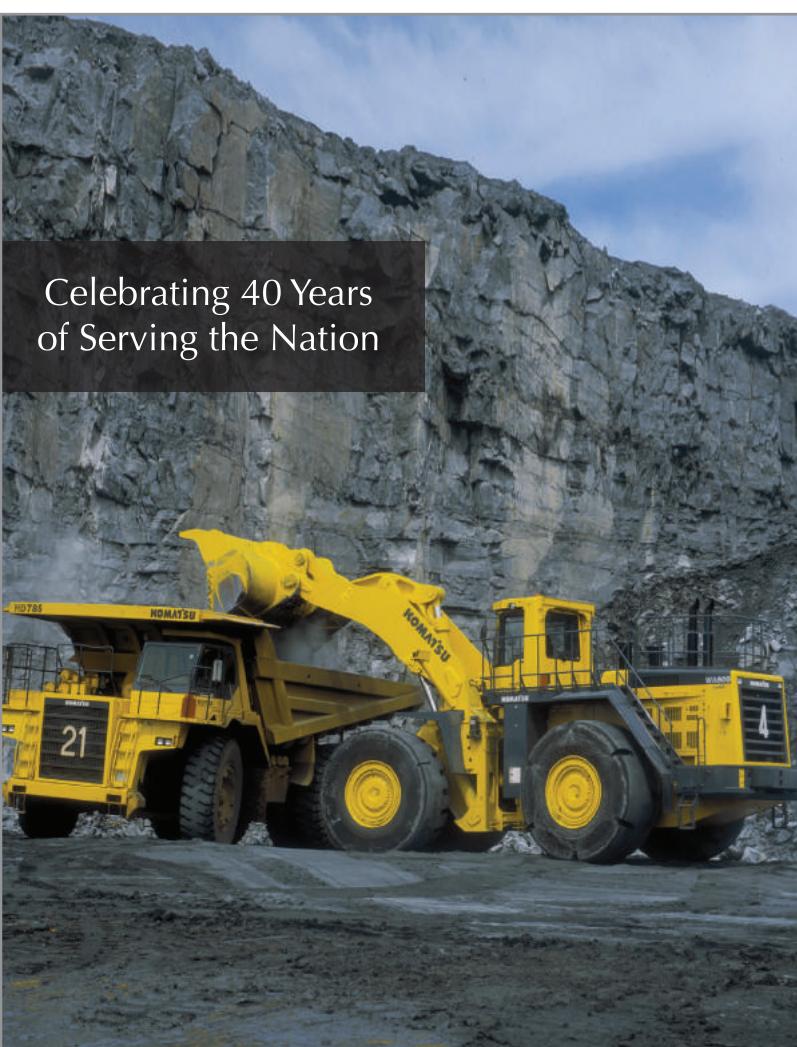
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locations,” says Cunningham. “We deliberately strive to create a mixed work force to create a competitive environment, one that encourages people to think outside of the box.”

This falls in line with the company’s approach to sustainability. Cunningham feels that the key to long term success requires discipline and the rolling out of strategies and processes that make no individual irreplaceable, including himself.

“Our company is about pushing people. They have to feel confident in themselves to deliver and surround themselves with these smart thinkers who challenge them and push one another, including upper management and myself,” he says.

“This will only enhance the business and if channelled correctly, it will add significant value to the business. It’s been a continuous process, and it’s been challenging, but we are achieving it, and we are growing.”

Since the consolidation of Kunooz’s subsidiaries in 2014, it has been a journey of transformation and realignment. As it continues to grow and expand and establish

itself in the mining market, Cunningham understands that this is a continuously evolving process.

This includes diversifying its logistics operations away from simply supporting the mining subsidiaries, and into a fully-fledged logistics operation.

But, the main goal remains. “We will continue to grow and diversify our offering in the mining industry on a local level,” Cunningham says. “Once we’ve fully established ourselves, then we will look at the international mining market and look to transfer what we call the Kunooz way on a global scale to truly become a global company.” ■



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