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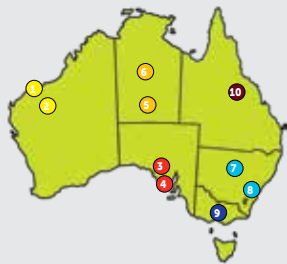
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KIRKLAND LAKE GOLD p30



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DIATREME
RESOURCES

THE INTERVIEW p70



Image: QRC.

THE NEW BLACK

QLD COAL IN REVIEW

No one is calling it a boom just yet – but the QLD coal sector's strong growth over the past year now looks set to continue its upward trajectory through 2018.

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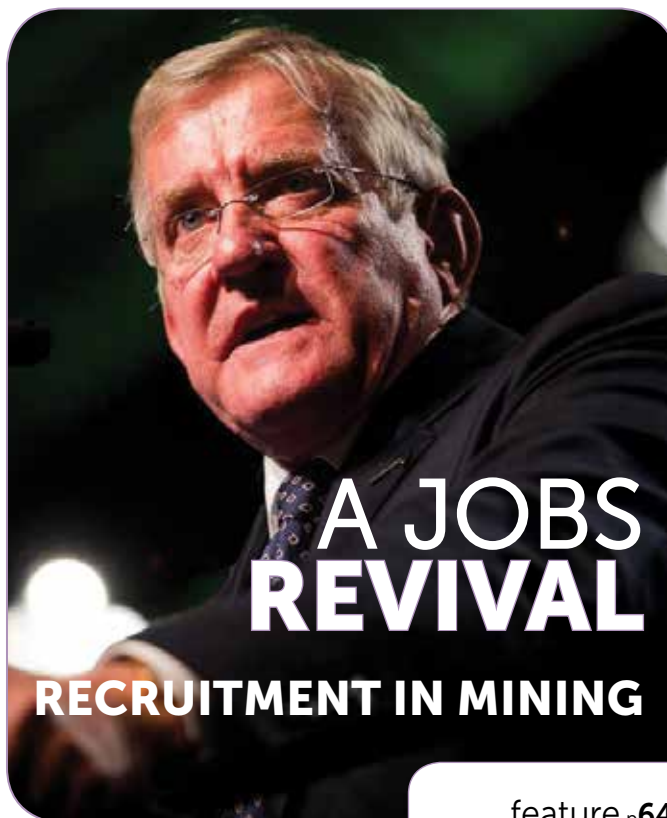
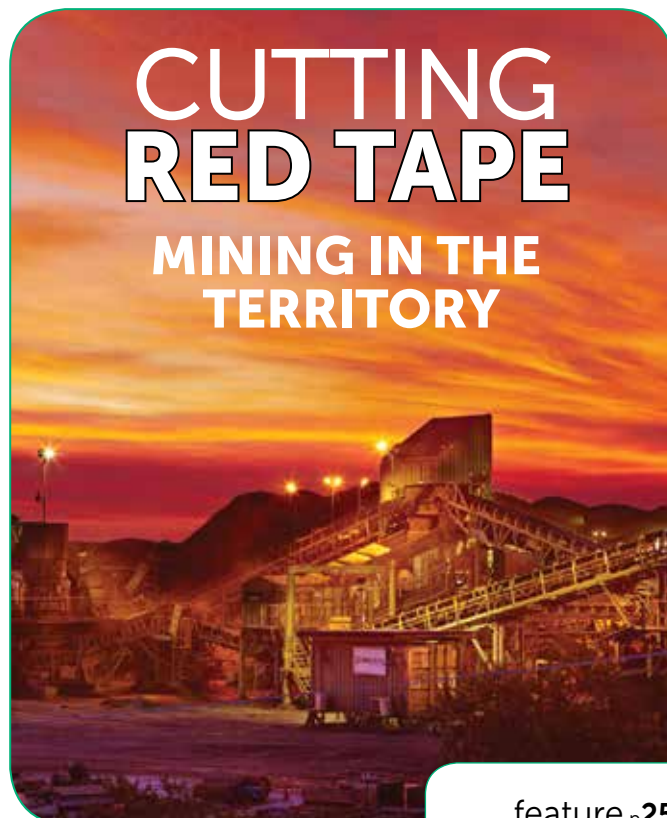
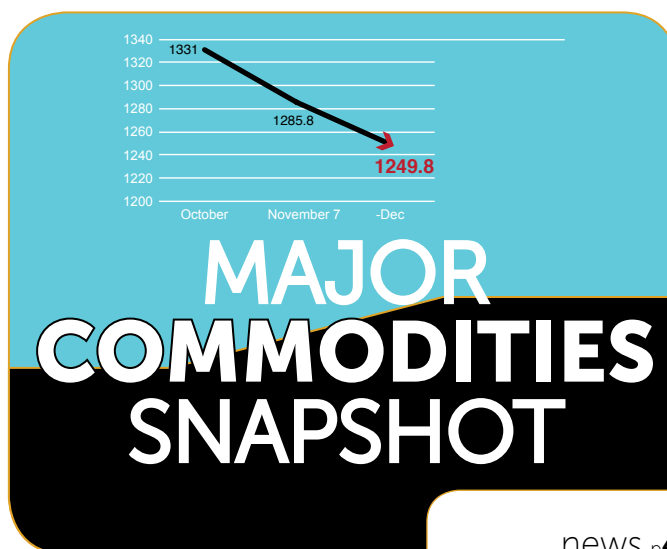
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**NEIL MCINTYRE**
DIATREME
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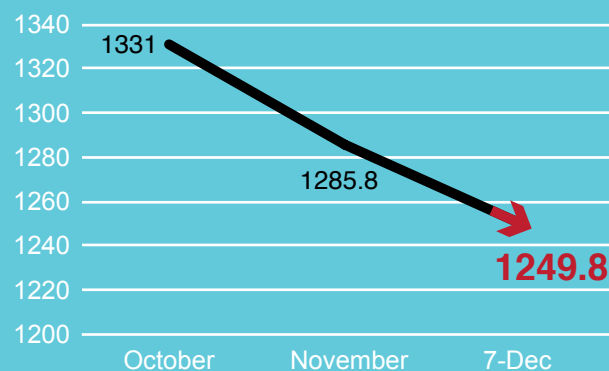
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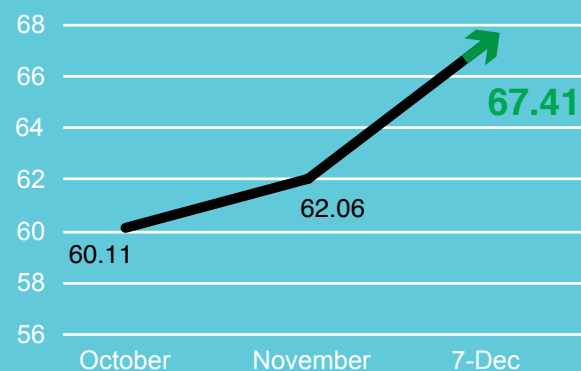


Gold has slid recently to five-month lows, however is expected to rally upon upcoming US policy decisions.

IRON ORE

62% Fe CFR China

\$US/t

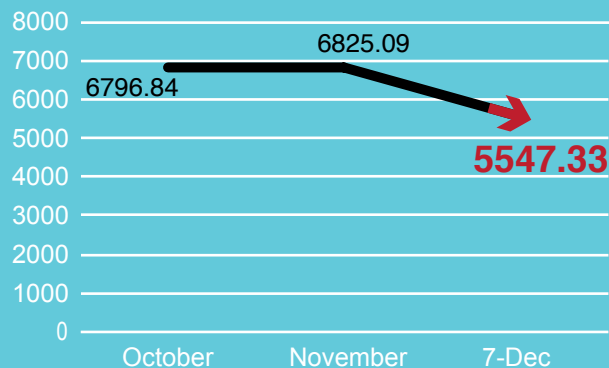


Demand for high quality ore in China and India has seen iron ore prices rebound from mid-year lows.

COPPER

\$US/t

LME Price

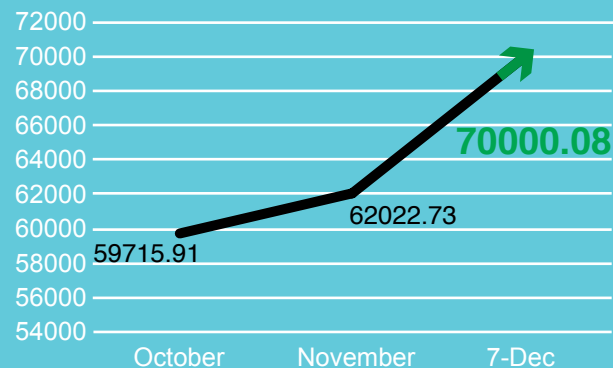


Copper prices remain strong despite a recent decrease in Chinese smelting. A surge in demand for electric vehicles is expected to burgeon the commodity throughout 2018.

COBALT

\$US/t

LME Price

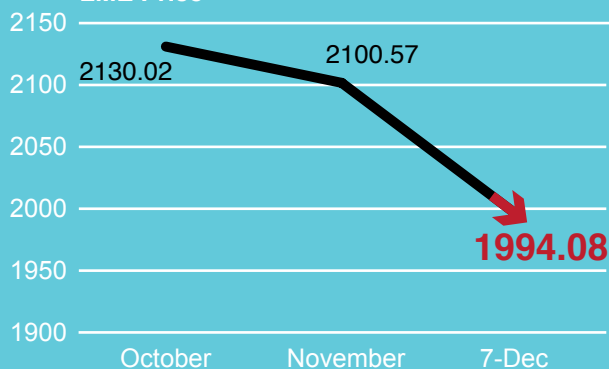


Cobalt prices have gone ballistic during 2017 surging past \$US70,000/t – the highest in 9 years – off the back of high demand for battery metals.

ALUMINIUM

\$US/t

LME Price

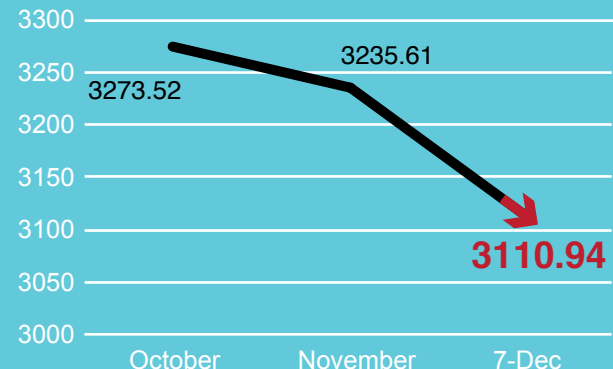


Aluminium prices have slid down in line with its futures market, dipping below \$US2000/t during December.

ZINC

\$US/t

LME Price

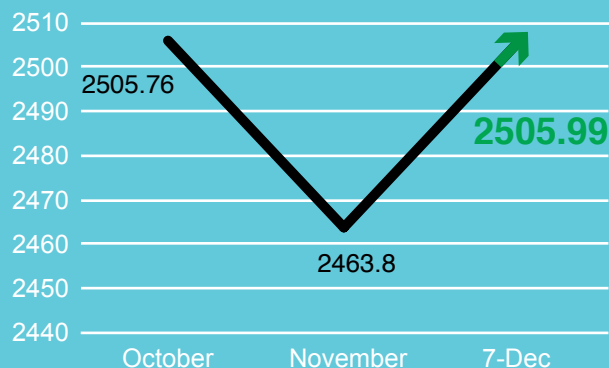


Zinc prices have dropped off pace in the last few months, however Chinese production cuts could see the commodity bounce higher in early 2018.

LEAD

\$US/t

LME Price

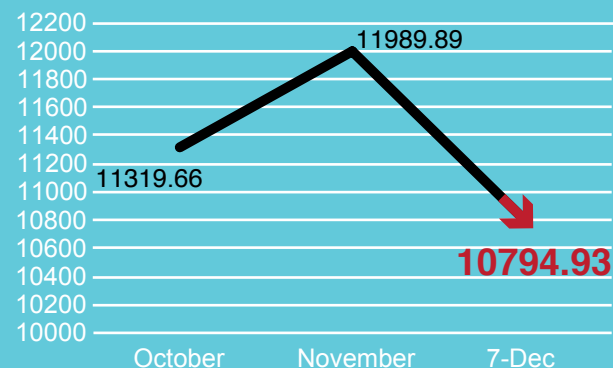


Lead remains one of the more stable base commodities, with demand projected to remain steady.

NICKEL

\$US/t

LME Price



Nickel has dropped off from its recent gains as mill production slows from seasonal shutdowns.



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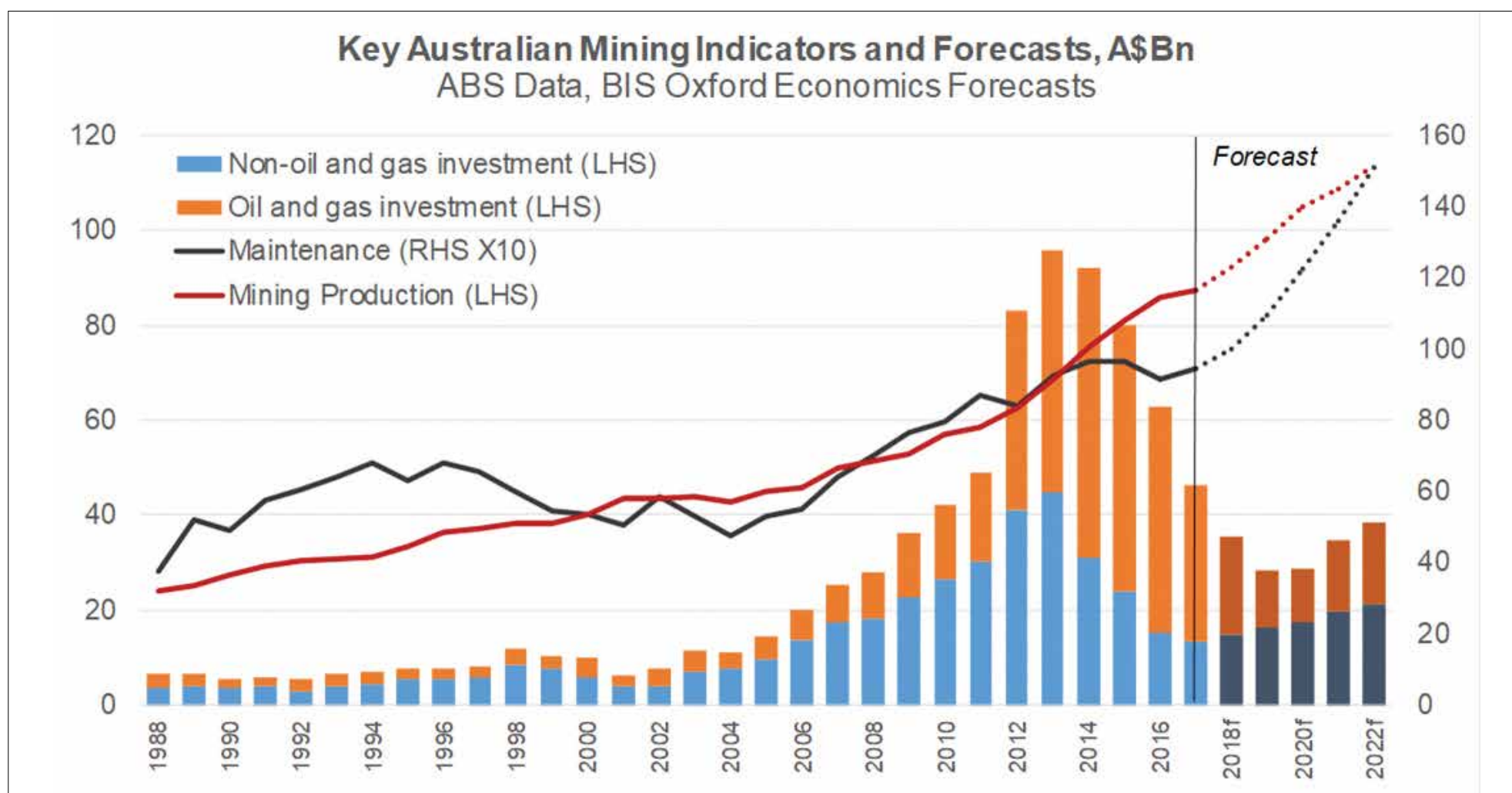
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Resources rush for 2018 and beyond



ELIZABETH FABRI
NATIONAL

AUSTRALIA'S mining sector is set to accelerate through 2018 as strengthened global economics, particularly in China, support commodity prices and underwrite new investment.

According to a recent report by S&P Global Market Intelligence, over the next 12 months China will drive continued growth in end-use demand for most base metals through developments such as the 'One Belt One Road' initiative.

However the report highlighted fears surrounding China's debt and ability to sustain GDP growth rates (a process that determines the success of large infrastructure spending), but

assured macroeconomic improvements were still likely despite the risks.

"Growth in mining production will be roughly double the pace of the national economy over the next five years."

"A key macroeconomic area of support for base metals prices will be through the US dollar, as it moves weaker relative to producer currencies," S&P stated.

"It is likely that we could see a depreciation

of the dollar in 2018 against its trade-weighted basket.

"Further USD weakening will support prices for metals as financial investors look for a store of value outside of the greenback."

S&P added nickel and zinc were set to continue to operate in deficit as end-use demand in stainless steel and automotive production remain elevated, while copper was projected to move into deficit and iron ore would remain in surplus in the near term.

Similarly, independent economic forecaster BIS Oxford Economics' *Mining in Australia 2017-2032* report said robust growth in the Chinese and Indian economies were "the key drivers that will sustain growth in Australia's mineral exports and buoy prices".

The report forecast mining exploration, production and maintenance to lift significantly in 2018, and rise further in the years to follow.

"Growth in mining production will be roughly double the pace of the national economy over the next five years," BIS Oxford Economics economist Rubhen Jeya said.

BIS Oxford Economics said production growth was expected to increase by 5.5 per cent in 2017/18, while exploration activity was forecast to rise 8.7 per cent in 2017/18 and almost 40 per cent over the next five years.

Maintenance activity was also predicted to rise almost 60 per cent over the next five years, opening up a wealth of opportunities for mining contractors.

Balla Balla ratified in WA Parliament

CAMERON DRUMMOND
WA

BBIG Group (BBIG) has received the final assent of a WA Government agreement for its multi-billion dollar Balla Balla Infrastructure (BBI) project, linking iron ore deposits from the Central Pilbara with a new export facility at the Balla Balla port via a 162km purpose-built railway.

The ratification of the project by Parliament is seen as a big step forward for the project, which would create about 3000 jobs during construction and about 900 operational positions.

BBIG estimated that the total royalties payable to the WA Government from customer mines over the life of the project could be in excess of \$4 billion.

BBIG chairman Jon Young said the company was particularly pleased with the bipartisan support that both the BBI project and its State Agreement has received in WA.

"The bipartisan support the State Agreement

has received sends an excellent signal to our business partners," Mr Young said.

"I would like to personally thank Premier Mark McGowan, and all members of Parliament for their support.

"We can now fulfil BBIG's commitment to provide employment, economic and social opportunities for Pilbara residents.

"These commitments will provide direct benefits to traditional landowners, the local community, and businesses as an outcome of the project's construction and operation."

WA premier Mark McGowan stated in Parliament that the agreement would facilitate the delivery of significant positive outcomes for local communities and those businesses servicing the mining and ancillary sectors of the WA economy.

"The project has the potential to generate significant jobs in both its construction and operation phases, and it must be acknowledged, is a project to which both sides of the house have provided their support."

"The project has the potential to generate significant jobs in both its construction and operation phases, and it must be acknowledged, is a project to which both sides of the house have provided their support."



Image: Supplied.

The Balla Balla Infrastructure project will open up Central Pilbara iron ore deposits for mining juniors.

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IN BRIEF

Tawana on track for Q1 production

WA

NEAR-TERM lithium producer Tawana Resources is on track to begin production at its Bald Hill project east of Kambalda, WA, in the first quarter of CY18.

At the end of November, design of separation circuit was 88 per cent complete, with contractors mobilising to site.

“Structural steel work is now well advanced and placement of mechanical equipment and electrical cabling has commenced,” Tawana managing director Mark Calderwood said.

“We have selected mining, crushing, power and fuel contractors, and the mining contractor has mobilised to site.”

Tawana joins Altura Mining and Pilbara Minerals in the race to become Australia’s next lithium producer, with all three expected to be in production by the end of March.

Gascoyne adds \$60m to fund Dalgangara

WA

GOLD developer Gascoyne Resources has secured a \$60 million debt facility with National Australia Bank and Commonwealth Bank to fund further development of its Dalgangara gold project.

Gascoyne stated that construction was continuing as scheduled, with production expected during Q2 2018.

“Finalising the debt facility with two tier 1 Australian lenders CBA and NAB for the debt funding is major step forward for the development of the Dalgangara gold project and significantly de-risks the project,” Gascoyne managing director Mike Dunbar said.

Kirkland divests Stawell gold project

VIC

KIRKLAND Lake Gold has sold its shuttered Stawell gold mining operation in regional Victoria to Melbourne-based equity fund Arete Capital Partners for \$US6.25 million.

Kirkland suspended Stawell’s operations after it bought out Newmarket Gold in 2016, leaving about 150 workers without jobs at the time.

Kirkland chief executive Tony Makuch said the transaction was consistent with the company’s long-term strategy to focus on our low-cost, high-grade core assets.

“We believe the management team at Arete is well positioned to optimise the operational potential of Stawell in a sustainable manner to create value,” Mr Makuch said.

Altona agrees to buyout

CMMC DEAL HIGHLIGHTS

- Would create a **leading TSX/ASX listed copper producer** with significant production and exploration upside in two tier 1 mining jurisdictions.
- Combined potential copper production of about **73,000 tonnes per annum by 2020.**
- Combined Proven and Probable Copper Reserves: **0.92 million tonnes**
- Combined Measured and Indicated Copper Resources: **more than 1.8 million tonnes**
- **Estimated pro forma market cap of C\$300 million,** with CMMC shareholders owning 71.5% and Altona shareholders 28.5% of the combined entity.
- Offer represents a **41.7% premium to Altona’s price of \$0.12 per share** (closing price on the day prior to the execution of the MID)

Image: Altona Mining.

The undeveloped Cloncurry project could give CMMC a global copper production footprint.

CAMERON DRUMMOND
QLD

ALTONA Mining will agree to a \$93m buyout from Canadian-based Copper Mountain Mining (CMMC), following a failed joint venture (JV) to develop its Cloncurry copper project with Chinese-run infrastructure business Sichuan Railway Investment Group (SRIG).

The undeveloped Cloncurry deposit, 95km northeast of Mt Isa in QLD, could produce 39,000 tonnes (t) of copper and 17,200 ounces (oz) of gold per annum across a minimum 14 year mine life.

SRIG failed to obtain necessary approvals for the development, and subsequently the deal went bust in July last year, leaving Altona open to offers on the project.

Speaking to *The Australian Mining Review* in September, Altona managing director Dr Alistair Cowden said the company was open to agreements for the development of Cloncurry.

“We are now seeking to get value for our shareholders,” Dr Cowden said.

“We are open to partnerships, asset sales or corporate deals, whichever generates the best return to our shareholders.”

By late November, Altona had agreed and executed an all-in scrip deal to be bought out by CMMC at 17 cents per share, representing a 41.7 per cent premium to Altona’s last closing price before the offer.

Altona would become a wholly owned subsidiary of CMMC.

CMMC said that if the deal comes to fruition, it would target production by 2020 and likely fund the \$US217 million capital expenditure for development of the mine via debt facilities and working capital.

“For some time, CMMC has patiently been evaluating cost competitive opportunities to achieve a step-change in copper production,” CMMC chief executive Jim O’Rourke said.

“Cloncurry exemplifies the criteria of low-risk, near-term and high quality for which we have been seeking.

“We intend to progress Cloncurry into production with the aim of doubling CMMC’s copper production profile to the range of 160 million pounds (73,000 tonnes) of copper per annum with significant precious metals credits.

“This additional copper production is timely to capitalize on the projected strong copper cycle.”

Dr Cowden said CMMC’s depth of experience in constructing and operating large open-pit copper mines would be essential to bring Cloncurry to life.

“Altona’s shareholders will receive a premium and will also gain immediate exposure to copper production just as copper prices have recovered and market shortfalls are predicted over the near term,” Dr Cowden said.

“This is a great opportunity for our shareholders to participate in the creation of a leading mid-sized copper producer.”

Tropicana JV commits to Long Island

CAMERON DRUMMOND
WA

ANGLOGOLD Ashanti and Independence Group have locked in \$46 million for Phase One of its Long Island strategy at the Tropicana gold mine, 330km northeast of Kalgoorlie in WA.

The development will see 2.1 million ounces (moz) added to the Tropicana business plan, extending the mine life until 2027.

Tropicana will also install a 6 megawatt ball mill to increase production and gold recovery rates by 3 per cent, to 92 per cent.

The JV partners said the Long Island strategy was driven by developing a more cost-effective way to mine waste.

It involves using a strip-mining approach that minimises waste haulage distances by using in-pit backfill, rather than trucking the material long distances to surface waste dumps.

“This project is in line with our approach of developing cost-effective brownfield projects with attractive payback periods that extend life and improve margins,” AngloGold Ashanti Australia senior vice president Michael Erickson said.



Image: AngloGold Ashanti.

Tropicana has delivered a 72 per cent increase in ore reserves since the project was approved in November 2010.

“The project validates the innovative ideas developed by our site team and technical specialists, and also gives us an excellent base from which we can investigate adding additional value through underground mining opportunities and regional exploration.”

AngoGold stated that production over Tropicana’s remaining life of mine was now forecast to be about 4moz.

This did not include potential underground production from the Boston Shaker ore body, where a pre-feasibility study would be undertaken sometime in 2018.

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Gaines spearheads refocused FMG



"It is this aversion to being the smartest person in the room, her obvious and effective collegiality and ability to communicate at all levels of both the organisation and the community that led to the Board's decision to select Elizabeth over an outstanding international field of CEO applicants."

Image: FMG.

Fortescue Metals Group's new core leadership team.

ELIZABETH FABRI WA

FORTESCUE Metals Group (FMG) has named Elizabeth Gaines as its incoming chief executive to replace long-time boss Nev Power in mid-February.

Ms Gaines' appointment will coincide with plans by FMG to lift the grade of the bulk of its production to more than 60 per cent iron to compete head-to-head in the higher grade markets.

The former Helloworld chief executive joined the FMG board in 2013 and was appointed chief financial officer on 6 February 2017.

Ms Gaines will be the third chief executive in FMG's 15-year history and the first female chief executive of a major Australian mining company.

Ms Gaines said she was both privileged and humbled to be chosen and was excited to take FMG through its next stages.

"Fortescue is a unique company and a feature of our success is the strong relationship between the chairman and chief executive," Ms Gaines said.

"I embrace the culture and values that truly set this company apart and I look forward to working with Andrew, the Board and the newly appointed leadership team of talented individuals to continue to deliver success and value for our shareholders."

FMG director operations Greg Lilleyman, the presumed front runner for the top job, has been promoted to chief operating officer, while Ian Wells will be appointed to the role of chief financial officer, moving from his current role as group manager, corporate finance.

Julie Shuttleworth will also take up the new role of deputy chief executive, having most recently held the position of Fortescue's Solomon operations general manager.

FMG chairman Andrew Forrest said the new Core Leadership Team (CLT) would continue and improve on Mr Power's legacy, and champion Fortescue's unique culture.

"Elizabeth has shown strong aptitude to encourage her colleagues and sleet recognition to them while actively supporting all those around her to be as successful as possible," Mr Forrest said.

"It is this aversion to being the smartest person in the room, her obvious and effective collegiality and ability to communicate at all levels of both the organisation and the community that led to the Board's decision

to select Elizabeth over an outstanding international field of CEO applicants."

Mr Forrest also announced a change in marketing focus to lift its production grade above 60 per cent iron to allow "greater penetration in global iron markets".

A recent Deutsche Bank research note reported discounting was continuing in China and affecting low grade iron ore.

It said iron ore stocks held by BHP and Rio Tinto were the equivalent of about 10 days of production, where lower grade producer FMG's stocks had grown to about 39 days.

Mr Forrest said it would achieve its target of higher ore grades through the Firetail replacement project, without "losing the company's focus on minimum mine lives of 20 years".

550 jobs for North QLD projects

CAMERON DRUMMOND QLD

A JOBS spree has kicked off in North QLD, starting with a 7 December open day in Townsville hosted by Swiss miner Glencore, which announced plans to fill more than 200 positions for various copper and zinc operations in North QLD.

The roles to be filled would be mainly underground and technical positions, including surveyors, operators, environmental advisors and engineers.

A week later Glencore announced plans for a phased restart of its 160,000 tonnes per annum (tpa) Lady Loretta zinc mine that would provide an additional 250 jobs to the region and was expected to restart in the first half of 2018.

About a quarter of Glencore's 16,000 strong workforce are currently employed in QLD's north.

Rio Tinto also recently announced an extra 100 positions would be made available for its Amrun bauxite project.

BHP's \$US1.6bn productivity push

CAMERON DRUMMOND SOUTH AUSTRALIA

BHP is looking to lower unit costs by 10 per cent through productivity gains at its Australian operations.

At a 28 November briefing in Adelaide, BHP Minerals Australia president Mike Henry said BHP's Australian assets would underpin 80 per cent of a projected \$US1.6 billion in productivity gains over the next two years.

"By sharing knowledge and replicating best practice across our global portfolio, we've been able to substantially reduce unit costs at our Australian mining operations over the last five years. But we have further to go," Mr Henry said.

"We can make ourselves safer and even more productive, and expect to lower our unit costs by a further 10 per cent over the medium-term.

"Through strengthening our maintenance capability and processes, including by bringing in expertise from other industries, and through better leveraging technology, our global Maintenance Centre of Excellence is enabling a step-change in maintenance performance across BHP.

"With our global technology initiatives and asset-level programs to unlock resources and lower costs, we expect our Australian



Image: BHP.

BHP is mulling expansion options at its Olympic Dam asset.

mining operations to deliver \$US1.6 billion of additional productivity gains over the next two years."

Also speaking at the briefing, Olympic Dam asset president Jacqui McGill said a brownfields expansion (BFX) option at Olympic Dam could provide a cost-efficient path to increased capacity through fast-tracking development into the Southern Mine Area.

"As we move into the Southern Mine Area we expect to see the copper grade increase to 3 per cent by financial year 2023, which we believe would coincide with a structural deficit in the copper market," Ms McGill said.

"If approved, the BFX option could lift production capacity to 330,000 tonnes per annum and move Olympic Dam into the first quartile of the cost curve, which is where we strive to be with all our assets at BHP."

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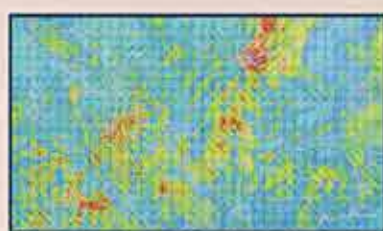


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UBIMET 
WEATHER MATTERS

IN BRIEF

BGC secures new Pilbara deals

WA

BGC Contracting is ramping up activity in the WA Pilbara after entering a series of contracts with BHP and NPJV.

In early December, BGC announced it secured two contracts with BHP that will see it complete an expansion of maintenance facilities at Jimblebar to support increased fleet capacity, and a major refurbishment of BHP's Coondewanna airport servicing Mining Area C.

The contractor also entered a separate deal with NPJV, an un-incorporated JV between Njamal Services and Pilbara Resource Group that provides opportunities for the Njamal people.

The NPJV deal will see the venture provide mobile plant and dump truck operators for BGC contract work at Atlas Iron's Mt Webber Project.

\$100m Byerwen work awarded to Sedgman

QLD

CIMIC subsidiary Sedgman has snapped up \$100 million worth of contract work at QCoal's greenfields Byerwen coal mine in Central QLD.

The work included two engineering, procurement and construction (EPC) contracts to undertake stockpiling and train load-out facility, and a coal handling and processing plant, with work beginning late 2017 and concluding in 2018.

A third contract involved the initial operation of the crushing and stockpiling, which would also begin in late 2017.

"By using an innovative modular processing plant design, we have been able to significantly reduce the site construction time and cost for this project, delivering value for our client," Sedgman managing director Grant Fraser said.

NRW Dalganga contract confirmed

WA

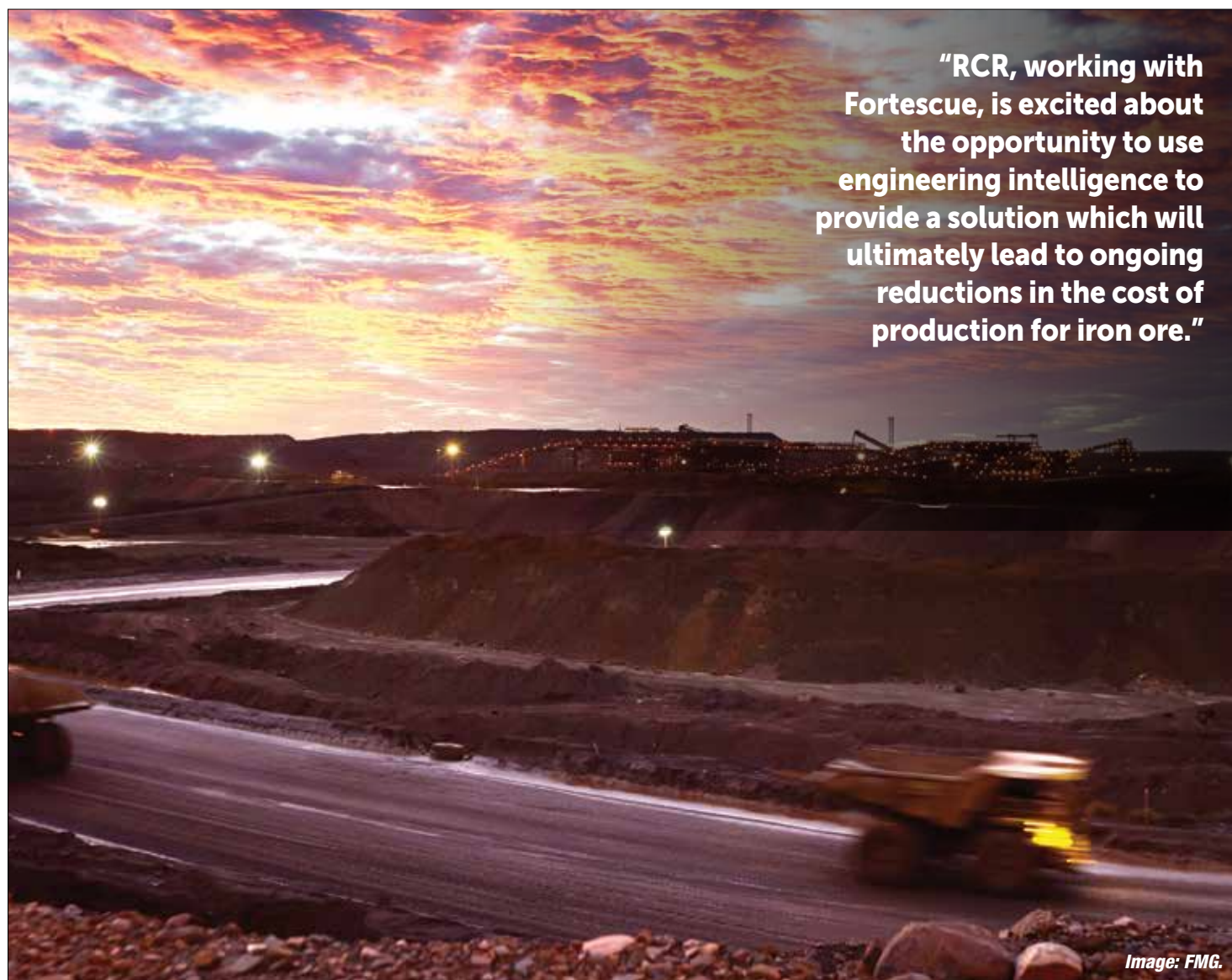
GASCOYNE Resources subsidiary GNT Resources has confirmed NRW Holdings as the mining contractor for its Dalganga project in the Murchison region WA.

The contract will involve open pit mining services, drill and blast operations and associated services for 72 months.

Gascoyne Resources managing director Mike Dunbar said the company was pleased to have progressed with NRW from preferred tenderer (announced in October) to an executed contract.

"We look forward to working with the NRW team to ensure that mobilisation and site establishment progresses as scheduled in January in preparation for mining in March, in line with the development timetable," Mr Dunbar said.

RCR wins conveyor contract



"RCR, working with Fortescue, is excited about the opportunity to use engineering intelligence to provide a solution which will ultimately lead to ongoing reductions in the cost of production for iron ore."

Image: FMG.

The relocatable conveyor system will be trialled at FMG's Cloudbreak project.

CAMERON DRUMMOND WA

ENGINEERING and infrastructure business RCR Tomlinson has won a \$33m contract to design and construct a 5km relocatable conveyor system at Fortescue Metals Group's (FMG) Cloudbreak iron ore operation.

The project is the first off the block under RCR and FMG's innovation and development

agreement targeted at identifying improved productivity and efficiency initiatives across the miner's iron ore operations.

RCR managing director Dr Paul Dalglish said RCR had a long history in materials handling and has focused on the concepts of in-pit crushing and conveying, which culminated in its relationship with FMG.

"RCR and Fortescue have each developed unique positions in the industry as innovators and first movers on smart technology," Dr

Dalglish said.

"RCR, working with Fortescue, is excited about the opportunity to use engineering intelligence to provide a solution which will ultimately lead to ongoing reductions in the cost of production for iron ore."

RCR will lead the design, manufacture and construction of the relocatable conveyor system for Fortescue, to be delivered as part of a joint venture with an Indigenous business partner.

OZ inks \$312m EPC deal

ELIZABETH FABRI SOUTH AUSTRALIA

DOWNER EDI and its joint venture partner Ausenco have secured a \$312 million contract to deliver engineering, procurement and construction (EPC) works at OZ Minerals' Carrapateena project, 160km north of Port Augusta.

The \$916 million project, green lit in August, is being constructed over two stages, with the first phase of development almost complete.

Downer and Ausenco will complete phase two works, including the processing plant and non-process infrastructure, plant bore fields for regional water supply, site power distribution, and full communications and telemetry network.

Initial works will begin in the first quarter of 2018.

Downer chief executive Grant Fenn said the joint venture was proud to be selected to deliver this "important project".

"Today's announcement builds on the joint venture partners' extensive experience and specialist skills in the development of large-scale materials handling infrastructure



Image: OZ Minerals.

The Carrapateena mine site under construction.

and combines Downer's national construction expertise with Ausenco's world-class mineral processing capability," Mr Fenn said.

Carrapateena is scheduled to begin

commissioning in the fourth quarter of 2019 and will have an annual output of 65,000t of copper and 69,000 ounces (oz) of gold over a 20 year mine life.

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IN BRIEF

World-first electric cargo ship launched

CHINA

THE world's first all-electric cargo coal ship has been launched in Guangzhou, China.

Manufactured by Guangzhou Shipyard International Company, the 70.5m ship will be used to carry coal for the generation of electric power, in the inland section of the Pearl River.

However, the ship can only run 80km after being charged for two hours, with a top speed of 12.8km per hour.

Guangzhou Shipyard International Company general manager Chen Ji told *China Daily* the ship will omit zero emissions of waste gas pollutants and will greatly reduce shipping costs for electric power operators.

Renewables cutting costs in mining

NATIONAL

RENEWABLE energy technologies are lowering costs for miners by up to 50 per cent, according to new research from Deloitte.

In its *Renewables in Mining: Rethink, Reconsider, Replay* report Deloitte explores the role of renewables in mining, where energy is one of the biggest expenses – about 30 per cent of total operating costs.

“Our analysis shows that having an effective energy management program in place, and with renewables a major component of this, miners can substantially reduce their energy costs – by up to 25 per cent in existing operations and 50 per cent in new mines,” Deloitte mining leader David Cormack said.

Mr Cormack said this involved a willingness to rethink operational processes; for example installing mobile renewable solutions that could be dismantled and moved to other sites after a project closes.

Curtin opens innovation hub

WA

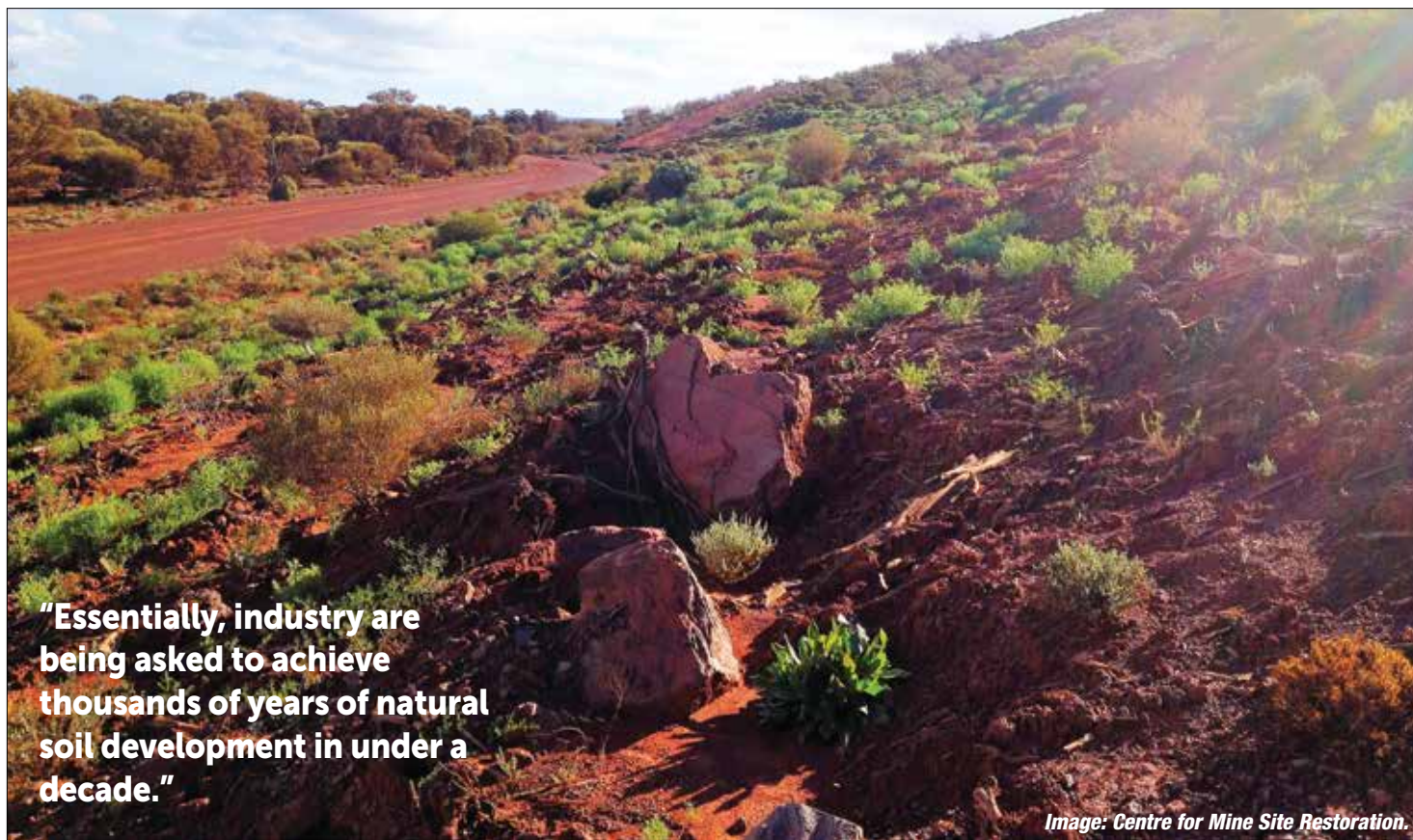
CURTIN University has launched a new-look innovation centre in Perth focusing on collaborative research projects, business solutions and knowledge sharing.

The Innovation Central Perth (ICP) builds on the work of the former Cisco Internet of Everything Innovation Centre, with renewed support of Cisco, Curtin University and Woodside, and a new partnership with CSIRO's Data61.

“Innovation Central and the partners involved offer the capability to work with a range of sectors to help them adapt to digital disruption,” Data61 business development manager Chris Nelson said.

“We also offer world-class research and development in cybersecurity, robotics, computer vision, decision support.”

More time for mine rehab



“Essentially, industry are being asked to achieve thousands of years of natural soil development in under a decade.”

Image: Centre for Mine Site Restoration.

A one-year old mine site restoration in WA.

ELIZABETH FABRI WA

TAILINGS dams are among the most ‘ecologically hostile’ by-products of mining operations, yet there is currently a lack of sufficient technology to deliver timely and cost-effective restoration outcomes, according to Curtin University’s ARC Centre for Mine Site Restoration (CMSR).

In its new report *One giant leap for mankind: can ecopoiesis avert mine tailings disasters?*, CMSR argues more time is needed to allow for adequate mine site restoration practices, with current legislation providing a

short timeframe.

“After a mining operation ceases, there is often less than 10 years given to adequately restore the used land back to a sustainable ecological landscape, but the time frames required for soils and plant communities to develop naturally on tailings is at odds with this short deadline, especially across different climatic zones,” CMSR leader Dr Adam Cross said.

“Essentially, industry are being asked to achieve thousands of years of natural soil development in under a decade.

“We’re not saying it can’t be done – we’re just saying it needs more time and industry need tools that can help predict the trajectory

and resilience of restoration at early stages.”

Dr Cross said studies showed natural microbes can assist in soil development and foster effective plant growth.

“The research highlights the need for the early establishment of site appropriate microbiota to adequately prepare the soil to sustain vegetation, before revegetation can begin,” Dr Cross said.

“Adequate restoration is much more than simply sprinkling some seeds and planting some trees – ecologists need to prepare the soil layer by layer, introducing microbes to create a sustainable foundation and then move on to the above ground landscaping – a process which takes a considerable amount of time.”

Robots will take over: Hitachi

ELIZABETH FABRI GLOBAL

WITHIN a decade Australian mines will be operated almost entirely by autonomous machines, according to global group Hitachi.

Game-changing technologies such as remote and integrated operation centres, driverless vehicles, and advanced analytics are set to be “commonplace” across the entire industry by 2030.

“Such advances in technology are predicted to increase productivity and reduce costs by up to 25 per cent, which will have a significant impact on retaining Australia’s competitiveness in the Asia Pacific region, in addition to major positive social impacts such as the ability for mining employees to work in metropolitan areas,” Hitachi stated.

“Hitachi also predicts that by 2030 most mines will have fully integrated IoT systems that will connect all mining operations to central analytics hubs where strategic decisions can be made and implemented thousands of kilometres away from the mining site.”

Hitachi’s views were echoed days later by Anglo American technical director Tony O’Neill at the *Mines and Money* conference in London.

Mr O’Neill said in five to seven years “the industry that everybody currently knows will be unrecognisable” and Anglo’s employees of the future would only need to focus on managing the company’s relations with Governments and

“Such advances in technology are predicted to increase productivity and reduce costs by up to 25 per cent.”



Image: Hitachi.

Hitachi’s 2017 Social Innovation Forum in Brisbane.

communities near its mines.

Bots or software that could execute solutions would be essential to underground mining, he added.

Technologies of this scale were already being rolled out by some of the nation’s biggest producers—BHP, Rio Tinto, and more recently Fortescue Metals Group and Roy Hill.

In December Rio Tinto iron ore chief executive Chris Salisbury announced in 2018 the Rio Tinto board will seek approval to

develop an “intelligent” iron ore mine at a cost of \$2.2 billion.

The Koodaideri project would produce about 40 million tonnes of iron ore a year from as early as 2021, and incorporate the latest innovations.

“We will bring all our technologies into a single place with a mine that is purpose-built to adapt those technologies,” Mr Salisbury told *Reuters*.

“We are calling it our intelligent mine.”

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IN BRIEF

Newcrest to sell Bonikro

CÔTE D'IVOIRE

NEWCREST Mining has agreed to divest its majority stake in the Bonikro operation in Côte d'Ivoire, West Africa to a consortium for \$81 million.

Newcrest managing director and chief executive Sandeep Biswas said following an extensive review, the company made the decision to sell its 89.9 per cent interest to F&M Gold Resources and Africa Finance Corporation.

"This outcome delivers value for Newcrest shareholders and provides a clear future path for the Bonikro mine for the benefit of its employees, the community and all our Côte d'Ivoire stakeholders," Mr Biswas said.

Newcrest still retained exploration tenements within Côte d'Ivoire, where drilling was currently underway at the Antenna prospect.

Lithium-boron extraction discovery

US

ASX-listed Global Geoscience has made an 'industry first' lithium-boron extraction discovery at its Rhyolite Ridge project in Nevada.

Recent test work at the project found that lithium and boron could be readily extracted by simple heap leach processing with high recoveries of between 88 and 92 per cent.

Global Geoscience said heap leach processing provided significantly lower operating and capital costs compared to other forms of acid-leach processing as grinding, flotation, filtration and leach tanks are not required.

"This is a very significant breakthrough as we are not aware of any other lithium deposit where heap leach processing has been successfully demonstrated," Global Geoscience managing director Bernard Rowe said.

Barrick Arakaka contract extended

GUYANA

BARRICK Gold will continue to fund exploration work at ASX-listed Alicanto Minerals' Arakaka gold project through 2018.

The gold miner entered its third year of an Earn-in Agreement, which would enable it to earn up to a 65 per cent interest in the project by meeting \$US10 million funding requirements within four years.

2018 exploration activity included 3500m of diamond core drilling on the Xenoparis target area, to follow-up on 2017 exploration success.

"We are very pleased to see Barrick's increasing confidence in both the Guiana Shield, and the discovery potential in Guyana's Northwest Mining District," Alicanto Minerals managing director Travis Schwertfeger said.

South32 spins off thermal assets



Klipspruit colliery in South Africa.

ELIZABETH FABRI SOUTH AFRICA

ORIGINAL BHP spin-off South32 will operate South Africa Energy Coal (SAEC) as a stand-alone business from April 2018, to increase local ownership and long-term sustainability.

South32 will also push ahead with a \$US301 million (4.3 billion Rand) expansion of its Klipspruit colliery in the region to extend the mine life by about 20 years, with first coal expected from the new open-cut pit in FY19.

The 6.5 million tonnes (mt) Klipspruit Colliery is one of three primary coal mining

operations and processing plants that make up the SAEC.

The latter included the 6mt Khutala Colliery and 13.8mt Wolvekrans Middelburg Complex (WMC), along with a 21 per cent interest in the Richards Bay Coal Terminal (RBCT) and a port capacity entitlement of 17.3mtpa.

South32 chief executive Graham Kerr said SAEC required ongoing investment to sustain production, and by establishing it as a stand-alone business it could improve the operation's competitiveness and ensure its ongoing sustainability.

"This process will also allow us to further simplify our organisation and unlock

additional value for shareholders," Mr Kerr said.

"We will also seek to increase the local ownership of South Africa Energy Coal, consistent with our commitment to South Africa's economic transformation, and may ultimately list the business on the Johannesburg Stock Exchange."

South32—which itself was spun off from BHP in 2015—currently held a 92 per cent stake in SAEC, with the remaining 8 per cent held by a Broad-Based Black Economic Empowerment (B-BBEE) consortium.

SAEC represents about 35 per cent of South32's workforce, with 4100 full-time employees and 4300 contractors.

Oyu Tolgoi doubles 2018 output

CAMERON DRUMMOND MONGOLIA

GOLD output from the Oyu Tolgoi copper-gold mine in Mongolia is expected to more than double after development phases for the project were brought forward.

Rio Tinto-controlled Oyu Tolgoi upgraded guidance to produce between 240,000 ounces (oz) and 280,000oz of gold in concentrates in 2018.

Capital expenditure for 2018 was expected to be \$US1.25 billion, with \$US1.1 billion spent on underground development.

It also forecast the mine to produce between 125,000 tonnes (t) and 155,000t of copper, down from between 130,000t and 160,000t in 2017.

Open-pit operations were expected to mine in Phase 6 in early 2018 and Phase 4 throughout the year, in addition, stockpiled ore would be processed during 2018.

The company said operating costs for the year would be lower at about \$US700 million; a 2.8 per cent drop from 2017.



Image: Turquoise Hill.

Capital expenditure for 2018 was expected to be \$US1.25 billion, with \$US1.1 billion spent on underground development.

Turquoise said the increased gold production relative to its 2016 technical report was due to splitting Phase 4 into two parts (4A and 4B) and bringing production forward from future years.

Oyu Tolgoi, 550km south of Ulaanbaatar, is joint-owned by the Mongolian Government (34 per cent) and Turquoise Hill (66 per cent – of which Rio owns 51 per cent).

The mine started production in 2013, and by 2025 is expected to become the world's third largest copper operation with an annual output of more than 550,000t.

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MAJOR PROJECTS SNAPSHOT 2018

4

KOOKABURRA GULLY

Lincoln Minerals (100%) www.lincolnminerals.com.au

An open-pit mine near Koppio with a planned output of up to 40,000tpa of high grade graphite concentrate.

- Capital cost: \$44 million
- Jobs: 60 during construction, 30 operational positions
- Development start date: 2018
- First production: 2019
- Mine life: 10+ years

5

MOUNT PEAKE

TNG (100%) www.tngltd.com.au

Up to 6mtpa vanadium, titanium and iron ore project south of Tennant Creek.

- Capital cost: \$853m (Stage 1)
- Jobs: 1700 during construction, 600 operational positions
- Development start date: 2018 (subject to approvals)
- First production: subject to approvals
- Mine life: 19+ years

6

CHANDLER SALT MINE

Tellus Holdings (100%) www.tellusholdings.com

The development of an underground salt mine and waste storage facility south of Alice Springs.

- Capital cost: ~ \$676 million
- Jobs: 350 during construction, 180 operational positions
- Development start date: Q4 2018 (subject to approvals)
- First production: subject to approvals
- Mine life: 500 years (initial 21 years)

7

WOODLAWN PROJECT

Heron Resources (100%) www.heronresources.com.au/

The 1.5mtpa Woodlawn Zinc-Copper Project is fully funded to production with construction kicking off in September 2017.

- Capital cost: \$156 million
- Jobs: 250 jobs during construction and more than 150 operational positions
- Development start date: September 2017
- First production: Late 2018, early 2019
- Mine life: an initial 9.3 years

8

SYERSTON PROJECT

Clean TeQ (100%) www.cleanteq.com

The 2.5mtpa open pit project is designed to produce high purity nickel sulphate and cobalt sulphate products targeted solely for the lithium-ion battery market. BFS due in Q1 2018.

- Capital cost: \$US680 million
- Jobs: 1000 during construction, [operational positions unknown]
- Development start date: Q2 2018
- First production: [unknown]
- Mine life: an initial 20 years

9

LATROBE PROJECT

Latrobe Magnesium (100%) <http://latrobemagnesium.com>

Latrobe Magnesium is developing a magnesium production plant in Victoria's Latrobe Valley using its world-first patented extraction process.

- Capital cost: (Stage 1) \$40 million, (Stage 2) \$325 million
- Jobs: (Stage 1) construction 75, operational positions 50 (Stage 2) construction 240, operational positions 297
- Development start date: July 2018
- First production: July 2019 (Stage 1 3000tpa) 2020 (Stage 2 40,000tpa)
- Mine life: an initial 20 years

10

CARMICHAEL PROJECT

Adani (100%) www.adaniaustralia.com

60mtpa mine with six open cut pits and five underground mines; 389km railway to Abbot Point export terminal

- Capital cost: \$16.5 billion
- Jobs: 10,000 direct and indirect jobs during construction and operation
- Development start date: 2018 pending funding
- First production: pending funding
- Mine life: 60+ years

1

BBI PROJECT

Balla Balla Infrastructure Group (100%) www.bbig.com.au

50mtpa iron ore operation with a 162km-long railway and port facility between Port Hedland and Karratha.

- Capital cost: \$6 billion
- Jobs: 3300 construction, 900 operational positions
- Starts development: 2018 pending a FID
- First production: 2021
- Mine life: ~30 years

2

SOUTH FLANK

BHP (100%) www.bhp.com

South Flank will expand the existing Mining Area C hub and replace iron ore production from the 80mtpa Yandi mine when it reaches the end of its life in the early to mid-2020s.

- Capital cost: \$US3.2 billion
- Jobs: Several thousand during construction
- Starts development: Preliminary works underway, construction begins mid-to-late 2018 pending FID
- First production: 2021

3

CENTRAL EYRE IRON PROJECT

Iron Road (100%) www.ironroadlimited.com.au

21.5mtpa magnetite iron project located on the Eyre Peninsula, comprising a collection of three iron occurrences (Warrambo, Kopi and Hambidge).

- Capital cost: \$4.5 billion
- Jobs: Almost 2000 during construction, 700 operational positions
- Starts Development: Mid-to-late 2018 pending FID
- First production: Mid-to-late 2021
- Mine life: 25+ years

IN BRIEF

Rothsay Gold drilling success continues

WA

EGAN Street Resources has reported further high-grade assays at its Rothsay Gold Project in WA's Mid-West.

The latest diamond drilling program returned results as high as 0.42m at 110 grams per tonne of gold from 418.7m down-hole on the Woodley's Shear, and 0.55m at 96.97g/t gold from 328.7m down-hole within the Woodley's East Hanging wall.

"These results, along with those from drilling now underway and the new programmes planned for early next year, will underpin our next resource estimate," Egan Street managing director Marc Ducler said.

A Definitive Feasibility Study for the project is targeted for completion in the second quarter of 2018.

QLD explorers receive \$1.3m funding

QLD

THE QLD State Government has announced the recipients of its first round of Collaborative Exploration Initiative (CEI) funding.

Nine companies will share \$1.13 million in funding to put towards a total of 12 copper, base metals, and gold projects in the State's North West minerals province.

The recipients included Sector Projects, Footprint Resources, Chinova Resources, Aeon Walford Creek, Minotaur Exploration, Red Metal, Topdrill, Capricorn Copper and Findex.

QLD Natural Resources and Mines minister Anthony Lynham said the CEI was "an excellent example of how a small investment reaps big rewards for QLD", allowing companies to kick-start projects that may have never got off the ground due to the costs and risks involved in exploring remote regions of QLD.

Red metal enters JV with MMG

NT

JUNIOR explorer Red Metal has inked a joint venture (JV) agreement with Chinese-backed MMG to advance its prospective Mallapunyah zinc project in the McArthur Basin region of the NT.

Under the agreement MMG will wrap up land access negotiations for Red Metal's tenements and have the right to earn-in a 70 per cent stake by completing a Bankable Feasibility Study within seven years.

Exploration at the project will target zinc-lead-silver deposits similar to the giant McArthur River and Century mines.

Artemis pens \$6m funding deal

CAMERON DRUMMOND
WA

PILBARA-focused Artemis Resources has received a \$6 million loan to fund the upgrade and refurbishment of its Radio Hill copper-nickel-cobalt processing plant south of Karratha.

The deal was penned with London-based Riverfort Global Capital, which funded a previous \$3m loan to the company.

The funding for the upgrade will also be used for a 500,000 tonne per annum (tpa) gold circuit allowing for treatment of ore from Artemis' Carlow Castle and Silica projects.

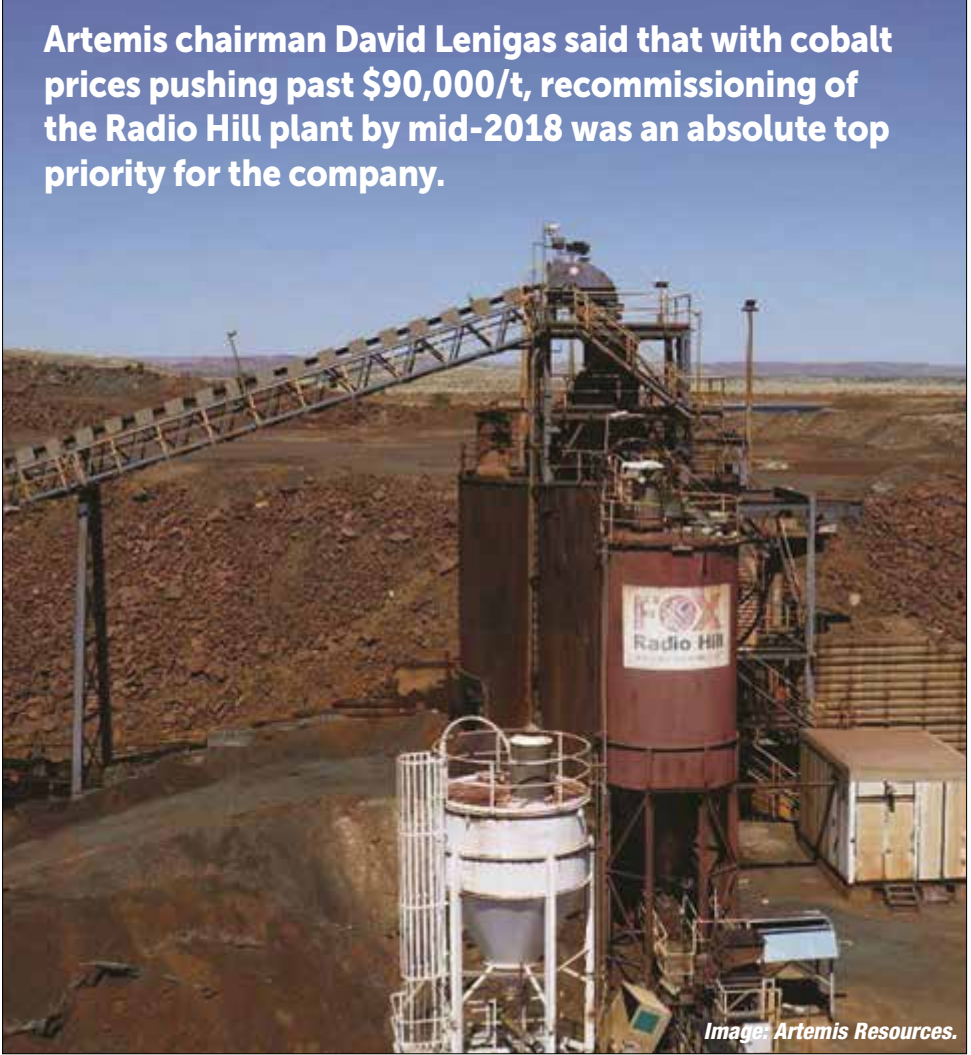
Artemis said that contract bulk sampling processing would be offered to other conglomerate gold companies in the region; with the plant expected to be fully operational by July next year.

Artemis chairman David Lenigas said that with cobalt prices pushing past \$90,000/t, recommissioning of the Radio Hill plant by mid-2018 was an absolute top priority for the company.

"Radio Hill is a known nickel/copper/cobalt producer and we have a lot of material ready at surface ready to feed the plant," Mr Lenigas said.

"In addition, now that the Novo JV is live, it is important that Artemis keeps its cash at bank in as strong a position as possible.

"The previous \$3m Riverfort deal, along very similar terms, worked very well for shareholders at the time and this new \$6m funding deal will assist the company with the refurbishment and upgrades currently underway at our Radio Hill processing facilities, whilst keeping a solid cash surplus available to fund our share of the 50:50 Artemis/Novo JV with respect to conglomerate gold.



Artemis' Radio Hill processing plant is on track to be in production by mid-2018.

"Artemis is now working hard towards getting the Radio Hill Plant being fully operational by July 2018, and the surface stockpiles on the ROM pad will give us a great jump-start into rapid cobalt production."

Mr Lenigas said while Radio Hill was always mined as an underground operation,

Artemis would look at the potential of starting an open pit mining operation where the deposit reaches the surface.

"This plant feed will be used for commissioning feed material whilst we complete our resource work on Carlow Castle, Silica Hills and conglomerate gold projects."

Northern Star spends big on Echo

ELIZABETH FABRI
WA

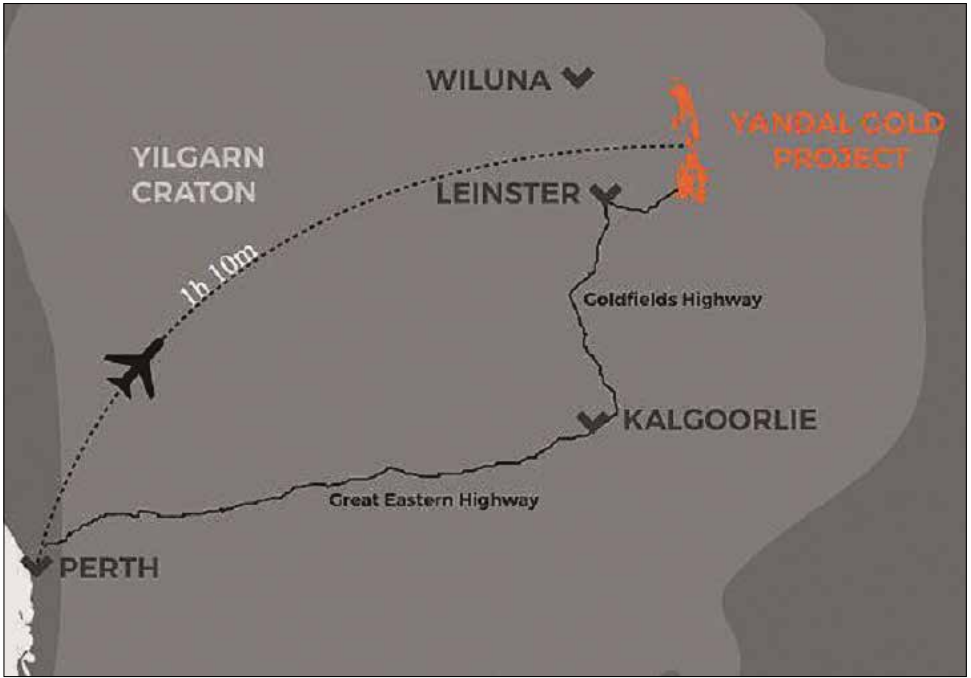
PERTH-based gold miner Northern Star has invested \$23.2 million in junior explorer Echo Resources to expand its footprint near its Jundee gold mine.

Echo Resources, which holds tenements immediately south of Jundee, is planning to develop a new Yandal gold project utilising its nearby mothballed Bronzewing processing plant.

"Since then Echo has increased its global resource base, and is well advanced on a Bankable Feasibility Study to commence production through the Bronzewing Processing Hub."

In early December, Northern Star purchased 80 million Echo shares at an average price of \$0.29, obtaining a 16.4 per cent interest in the company.

Its investment came a week after Echo released an updated ore reserve for the project of 15.6 million tonnes grading 1.7 grams per tonne for 856,000oz of gold, and a little over a month since Echo undertook a \$15 million capital raising.



Echo chief executive Simon Coxhell said the Northern Star investment was a "clear endorsement of its Yandal Gold strategy".

"It was less than 12 months ago that we completed the merger of Echo and Metaliko, which resulted in a company with a 1600sqkm package of some of the best underexplored gold ground in WA plus a clear and cost-effective pathway to production with ownership of the Bronzewing Processing Hub," Mr Coxhell said.

"Since then Echo has increased its global resource base, and is well advanced on a Bankable Feasibility Study to commence

production through the Bronzewing Processing Hub."

According to recent reports, the Bronzewing Processing Hub only required a \$17 million spend to be refurbished and operational.

In 2018, the company has an active exploration program scheduled to continue to grow its resource base and transition to production.

"We are pleased that a company of the stature of Northern Star shares our vision and we look forward to a successful 2018," he said.

SPECIAL FEATURES

QUEENSLAND COAL IN REVIEW

ENERGISED

The QLD coal sector is enjoying strong revenues, employment growth, and new investment. Now – as QLD Labor secures another term in office – it's time to examine how red tape, drawn out development approvals, and political risk are having a real and tangible impact on greenfields and brownfields mine development.



All images: New Hope Group.

REUBEN ADAMS

COAL has officially re-emerged from some of the most difficult industry conditions in years.

Even taking into account the substantial impacts of Cyclone Debbie in April, strong prices have put a spring into the step of the QLD's major producers.

In FY17, New Hope Group's revenue from its QLD and NSW operations jumped 59 per cent to \$844.1 million.

Whitehaven Coal rode higher volumes and prices to post a massive 20-fold jump in full-year profit to \$405.4m.

Glencore recorded a 50 per cent jump in energy products industrial revenue to \$US5.037m in H1 2017.

Even Yancoal narrowed its net loss to \$13.9m from \$180m the previous year.

And Anglo American's decision to hang onto its QLD coal assets now looks vindicated, as its 2017 Mine of the Year Moranbah North remains on track to deliver record production targets for the calendar year.

Industry insiders, including New Hope Group chief executive Shane Stephan, were confident that coal would make a comeback.

"Back in 2015, we were at a point where 60 per cent of the Australian thermal coal industry wasn't making cash," Mr Stephan said.

"Over 90 per cent of the Chinese thermal coal producers weren't making cash either – they weren't able to pay their workers, so they weren't able to pay their debts.

"But at the same time, the Chinese power utilities had their best ever year in 2015. It was reasonably foreseeable that that wasn't sustainable."

Things are beginning to change. In FY17, the entire QLD resources sector delivered \$55.1 billion to the State's economy, supported close to 300,000 full-time jobs, paid \$3.8 billion in royalties to the State budget and generated more than 70 per cent of total export value, according to Queensland Resources Council (QRC) chief executive Ian Macfarlane.

"It's very difficult, sitting in my position, to invest very high risk dollars in moving forward a greenfields project when I have no certainty that I will eventually get a mining lease and the ability to generate cash out of it."

New Hope Group chief executive Shane Stephan.

"With sustained higher prices for commodities new mines will open, such as QCoal's Byerwen which created 350 direct constructions jobs, 500 operational jobs, and as many as 5000 indirect jobs with first exports in coming months," he said.

"We are also seeing a measured response to employment with job numbers growing.

"However, the number of advertisements are considerably less compared to the boom times and are coming off a very low base after several years of softer commodity prices."

A key election result

These numbers may be coming off a low base, but there are already reasons to celebrate.

Now, an eventful State election has concluded with Labor retaining power – this time with a clear majority. This is a good thing for business, Mr Stephan said.

"No matter which party, I think business prefers a Government with a clear majority," he said.

"Any Government that has a clear majority

is in a better position to govern and provide certainty to business; as a member of the resources industry that would be our hope."

Moving forward, a sustainable and globally competitive coal sector will require effective collaboration and consultation between Government and industry.

The QRC has applauded the "proactive approach" of the Palaszczuk Government to release acreage to supply the domestic gas market and land for minerals in the North West Minerals Province, however it is concerned about the "conflicting messages" being sent about future investment.

In particular, the divisive Adani project – which dominated the election news cycle – and the potential for new restrictions on gas imposed on oil and gas exploration and development through the extension of the Pristine Rivers policy in the Cooper Basin.

"During the election campaign, the Premier focussed on her government's commitment to consultation, and the QRC looks for a genuine commitment to this as the essential ingredient in stability for our sector and State," Mr MacFarlane said.

The LNP failed to win Government, but it ran with an important message – cut red tape.

Red and green tape, drawn out development approvals, and political risk are having a real and tangible impact on greenfields and brownfields mine development in QLD.

QLD Premier Annastacia Palaszczuk's snap decision to veto a \$1bn Federal loan for the Adani Carmichael mine is an obvious example. But when discussing the impacts of excessive red tape, New Hope Group's \$900m New Acland Stage 3 expansion is the perfect case study.

New Acland Stage 3

New Hope's New Acland mine near the town of Oakey has played a key role in the Darling Downs region as an employer and economic contributor since 2002.

The mine has around 300 full time employees and approximately 550 contractors on its books, and a large number of these are small to medium sized businesses based in the communities around the mine site.

First proposed in 2007 – a decade ago – the New Acland Stage 3 project must go ahead or the operation will close after mining its reserves in 2020 or 2021.

A recent EY report stated that the Australian economy stood to benefit from an estimated \$7bn in additional economic activity if the New Acland Stage 3 project receives the green light.

The vast majority of this economic activity will be generated in QLD.

After receiving Federal environmental approval early in 2017, the QLD Land Court delivered New Hope a body blow in late May.

In the longest case in QLD Land Court history – which included more than 100 days of hearings and 2000 exhibits – the Land Court recommended Stage 3 not be approved.

"He ticked off a number of the potential issues, but took a negative view on noise and potential impacts to groundwater," Mr Stephan said.



"We have over 40 per cent of our current mining disturbance already rehabilitated – 490 hectares of grazing country."

"It was a disappointment to us, as we don't draw on groundwater for our mining operations [recycled waste water from nearby Toowoomba is supplied to the mine via a 47km pipeline built by the company], and only a couple of months prior we had received all the environmental approvals required by the Federal Government based on our updated water modelling."

This is important, because the Federal minister makes a decision based on advice from the Independent Expert Scientific Committee (IESC) – and one of the specific areas the committee examines is groundwater.

Now New Hope must wait until 9 March 2018 for a five day judicial review of the judges hearing to possibly determine the project's fate.

Red tape: a case study

There is an obvious problem with red tape in particular areas of regulation.

Take groundwater. Currently, a resource proponent needs Federal Government approval with the advice of the IESC; it needs to get through the coordinator general in QLD who looks at groundwater issues; it needs to go through the QLD Land Court; and now it needs to go through an associated water license application process.

Groundwater is important to the agricultural sector, the resources sector and the community at large, so it is crucial that it is managed properly.

But the current process represents four different mechanisms and processes that require miners, such as New Hope, to present the technical material and the modelling in four different ways to manage the same risk.

Mr Stephan said long approvals processes, excess red tape, and political uncertainty were having a manifest commercial impact industry wide.

"If you take a step back from New Acland, instead of investing in new greenfields projects mining companies are buying existing projects

from other companies," he said.

"It's actually distorting some of the values being paid for some of those existing assets."

"From the State's perspective, because of royalties and employment the Government should encourage both greenfields development and brownfields expansions."

"The State benefits from increased production. Right now, all that's happening is investment dollars are going from one company to the next; just buying and selling assets."

This regulatory climate actually influenced New Hope's \$US11m acquisition of Peabody's Burton coal mine, which adjoins its majority stake Lenton JV.

New Hope plans to seek Board approval for a sub-\$100m capex development of the 2mtpa Burton-Lenton coal project by mid-2018, resulting in between 200 and 300 jobs from the central QLD towns of Nebo, Glenden and Moranbah.

"We targeted Burton because its approvals are very long dated, and its diversity in terms of infrastructure and jurisdiction," Mr Stephan said.

"It's very difficult, sitting in my position, to invest very high risk dollars in moving forward a greenfields project when I have no certainty that I will eventually get a mining lease and the ability to generate cash out of it."

"Also, I have to look forward at least seven years into the future – probably 10 – just to get the approvals. [It] makes it pretty hard to get the funding to put holes in the ground."

Community Support

Community response to the New Acland mine and the expansion has been overwhelmingly positive.

(CONTINUED OVER)



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(CONTINUED FROM PAGE 21)



Just some of the local Oakey businesses with New Acland Stage 3 supporter signs.

Unlike Adani's exposure, even mainstream media coverage is now more focused on the negative impacts should the mine close in 2021.

Mr Stephan said it was very encouraging to the company and its employees that members of the local community were prepared to stand up for the project.

"In the past our objectors in the media often said they were speaking on behalf of the community, and the community came to us saying 'well, we've really had a gutful of this; these people are speaking on their own behalf, they aren't speaking on behalf of the majority of the community'," he said.

"They came to us wanting us to support them and give them a voice. The media campaign that they have actively participated in, and that we have supported, is a real demonstration of giving a community their voice in support of the project.

"We are the second largest employer in the district – we employ locally, there's no fly-in fly-out – many of our operators are in fact farmers themselves working with us for off-farm income.

"We have a great track record for supporting local communities. We also have good track record with the environmental rehabilitation; we have over 40 per cent of our current mining disturbance already rehabilitated – 490 hectares of grazing country."

QRC chief Ian Macfarlane is a Toowoomba resident, which gives him a first-hand view of the support that large mining projects, like Carmichael and New Acland, receive from the regional businesses and communities impacted by them most.

"Regional bodies including Toowoomba and Townsville are vocal in their support for these two projects, as are the local suppliers who will benefit from the flow-on

contracts the mines will create," Mr Macfarlane said.

For the record, New Hope is confident it will get approvals for Stage 3.

The concern is in the delays in timing between completion of mining the reserves at Stage 2 in 2020/2021 – assuming the coal price stays where it is – and the development of Stage 3. It will take about 18 months to build the infrastructure to access the Stage 3 reserve.

"It's a very tight timeline, so that's our real concern," Mr Stephan said.

"That will mean a gap in employment between Stage 2 and Stage 3 and we don't want to lose our highly skilled workforce; nor do they want to have to leave their local area in search of work elsewhere.

"We are a medium sized mining company. We know the people that will be directly impacted at Acland. Young people, young families, whose kids go to the local schools. They need security.

"From our perspective we have very skilled employees. It takes several years for us to train up a dozer driver to mine multiple thin seams, so the last thing we want is to let those employees go for any period of time."

A Bright Outlook

According to the Office of the Chief economist, buoyant prices for steel-making commodities and thermal coal, and increased LNG export volumes, are expected to see Australia's resources and energy export earnings increase by 2 per cent in 2017–18 to a record \$211bn.

Robust metallurgical coal spot prices are expected to contribute to continued strong export earnings in 2017–18, before moderating in 2018–19.

Australia's thermal coal export earnings

will also stay robust over the next year, before spot prices decline from recent highs to \$US69 a tonne in 2019.

Mr Stephan said that to incentivise the next wave of the capital investment needed to boost production out of Australia, "you really need about \$US85 to \$US90/t".

"That's not going to happen anytime soon, but we believe that it will be demanded by Asia around 2023/2024," he said.

"There are increasing energy needs in Asia, and coal will form a part of that mix along with renewables and gas."

This increased infrastructure investment is already happening—as of June 2017, there were 286 advanced technology coal fired powers stations planned or under construction globally—with around 85 per cent of those located in Asia.

In QLD, QCoal's Byerwen project is aiming for first exports in the coming months. Adani is forging ahead with its regional hiring drive and is still aiming for first coal in March 2020.

But even if Carmichael doesn't finalise the funding it needs to support major construction, QLD as a whole is well positioned to take advantage of Asia's growing demand in the medium term.

"We have high-quality coal, some of the cheapest coal transportation in the world, and are comparatively short distances away from major markets in Asia," Mr Macfarlane said.

"The key challenge will be making sure our regulatory environment is supportive of future brownfields and greenfields investment.

"Regulatory uncertainty continues to be a dampener for resources chief executives. The coal industry needs greater certainty over its regulatory environment before it can commit to the next wave of investment."



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WA spodumene producers are moving downstream to cash-in on sky-high lithium hydroxide prices. But is the capital spend on processing infrastructure worth the risk?

FLOWING DOWNSTREAM



Image: Tianqi Lithium Australia.

ELIZABETH FABRI

2017 was a game-changer for the WA lithium industry.

In 2016 there was just a few producing mines in the State; in 2018 this number looks set to explode as investors pour capital into the swarm of lithium mines now at various stages of development.

The Neometals and Mineral Resources Mt Marion JV entered production in late 2016, followed shortly by Galaxy Resources' Mt Cattlin project which exported its first shipment of lithium concentrate in January 2017.

Next cabs off the rank are Pilbara Minerals' and Altura Mining's identically named Pilgangoora projects, and Tawana Resources' Bald Hill project, which are in the final stages of construction and due to come online in 2018.

Then there's Kidman Resources' Earl Grey project, which could hit the start button on production as early as 2019.

Further south, an expansion at Talison's long-established Greenbushes mine was also making headway.

However, producers are also looking beyond lithium concentrate supply towards ready-for-market, battery-grade lithium to fuel the impending electric vehicle boom.

"I think globally, the significant shortage in the next five years is going to be in downstream processing and not in resources," Tianqi Lithium Australia general manager Phil Thick said.

"There's more than adequate resources around the world to supply the exponential growth in demand expected in the next eight or nine years, but there's not a lot of investment in plants like we're building, and that's where the big gap will be."

Mr Thick is talking about Tianqi Australia's Kwinana Lithium Plant – currently under construction – which will become Australia's first lithium hydroxide processing facility.

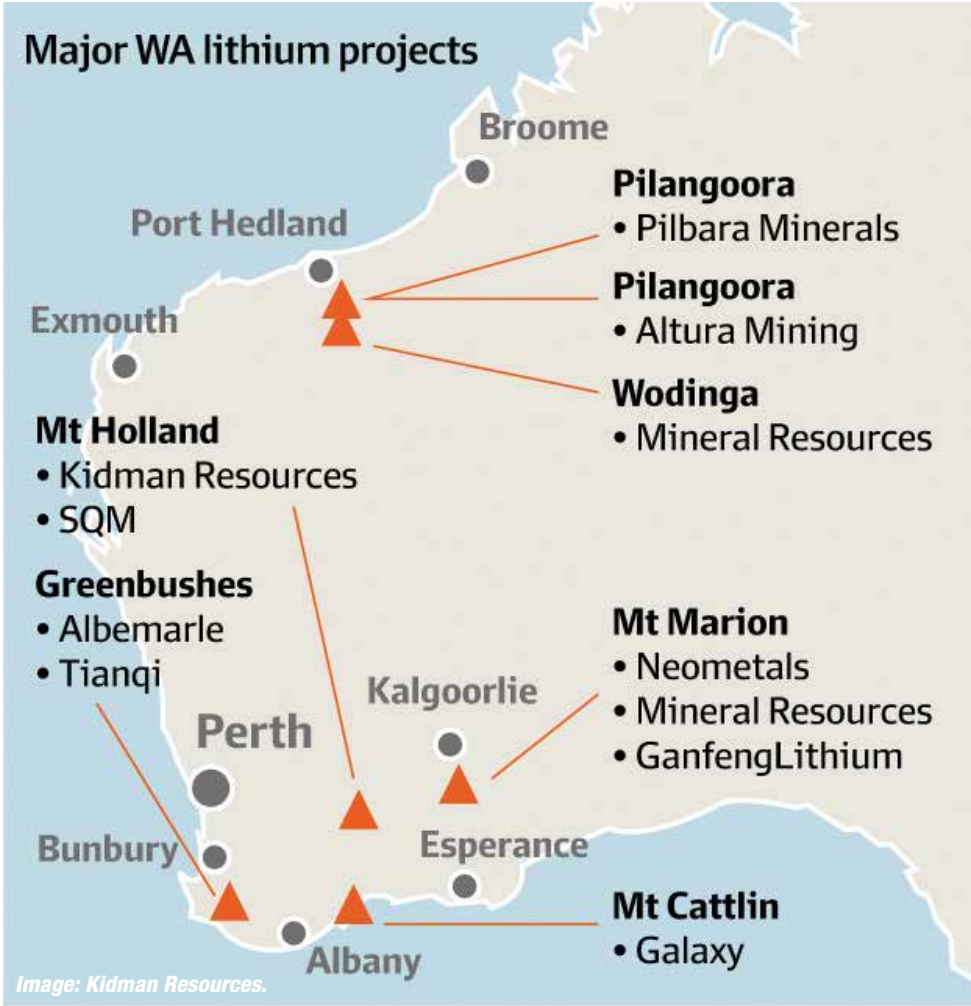


Image: Kidman Resources.

WA is set to become the lithium capital of the world.

The Kwinana Lithium Plant's \$400 million first stage will produce lithium hydroxide from spodumene mined at the Greenbushes operation, with commissioning set for late 2018.

The \$300 million second stage received board approval in October and will double plant capacity to 48,000 tonnes of lithium hydroxide per annum.

A number of WA miners were following in Tianqi's footsteps with plans to build plants

to process lithium concentrate, worth about \$1000 a tonne, into battery-grade lithium hydroxide, which fetches 10 times that amount.

Kidman Resources recently teamed up with Chilean lithium major SQM to build a chemical plant at its planned Earl Gray mine, that will generate up to 200 jobs during construction and 180 full-time operational jobs.

Mt Marion's joint venture partners were also looking to develop a lithium hydroxide

plant at their mine, while Pilbara Minerals and Altura Mining were considering building plants in Asia.

In November, Albemarle (which had a stake in Greenbushes) also sought Government permission to build a new one-train downstream processing plant near Bunbury capable of producing 20,000tpa.

Mr Thick said he was aware Albemarle was also setting its sights on a staged expansion of the facility with an additional four trains and output of 100,000tpa.

"They said they were expecting the first plant to be producing in 2020," he said.

"They're trying to take advantage of the same thing we're taking advantage of, which is this shortfall that we're expecting in processing quantities."

Downstream processing: the risks

However, investing in lithium processing facilities was not all smooth sailing.

"There's significant risk," Mr Thick said.

"We've been running two plants in China for 20 years so we know the process and the chemistry probably better than anyone in the world – and it's still a challenge.

"For companies that haven't done this before and are talking about going into this space, there is risk associated with it. It's not a guaranteed result or an easy process."

Mr Thick said it all came down to the quality of the product, and electric vehicles being the largest driver of global lithium demand needed the highest quality available.

"You have got to get your chemistry right, you have got to get processing spot on and there's a lot of variables in that; right from the quality of the ore you're starting with, to how well you know the process and how experienced you are with it," he said.

(CONTINUED OVER)



Stage 1 of the Kwinana Lithium Plant will be complete late 2018.



Image: Tianqi Lithium Australia.

KWINANA PLANT CONSTRUCTION

Construction is ramping up fast at Tianqi's Kwinana lithium plant, with Stage 1 of the project now about 45 per cent complete.

"We're just starting to receive all of the large equipment on site," Mr Thick said.

"About 20 tanks fabricated locally have all been delivered and installed, all the concrete work is complete and the structural steel work in the plant is going up fairly rapidly.

"All of the main buildings; the office building, the control room building, warehouses, are about 70-80 per cent complete with windows starting to go in, roofs on."

Mr Thick said he had people visiting at least once a week from all over the world, including a recent visit

from Tianqi's founding chairman Jiang Weiping and chief executive Vivian Wu.

"They were very impressed," he said.

"There is no doubt that their visit, which was made before the decision for Stage 2, was very critical because it gave them a high degree of comfort around the quality of what we were doing and how well it was progressing."

Mr Thick said the four major contracts for long lead items of equipment for the \$300 million Stage 2, had now all been let and signed for a total of about \$50 million.

Stage 1 is due to be complete in late 2018, with Stage 2 commissioning to begin a year later in the fourth quarter of 2019.

GREENBUSHES EXPANSION

In March 2017, Talison Lithium (a joint venture between Albemarle and Tianqi Lithium, the parent company of Tianqi Lithium Australia) announced a \$320 million expansion to double production at its Greenbushes mine.

The historic mine, 250km south of Perth and about 90km south east of the Port of Bunbury, has produced lithium for more than 25 years and tantalum since the 1940s, and under an expansion will expand LCE capacity from 80,000mtpa to more than 160,000mtpa.

The mine currently produced about 65,000 tonnes of lithium carbonate equivalent each year.

Commissioning of the expansion was expected to begin in the second quarter of 2019.

However, the expansion plans have since been muddled by an ongoing legal dispute between Talison and Global Advanced Metals, which claims the upgrade will waste the mine's tantalum resource, over which it has rights.

Tianqi Lithium Australia general manager Phil Thick said while he couldn't comment on the legal action, as far as he knew the Greenbushes expansion was "progressing and on schedule".

"We have been doing it for a long time and we're still improving and finding opportunities to get better at it.

"That gives us a strong advantage over others that are just entering for the first time."

There's also the risk a replacement for lithium ion batteries could take over — for example sodium ion, aluminium graphite and gold nanowire currently in the research phase — but Mr Thick said this was not a concern.

"We recognise there is a lot of work being done around the world on research around what is going to be the next big thing that replaces lithium ion batteries," he said.

"We probably expect at some point they're going to find that but it's taken about 20 years for lithium ion batteries to be the go to technology for just about all storage requirements and that's becoming pretty deeply embedded in facilities and industries around the world, particularly the electric vehicle industry.

"We think even if something comes up in the next couple of years as a replacement for lithium it would be 10-15 years before that's fully commercialised and an effective replacement.

"We've got no concern in the short term about lithium ion batteries remaining the absolute driving force for electric vehicles and for general power storage.

"That's why we're investing so much money in it."

Yet, Mr Thick said he was disappointed that Australia was "so slow" in embracing the rollout of electric vehicles.

"We've got no concern in the short term about lithium ion batteries remaining the absolute driving force for electric vehicles and for general power storage."

"We use distance and range of vehicles as an excuse for not being more aggressive in this space because Australia is so large," he said.

"But electric vehicles in their standard form only have a 200-250km range and about 90 per cent of Australians that live around city areas are very rarely going into the country, so there's no excuse for us being as slow as what we are.

"I suspect when the large car manufacturers that we depend upon are producing much larger quantities of electric vehicles we'll have to get on board with that."

Building a WA lithium hub

All going well, WA is set to become the lithium capital of the world.

While much of the new lithium mining activity will be happening up in the Pilbara,

Kwinana had its name up in lights as a potential lithium processing hub for the State.

Miners such as Kidman and Neometals were considering options to build their prospective processing plants in the town, 38km south of Perth's CBD.

"Kwinana is a really great place to build this type of plant because you have got all of the inputs into the plant that you need, like caustic soda and sulphuric acid [which are] all available on the strip there," Mr Thick said.

"You've got electricity, gas, water all in the quality and quantity that you need, and then you're close to Fremantle Port for export.

"Probably the most important thing is a ready supply of world-trained experienced people to man the plant, because there's been a lot of similar activity in Kwinana for years, and there are people who are keen to get into this new industry."

Mr Thick said the company was "extremely excited" it was leading the charge and hopeful companies such as Albemarle would follow through with their plans to develop downstream facilities to get a reasonable percentage of battery-grade product out of the State.

"We're fully supportive of other players following us downstream, and if we can set up WA as a significant hub that would be great," he said.

"We already supply more than a third of the world's lithium in concentrate form, but if we could get the percentage of processed material out of this State up to similar levels that would be fantastic."



Spurred on by rising commodity prices and booming battery-affiliated raw material markets, the Northern Territory is seeing a marked rise in exploration and the number of projects moving towards development.

Image: NT Department of Industry and Resources.

CAMERON DRUMMOND

ON the back of a global increase in demand for raw materials the NT Government is wasting no time reforming its mining industry processes to make the region more attractive for investment.

Behind construction, the resources sector is the Top End's biggest industry, accounting for about 13 per cent of gross state product (GSP).

NT Resources minister Ken Vowles said mining and exploration remained a "key element" of economic development and employment in remote and regional areas, as the value of mineral production in the Territory hit a new record of \$3.63 billion in FY17.

"The NT has eight major operating mines, with our manganese, zinc and gold mines all benefiting from strong commodity prices that have led to record values of production," he said.

"Newmont has recently completed a major expansion of its gold operations in the Tanami Desert, which will increase production to around half a million ounces of gold per year.

"In Tennant Creek we saw the opening of the Edna Beryl gold mine earlier this year, the first new mine to open in the area in over a decade."

Currently, mining creates about 4800 direct jobs, with many more indirect jobs in the service and supply industries.

Mr Vowles said that figure could more than double in the near future, with reforms aimed to help the 17 projects across the Territory currently at various stages of development.

This includes changes to the current royalties system, streamlining processes for miners to gain necessary approvals, and the continuation of its Creating Opportunities for Resource Exploration (CORE) initiative.



"In five years, there is every reason to believe the Territory can be producing rare earths for use in magnets, and lithium and vanadium electrolyte for battery storage."

Image: NT Department of Industry and Resources.

NT Resources minister Ken Vowles is confident that reforms will make the Top End more attractive for miners.

"The Territory has strong bipartisan support for the mining sector, and the NT Government is focused on cutting red and green tape to continually improve our competitiveness in attracting investment," Mr Vowles said.

"The Territory has significant resources of valuable metals and minerals that are used in high-technology and clean energy industries, such as rare earths, vanadium and lithium.

"This presents a major opportunity, and

we see a strong outlook for the Territory in supplying the industries of the future.

"In five years, there is every reason to believe the Territory can be producing rare earths for use in magnets, and lithium and vanadium electrolyte for battery storage."

Reforms

The NT Government recently released its Northern Territory Revenue Discussion Paper to look at policy changes that could

There are currently **17 mining projects** in various stages of approvals in the Territory with a combined potential to deliver **\$6.15 billion CAPEX**, up to **4050 construction jobs**, and **3081 operational jobs**. 9 of these projects have an expected **15+ mine life**.

increase own-source revenue, including changes that could be made to increase mining royalty returns for its community.

The paper reported that mineral royalties could provide significant amounts of revenue to the Territory; however as most mines in the Territory currently pay profit-based royalties, the levels of revenue were unpredictable, with some mines closing before incurring royalty liabilities.

(CONTINUED ON PAGE 27)

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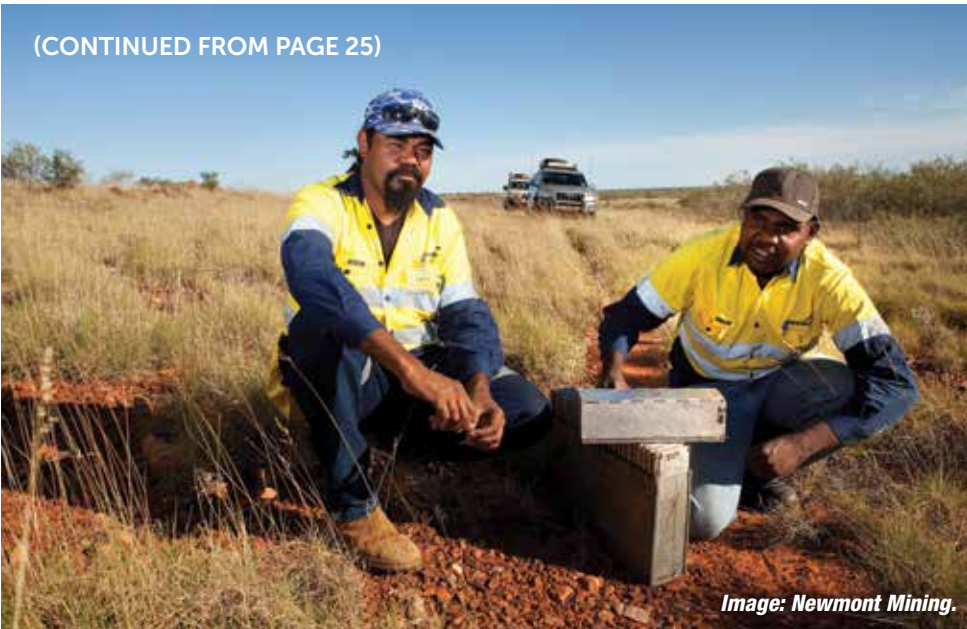
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Newmont has recently completed expansion works at its Tanami gold project.

“Some options put forward by the Government include an adjustment to the mineral royalty rate (while acknowledging that a high royalty rate may act as a disincentive to mining activities), the introduction of a value based minimum royalty (ensuring a return to the Territory for mining, regardless of the profitability of the mine) and the replacement of the profit based scheme with a value based scheme,” the report stated.

Apart from the Commonwealth’s Petroleum Resource Rent Tax (PRRT) and the royalty arrangement for Barrow Island in WA, the Territory is the only Australian jurisdiction that has a wholly profit-based royalty.

“One of the main advantages offered by value-based royalties is they are simpler and more transparent for Government and miners to administer, while also providing a more predictable source of revenue,” the report stated.

The NT Government said it was open to dialogue with the community, industry and peak bodies regarding any changes to the royalty system.

In efforts to minimise red tape, the NT Government said it would conduct a review of Mine Management Plans (MMP)

to ensure they are fit-for-purpose, and to streamline the procedure for lodgement and assessment.

Mr Vowles said key mining industry groups would be consulted to ensure the revised MMPs met the needs of both industry and Government.

Also on the agenda would be reforms to the environmental approval process.

“More broadly we are looking at restructuring environmental approval, which is likely to involve legislative change,” Mr Vowles said.

“Industry is calling for a more streamlined and efficient process and complex issues are being worked through to achieve contemporary, transparent and effective regulation of the resources sector.

“This work will align with broader environmental regulatory reforms being developed by the NT Department of Environment and Natural Resources.”

Mr Vowles also said the reforms would be aimed to ensure the benefits of mining would be maximised within the local economy by encouraging participation instead of relying on FIFO workers.

“We are developing Tennant Creek as a mining services hub, with programs to



(L to R) Roric Smith, NT Resources minister Ken Vowles, Member for Fong Lim Jeff Collins, and Rob Bills from Emmerson Resources at the Edna Beryl gold mine.

stimulate exploration in the region, and we are supporting the development of a common-user milling facility that can help the development of small mines in the area,” he said.

“This has the potential to revitalise the local economy and provide much-needed business and employment opportunities.

“Aboriginal communities are also benefiting, with the development of a new bauxite mining operation near Gove in Arnhem Land after the granting of a mining lease to the Gulkula Mining Company.

“This is the first Aboriginal-owned mining operation in the Territory and is expected to provide valuable employment and training opportunities for local people.”

CORE

Soon to be in its fifth year, the CORE initiative involves a range of programs aimed at improving the Territory’s competitiveness in attracting exploration investment by lowering the cost and risk of exploration.

This has included providing baseline geoscientific data and interpretations to

underpin exploration decision-making.

It also provides collaborative grants for exploration to reward innovation and share the risk of greenfields exploration.

So far under the initiative the NT Government has co-funded more than 15,000m of drilling, as well as a diverse range of seismic and airborne geophysical surveys.

Mr Vowles said there had also been a focus on improving accessibility of data and information for the global exploration industry.

“Earlier this year, every industry report on mineral exploration in the NT since 1901 was put online – around 23,000 reports can now be viewed from anywhere in the world,” Mr Vowles said.

“Under CORE, the Territory is co-investing with Geoscience Australia under the \$100m Exploring for the Future initiative, with major new collaborative geoscience programs underway to investigate the poorly known geology that sits beneath the Barkly Tablelands between Tennant Creek and Mount Isa.

“This has the potential to open up new mineral provinces for the Territory.”



The NT Government is looking at cutting red tape to get projects off the ground.

ADVANCED STAGE PROJECTS

TNG: Mount Peake

Product: **vanadium, titanium and iron ore**

Construction: **1700 jobs**

Operation: **600 jobs**

•

Tellus Holdings: Chandler

Product: **salt, waste storage**

Construction: **350 jobs**

Operation: **180 jobs**

•

Arafura Resources: Nolans

Product: **rare earths**

Construction: **375 jobs**

Operation: **250 jobs**

Fully equipped quarry services



Kings Quarry services right across the Territory.

ALLAN King and Sons Constructions (AKSC) is a local, privately owned civil construction company specialising in bulk earthworks, all aspects of civil construction, drainage works, and concrete works, along with crushing and screening of construction materials at its fully established quarry.

The company has a number of other leases supplying products such as sand, gravel, fill and top soil.

It also owns and operates a variety of crushers and screens capable of producing various sized aggregates, fine crushed rock,

sands, and more.

The company has been in operation in the Northern Territory for more than 20 years, originating in Katherine where it was formed by directors' Allan and Sandra King.

The company has since expanded its operation to include Darwin, now the location of its head office.

Alongside AKSC, Kings Quarry, which commenced operations in 2010 is located about 107km southeast of Darwin, near Mount Bundy.

A permanent camp and workshop on site allow staff at Kings Quarry to stay on site when needed, and all maintenance and repairs are carried out by its own qualified mechanics and boilermakers.

Originally established to supply its core division with all quarry products required for civil works, Kings Quarry has since expanded operations to supply various projects throughout the Darwin area as well as remote regions.

Kings Quarry also supplies material such as asphalt premix blends, concrete

premix and sealing aggregate to local batch plants, brick plants, as well as bitumen and asphalt companies.

The installation of a fully certified weighbridge and elevated access track has enabled the quarry to supply government, defence and other contracts – with access in both wet and dry seasons.

Kings Quarry's own testing lab on site ensures that product is within specification during manufacture, with certified testing taking place before material leaves site.

KING'S QUARRY

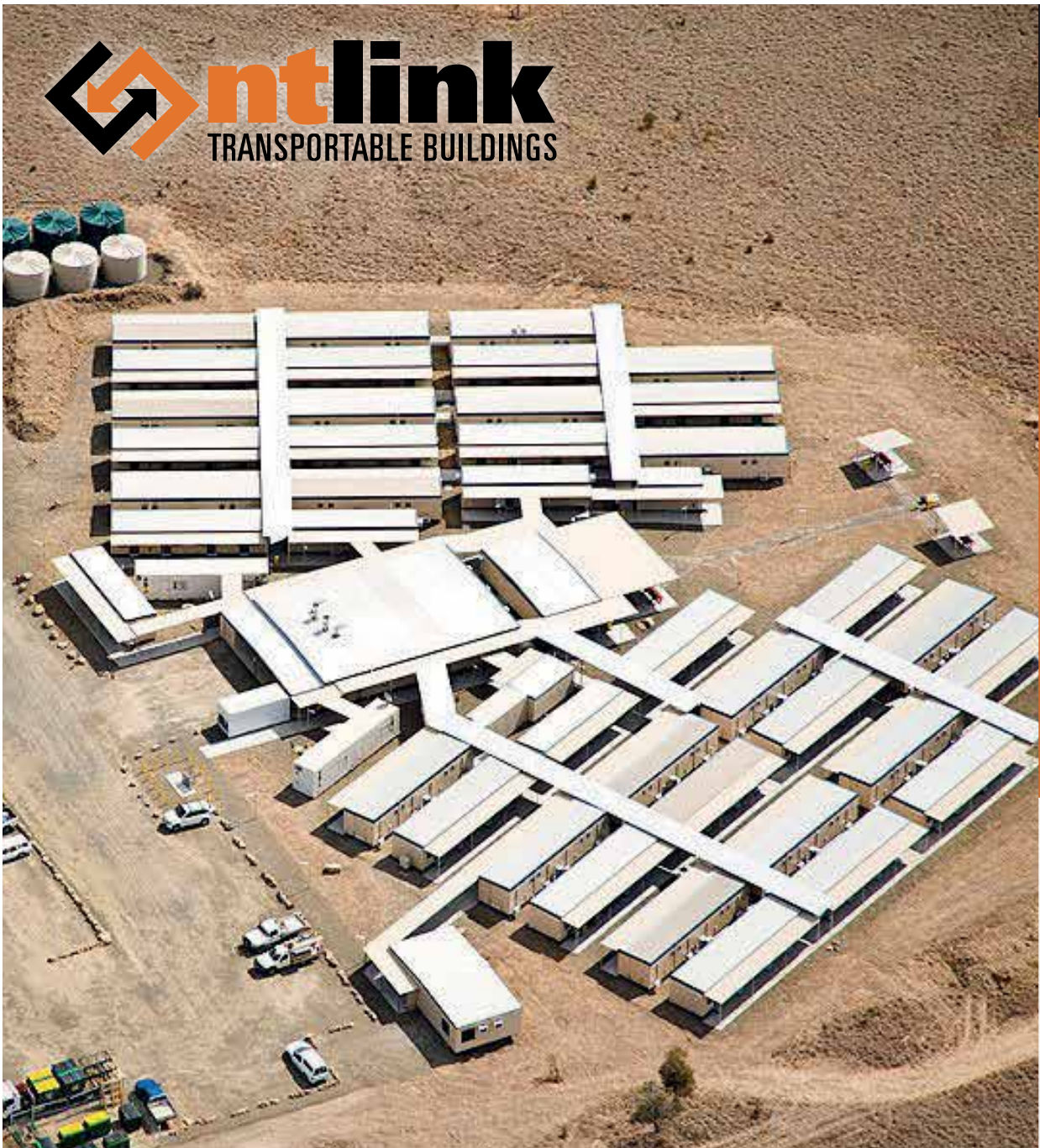
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BULLION HUNT

Under the guiding force of gold bull Eric Sprott, Kirkland Lake Gold is starting to cement its position as one of the leading backers of underdeveloped WA gold projects.

Image: Supplied.

CAMERON DRUMMOND

CHAired by renowned billionaire gold investor Eric Sprott, Kirkland Lake Gold emerged as a global mid-tier miner after acquiring Newmarket Gold in November 2016 for \$US764 million and amassing stakes in other prospective Canadian and Australian assets.

The company owns and operates five underground gold mines, including the Macassa, Holt and Taylor mines in Ontario, Canada; the Fosterville mine in Victoria and the Cosmo mine in Northern Territory.

Mr Sprott owns 10.3 per cent of Kirkland, and has been a guiding hand in the company's Australian strategy.

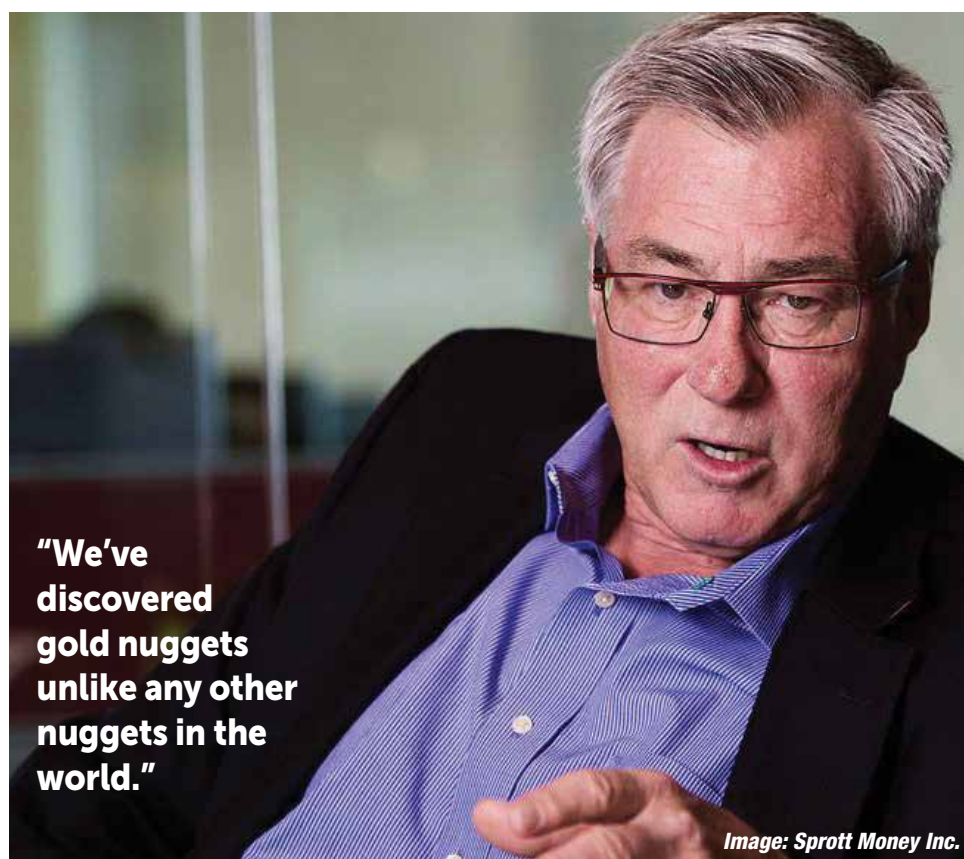
This has included the development of Fosterville gold mine near Bendigo, Victoria, and opportunistically boosting stakes in gold explorers based in the WA Pilbara – the location of Australia's newest gold rush.

The former Merrill Lynch investment banker – a self-proclaimed “gold bull” – said he had a “long term view” of Kirkland and may acquire additional shares either on the open market or through private acquisitions.

The Pilbara: Australia's newest gold province?

Hype around the Pilbara's high grade exploration results did not go unnoticed by Kirkland.

In September last year the miner paid \$56m to boost its stake in fellow Canadian miner Novo Resources to 17 per cent; the latter having farmed-in to ASX-listed



“We’ve discovered gold nuggets unlike any other nuggets in the world.”

Image: Sprott Money Inc.

Gold bull Eric Sprott has a keen interest in Australia's prospective gold projects.

Artemis Resources four months earlier as part of a \$2m exploration joint venture (JV) in the WA Pilbara.

Artemis had kicked off the so-called ‘Pilbara gold rush’ early last year when it uncovered highly prospective gold mineralisation at its Purdy's Reward deposit.

In September, neighbouring explorer De Grey Mining received a \$5m investment from Kirkland after it found similar gold

nuggets at its Loudens Patch deposit.

De Grey chairman Simon Lill described Kirkland's investment as a “game changer” for the company.

“Together with our recent August capital raising of \$3m, we have now raised \$8m, which confirms funding for our exploration programs through until the end of 2018,” he said.

Independent of Kirkland, Mr Sprott is also lifting his exposure to WA gold through his investment arm Sprott Capital Investments.

In October he made a \$5m investment into lithium-turned-gold explorer Kairos Minerals.

Kairos' key assets are its Mt York Lithium-gold project 90km southeast of Port Hedland and Roe Hills gold project east of Kalgoorlie.

Kairos executive chairman Terry Topping said the backing by Sprott Capital Investments was a “watershed” moment for the company's focus in the Pilbara.

“We are delighted to welcome Eric Sprott as a cornerstone shareholder and participant in this pivotal capital raising, which puts Kairos in an exceptionally strong position to pursue aggressive exploration programs across our key projects,” Mr Topping said.

Speaking to *WestBusiness* at November's Precious Metals Investment Symposium in Melbourne, Mr Sprott said he believed the region could host a gold resource of the same scale as Witwatersrand, from which more than a third of the world's gold has been mined.

“We know conglomerate rock exists over a wide area of the Pilbara and we've discovered gold nuggets unlike any other nuggets in the world,” he said.

“We now need drilling and assays to test the grade and thickness of the mineralisation.

“It's not yet conclusive but it's looking good.”

(CONTINUED ON PAGE 33)

Delivering on projects across Australia

OVER the course of its 105 year history, shotcrete and concrete specialist Mawsons has grown to be an industry leader in concrete and quarry product supply in regional Victoria and Southern NSW.

In addition to its fixed plant operations, Mawsons has great expertise in mobile concrete and quarrying with autonomous teams working on various projects.

Mawsons has more than 10 quarrying sites, 38 concrete plants, mobile hire equipment and a fleet of various concrete, cement and quarrying delivery vehicles.

These dynamic, specialist teams can be applied to either small or large projects.

Previous projects Mawsons has been involved in include the Victorian Desalination Plant, Calder Highway duplication, Hume Highway duplication at Tarcutta, the North South Pipeline and the Northern Expressway in Adelaide.

Mawsons is currently engaged in concrete and quarry supply to the Silverton wind farm near Broken Hill.

This project is being run with both Mawsons' concrete and quarry mobile teams.

It is a great example of the company's ability to bring together various parts of the organisation to package up a total turnkey approach to delivering on demanding projects.

With increasing demand for high-quality services and products from the mining and construction industries, Mawsons is well placed to continue to produce creative solutions for its customers.



Fosterville manager Lee Yowarth presenting the winners of the Rope Rescue competition at the Victoria Mine Rescue Competition.

This includes shotcrete for the mining industry, which Mawsons currently supply to the Fosterville gold mine and Broken Hill's RASP mine.

Being a regionally-based organisation, Mawsons is a strong supporter of local

communities; and continues to proudly sponsor numerous local events including the Victorian Mine Rescue Competition – Rope Rescue Exercise.

With a high priority given to employee wellbeing, Mawsons also sponsored the

IQA Institute of Quarrying - Mental Health Awareness training in Bendigo.

The company continues to expand its network and improve performance to contribute to a prosperous and sustainable future for the communities which it serves.



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(CONTINUED FROM PAGE 30)



Image: Kirkland Lake Gold.

In a further sign that Mr Sprott's sights were firmly set on the Pilbara region, in early December his funding arm Sprott Private Resource Lending provided a \$35m credit facility to Kin Mining for the construction of its Leonora gold project (LGP) in the north eastern Goldfields.

The LGP has a current gold resource of 22.32 million tonnes (mt) grading at 1.43 grams per tonne (g/t) for 1.023 million ounces (moz) of gold.

Kin said the funding would provide sufficient capital to carry out the necessary pre-production works to fast-tracking the project's development.

"We are delighted to partner with Sprott, the credit facility would allow the company to immediately commence development of the LGP," Kin managing director Don Harper said.

"Sprott is known to be well-versed in

determining the viability of resource projects and making astute investment decisions," Mr Harper said.

"We look forward to collaborating with Sprott to become Western Australia's next gold producer."

Sprott managing partner Narinder Nagra said the company was excited to partner with Kin to develop the Leonora project.

"Our partnership with Kin is consistent with our strategy of providing innovative and flexible capital to maximise the value of exceptional projects."

Realising Fosterville's potential

Since taking ownership of the mine through its Newmarket acquisition, Kirkland has made significant inroads.

(CONTINUED OVER)

More than just air and hydraulics

BENDIGO Air and Hydraulics (BAANDH) not only provides compressor and hydraulic services, but also fabrication and machining services to the mining industry across Australia and overseas.

BAANDH specialises in tailored manufacturing and fabricating work to meet client-specific needs, as well as quality inspections of major machinery to Australian Standards.

The company can manufacture and/or rebuild almost anything, including – but not limited to – machining dozer undercarriage track gear (most recently a D11R), bucket wear packs and rebuilds, dump truck liner packs, safety access stairs and conveyor drums.

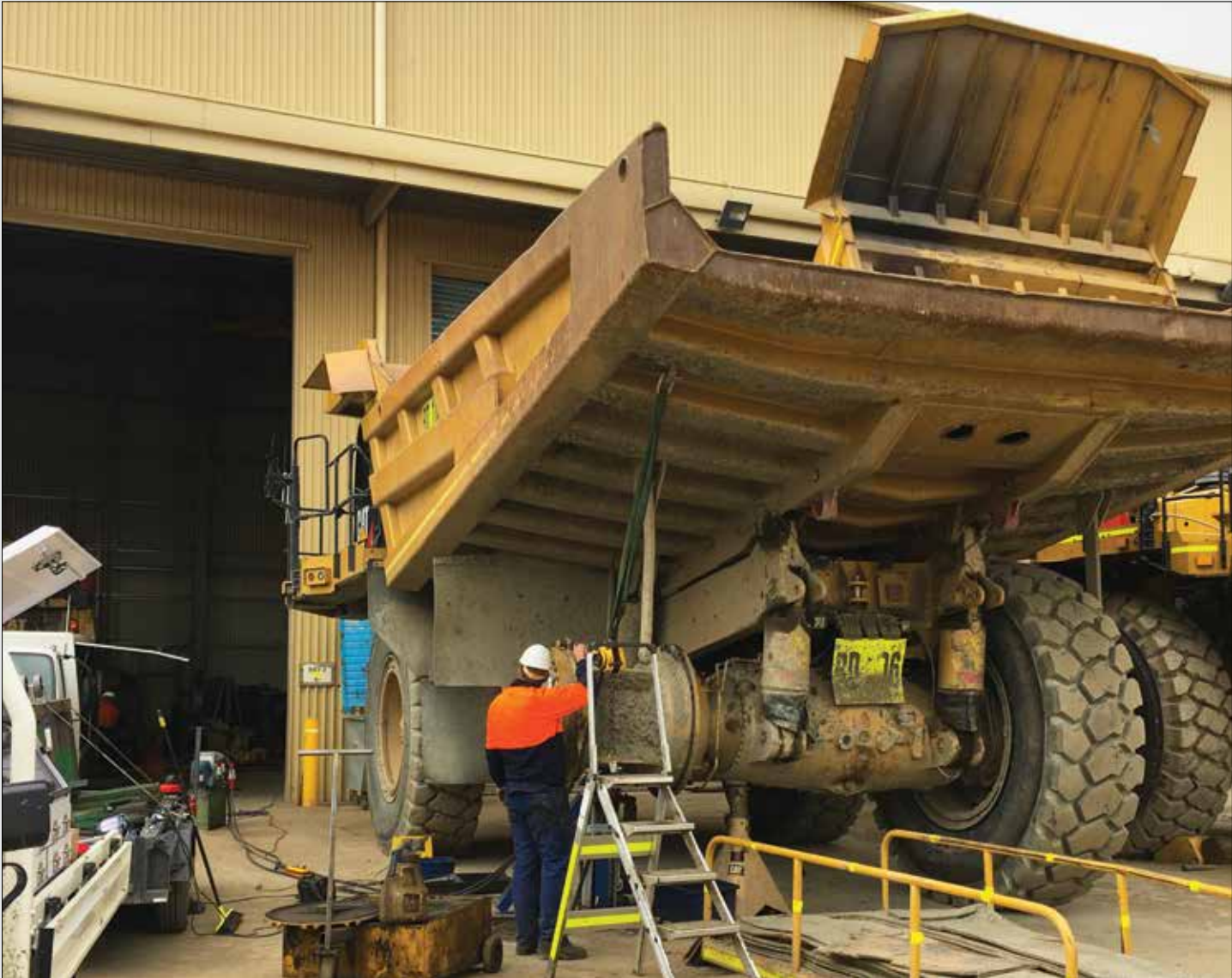
The company has supplied Kirkland Lake Gold's Fosterville project, Emeco Group, Inglewood mine and Philsaga Mining's Co-O mine in the Philippines.

For Philsaga, BAANDH supplied pneumatic control cabinets, cylinders, collar doors and associated fabrication and machining for seven shaft access platforms at its Co-O underground gold mine.

The company has fabricated safety access stairs for Komatsu dump trucks, and has also completed conversions from dump truck to water cart.

Recently, BAANDH specialists travelled to Hillgrove Resources' Kanmantoo copper mine in the Adelaide Hills to machine wheel hubs.

The team at BAANDH provide personalised services with a superior attention to detail and the tenacity to think outside the box to get the job done, drawing on many years of mining experience to offer the very best in service and workmanship.



BAANDH provides personalised manufacturing and machining services to its clients.

(CONTINUED FROM PAGE 33)



"One month into the fourth quarter, [and] we have just achieved record monthly production at Fosterville of over 30,000oz in October."

Image: Kirkland Lake Gold.

Kirkland Lake Gold acquired the historic Fosterville mine from Newmarket Gold in late 2016.

The company's substantial 2017 budget of \$40.4m for Fosterville included 128km of exploration drilling and development of 2kms of drill platforms.

By the end of 2017, underground reserves had more than doubled and production guidance for FY18 increased by a whopping 110,000oz.

The work translated to an upgraded resource estimate of 1.03moz, and increased the average underground reserve grade estimate by 83 per cent to 17.9g/t.

The significant increases were supported by down-plunge extensions of the high-grade, visible gold-bearing Lower Phoenix gold system.

In particular, the Swan Zone contributed 532,000oz to the updated reserve estimate at an average grade of 58.8g/t.

Kirkland expected Fosterville would report production of between 250,000oz and 260,000oz for 2017.

Kirkland Lake chief executive Tony Makuch said the company's strategic investment into Fosterville was already paying dividends.

"At Fosterville, we had our second-best quarter ever in the third quarter and exited the quarter having achieved solid results in September, including over 24,000oz of production," Mr Makuch said.

"One month into the fourth quarter, we have just achieved record monthly production

at Fosterville of over 30,000oz in October."

Kirkland said growth drilling at Fosterville would continue to focus on expanding reserve and resource estimates.

Company growth

At the end of FY17, Kirkland had cash and cash equivalents of \$267.4m, an increase of \$32.5m from 31 December 2016.

The increase was after the repayment of \$43.8m related to the maturity of the company's 6 per cent debentures due at the end of last financial year.

Kirkland's investments during FY17 had proven their worth, with gold production

of 429,822oz in the first 9 months of 2017, representing an increase of 107 per cent from comparable 2016 levels.

"Looking ahead, we are off to a strong start in the fourth quarter and now expect to produce between 580,000 – 595,000 ounces of gold for full-year 2017 and have also improved our operating cash cost and AISC guidance," the company stated.

"In Canada, we are targeting one of our best quarters ever from our Canadian operations, with all three mines expected to achieve strong results.

"Turning to exploration, results from ongoing drill programs at Fosterville, Macassa and Taylor continue to be very positive."



Image: Kin Mining.

Kin Mining's Leonora gold project has received a \$34m backing from Mr Sprott.



Fosterville production is expected to increase by 110,000oz in FY18.



At last – the \$10 billion Roy Hill mine has hit its 55 million tonne per annum run rate. After overcoming significant orebody challenges during ramp up, the miner is now posting tidy profits as it nears the end of a 90 day lenders test to demonstrate sustainable levels of production.

All images: Roy Hill.

ELIZABETH FABRI

IT has been a rocky road to full production for Roy Hill since sending off its first shipment in December 2015.

Teething issues encountered with the orebody caused a series of delays, pushing what was originally scheduled to be complete by the end of 2016, back until late 2017.

It was a tough time for the miner, but after much perseverance and the introduction of a new jaw crushing system to handle harder ore, the long-awaited target was met in September when production hit 4.8 million tonnes (the equivalent of 55mtpa on an annualised basis).

Reflecting on complications at a recent WA Mining Club lunch, Roy Hill chief executive Barry Fitzgerald described this time as a “horrible period” for the company.

“The reality was that the orebody had a few more difficulties than we thought and the material was much harder,” Mr Fitzgerald said.

“I can assure you that there were some interesting questions around the business about whether we were ever going to get out of that.

“We had significant wear [on the plant] that we hadn’t foreseen because when we started the project seven years ago all the experts said to me: ‘Barry you will never make 40 per cent lump, that material is so soft’.

“I am happy to say 18 months on we have got some of the hardest material in town.”

The miner was also in a stronger financial position.

According to an Australian Securities and Investments Commission filing, Roy Hill posted a profit of \$331 million for the 12 months ending June 30 2017, compared to a \$34 million loss the previous year.

Roy Hill was also the proud owner of a growing trophy collection; after receiving a handful of national industry awards in 2016, Roy Hill and its executive chairman Gina Rinehart were recognised on an international

ROY HILL AT A GLANCE

340km south-east of Port Hedland.

Initial mine life of **17 years**, with a likely extension of **12 years**.

Iron ore operation consists of; a conventional open pit; **55mtpa** wet processing plant; **344 km** single line, heavy haul railway; two berth iron ore port facility at Port Hedland; Remote Operations Centre in Perth.

Five ore trains operate per day, each consisting of two diesel electric locomotives hauling **232 ore cars** with a total payload of **31,132 tonnes** of ore.

level in May 2017, snapping up the *Rising Star* and *Lifetime Achievement* awards, respectively, at the London Platts *Global Metals Awards*.

In October, Roy Hill also picked up the 2017 Golden Gecko *Certificate of Merit*, for its innovative and best practice approach to using its existing mining technology to track and manage rehabilitation materials.

In November, the award streak continued when Mrs Rinehart and Barry Fitzgerald received dual accolades at the CEO Magazine 2017 *Executive of the Year Awards*.

Completing (and passing) a 90 day lenders test was the next hurdle, which all going well was expected to be ticked off by Christmas.

“This is important to complete to ensure that we meet our obligations to our lenders and owners,” Mr Fitzgerald told *The Australian Mining Review*.

“To date, consistency in material (primarily

hardness) and mineralogy have been our biggest challenges.

“Improved ore body knowledge is enabling us to better manage and optimise our mining, processing and logistics by knowing in advance what type of material will present.”

Advancing technology

Roy Hill was also soon to join its three Pilbara rivals – BHP, Rio Tinto and Fortescue Metals Group – in the roll out of autonomous trucks across its operations.

The introduction of driverless trucks was part of its Smart Mine program, which aimed to identify, develop and deliver solutions across its operations.

The plan included testing and implementing the latest technology to create a ‘digital twin’ of the physical ore body; evolving and developing the mine planning

and execution capacity to reflect the increased understanding of the ore body, and a series of automation initiatives.

The miner had already begun installing cruise control on its rail system, and several autonomous drills.

The next step was a phased roll out of the autonomous trucks, beginning in the second half of 2018.

“Our current plan will see a small fleet of six trucks being trialled in 2018 and then progressively rolled out through to 2021,” Mr Fitzgerald said.

“This will complement our current drill program where we have three of the nine Pit-Viper drills automated.

“The remaining six drills will be completed in 2018.”

When asked how the move to autonomous trucks and drills will effect jobs, Mr Fitzgerald said it “will change some existing roles and result in new roles emerging”.

“The future of work and the workforce is facing rapid changes brought about by technology, globalization and social values,” he said.

“Our personal lives, the mining industry and other industries are being disrupted and the rate of change is accelerating.

“We are developing a plan that includes pathways for people to learn additional skills with a mix of automation and manual.”

Over the next 12 months, Roy Hill will bring on another 300 workers, taking its total to about 2000 employees.

“Roy Hill’s vision is to be a high performing iron ore business where people contribute and realise their full potential,” Mr Fitzgerald said.

“The attitude, skills, knowledge and capabilities of our people are fundamental to our success.

“Our success has been possible with an exceptional team, a strong culture, and a carefully planned and coordinated effort from conception to commissioning and operations.”

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INDUSTRY SPOTLIGHT

COMPANIES GEARING UP

KNOCK ON WOOD

Why shouldn't mine sites use wood pallets for transporting used lead acid batteries?

DAVID BUSH
BATTERY RESCUE

THE lead acid battery is by far the most common type in use today, with more than 90 per cent of all batteries (by weight) containing lead.

However lead has a dark side; it is the world's number one toxic poison in regard to the number of humans affected.

As such, it has been designated as a Dangerous Good and Hazardous Waste, with the transportation of used lead acid batteries controlled by DG Transport and Controlled Waste Regulations.

These regulations contain "Chain of Responsibility" provisions that place a legal responsibility on ULAB Producers to ensure compliance by their supply chain.

Despite these requirements, we have witnessed systemic non compliance by the WA mining industry with how ULAB are being transported off site.

We believe these practices are indicative of what is occurring nationally, and that one of the major contributing factors to this non compliance is the use of the wood pallets.

What are the transportation requirements for ULABs?

As a Dangerous Good, the transportation of used lead acid batteries by either road or rail within Australia is controlled by the "Australian Code for the Transportation of Dangerous Goods (ADG Code)".

The Packaging Requirements for new and used lead acid batteries are contained in the ADG Code's P801 Packing Instruction.

In Australia, the wood pallet is the most common device used when transporting ULABs.

If you are using wood pallets, referred to as an overpack in the ADG Code, then your packaged ULABs should appear like the example in Figure 1.

Non-compliant ULAB transportation using wood pallets

Common examples of non-compliance when using an overpack, such as a wood pallet, include:

1. Inadequate restraints

Many batteries are being transported from WA mine sites with the batteries secured to the pallet by plastics wrapping only.

In the event of a vehicle accident this would not adequately restrain the heavy batteries. The batteries should also be secured with plastic strapping, with a horizontal band to secure each layer of batteries and 2 vertical over straps (Figure 1).

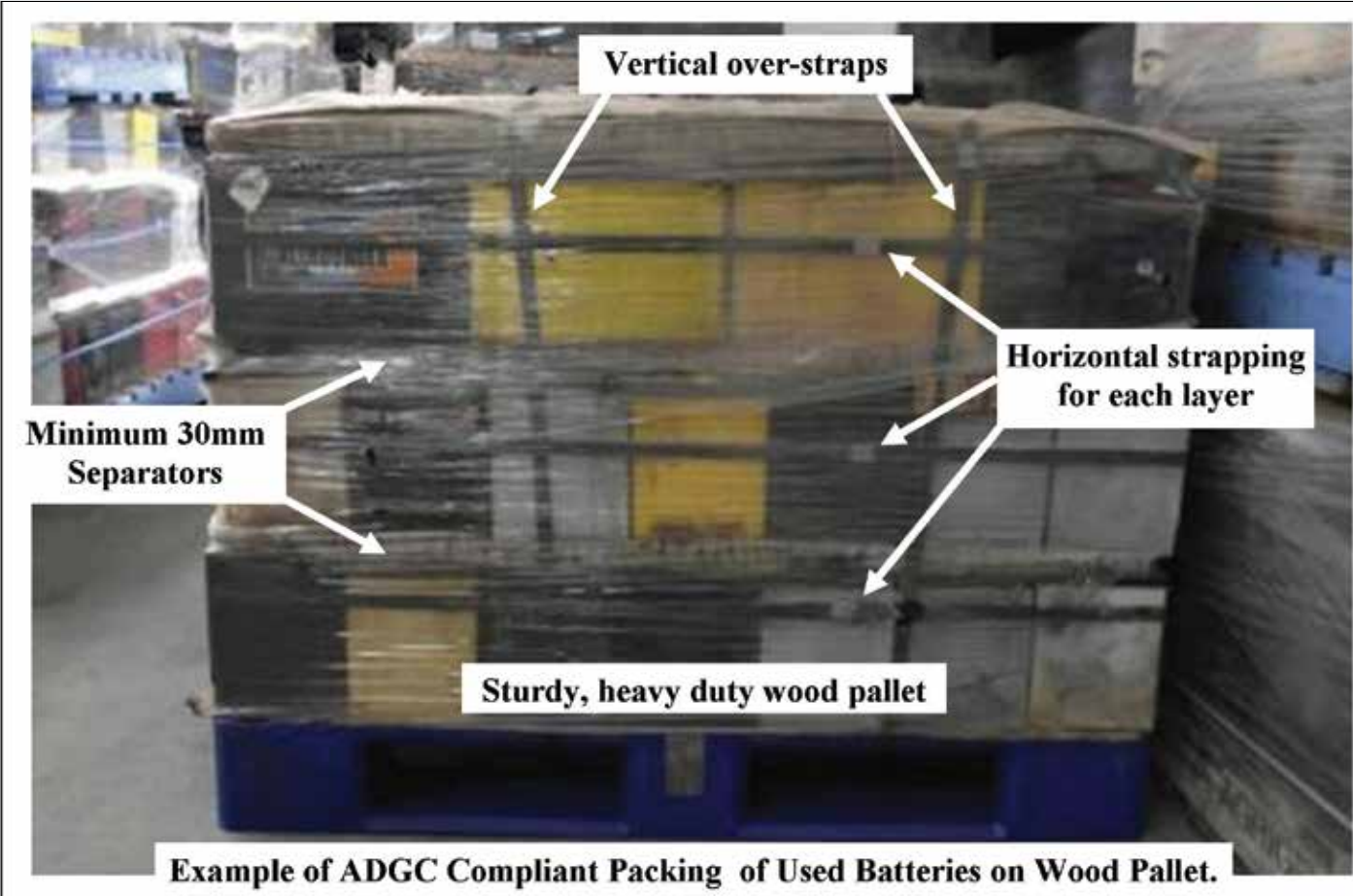


Figure 1.

2. No/ inadequate separators between battery layers

The ADG Code P801 Packing Instruction states that "battery terminals shall not support the weight of other superimposed elements" and "batteries stacked shall be adequately secured in tiers separated by a layer of non conductive material".

Many shipments of used batteries have either no separator applied or use an entirely inadequate 5mm piece of cardboard. To meet the P801 requirements the non-conductive separator should at least be 30mm to adequately protect the terminals from damaging batteries packaged on top.

3. Use of poor quality pallets

Batteries are heavy with a pallet load weight up to 1.5 tonnes.

Poor quality, light wood pallets cause issues during transport and can fail in the event of an accident.

4. No/ inadequate restraint of pallets to vehicle

We have observed several instances of ULABs being transported on wood pallets without being secured to the vehicle.

The ADG Code requires "placard loads" to be adequately restrained.

5. No Class 8 Corrosive Labels or DG documentation

Absence of Class 8 Corrosive labels on each overpack and no transport documentation detailing quantity and type of dangerous good.

Why aren't wood pallets suitable?

In Australia, the wood pallet is currently the default device used for transporting ULABs.

It has become the default standard for several reasons, including its low cost, widespread availability and because many used battery recycling facilities have a stated preference for receiving the batteries delivered on wood pallets.

The wood pallet however has several significant drawbacks when used for transporting ULABs. These include:

1. Acid leaks during storage and transportation are not contained posing several threats to human health and the environment.

The sulfuric acid electrolyte contains high lead levels and other toxic heavy metals. Lead is one of the most toxic substances to human health with the World Health Organisation currently suggesting there are no known levels of lead exposure that are considered safe. The acidic electrolyte can also result in burn injuries, damage to property and the environment.

2. Poor, inadequate and non-compliant packaging due to:

a. Variations in the worker's attitude, training & understanding of the regulations.

b. Time consuming, difficult and unsafe task.

c. Required materials & tools not available (good quality wood pallets, plastic wrap, strapping tool, 30mm card separators).

d. Use of cheap, poor quality wood pallets due to convenience and to save costs.

e. Batteries of many different sizes are difficult to stack securely on wood pallets.

Systemic non-compliance of the packaging requirement is increasing the risks to the public and environment in the event of an accident and results in load shifting and acid spills during transport. And due to the "Chain of Responsibility" provisions it is increasing the legal risk to mining companies.

What are the alternatives?

With the increased availability of plastic boxes of suitable strength and capable of retaining any acid leaks, Battery Rescue believe it is time the industry moved away from the use of wood pallets to store and transport used lead acid batteries.

We believe the Australian Government should provide regulatory support to eliminate the use of wood pallets.

Diversity key to adaptation



LINX believes that diversity and inclusion are the best tools for adapting to new technologies.

LINX Care Cargo Group is Australia and New Zealand's leading diversified logistics infrastructure and solutions provider, with an extensive fleet of road haulage and trailer equipment offering long distance and short haul services across multiple applications.

The group brings together the capabilities of four market-leading operations built on more than 100 years of ports and logistics experience.

These are made up of LINX, Autocare, C3 and GeelongPort; which employ more than 3800 highly-skilled professionals.

LINX is a firm believer that future business success is heavily reliant on how well it understands its customers — adapts to new technologies — and its ability to recruit, engage, develop and manage people with different backgrounds and thinking styles.

The biggest transformation in the workplace today is the increasing adaption of technology, and this transformation has been painful for many.

However rather than technology being

a threat, the addition of automation across industry will likely create new jobs and opportunities as new technologies make processes faster, safer and more efficient — and as a result, the logistics market will grow, along with its workforce.

To be successful throughout this upheaval, industry leaders need to bring their people along with them.

They need to inspire, to be the front-runners that set precedents, and at the same time, unleash imagination amongst their employees.

Employees need to upskill and demonstrate flexibility to embrace the changes that new waves of technologies will bring.

The logistics industry of the future will employ highly skilled professionals in positions that do not exist today.

Therefore, an employee's willingness and ability to acclimatise and assimilate new technology is critical.

The bottom line is that automation can enhance the logistics workforce, as long as

people are brought along on the journey through good leadership.

A critical factor of what sets LINX apart from its competitors is how it diversifies skillsets across the workforce for people to work within the increasing complexity of the industry.

"The pace of technology change requires us to adapt quickly and efficiently to meet our customers' expectations, or even better, exceed them," LINX Cargo Care Group chief executive Anthony Jones said.

"Diversity for us is not just about ensuring more women are given the opportunity to join our team — that's a key component — it's about pro-actively creating a diverse and inclusive workplace with a broader mix of capabilities and mindsets.

"We see diversity and inclusion as leadership responsibilities, not HR responsibilities, which is why our leaders play a key role in building capability to work more effectively in diverse teams, and adapt quickly to the future needs of the logistics industry."



The KTZ411 proves itself to be a worthy investment for mine operators by reducing pump maintenance and improving water handling on site.

Mine pump delivers

THE ever-changing site topography at a mine presents a unique dewatering challenge. Submersible pumps offer a flexible solution with a number of cost saving advantages in terms of installation, maintenance and supervision.

"Moving water efficiently to maintain production capacity, especially after a flood event, needs a robust submersible that can handle dirty water," Aussie Pumps product manager Neil Bennett said.

"Tsurumi's KTZ submersible pumps are specifically designed for such applications and make a smart investment for mine managers."

Tsurumi, the world's largest manufacturer of submersibles developed the KTZ range of cast iron pumps to handle dirty water.

These reliable pumps are huge cost savers, substantially reducing maintenance and installation costs.

The KTZ pumps are simple to install so can be moved around the site as required.

Their unique internal features, together with the cast iron construction, allow them to operate on an angle thus eliminating the need for a pontoon or stabilising platform.

"Submersibles can be stored for months when not required, then set up quickly without the fuss of engine servicing and refuelling," Mr Bennett said.

"There's no danger of swamping the pump if it's located in a flood prone area, and it can be set up to run automatically as required."

The KTZ411 is a high capacity 4" 11kW pump that can deliver in excess of 1000L of water at a head height of 35 metres.

That performance makes it an ideal mine pump; flooded areas are brought back online faster and the water can be moved further distances.

The KTZ411 has been built to withstand dirty water meaning it offers a considerably longer service life.

It comes fitted with a three phase heavy duty two pole motor with thermal protection. The heavy duty cast iron pump has high chrome wear components.

It also features anti-wicking cables and silicon carbide seals that function to maximise performance longevity in extremely challenging environments.

A free selection guide covering Tsurumi's range of heavy duty submersibles from dewatering through to slurry pumps is available from Australian Pump Industries and online at www.aussiepumps.com.au.

Transport solutions for mining

ENDUROCO is Australia's leading manufacturer of 4x4 conversion systems for Toyota Coaster and Commuter Buses.

The 4x4 kits are manufactured in Victoria, and installed into vehicles by OmniBus in WA, Vehicle Solutions NT in Darwin, Sharps Heavy Engineering in Mackay and FCR Industries in Victoria.

EnduroCo has established strong ties with the mining industry, delivering more than 50 vehicles to various mine sites around Australia in the last year.

The company's engineered 4x4 off-road solution for the 10 to 22 seat 4x4 bus range are available in both automatic and manual transmissions with increased ground clearance and redesigned suspension, setting a new standard in passenger comfort, performance and safety.

One of EnduroCos latest designs in 4x4 conversions is the 2017 Toyota Coaster, packed with exciting new features including; a strengthened body made from anti corrosion steel, larger side windows with privacy glass, SRS Airbags for both driver and front passenger seats, a



EnduroCo delivered more than 50 vehicles to mines this year.

reversing camera, and satellite navigation.

The Coaster has always been the benchmark for medium sized people movers and now EnduroCo has made it even better with its proven 4x4 conversion system.

More information on EnduroCo's Toyota Hiace Commuter and Coaster bus four wheel drive mining and emergency services conversion options, can be found at: www.enduroco.com or by contacting the company on 1300 493 493.

One link in a chain reaction

AS the formative link in the mining supply chain, haul roads, tip heads and pit floors must flow without interruption, however all too often sharp rocks pose a major threat to this rhythm.

Thankfully, the Broons Square Impact Roller can provide affordable insurance against breaking that crucial first link.

Used in mine sites around the world, the towed Square Impact Roller has been reducing oversize destructive rock for decades.

Available in both 1.3m wide 8-tonne module and 1.95m wide 12-tonne module configuration, these units fracture and bury the offending rocks that are capable of inflicting fatal tread and tyre wall damage to mine trucks.

It's not just the cost of the damaged tyre, it's the lost productivity while decommissioned – so there's plenty of profit to be extracted by using the unique Square Roller.

Towed at around 10kph, the Broons Square Impact Roller is simple to operate, low on maintenance and high on productivity.

Fitted with a wear plate package on the impact faces of the module, machines are available for rental or sale.

Broons' experienced staff are able to train mine operators within hours and start securing the ground surface.

The company also offers the well proven towed Grid Roller as an alternative for mines with softer rock to be crushed.

Broons can be contacted on (08) 8268 1988 or via email at info@broons.com, and a brochure is available at: www.broons.com/impact.



The Broons Square Impact Roller at work.

An ongoing commitment to mining



More information can be found at: mcmahonburnett.com.au.

MCMAHON Burnett Transport is a privately owned company that provides freight services to customers across WA.

McMahon Burnett Transport managing director Santo Guagliardo has been involved in the transport industry for more than 30 years, starting with his father in the north west of WA in the 1960s as a driver and now owning one of the most innovative transport

companies in the State.

The evolution of the business to its current form, McMahon Burnett Transport, has happened through good management skills, dedicated staff, and a devotion to customers' needs.

McMahon Burnett Transport services customers throughout WA and has depots

in Kalgoorlie, Onslow, Cue, Mt Magnet, Laverton, Leonora, Wiluna and Leinster.

The team are committed to Occupational Health and Safety and continually train personnel to the highest standards.

McMahon Burnett Transport are specialists in all forms of mine freight and service many major mines in WA.

Oversize, dangerous goods and catering service are all included in services offered.

Its Kalgoorlie branch manager Russell Hounslow can be contacted on 0448 031 268 for all transport and logistics needs.

Perth branch logistics manager Dennis Scanlan can also be contacted on 0409 445 904 to quote all freight requirements.

Australia is the first market to receive the 300 Series trucks.



All images: HINO.

HINO

BRINGS LIGHT DUTY 4X4 TO MARKET

JAPANESE auto manufacturer HINO has recently launched its 4x4 300 Series light duty trucks to the Australian market.

The 300 Series marks HINO's first entrant into the light duty category of vehicles, aimed at complementing its medium (500 Series) and heavy (700 Series) vehicle lines.

Australia, with its rugged and diverse terrain, was chosen as the first market to launch its new category.

"We have been testing prototypes of the 4x4 here for over three years, with real-world customers whose feedback has enabled us to refine the specification of a truck built specifically for the Australian market," HINO product strategy manager Daniel Petrovski said.

"The 300 Series 4x4 is a specialised vehicle and this sort of approach has genuinely benefitted what we can now offer our customers."

Mr Petrovski said real world testing of the vehicles gave the production team valuable information on how to approach the market.

Specific to the mining industry, they chose exploration drilling contractor Kennedy Drilling to field-test the vehicles across Australia.

"Kennedy Drilling specialises in RC, RAB and air core drilling and has an area of operation that is basically all of WA out through NT, over to QLD and down through South Australia," Mr Petrovski said.

"They cover more than half of the country, and a lot of that is off-road, or severe off-road, towing trailers and operating through the scrub – it is essentially one of the harshest operations that we could find."

Kennedy Drilling maintenance supervisor Wade Brangrove said he was impressed with the series' air intake ability driving through dusty terrain.

"The low air intake on the test truck sucked up the dust but the most impressive thing for me was that the intake never bypassed," Mr Brangrove said.

"I've seen a lot of filters get to that point, they start to crush and let dirt pass and there goes your engine."

"I purposely let it do 10,000 kilometres before even checking if it could cope – and it could."

"It's about being able to offer our customers a one-stop shop solution, where HINO can provide a complete range of trucking requirements, from light duty 4x4, our medium duty 500 series, right up to our heavy duty 72-tonne GCM trucks."



Built for Australia

"If you're going to enter a new category in the Australian truck market for the first time, you want to do it with a product that sets a new benchmark for that category and that's what we've done with the new 300 Series 4x4," Mr Petrovski said.

Both Single and Crew Cab variants are powered by a 4-litre HINO N04C-UT turbocharged diesel engine.

The N04C utilises common-rail fuel injection technology combined with a Variable Nozzle Turbocharger (VNT) to deliver a maximum power of 165hp (121kW) and 464Nm of torque.

It's an engine that's designed to perform and to deliver the right mix of useable performance on highways, dirt roads and in serious off-road 4x4 applications.

4-wheel-drive (4x4) is selected by a combination of manual locking front hubs

and the press of a dash-mounted button to engage with 4x4 in the transfer case which sends drive through the front drive shaft.

Likewise, 'low' range can be selected with the press of a dash-mounted button to engage the transfer cases class leading 2.2:1 low range reduction ratio.

The transmission and transfer case ratios have been specially selected and recognise the broad range of applications in which the Hino 300 Series 4x4 is likely to work in.

"This means the Hino 300 Series 4x4 with its first gear transmission ratio of 6.369:1 and the transfer cases low range 2.2:1 ratio will crawl across the most rugged terrain," said Mr Petrovski.

"Conversely, it is equally as comfortable cruising at 100km/h with the engine running at a conservative 2440rpm."

Mr Petrovski said that safety was definitely not an after-thought in the design and manufacture of the 300 Series.

"The 300 Series has four wheel ventilate disc brakes as standard and vehicle stability control (VSC) is a part of that disc brake solution," he said.

"It keeps the vehicle on the corner or where you've got it pointed.

Basically it looks at your centre of gravity, how you're moving around a corner and it will take the steps needed to help you get around that corner safely; that may mean de-powering the engine or individual brake applications.

Benefits to miners

Mr Petrovski said the 300 Series would easily stand up to hard accessibility and the heavy loads necessary in mining and exploration duties.

"It has more power and torque than any other competitor, more gears (6 speed manual) and a transfer case with a lower low range," he said.

"What that combination does is give you better 'crawlability' and slow speed manoeuvring in first gear low range.

"It also has great six gear two-wheel drive high range with 100km/hr cruising speed, low engine RPM and a nice quiet cabin ride.

"Mining customers are always looking for a truck with a great payload.

"Our HINO 4x4 enters at the top of the light duty market with 7.5 tonnes GCM."

Mr Petrovski said that with the addition of the 300 Series to the Australian market would give customers a superior range of required vehicles.

"The benefits of adding the 300 series to the market is that we are able to provide our customers a consolidated product offering.

"It's about being able to offer our customers a one-stop shop solution, where HINO can provide a complete range of trucking requirements, from light duty 4x4, our medium duty 500 series, right up to our heavy duty 72-tonne GCM trucks."

**An Australian Mining Review journalist was at the launch as a guest of HINO Australia.*

Training innovation with Transqual

WHEN it comes to regulatory requirements in industries such as road transport, warehousing, and stevedoring, compliance isn't a bonus; it's an absolute necessity.

Non-compliance is a threat for a list of reasons.

Companies that fail to comply are at risk of massive fines, regulatory penalties and even jail time.

Moreover, compliance (at its core) focuses on the safety of the team; allowing non-compliance to pervade an organisation is flat-out dangerous.

Change, as always, starts from the top.

Transqual is the largest privately owned RTO (Registered Training Organisation #90388) that provides an extensive range of logistic training services, including road transport.

Its training packages include everything from chain of responsibility, dangerous goods and workplace health and safety programs, to high-risk licensing, with regular scheduled courses for forklift, dangerous goods, fatigue management, 4WD and load restraint.

Other qualifications that Transqual offer include transport and logistics certificates.

Transqual prides itself on offering the best possible facilities for its clients, in line with its commitment to quality and the provision of a high standard of service.

Transqual can also customise each facet to meet the client's enterprise specifics while still maintaining national regulations and State legislation requirements and the



Transqual offers 4WD training courses nationwide.

national 'Standards for RTOs 2015'. Its exploration and resource clients, such as Santos, have implemented policies where

all staff, contractors and visitors to their sites must undertake the Transqual 4WD Defensive Driving training program before

operating a 4WD vehicle on-site. Transqual delivers these programs Australia-wide.



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TLIC2025 Operate a four wheel drive vehicle

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Including unit:

TLIA1001 Secure Cargo

CHAIN OF RESPONSIBILITY

- Chain of Responsibility (Executive Brief) - Non accredited, aligned to TLIF0003 Develop and implement policies and procedures to ensure chain of responsibility compliance
- Chain of Responsibility (Level 1) - TLIF0001 Apply chain of responsibility legislation, regulations & workplace procedures
- Chain of Responsibility (Level 2) - TLIF0002 Administer chain of responsibility policies and procedures
- Chain of Responsibility Awareness Online Module (Non accredited)



RTO# 90388

A multi-faceted approach

VERTICAL Horizonz (VHA) is a privately owned national and international Registered Training Organisation (RTO) based in Geebung, QLD with operations globally.

The company is one of the only training providers that can offer accreditations across multiple qualification frameworks (ISO, Nebosh, GWO) and industry standards in Australia, New Zealand, UAE, Singapore, Malaysia.

VHA provides driver training and certification for on road and off road applications, from light vehicle and 4WD to heavy rigid and haul truck competencies through to multi-combination licensing.

It has provided driver training and plant accreditation for Australia's largest mining and construction companies and recently completed a contract to train and upskill the Australian Defence Force on the implementation of the new Mercedes G-Wagon under the land 121 program.

VHA can also provide a multimodal delivery option where participants engage in online, interactive content available on any device, which is mapped to both internal policy and procedures and national or international standards followed by practical training and assessment.

VHA can provide companies with its own branded version of the system with



More information can be found at www.verticalhorizonz.com.

the client having full control.

Vertical Horizonz is working to become the only training provider globally that can offer qualifications that are recognised globally by meeting the standards locally.



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PNL 4WDDriving can operate Australia

wide.

In Victoria, it has a training area each side of Melbourne to reduce the travel required by customers.

The intermediate four wheel drive course is a two day 20-hour course which includes a lot of practical driving, as well as the required theory.

More information can be found at the website or by calling (03) 9786 8490.

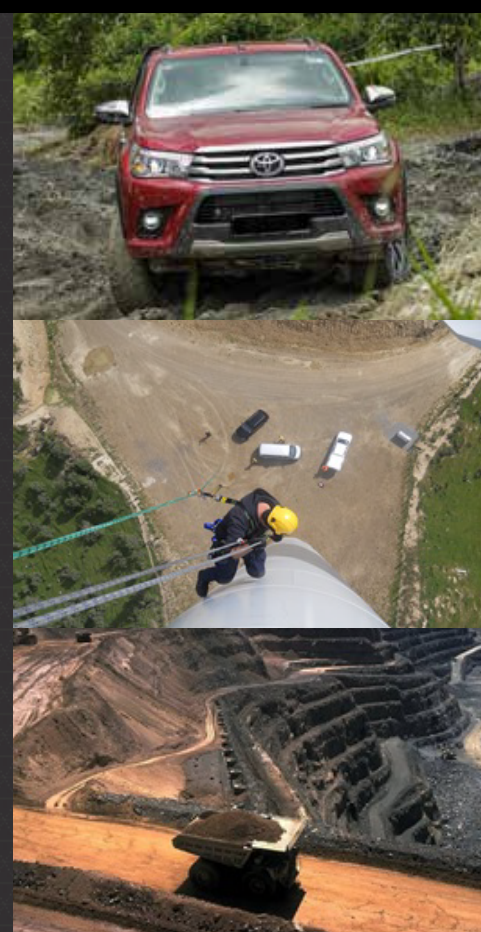
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Grays leads way with online selling platform

SEARCHING for quality used mining equipment or wanting to turn idle/surplus equipment into cash? The solution is GraysOnline.

GraysOnline is the largest industrial and commercial online auction business in Australasia, offering a huge range of industrial, commercial and consumer goods, direct from asset owners, dealers, wholesalers and administrators.

The company offers vendors an efficient sales channel to unlock value from their assets and free up cash flow.

It's online selling platform and commitment to first-class customer service mean clients can trust the team to make buying and selling easy, efficient, fair and transparent.

For decades, GraysOnline has been providing specialist services to the mining industries in Australasia, Middle East and Africa.

Its extensive experience covers all mining sectors, including gold, coal, base metals, precious metals, and mineral sands, including open cut, underground and alluvial processes.

The full-service provider offers valuations and flexible turnkey solutions for the decommissioning of mine plants and the realisation of mining and related equipment including fixed plant, mobile, support equipment, and inventory.

The team tailor the sale strategy to meet client requirements whether this is negotiated sales, online auction or tender; and offer guaranteed sales results or outright



GraysOnline tailors the sale strategy to meet a client's individual requirements.

purchase options.

It can also help its vendors sell their assets in-situ and save on relocation costs, coordinating the whole sale and collection process for them.

As part of the publicly listed Eclix Group, GraysOnline have access to capital to take a position in assets, and provide sellers with

a true global selling platform with access to more buyers across key markets and proven ability to sell equipment offshore.

Assets are sold on its main website www.graysonline.com, while its dedicated Middle East selling platform www.graysmiddleeast.com also provides access to buyers in the Middle East and Africa.

By choosing GraysOnline, sellers benefit from the company's proven expertise, global reach and track record providing complete project management services; major event sales; reduced risk via WHS compliance; promotion through tier 1 media avenues; and a unique sales channel with access to national and international networks.

IronPlanet is mining equipment sales gold

RITCHIE Bros. predicts the launch of IronPlanet in Australia will boost used heavy machinery sales in 2018.

IronPlanet, which boasts 1.8 million registered users, sold close to \$US1 billion in heavy machinery internationally in 2016/17, and now hosts monthly Australian auctions.

Ritchie Bros. Asia-Pacific director operations Richard Tucker said Australia had been fast to adopt machinery cyber auctions as moving heavy equipment to market drove up costs.

"Mining in Australia is a remote business, with sites based thousands of kilometres from a capital cities or major centres," Mr Tucker said.

"Moving a 100-tonne plus machine or a fleet of them, isn't easy or cheap.

"IronPlanet clients can sell, buy and list an item or an entire consignment when and where they want, which can save thousands.

"It's frustrating for a buyer to spend money shipping an item to auction, only to see it freighted back to a new owner just down the road."

Mr Tucker said IronPlanet was owned and operated by Ritchie Bros. so quality control was paramount.

"Each piece of equipment listed online is inspected by an expert prior to sale," Mr Tucker said.

"Its important buyers have a strong level of comfort when purchasing online.

"IronPlanet buyers browse a virtual world but our team of expert inspectors who visit each item are very real.

"A qualified expert inspects each listed item, provides an authorised report and the IronClad Assurance, guaranteeing the



More information can be found at: rbauction.com.au.

accuracy of the inspection report.

"Sight unseen, IronPlanet buyers get what they expect and with no expected surprises, sellers secure the best market price."

Mr Tucker said it was IronPlanet's ability and market respectability that had resulted in the online portal's mammoth global success.

"One billion in international sales last year proves IronPlanet is trusted and effective," he said.

"IronPlanet provides access to tens of thousands of buyers, sellers and equipment from around the world.

"You can bid, sell and inspect all from the

comfort of a lounge chair."

Ritchie Bros. is industry renowned for its highly-successful onsite un-reserved auctions but IronPlanet offered customers the choice of selling at a fixed price, negotiation offers or setting a reserve price.

Mr Tucker said the introduction of the online reserved platform afforded Ritchie Bros. customers more options.

"Last year 49 per cent of the equipment sold in our onsite auctions were sold to online buyers," Mr Tucker said.

"IronPlanet widens the online audience by providing different solutions for customers."

Mr Tucker said onsite auctions would remain highly popular with buyers and sellers even as the popularity of online auctions grew.

"Richie Bros. has three onsite auction sites in Perth, Geelong and Yatala, and they serve an important purpose," he said.

"Online is an important cog in the wheel but you can't underestimate how much buyers still like to kick a tyre and see products first-hand.

"We have buyers fly in from all over the world to see a piece of equipment.

"Thanks to IronPlanet, Ritchie Bros. can offer the perfect mix of options."

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*All numbers from 2016 GTV in USD.



Danca CNC can design and manufacture components from all materials.

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DANCA Screw & Fittings specialises in high-quality precision CNC repetition engineering, including CNC milling and turning.

The company's core difference is its manufacturing quality, cost-effective components manufacturing, and wealth of trade experience since 1976.

No matter what type of precision or repetitive componentry a client needs created, Danca CNC can design and machine it from any material required.

"We guarantee absolute customer satisfaction by producing extremely high-quality craftsmanship that is consistently accurate and always

delivered on time," Danca director Sam Aloe said.

Danca's services include component design using 3D design; prototype manufacture to exact specs; research and development assistance; cold forming and thread rolling; high volume CNC repetition machining; four axis/milling, turning and tapping; welding and heat treatment on metals; plating/anodising metals; powder coating and component assembly of machined parts.

The company holds full ISO certification with QAS International.

More information can be found at www.danca.com.au.

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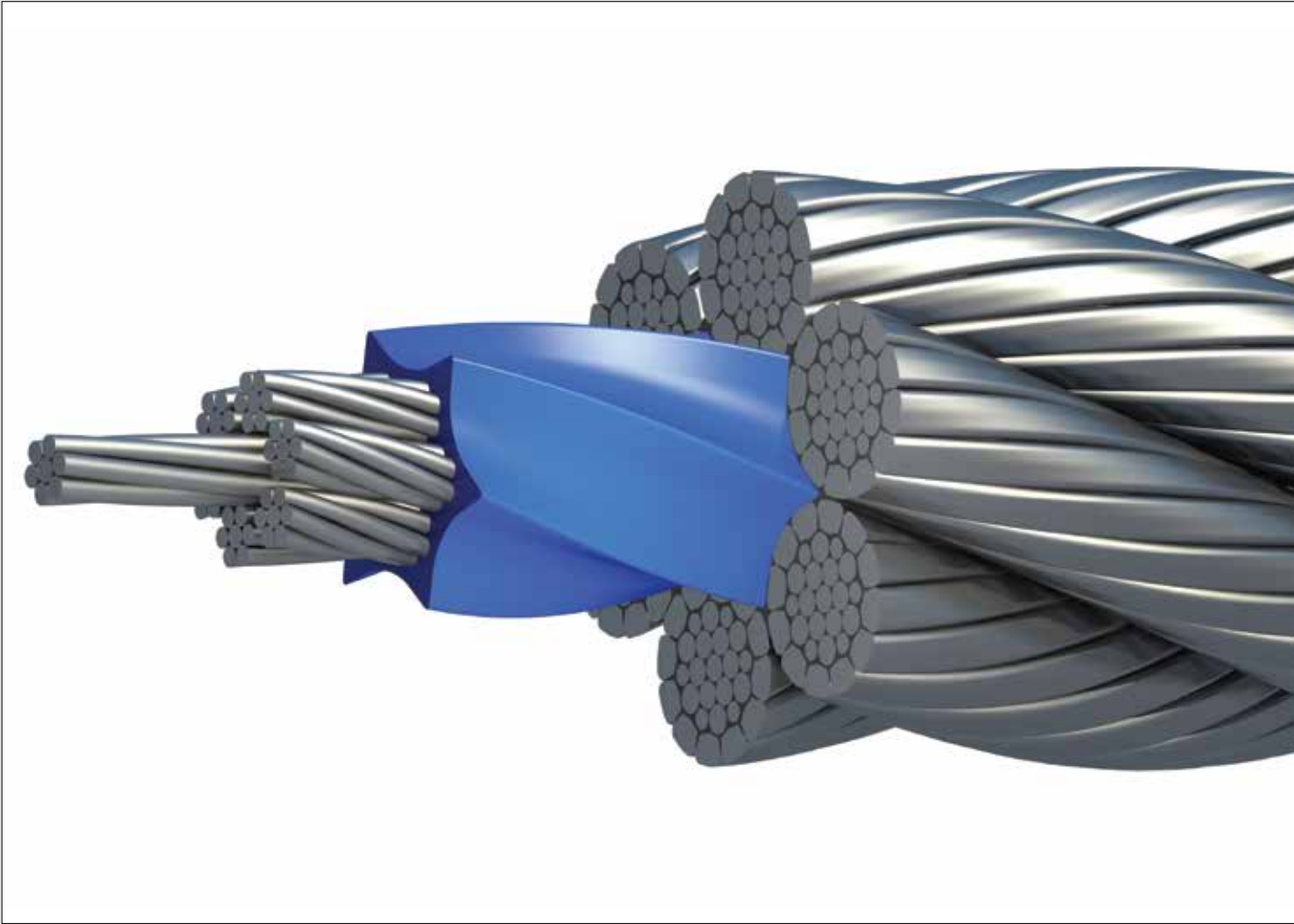
NATIONAL lifting and rigging equipment services provider A. Noble & Son (Nobles) has inked a deal with Bridon-Bekaert to jointly market and sell Bridon and WRI branded wire ropes into the Australian underground mining and crane market.

Effective since 27 November, the wire rope distribution and supply agreement has expanded on Nobles' already diverse product offerings; including synthetic and wire rope slings, chain slings and components, lifting and rigging hardware, mooring chains, hoisting and winching products, materials handling, load restraints, vehicle recovery and more.

"Bridon-Bekaert Ropes Group is a global wire rope manufacturer producing both the Bridon and WRI range of high-performance underground mining ropes from its technically advanced global manufacturing facilities," Bridon-Bekaert Oceania vice president Stuart Callender said.

"Globally, we are the leading and innovative supplier of underground mining wire ropes with an extensive installed base across North and South America, Africa, Europe & Russia."

Nobles managing director Guy Roberts said given Nobles' extensive mining wire rope customer base and associated technical installation, inspection and NDT services in Australia, and Bridon-Bekaert's leading underground mining wire rope manufacturing and technical capabilities globally, it made sense that they aligned their respective businesses to supply and service the growing underground mining market in Australia.



Bridon-Bekaert's high-performance wire rope construction.

Mr Roberts said both parties jointly agreed on a set of key performance indicators that will be supported by comprehensive in-country technical support and local stock holdings to service customer requirements. More information on the new Bridon-Bekaert products can be found at: www.nobles.com.au.

You will make plenty of tough calls in 2018.

Where to source and service your hoist ropes won't be one of them.

Nobles has been serving the Australian mining industry since 1911. Today Nobles is the country's number one provider of underground haulage and mine shaft ropes, now including Bridon-Bekaert's world-leading Bridon and WRI brands. This new partnership will give our Australian customers access to global leading underground hoist rope products and innovations such as Bristar plastic core technology that significantly increases the longevity of the wire rope.

These proven mission-critical products from Bridon-Bekaert are backed up by comprehensive services from Nobles including assembling & testing attachments, installation, inspection and NDT. Combined, both organisations have true Australia-wide coverage and global expertise with world-class local engineers and technical specialists for rapid technical support and cost-effective solutions to all of your underground wire rope needs.

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Nyrstar project heats up with Lampson

IN 2017 Nyrstar has been busy improving its processing power for metals such as lead and zinc at its refinery in Port Pirie, South Australia as the project moves through the commissioning stage.

The improvement works at Port Pirie refinery required a very large crane to lift and install the modules of a new furnace tower and called upon the heavy lifting and oversize transportation expertise of Lampson.

A long established project equipment supplier, Lampson completed the lifting works with its proprietary Lampson Transi-Lift LTL-2600 as well as the Manitowoc 2250 with Max-er, Manitowoc 999 and 777, Grove RT-9130's and 81 axles of SPMT Goldhofer trailers for transporting the furnace modules.

"This project was a great fit for Lampson's equipment and personnel as it called on the specialised capabilities of our SPMT fleet, as well as the heavy and very high lifting ability of the LTL-2600 crane," Lampson Australia managing director John Lee said.

The heaviest lifted furnace module weighed 677 tonne and the top of the highest module set by the LTL-2600 was 76m; the boom length was 140 metres and the crane had 2300 tonne of counterweight.

To lift the furnace module and other heavy components, Lampson's engineering team designed rigging equipment with a spreader bar system to suit many of the heavy modules so that the crew wouldn't have to make great changes for each lift, which saved time and costs for Nyrstar.

The Lampson Transi-Lift crane is a



The Lampson LTL-2600 in operation at the Nyrstar site.

patented configuration that combines the heavy lifting capacities of derrick lifting equipment with the mobility of a conventional crawler crane, and includes great maneuverability with adjustable stinger length and multiple boom combinations.

"The crane is completely mobile at full capacity and it can be transported by conventional trucks and the counterweights are assembled and can be filled at site," Mr Lee said.





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The company has a highly diverse range of equipment which can assist with all aspects of load in/load out operations, site moves of draglines and shovels, skidding and jacking, stacker and reclaimers/shiploader installations, as well as crane and customised lifting equipment for general shutdown works.

Sarens is an experienced partner with strategically positioned operational yards throughout Australia from which equipment can be mobilised for maintenance contracts.

Its engineers work closely with their client's project teams during the FEED, pre-design and engineering execution phase of each project to ensure the most efficient approach possible and to safeguard all project requirements.

The company is also proud to own the youngest crane fleet in Australia equipped with black boxes, which enable the team to monitor individual crane history within the fleet and a variety of operational activities.

Sarens' dedicated, well trained and disciplined team are committed to achieving the highest levels of safety, quality service and environmental awareness.

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Celebrating 30 years of success



NQCrane is a leading supplier and service provider of overhead cranes.

AUSTRALIAN-owned and operated NQCrane has been at the forefront of the overhead crane industry for more than 30 years.

It is Australia's largest independent overhead crane service business, employing 55 technicians to provide crane and hoist supply, design, manufacture, servicing, repairs and compliance inspections.

NQCrane is headquartered in Mackay, giving it direct access to service Bowen Basin mining operations.

Other locations, strategically located near industry, include Brisbane, Cairns, Emerald, Gladstone, Newcastle, Rockhampton and Townsville.

Compliant with all Australian standards, clients can be assured they receive a safe, reliable and cost-effective lifting system, delivered on time and on budget.

With safety as one the company's top concerns, NQCrane offers after-sales support, including inspections, repairs

and emergency breakdowns performed by its qualified and highly experienced personnel.

Delivering the highest level of customer service is a significant foundation to NQCrane's service model and differentiates it from its competitors.

"We live and breathe lifting systems," NQCrane managing director Wayne Pidgeon said.

"We've encountered just about every

scenario possible, so we know exactly what crane to recommend in order to keep your project as cost-effective and seamless as possible.

"We also have our own unique style of business – one that's personal, down to earth and respects each customer as being as important to us as the next.

"This progressive culture has been a cornerstone in our growth, enabling us to become the largest overhead crane manufacturer in QLD."

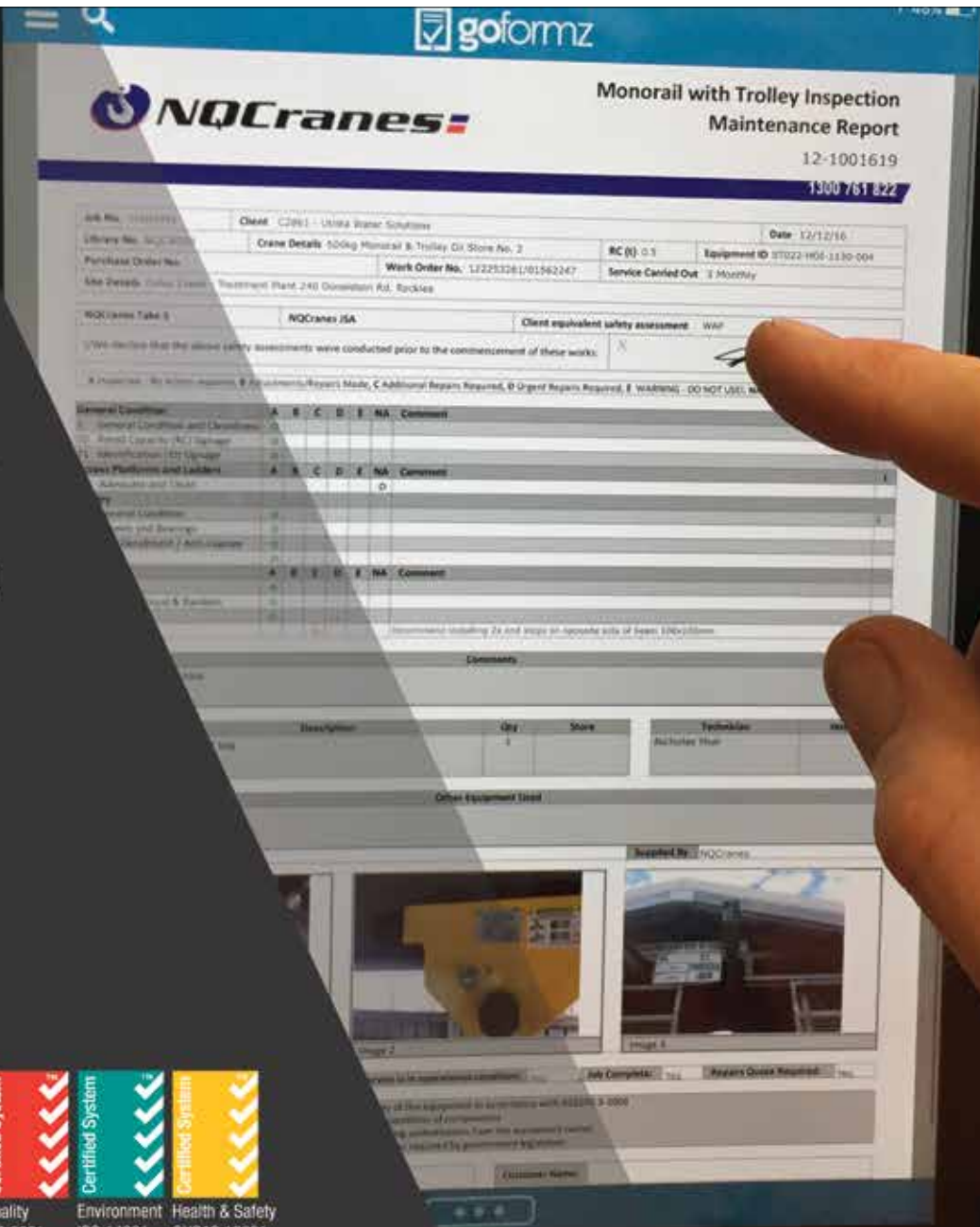
RIGHT KNOWLEDGE AND CAN-DO ATTITUDE

'The job task planning, risk management and execution were exceptionally well planned... This is a great tribute to NQCrane personnel with right knowledge and can-do attitude whilst upholding all of our values.'

Jung Lee, Facilities Management Superintendent,
Tarong Power Station



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Australia's lifting IKON

IKON Lifting Equipment is a specialist product supplier to all facets of industrial transportation in Australia.

The company's range covers road, rail, sea and air as well as other diverse applications for relocatable buildings and over dimension loads; drawing its products from STERIL BV in the Netherlands, the world's largest manufacturer of heavy vehicle lifts.

Whatever the type of vehicle, IKON has the lifts and hoists to get it up in the air so work can be done as safely and as quickly as possible.

IKON's 12 years' experience in wireless communications and battery powered equipment has overcome the reliance on mains power and attendant cabling hazards on workshop floors.

Battery powered lifting units – with up to 17.5t swl per lifting unit over sets containing as many as 32 units synchronised to within 15mm lift height – meet the tricky challenges of transporting equipment, relocatable buildings, ore wagon maintenance, vehicle maintenance and some locomotive maintenance.

Mains-powered vehicle lifts up to 70 tonne swl in various product designs complete the wide array of equipment options available from STERIL BV to meet the needs of the Australian mining industry.



IKON provides the mining and heavy industry sectors with world-leading STERIL BV lifting equipment.

IKON's WAGONLIFT, made in the Netherlands by STERIL KONI, is a remarkable new offering that can be used to separate wagons from bogies, wagons and spiders from wheel-sets or lift an entire wagon and reduce wheel-set changeover times from 2.5 hours to under half an hour.

With level hard standing alongside a wagon in a workshop, over a pit or in a marshalling yard, the WAGONLIFT is a quick and simple means of providing a quick

turnaround whether one axle or two of a bogie need replacement or the entire bogie needs replacement.

IKON also provides custom designed adapters that can cater for most needs; and IKON's OEM parts back-up and local service agents in all sale locations, together with its long warranty commitments, have earned it Preferred Supplier Status from users in all States and industry groups.

Listed among IKON's major mining associated accounts are Fortescue Metals Group, Rio Tinto, Aurizon Operations, Pacific National and Genesee & Wyoming.

The company also provides its products to industrial and commercial vehicle companies, smaller equipment hire businesses and diesel vehicle repair workshops.

More information can be found at: www.ikonlifting.com.au.

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THE AUSTRALIAN
MINING REVIEW

New micro-mist tech delivers



RomBin Spray Bars.

ENVIROMIST provides industry leading micro-mist dust suppression solutions, and has won Australian Bulk Handling Awards in 2015 and 2016 for systems developed for a WA iron ore mine and a Queensland underground coal mine.

The EnviroMist high-energy micro-mist system is based on new research in the

application of dust control technology.

The techniques used by EnviroMist focus on accurately identifying material properties and flow dynamics, so that a total solution that is effective across the application's full operating range can be developed.

EnviroMist's use of simulation modelling



EnviroMist Pressure Booster Units.

allows efficient and accurate designs to be created, which results in systems producing high dust capture efficiencies without the need for huge water consumption.

In order to reduce fugitive dust emissions, EnviroMist worked with the University of Wollongong to analyse droplet sizes of various dust suppression sprays, leading to

the development of a system that matches energy and droplet size with the size of these dust particles.

This is the optimum solution for eliminating particulate matter of the sizes PM10 and PM2.5, both of which are hazardous to humans due to their ability to be drawn deep into the lungs.

DUST SUPPRESSION COAL AND HARD ROCK MINE APPLICATIONS:

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- Dust PSD Analysis
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DAS 'in complete control' of dust control

IF there is one company that can claim to be in "complete" control of dust suppression at mining operations across the length and breadth of Australia, it would have to be Dust-A-Side Australia.

Such is the capability of this national company, it has the products, experience and know-how to provide a complete dust control solution at both open cut and underground mines ranging from Central QLD to WA.

Dust-A-Side Australia provides a one-stop shop for dust suppression and dust management; delivering operationally sound and cost-effective solutions from pit to port.

Its "whole solution" capability can be seen across entire mine sites – in the form of haul roads and underground roads, light vehicle roads, stockpiles and dust suppression systems.

Custom-made solutions

While many dust suppression companies hang their hats on just one product, Dust-A-Side offers a range of bespoke solutions.

It won't simply specify DAS Product – even though its flagship formulation has been proven to provide operational dust reductions of more than 90 per cent and water savings of more than 95 per cent.

It will look at a mine's particular dust problems in-situ, before specifying custom-made solutions.

This could be AquaTarp (suitable for stockpiles, re-vegetation sites and rail wagons), HydroTac (used to contain fugitive



More information can be found at www.dustaside.com.au.

dust on haul roads, storage piles and materials handling transfer points) or any other of their patented solutions.

Each product is designed and developed to perform a specific task and can be applied in

different ways to achieve different outcomes.

Then there is its dust suppression systems, of which more than 100 purpose-built systems are in use globally.

From conveyors to transfer stations,

Dust-A-Side is an acknowledged leader in this field.

With more than 30 years of global research and refinement to rely on, Dust-A-Side can be quietly confident of solving all dust problems.

Flexible, autonomous dust suppression

DUST can't be suppressed without water, but many sites don't have easy access to a water supply; so what can they do?

Italian company EMIControls recently launched its latest model, the autonomous V12sm Dust Controller, which is mounted to a specially designed trailer with integrated water tank.

The unit looks like something out of the legendary 1960s TV series, *Thunderbirds*.

Along with improvements to the V12 Dust Controller itself, the trailer accommodates a 10,000 litre water tank and a 60 kVA diesel generator.

The V12sm design improvements include faster rotation and tilting speeds.

It also has an increased tilt range of -10 degrees up to +45 degrees from the horizon, an easy-to-use touch screen, and a heavy duty remote control.

The unit also has a low noise function with an operation sound level of 63 dBA at 20 metres; that equates to conversation levels in an office.

The V12sm continues to include EMIControls' patented nozzle head, which comprises a centre ring of spray nozzles to ensure the spray is more resistant to wind.

As a result, throw accuracy and distance are maintained with up to 60 metres coverage.

The entire unit is manufactured and assembled at the factory in Italy and includes the trailer with mounted V12sm Dust Controller, water tank and generator.

At 6000mm x 2500mm, the self-contained unit easily fits into a shipping container or can be installed onto trucks with a six metre tray.

Tecpro Australia has the exclusive distribution rights in Australia and New



Tecpro's V12sm mobile dust controller.

Zealand for all EMIControls' products including the self-contained V12sm dust suppression unit.

More information on the V12sm dust suppression audit and strategy consultation, Tecpro can be contacted on www.tecpro.com.au, or to arrange a (02) 9634 3370.

Dust Suppression problems? DAS have the **total** solution.

If you have a problem with dust – be it at an open cut or underground mine – it's reassuring to know that Dust-A-Side Australia don't do things by halves. Never have. Never will.

Instead we offer you a total dust control solution, a complete 'Pit to Port' package that encompasses all facets of mining, including:

- Haulroads
- Underground roads
- Light vehicle roads
- Stockpiles and
- Dust suppression systems.

Best of all, it won't be a 'one-size-fits-all' solution, but a bespoke package custom-tailored to your specific site, with different products specified for different environments.

So why put up with partial solutions when one call can put an end to your dust problems once and for all, plus reduce operating costs AND wet weather delays.



Underground



Light Vehicle Roads



Stockpiles



Haulroads



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Luehr Filter products are engineered to last, with most systems still in operation decades after installation, even in the most demanding of applications.

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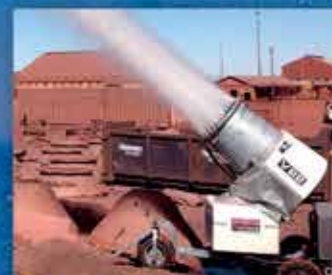
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More information can be found at www.catalano.com.au.

B&J Catalano is a WA owned and managed company with a rich history of successful operation within the mining, port operations, bulk haulage and civil construction industries spanning more than five decades.

The company is unique in the way it does

business.

B&J Catalano offers a range of end-to-end services unmatched by industry competitors, through ownership of an extensive fleet of plant and equipment; full in-house and mobile maintenance capabilities; a loyal and

multi-skilled workforce; and quarries located across the south-west, mid-west and metro regions of WA.

This unmatched combination of capabilities and resources provides its clients with a one-stop-shop, where the use of subcontractors

is limited to only the most specialised tasks.

It also provides confidence in the team's ability to provide a reliable, quality-driven, and safe service – a delivery promise they back up by a 100 per cent completion record since first operations began in 1962.



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Quality earthmoving attachments

ESTABLISHED in 1985, Atlas Heavy Engineering is a leader in innovation through the design, engineering and manufacture of quality attachments, custom designed to meet a client's needs.

Whether it is a bucket for a mini excavator, or attachments for large excavators and loaders, over the last 30 years the team has developed a proven track record of delivering attachments fit-for-purpose, on time to meet all needs.

"Our products are used across many industries, including construction, quarries, demolition, forestry and mining," Atlas Heavy Engineering sales and marketing manager Andrew Moir said.

"We also carry out heavy fabrication and welding to in-house and customer design, and control the entire process in house, from engineering, cutting, rolling, pressing, fabrication, welding, hydraulics and where required, final machining, blast and paint.

"This ensures that Atlas continue to supply the product we are noted for in the market place."

The company employs its own qualified engineers, and intensive testing is in place to ensure all products produced are of the highest standard and quality.

Its products include pulverisers and processors to suit machines from 6-65 tonne; grabs and shears; quick hitches with automatic hydraulic locking; excavator buckets to suit all machines from 1-250 tonnes; an extensive loader bucket range and abrasion and coal dozer blades.

"We supply attachments to some of



Atlas designs, engineers and manufactures quality custom designed earthmoving attachments to meet specific operational needs.

the largest and emerging OEM's and contractors, and all our buckets are manufactured using high tensile steels and are available in a range of configurations to suit most applications," Mr Moir said.

"Our client base includes Caterpillar and its Australasian dealers, Komatsu, Hitachi, Hyundai Construction Equipment, Tutt Bryant Equipment, Thiess Contractors, Daracon, Dundrum

Excavations and many more."

More information on Atlas Heavy Engineering' services can be found at: ahe1.com.au.

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CCR covering all bases

ESTABLISHED in 1996, Compatible Concrete Repair (CCR) has a proud history assisting builders, engineers, project managers and the mining sector with attainable solutions to difficult problems.

Over the years, the business has prospered and gained an excellent reputation in difficult remediation projects, high performance flooring applications, industrial waterproofing and sealing works.

“Our expertise lies in concrete cancer (spalling) repairs, epoxy flooring and injection into cracks, brickwork repairs, protective coatings, grouting, joint sealing, industrial waterproofing, and resurfacing of concrete (includes spray-on stencil crete),” CCR founder Peter Hutchison said.

Among the many types of coatings applied are epoxy resins, silanes, acrylics, polyurethanes, and cementitious materials.

The coatings are sprayed, rolled or brushed onto the surface for a variety of reasons including corrosion protection, waterproofing, decorative and mechanical protection.

If damaged concrete paving sections are a problem, CCR is able to demolish, dispose of and re-pour paths, expansion



CCR can find solutions to the most difficult flooring problems.

joints, hardstand areas and ramps to match existing grades and profiles, with all repairs designed to last the test of time.

CCR also specialises in labour hire solutions and prides itself on its ability

to adapt to various onsite challenges and inevitable variations.

Some of the major company’s CCR have contracted to include Downer EDI Rail, Downer Engineering, and X Strata.

More information on CCR capabilities can be found at www.ccrnet.com.au, or for an obligation free quote call (02) 4987 7155 or email info@ccrnet.com.au.

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- ◊ Specialised labour hire



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Celebrating 40 years in the plastic fabrication industry



More information on BW Plastics can be found at www.bwplastics.com.au.

WA-based BW Plastics can fabricate a large selection of plastic products for a range of industries.

BW Plastic's team of specialists boast extensive experience in the manufacture of customised plastics, and specialise in HDPE (polyethylene) spools and launders

for the mining sector; spools with Ultra High Density PE liners to assist with wear issues; PP (polypropylene) screens for gold mining applications; bunding and containment products; and tanks and belt covers.

The manufacture of PVC fittings for the commercial plumbing and civil sectors is

also a major component of the business.

BW Plastics is committed to quality and cost-effective product development, as well as unsurpassed customer service with a guarantee to deliver work to a promised schedule.

It's fully qualified and experienced staff

work out of a well-equipped workshop, and are familiar with nickel, gold, and mineral sands mining sites.

Clients requiring quality, custom-made fabricated products are encouraged to contact the company to discuss their requirements.

BW Plastics PTY LTD



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HDPE Belt Cover



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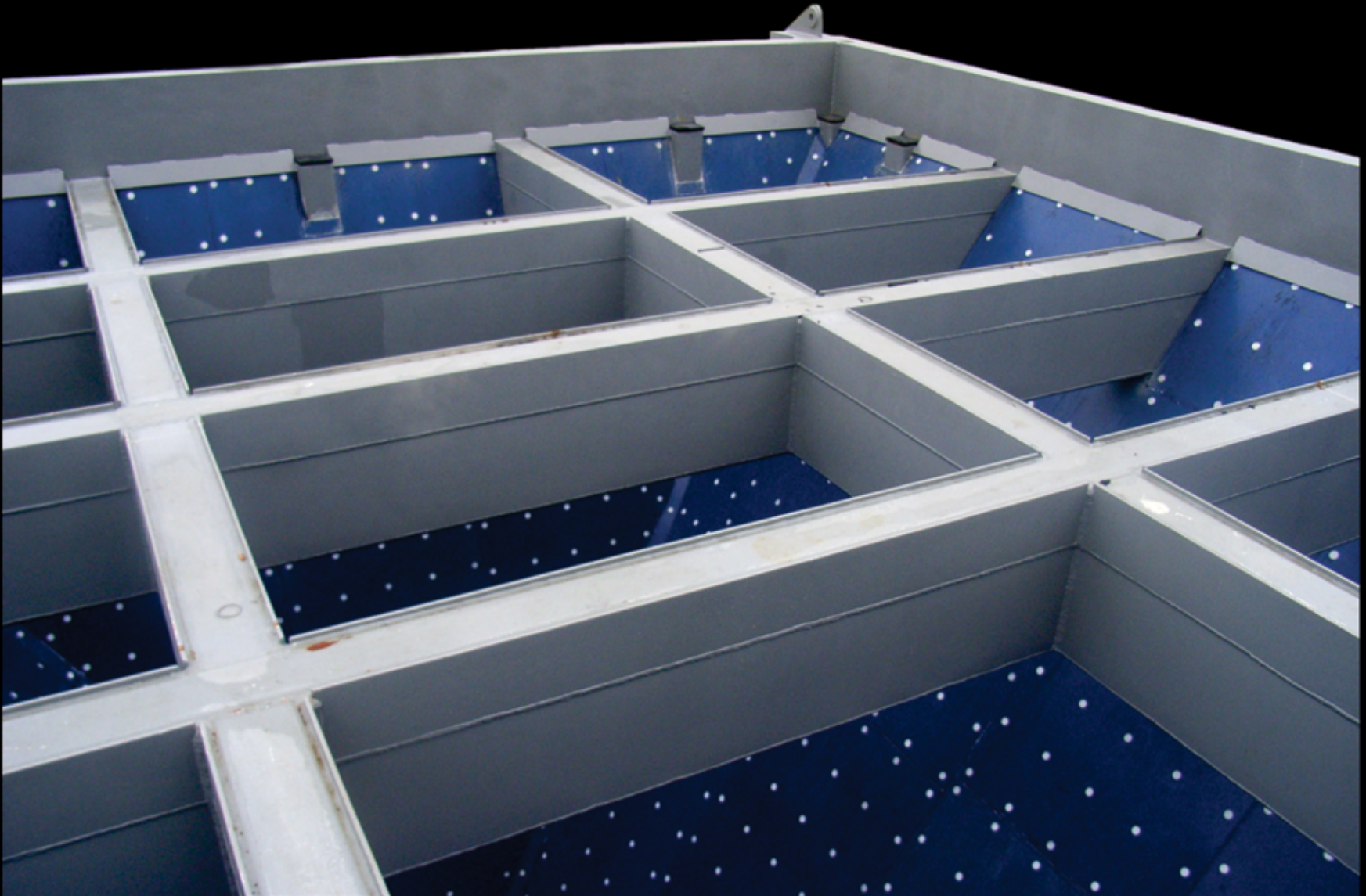
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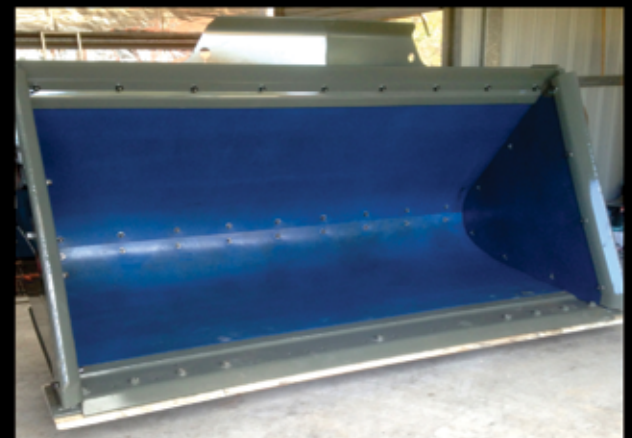
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A JOBS REVIVAL

Australia's five-year mining investment slump is almost over. The next round of mining operations are starting development, and industry activity will ramp up even further in 2018.

Queensland Resources Council chief executive Ian Macfarlane.
Image: QRC.

REUBEN ADAMS

IN October, jobs ads on SEEK had jumped 16.1 per cent compared to the same period last year.

"In terms of growth, while off a low base, the Mining, Resources & Energy sector, for the tenth month in a row, recorded the largest annual growth of all industries on SEEK, up 59 per cent year-on-year (y/y)," SEEK Australia and New Zealand managing director Michael Ilcynski said.

This strong growth was recorded across all States and Territories.

When the Queensland Resources Council's (QRC) eighth yearly economic contribution report was launched in November, QRC chief Ian Macfarlane was positive.

"It is a 'jobs story' [in QLD] this year, with direct full-time employment in the resources sector growing by more than 12 per cent to 38,150. That's a lot of truck drivers, diesel fitters and port workers," he said.

Mr Ilcynski said that in the country's largest labour markets of NSW and Victoria "job ads were up 12.4 per cent y/y and 18 per cent y/y respectively".

In NSW, the strong turnaround in coal prices and increased demand for coal at key export markets resulted in an uptick in mining jobs for the State.

July figures from Coal Services showed there were just over 20,600 coal production jobs in NSW – over 1300 more than at the same time in 2016, and the highest number since March 2015.

Many of the new coal mining jobs are in the Hunter Valley, particularly in mining communities like Singleton and Muswellbrook, with more than 1000 additional positions in the region than a year earlier.

Even South Australia, which held the mantle as the State with the nation's



highest unemployment rate for too long, is feeling optimistic.

While off a lower base, South Australia recorded the largest annual growth of all States and Territories, up 24.5 per cent y/y, Mr Ilcynski said.

"Trades & Services offered the most job opportunities across the State, with job ads for the industry up by a solid 62 per cent y/y."

The State Government also recently promised more than 3000 jobs would come from grants and low-interest loans.

The WA labour market was still recovering but recorded an impressive y/y growth of 19.2 per cent, with Trades & Services and Mining, Resources & Energy offering the most job opportunities.

A September DFP Resources job index showed a 29.6 per cent rise in

WA job vacancies in the year to August compared with the same period the previous year, in fields including geology, drilling, engineering, business support, operational managers, and trades.

From a longer-term standpoint, the NAB November Survey saw construction as the sector with the best employment conditions, followed by mining, which had "improved considerably in the survey since the start of this year [2017]".

New figures from ANZ in December also showed demand for workers remained steady, with job advertisements growing by 1.5 per cent to 172,000 in November – 12.1 per cent higher than a year earlier.

Federal Treasurer Scott Morrison said that by December, Australia had experienced the strongest jobs growth across all industries in forty years, with

four out of five jobs being full time.

Looking forward, the ManpowerGroup Employment Outlook Survey for the first quarter of 2018 reports positive signs across the Mining & Construction, Finance, Insurance & Real Estate, and Services sectors; especially in NSW, QLD, South Australia and WA.

"It is a 'jobs story' [in QLD] this year, with direct full-time employment in the resources sector growing by more than 12 per cent to 38,150. That's a lot of truck drivers, diesel fitters and port workers."

Employers in the Mining and construction sector report the strongest outlook (+23 per cent) as well as the strongest year-over-year gain of 16 percentage points, according to the survey.

This is apparent in QLD (+15 per cent) and WA (+9 per cent), where mining and construction are integral.

ManpowerGroup Australia and New Zealand managing director Richard Fischer said job outlook – the strongest in more than six years – signalled that wages pressure would start to build in the economy throughout 2018.

Employers would face a more competitive environment in which to attract and retain the best talent.

"With a low unemployment rate and a strong outlook, the labour market is rapidly approaching the point at which the war for talent will see wages pressure return to the economy," Mr Fischer said.

"Employers will need to reset their focus in the New Year if they want to attract and retain the very best employees."

HAYS Recruiting experts
in Resources & Mining

MINING BOSSES WARN OF SKILL SHORTAGES

For many it's been a long time coming, but finally vacancy activity is increasing across Australia's mining industry.

Renewed optimism in the Australian mining market and more confident investors are helping to increase vacancy activity, so much so that skill shortages are emerging again. In fact, a growing number of mining bosses are warning of looming skill shortages, with certain skills already in high demand and short supply.

These candidates will remain in demand throughout 2018 thanks to an increase in new mine sites coming on line or expanding production, particularly gold and lithium. An increase in gold and lithium exploration will further fuel candidate demand.

But mass redundancies and the uncertainty of previous years have taken their toll and driven much of the blue collar workforce into alternative industries closer to home, where many remain satisfied to trade reduced wages for improved lifestyles.

Given increased vacancy activity, mining companies are once again employing graduates and trainees, supplemented with flexible and experienced contractors, in an effort to fulfil their labour requirements to meet production targets. Unsurprisingly, employee retention is a high priority once more. The focus is on creating a good culture, family-friendly rosters and flexible working hours for parents.

The focus on workforce diversity remains, with most major miners adding more female and Indigenous employees to their teams. This improves their social license and widens the candidate pool. Larger miners are also now using automated technology to improve mine efficiency and maximise production. Rather than an emerging trend, this is very much the norm for the industry's leaders.

Skills in demand

Vacancy activity differs by location. In Western Australia, Geologists are increasingly sought with gold the major driver as exploration budgets are increased. In turn, Metallurgists and Drill and Blast Specialists are sought. Employers want cross-discipline and underground candidates.

Turning to Queensland, Dragline Operators, Diesel Fitters and Drill and Blast specialists are in short supply. With stronger coal prices, a huge number of jobs are being created within the Bowen Basin and so demand will continue.

Mechanical, electrical and heavy diesel Fitters are needed in the Northern Territory. Vacancy activity extends to supervisory and engineering roles.

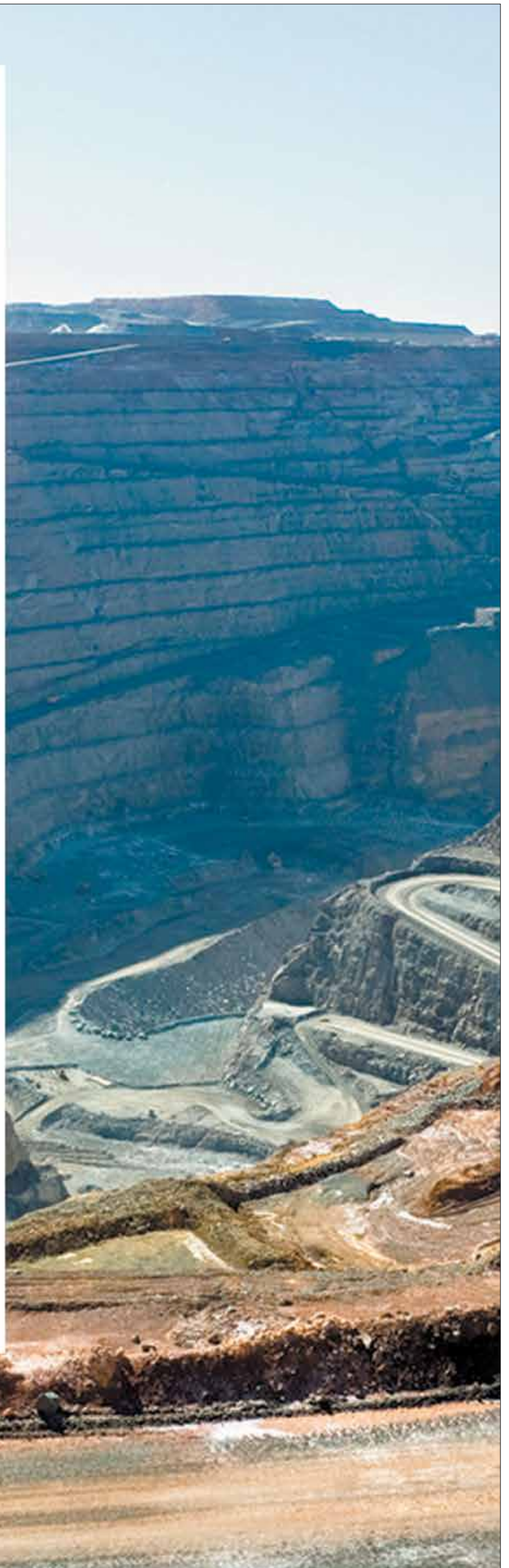
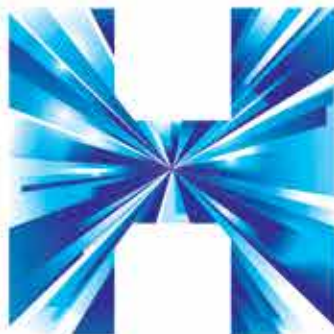
Rubber Liners and Belt Splicers are in high demand in South Australia for temporary roles. Demand is so high that suitable candidates are flown in to complete contracts and can command a strong rate.

New South Wales and Victoria need Boilermakers. Victoria also requires Mechanical Fitters. In both cases, most suitable candidates transitioned into the manufacturing industry and few are interested in returning to work on remote sites. This is especially true within the quarry sector, which also needs Operators.

For more, visit www.hays.com.au/report

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Cutting-edge training tech

MINE site inductions are synonymous with being necessary; however often dry, boring, and forgettable.

Mining operations are now acknowledging the value of virtual reality training; shifting site inductions to become a significant opportunity to proactively mitigate risk.

With the use of Immersive's WorksiteVR Quest, this is being achieved with exceptional results.

Immersive Technologies has more than 24 years' experience in developing high-end training simulators for the mining and earthmoving industries and has developed a series of virtual reality scenarios designed to facilitate a blended learning model in conjunction with eLearning and practical activities.

Custom-made mine sites can be created to cover topics ranging from identification of correct PPE to refuge chamber access and procedures; and training sessions can be easily conducted and developed in different languages.

The WorksiteVR Quest equipment includes a high-end PC, monitor, keyboard, mouse, speakers, and headphones.

In addition to the virtual reality headset, two wireless hand controls are packed up into a sturdy transportable case.

Recently, the company completed a project for Rio Tinto's Oyu Tolgoi mine site in Mongolia.

This involved creating three scenarios covering the correct use and identification of personal protection equipment (PPE),



WorksiteVR™ Quest allows users to virtually experience, engage and understand surface and underground environments, safety hazards and emergency situations.

identification of workplace hazards and emergency evacuation procedures.

Over the course of a six-month period, Oyu Tolgoi trainers ran 1100 employees through both the traditional courseware and a course integrating Immersive's WorksiteVR Quest.

Through a series of surveys, it was determined that there was a significant improvement in the learning retention rates and satisfaction of the users that went

through the WorksiteVR Quest program.

Mining personnel are now completing their induction possessing the confidence that they can apply their learnings and safely deal with emergency situations with an increased level of information retention.

Along with further induction and safety awareness projects, Immersive has also received requests ranging from basic machine maintenance and operation to

working from heights and critical risk management training.

Advanced understanding in the complexity of mining operations; training know-how and customer support; as well as a dedicated research and development team staying current on latest technological advancements, ensures Immersive Technologies continues to provide the best possible products and services to its clients.



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LaserBond exports laser cladding tech

LASERBOND has successfully designed, developed, manufactured and shipped its first customised turnkey laser cladding system.

LaserBond will export the system to its partner in mainland China; the first of many laser cladding innovations the company expects to ship in the coming years.

The export package to China was for an additive manufacturing laser cladding cell, tailored for initial surface engineering enhancement and remanufacturing of mineral processing crusher rollers, up to 2m diameter x 5.5m long with a mass of 10 tonnes.

All components except the 6-axis robot, 4kW laser diode power unit and the control hardware are designed, manufactured and integrated in LaserBond's Smeaton Grange workshops.

LaserBond's technology division was established in response to a number of international enquiries to license its laser cladding innovation.

Offering tailored systems in custom hardware, software, and support packages, it capitalises on the company's unique knowhow around the application of very high-powered lasers to apply specialised surfaces to heavy machine parts; typical of the resources sector.

LaserBond executive director Wayne Hooper, who leads the technology division, said LaserBond's niche is at the 'heavy end'.

"Many surface engineered products require extended running times at high power levels, some projects running 16 hours at maximum power," Mr Hooper said.

"This comes with challenges that our team has met."

Many of LaserBond's parts and technologies were also developed in-house for heavy industry and protected with patents (and applications), and its units were designed to handle high loading and high temperature (preheated) components.

Mr Hooper said one proprietary development was its powder injection nozzle system.

"We developed our own water-cooled, off-axis powder injection nozzle," he said.

"This incorporates a rapidly replaceable powder injection tube and gas depressurised gravity-fed powder mixer to enable us to manage the intense heat accumulating in the laser head.

"Flowing on from that and the geometry of the part being processed led us to invest in our own control system development.

"We have a world class product."

Another element is work piece manipulators for heavy components up to 20 tonne.

As awareness of the application benefits of laser additive manufacturing and advanced metallurgy to heavy end of industry grows, LaserBond has received new licencing enquiries for other turnkey LaserBond cladding system packages.

Across its two facilities, the company is working in additional R&D collaborations to develop a centre of excellence for surface engineered components for resource, infrastructure, defence and agricultural industries.



Leaders in 'better than new' technology

In 2017 we continue to lead the field in surface engineering technology across a range of industrial applications. We're passionate about innovation, productivity and conservation. We've been excelling at it for 25 years. We've learned a great deal about the tribology of wearing parts and advanced metallurgy. We're tailoring alloys that will dramatically reduce wear in specific situations, rebuilding worn parts to work better than new and creating innovative new components that are superior. And we have the best deposition methods to apply them. This is why we have attained prized strategic partnerships with leading companies and university researchers. Why we enjoy alliances with key industry bodies and cutting edge technology associations. Why we're actively collaborating to develop more 'Living Labs' to further pioneer improved wear resistance methodology. To discuss the possibilities of increasing wear life, refurbishing worn components and reducing costs for any aspect of your business, contact Laserbond.



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LASERBOND
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Pre Delivery Commissioning testing the operation of 6-axis robot and 2-axis work piece manipulator.

Neil McIntyre

Diatreme Resources chief executive

Mineral sands developer Diatreme Resources' footprint extends from WA to QLD. Supported by a wealth of experience in finance and resources, **Mr McIntyre** spoke with **Cameron Drummond** about the growth of zircon and silica in Asian markets, as well as the progression of Diatreme's Cyclone, Cape Bedford and Tick Hill projects.

Q. What is your professional history?

I've worked in the finance and resources sector for my whole career, including overseas posts.

My experience includes more than 25 years' senior management experience at national and state levels in Australia, Asia and the Pacific, including eight years as managing director of Pacific Capital in Papua New Guinea, a boutique merchant bank focussed on natural resources advisory (timber, fisheries, mining and petroleum) and funds management.

I have also held a range of posts, from chairman to executive and non-executive director, at various listed and unlisted minerals and petroleum exploration companies.

During my stint in PNG, I was delighted to accept the honour of an MBE for services to commerce, finance and forestry, following my work with resources and other companies.

Q. Tell us about your current role.

Since July 2014 I have served as CEO of Brisbane-based Diatreme Resources, having previously served as a non-executive director since 2011.

Since accepting the role of CEO I have worked to cut overheads and refocus our exploration portfolio, with a clear focus on our flagship Cyclone Zircon project in Western Australia. Discussions are underway with potential Chinese offtake partners and we are confident of progressing this project amid an improving outlook for zircon.

In addition to Cyclone, we are undertaking exploration work at our Cape Bedford project in North Queensland, which is considered highly prospective due to its location near the world's biggest silica sand mine.

Our Tick Hill gold project near Mount Isa is also seen capable of generating near-term cash flow.

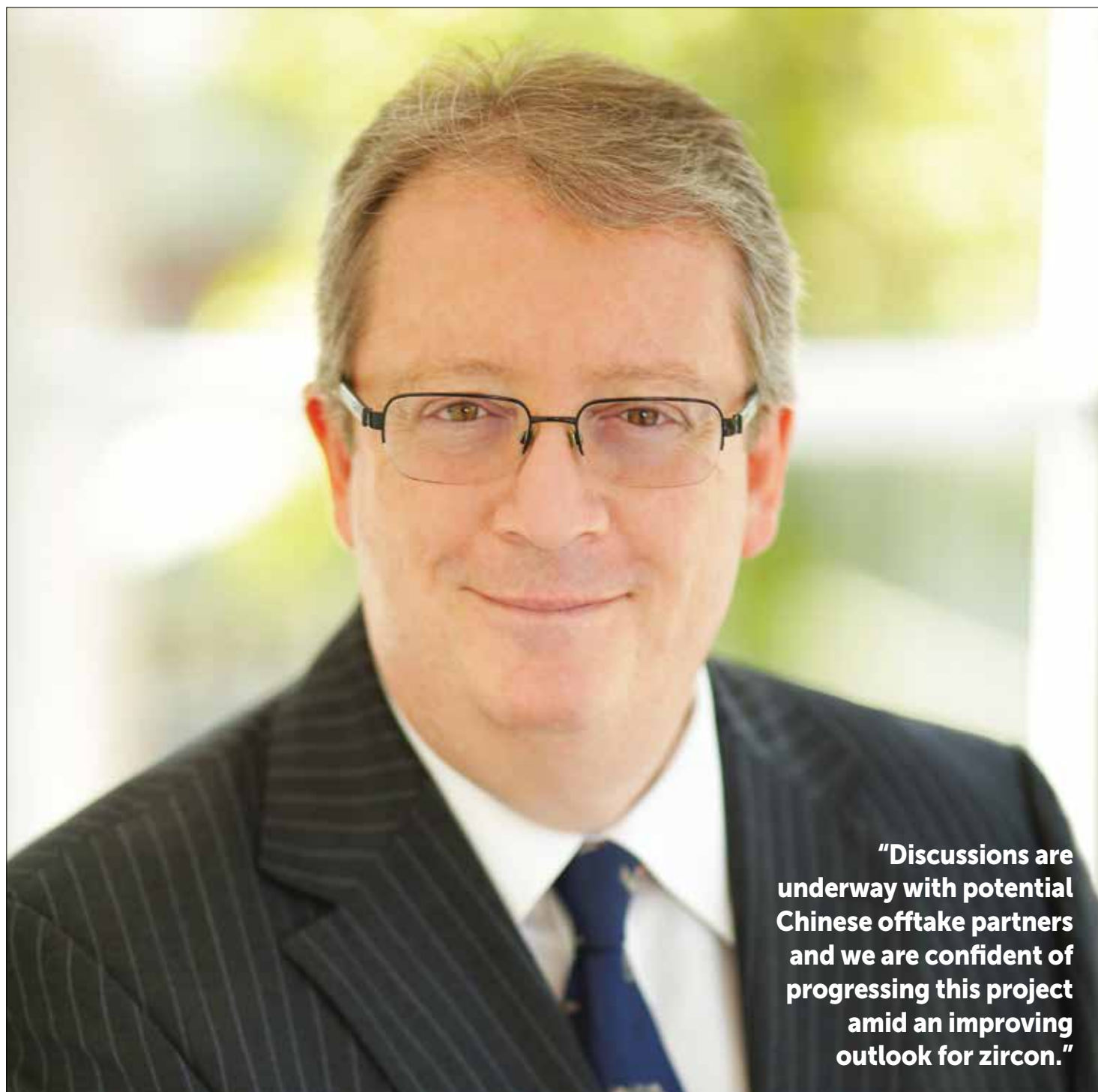
Q. How is the Cape Bedford project tracking?

On November 30, we announced an update highlighting Cape Bedford's potential for large-scale sand extraction, with plans for additional drilling on high-value targets.

Cape Bedford is considered capable of helping to satisfy an emerging Asian silica sand supply deficit, and the project is favourably positioned as the closest high-grade undeveloped project to the world's largest silica markets in Asia.

Given we have only commenced exploration on a small fraction of the tenement area and have already identified clear high-grade silica potential, we are hopeful also of finding heavy minerals in mineable quantities.

During 2018, we plan to commence further exploration drilling pending



"Discussions are underway with potential Chinese offtake partners and we are confident of progressing this project amid an improving outlook for zircon."

approvals from the traditional owners, and we see an excellent outlook for this project.

Q. How are your other projects going?

Our flagship Cyclone project has been extensively de-risked, with ministerial approval for a new mineral sands mine received in early 2017 following the securing of an agreement with the traditional owners, identification of suitable water, and expansion of the projected mining life.

We are now working to advance a Bankable Feasibility Study, supported by our Chinese partner ENFI, which is backed by state-owned enterprise Metallurgical Corporation of China.

ENFI through their extensive Chinese SOE connections will also assist us in

sourcing potential project development partners, investors and project debt providers as we progress through the last aspects of the bankable study.

Q. What is driving demand for high-grade silica?

High-purity silica sand has become an increasingly strategic resource due to its usage in photovoltaic panels and other applications, such as composite material for high capacity lithium-ion batteries.

The global glass market is another increasing source of demand from the construction and automotive industries.

In the Asia-Pacific region alone, demand for silica sand is seen reaching 138 million metric tonnes in 2018, while the global market is seen expanding to reach \$US9.6 billion in annual revenues by 2022.

Q. What are the future plans for Diatreme Resources?

We are working to progress our flagship Cyclone project into production, tapping into an emerging supply deficit for zircon amid rising demand from Asia and other markets.

Cape Bedford also offers significant potential for high-grade silica, adding to our project pipeline and giving us further opportunities to grow shareholder value.

Q. What is the best piece of career advice you have been given?

Never give up, as perseverance overcomes all. There are always doubters and knockers, but as company leaders we need to keep our "eyes on the prize", stay focused and don't deviate from the end goal.



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