

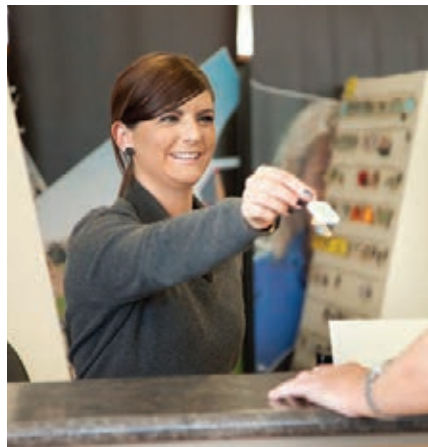


Bowen Basin Mining Club

# YEARBOOK 2018



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# YEARBOOK 2018

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Image: QCoal's Northern Operations Hub

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# Contents

From the editor	3		
A bright future for Queensland's resources	6		
Low-emissions coal technologies essential to meet global climate goals at least cost	12		
The capital of coal just keeps contributing	16		
Optimism abounds – 2018 Exploration Scorecard shows record levels of positive sentiment	19		
On the Horizon	23		
What is HELE?	25		
Global energy outlook – renewables switch but upside for Australian coal and gas	30		
Carbon capture and storage	32		
Where do our speakers operate?	34		
Spotlight: Glencore gets real with local suppliers	36		
Spotlight: BHP Innovation, from the old to the new	37		
Spotlight: Fitzroy Australia Resources doing things differently	40		
Spotlight: Olive Downs, the Bowen Basin's Next Big Coking Coal Mine	42		
Spotlight: Bounty Mining takes over Cook Colliery	44		
Spotlight: Downer Mining, Energy and Industrial – success through strategic partnerships	45		
Spotlight: Adani gives the green light	46		
The next phase in innovation	48		
		Peabody's Coppabella mine celebrates 20 years of coal	52
		New Hope's environmental credentials continue to grow	55
		Anglo American's metallurgical coal operations get FutureSmart	58
		Five Minutes with Lucas Dow	60
		Delivering Smiles - CSR in practice for QCoal Group	64
		Whitehaven Coal: Diversifying into the Bowen Basin	66
		The best of the Gateway in 2018 – QUREX, brought to you by the QEC	68
		Our mining and exploration automations will be attacked – here are the risks you should know about	68
		Collaborating is faster than competing when it comes to exploration innovation	71
		Coal Workers' Pneumoconiosis and the Coal Mine Dust Lung Diseases	74
		Australian Coal Exports – Boom or Bust, or is it all about the Lag?	76
		Advancing technology to reduce diesel particulate matter	78
		Glitz, glam and trophies – the 2018 Queensland Mining Awards	82
		Mining Services Directory	89





# From the editor

**JODIE CURRIE**

**T**he Bowen Basin Mining Club has been proudly advocating for Queensland's resources sector for the last eight years. In 2018, we have had the privilege of meeting and networking with a huge cross-section of the sector; from politicians to mining executives, Trade Commissioners, international companies, contractors, suppliers and the community.

We've seen strong luncheon attendance, a bumper Queensland Mining Awards line-up and then the launch of this Yearbook as a natural extension of the BBMC. With all of this in the rear-view mirror, we are very excited about what the future holds.

Similarly, it's not far-fetched to say that the Queensland coal industry has seen a resurgence in 2018. With the downturn finally behind us and a strong coal price driving demand, the industry is in a very strong position going into 2019. Several new projects have passed approvals, several more have started construction and the pipeline of both greenfields and expansion projects is strong. Here's why that's the case:

## **Worldwide coal demand only increasing**

The International Energy Agency (IEA) released their World Energy Outlook in November 2018, painting a picture of complex policy shaping undeniable global demand. It's true that renewables will become a strong part of the global power mix, rising to over 40 percent by 2040. However, this in no way removes the need for coal as an affordable and stable source of baseload power, particularly in developing countries like India. The reality is that the average coal-fired power plant in Asia is only 11 years old and will still operate for decades to come. And even though we tend to focus on coal, let's not forget gas, with Queensland's strong LNG export capability.

Energy policy aside, the Bowen Basin's real strength is in producing and exporting the world's best metallurgical coal. The Minerals Council of Australia projects that in 2018, coal will overtake iron ore as Australia's largest export by value. The need for metallurgical coal is also strong in the developing world, with projected demand growing by a steady two percent (around 95 mpta) for the next decade or more. Without coal to make steel, development certainly can't progress – and with Queensland supplying more than 50 percent of global coal exports, we are ideally positioned for several decades to come.



Mining is absolutely vital and this won't change any time soon.



In his words: *The best way forward is to accept mining is an absolutely necessary and valuable activity, but hold all of the industry to account for making sure we operate in a responsible way with care for the environment, our people and society, while remaining economically viable. Mining is absolutely vital and this won't change any time soon. But I hate to tell you, our industry is one of the least trusted on the planet. And unfortunately, it is a mainstream idea. It is a simple fact that mining is essential to human progress and has been for the last century and more. So, the world needs us, and it is about time we stopped punching below our weight. We need to be better at telling our story.*

This is how we start to change the conversation and the perceptions of mining – become a more human industry. We may be the ones that reliably keep your lights on or provide the steel for your family car, but we're also a major employer, keeping the economy spinning in Queensland. Mining royalties helped to pay for the roads you drive on to see your family, the teacher that shapes your children and the police officer that protects you. Let's focus on the facts and the incredible things that everyday people are doing within the industry.

I truly hope that the articles within this Yearbook help to inform, educate and shine a light on the major initiatives and developments that 2018 has brought to the mining industry in Queensland. Take what you learn and talk about it in the boardroom or at the BBQ – it's up to you to start changing the conversation! ■

### Social license – not to be underestimated

This year has also seen the prevalence of social license and its impact on operations and development in the Australian coal industry. Mines in outback Queensland are suddenly an election issue in inner-city Brisbane and as far away as Melbourne, thanks to well-organised and well-funded green groups.

While social license and social impact have always been considered an important part of the mining industry in Queensland, the reach and influence of social license now goes far beyond the local communities that are directly impacted by a mine's operation. This produces an interesting conundrum both for those currently operating mines and those proposing new projects – not to mention larger contractors, who in some cases have also seen adverse impacts by associating themselves with controversial projects.

The Queensland coal industry should take a lesson from the New South Wales coal seam gas industry, and act now to strengthen social license and change the conversation about our industry before it's too late. Social license isn't just about an opportunity for people to complain, as it often brings to the surface real-world concerns that need to be addressed with transparency, building credibility and truly engaging with communities – wherever they may be located.

Once the tide turns against an industry in the wider community, it's difficult to claw that social license back.

### Changing the conversation

It's clear that the demand for our industry isn't going away any time soon. So how do we influence social license to make the next few decades easier on ourselves?

Rio Tinto's CEO, Jean-Sébastien Jacques, spoke at IMARC in Melbourne earlier this year and emphasised that it is time to reinvent ourselves as an industry, as well as redefining the way we partner with communities and government.

### Closer to Home

Despite the appearance of political opposition to new coal mine development, mining leases are certainly still being granted in Queensland, with several projects like Olive Downs, Byerwen and Meteor Downs South progressing significantly this year.

We've also seen several mines change hands through acquisition: Glencore acquiring Hail Creek, Bounty acquiring Cook Colliery, Coronado acquiring Curragh, and Whitehaven acquiring Winchester, to name a few.

While these acquisitions have seen major companies like Rio Tinto exit the Queensland coal market, they have opened the door for smaller players to make the most of the opportunity and enter the Bowen Basin through revitalising shelved mines, existing operations or projects.

On the back of these developments, the pipeline of new mining leases is exceptionally strong. According to a November presentation by the Department of Natural Resources and Mines, the rate of mining lease applications in 2018 was more than triple that of 2017, and more than double the 2016 figure. With the average mining lease taking three to four years to be granted, this sets Queensland up for a competitive few years ahead, scaling up to meet increasing demand.

It's also an interesting time to be a METS supplier. The Federal Government's enquiry into the impact of payment terms in the mining industry elicited a barrage of responses from frustrated businesses, and with the METS industry comprising a massive 15 percent of the national GDP, this is an important issue. Adjusting from a feast-or-famine mindset as we come out of the downturn is an important phase in setting our industry up for the future, and payment terms play an important part in this adjustment. I am sure this is an issue that will continue to impact the industry into 2019 and beyond.



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# A bright future for Queensland's resources

**IAN MACFARLANE,  
QUEENSLAND RESOURCES COUNCIL**

**A**s a proud Queenslanders, we live in the most exciting state of Australia which is rich with possibilities. Those possibilities don't come much richer than those in the resources sector.

Recently the value of the State's resources was illustrated in the Queensland Resources Council's (QRC) annual economic contribution data which reaffirmed the sector's critical importance to the economy in the 2017-18 financial year.

Our updated data showed the total value of the resources sector was \$62.9 billion; up 14 percent on 2017. The sector also supported more than 316,000 full time jobs – either in direct roles or in associated industries.

In fact, over the last twelve months the resources sector has added the equivalent of a new job every 40 minutes. It's not just diesel fitters and port workers but also butchers and chefs, lawyers and environmental scientists who have a job connected to the resources sector in communities across Queensland.

Over the past nine years, the sector has contributed almost \$600 billion – which is larger than the economy of Hong Kong. For 2018, we're on track to deliver more than \$5 billion in royalties, which is plenty of money for new roads, schools, hospitals and can pay the wages of our valued nurses, teachers and police.

All of the industry's economic contributions were achieved while operating within a strict environmental management framework and using only 0.1 percent of Queensland's land mass.

The return from our resources sector is strong and consistent. Our sector is responsible for one in every five dollars in the economy and one in every eight jobs, including giving Queensland's Indigenous population its share of employment.

### Resources building Queensland

When we look back on the last 25 years, the true impact of the resources industry is clear.

Queensland would be an unimaginably different place without the huge scale of mining investment over the last 25 years. In the space of a generation, the resources industry has almost doubled its value to Australia.

A report from the Australian Bureau of Statistics said the investment from the mining sector is of a scale never seen before in history. We know that's the case too through the record values delivered to the Queensland budget bottom line and the widespread investment in towns and communities across our state.

The mining industry added 8.8 percent of the value of the Australian economy in 2018. It was just 4.7 percent in 1994-95. During a time of significant industry change, including major changes in Australian manufacturing, the resources industry has consistently grown and added jobs.



“The Queensland resources industry is planning new investments in technology and innovation that will make it one of our state's most cutting-edge job creators.”





That growth has come mostly from the two commodities that make Queensland a resources powerhouse - coal and gas. In 1994-95, Australian coal production was worth \$8.8 billion, compared with an incredible \$65.6 billion in June 2018. For gas the figures are even more stark - \$2.6 billion in 1994-95 compared with \$46.5 billion in 2018. The bottom line is - resources aren't going anywhere, no matter what the small group of naysayers wish was the case.

Our task now is to continue to create long-term sustainable jobs from resources. My answer each time I'm asked how we could make the regional benefits last even longer is to explain that this time, the upturn is rather different from the last one.

It's not associated with a construction boom, but

rather it's built from strong demand for our high-quality Queensland commodities, which means even with the inevitability of price cycles, this time the upturn should be longer-lasting. The key is to keep exploring and keep producing.

The Queensland Government has done its part to help our industry in the task of finding new deposits. This was highlighted by the Palaszczuk Government's land releases throughout 2018 including:

- 44,000 square kilometres for gas and coal
- 1107 square kilometres in the North West Minerals Province
- authorities to prospect for petroleum and gas over 17,245 square kilometres
- 540 square kilometres for coal exploration

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When we think of the resources sector we often think of the huge scale – global companies, big pieces of equipment and huge export values.

But just as importantly, the resources industry is associated with small businesses, small towns and local regions. With perhaps the exception of agriculture, the resources industry is more tightly bound with the development of regional Australia than any other part of our economy.

To ensure this continues to be the case well into the future, Queensland, like all of Australia, must turn its attention to new opportunities.

### New technologies

Of course, we can and should expect our sector to evolve.

The Queensland resources industry is planning new investments in technology and innovation that will make it one of our state's most cutting-edge job creators. In one of our State of the Sector surveys in 2018, resources CEOs reported they are on the cusp of new investments in the full range of advanced equipment ranging from automated vehicles to virtual reality tools.

The resources industry is one of Queensland most resilient and innovative sectors. The resources

industry is both high viz and high tech. And it's an industry for the future. That's a message we'll keep sending through the Queensland Minerals and Energy Academy (QMEA), which is currently teaching science, technology, engineering, maths or STEM subjects and vital trade skills in 60 schools across the state.

Every month the QMEA goes into schools with industry professionals who talk to young people about their future in the resources industry.

We know we're having an impact and introducing the next generation to their options for a fulfilling career in the resources sector. Queensland Government data has shown that over the 13-year life of QMEA, approximately 20 percent of students have undertaken a study or employment pathway into engineering and related technologies compared to 13 percent from non-QMEA schools.

And we know the message is spreading far and wide, with huge media interest across the regions reaching an audience of almost a million people.

### Indigenous participation

The future strengths of the resources sector and resources communities also lie in our enormous potential to create careers and opportunities for Indigenous Australians. The resources sector has seen an increase in Indigenous employment of 120 percent in Queensland in ten years from 2006 to 2016.

It is one of the few industries with a

genuine representation of Indigenous employees – Queensland's Indigenous population is four percent and the resources sector has a four percent representation of Indigenous employees.

Indeed, the annual Closing the Gap update recently reported that 6,599 Indigenous Australians were employed by the mining industry. We are part of an industry that provides pathways and careers – not just jobs – for Indigenous Queenslanders. In continuing to do this, our sector will demonstrate a genuine connection with the communities in which we operate and improve the sector's social licence to operate in those communities.

Queensland's resources sector's strong commitment to increase Indigenous participation and retain Indigenous talent has never been stronger. The QRC has been a long-standing advocate for Indigenous employment in the sector and actively involved in a Memorandum of Understanding with the State Government to increase Indigenous Participation in the Sector.



For more information, contact the National Group on [info@national-group.co](mailto:info@national-group.co) or 1300 794 448

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The MoU is a partnership between the QRC and the Queensland Government that was established back in 2008.

Since that time, it has provided an opportunity for information sharing and collaboration, supporting companies to maximise Indigenous participation both in terms of employment and business procurement opportunities.

Our resources sector delivers the best return for Queensland when we all row in the same direction.

#### Activists

I can assure you that we are proud of our resources industry and we place great value on our trading relationships that are based on our resources commodities. But, being the robust democracy that has served us so well in Australia, we do encounter alternative viewpoints.

Indeed, a small proportion of our population dedicates a great deal of their time to opposing resources projects. From the outset, I don't shy away from saying I disagree wholeheartedly with their anti-resources views, not least of all because of the great economic benefit the sector delivers to all Australians – even those who don't want to admit it.

I do, however, respect the right of protestors to express their alternative views. But that comes with a strict qualification – there should be no tolerance of protests that break the law or disrupt the ability of workers and businesses to go about their lawful daily business safely.

More broadly, what the actions of anti-resources activists show is that we must be prepared to stand up for our industry in private and in public. Make no mistake, these activists don't have just one target or one mine in their sights. They lightly dismiss the entire resources sector and the hundreds of thousands of jobs it supports. All of us should work together to stand up for all the people and businesses who work in the resources sector.

Australia has some of the highest quality resources in the world, and some of the most abundant.

Our resources provide energy and electricity here at home, and to nations around the world, including developing nations where access to electricity lifts people out of crushing poverty.

Our resources sector is something to be proud of, not something we should let get talked into the ground.

#### Future prosperity

Queensland is in the box seat to be Australia's resources superpower for decades to come, which will be welcome news to everyone. We are ready to deliver the partnership that builds up our towns and communities across the state, creating jobs now and for our kids.

As Queensland continues to develop, the simple truth will be that it's the resources sector building our state's prosperity.

Every Queenslanders needs a strong resources industry. That includes people in the mining hubs of Central and North Queensland, to those in Queensland's biggest mining town – Brisbane.

The resources industry creates the means and momentum that gives Brisbane its dazzling appearance and the spirit of a vibrant capital city, while at heart it remains just a humble mining town – one of the many that makes our state great.

**To download these economic contribution infographics and other regions, cities and commodities go to [www.qrc.org.au/contributiontoqueensland/](http://www.qrc.org.au/contributiontoqueensland/)**

\*\*QRC's economic contribution report, independent analysis prepared by Lawrence Consulting ■



# Low-emissions coal technologies essential to meet global climate goals at least cost

TANIA CONSTABLE, MINERALS COUNCIL OF AUSTRALIA

**T**he Australian minerals industry acknowledges that sustained global action is required to reduce the risks of human-induced climate change and supports a measured transition to a low-emissions global economy.

Reducing emissions while ensuring reliable and affordable energy supplies and allowing developing nations to lift their populations out of poverty will require a mix of electricity generation technologies in coming decades.

New high-efficiency, low-emissions (HELE) coal-fired electricity generation plants will be a part of this mix along with gas, renewables like wind, solar and hydro, and nuclear power (including emerging nuclear technologies like small modular reactors).

HELE technologies significantly reduce emissions from coal-fired electricity generation. In the longer-term, carbon capture and storage technologies have the potential to reduce emissions to close to zero.

That means coal-fired electricity generation will continue to be part of the energy mix as the world moves to tackle climate change by reducing greenhouse gas emissions.

Australian mining is contributing to climate change mitigation efforts by investing in areas such as the development of carbon capture and storage (CCS). This investment is in step with advocacy from the International Energy Agency (IEA) for Australia to do more on CCS.

During a presentation in Canberra in early 2018, IEA Executive Director Dr Fatih Birol described the enduring dominance of fossil fuels in global energy supply.

The IEA forecasts that coal demand will continue to grow although at a much slower pace than previously, with Dr Birol stating that the IEA sees Australia as one of the cornerstones of the world electricity market due to its coal, uranium and LNG assets.

Dr Birol also called on Australia to become a world leader in CCS, emphasising that government support is needed around the world to boost investment in this technology.

Coal, oil and gas not only meet 81 percent of the world's energy demand; they also fuel 73 percent of global electricity generation and are critical to the production of fertilisers, cement, iron, steel, plastics, chemicals and explosives. Much of our modern standards of living rely on these resources.

While the production and use of fossil fuels generates greenhouse gas emissions, there are technology solutions available to reduce emissions. HELE power generation technologies produce more energy from a given amount of coal or gas input than conventional power generation while reducing CO<sub>2</sub> emissions by up to 40 percent.

CCS can be integrated into HELE power, gas processing, steel, cement and other industrial plants to reduce CO<sub>2</sub> emissions by up to 90 percent.

Modelling by the IEA and International Panel on Climate Change shows that without CCS, meeting climate goals will be significantly more expensive.

So investment in both HELE and CCS technologies is vital in meeting emissions reduction goals in a cost effective way.

## Australia's part to play

Australia is making a major contribution to the global CCS effort.

Funding by governments, the black coal industry's COAL21 Fund and other industry stakeholders means that finding and proving up storage in Australia is well underway and the search for storage sites in Queensland, NSW and Victoria has intensified.

At Callide in Queensland, Australia and Japan have successfully demonstrated the Oxyfuel capture technology through retrofit of an entire power plant unit. Australia has adapted post combustion capture (PCC) for deployment in Australian conditions and we have a greater understanding of the technical and financial viability of different CCS technologies.

Australia is also contributing to the global CCS effort through projects such as the Gorgon Carbon Dioxide Injection Project (Western Australia) and CarbonNet (Victoria).

Adoption and development of new technologies will ensure that Australia can continue to support reliable, affordable power, local businesses and jobs while contributing to global emissions reduction targets in a responsible and sustainable way.

### The road ahead

We know that a targeted storage search program is fundamental to enabling CCS – while capture technology can be imported, storage requires a local solution.

We can also see the costs of low-emissions coal technologies starting to come down. For example:

- The Boundary Dam and Petra Nova CCS projects in North America have both identified future cost reductions of the order of 30%.
- The Callide Oxy Fuel project in Queensland estimated that the next build could be 20 percent cheaper.

The COAL21 Fund recently committed to fund a range of projects over another 10 years to 2027.

“

Australia and Japan have successfully demonstrated the Oxyfuel capture technology through retrofit of an entire power plant unit.

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These projects are being developed to be consistent with Australia's 2017 CCS Roadmap, developed by energy specialists from the University of Queensland with funding provided by government and industry.

Important projects include:

- the Queensland Surat Basin CCS Hub development through two projects: the Carbon Transport and Storage Company integrated CCS project, and the University of Queensland Surat Deep Aquifer Appraisal Project
- the NSW Storage development project in conjunction with Coal Innovation NSW
- supporting R&D through Australian National Low-Emissions Coal R&D and the CO2CRC, and
- continued work on the safe abatement of methane in ventilation air from underground coal mines.

These projects represent a tangible indication of the coal industry's strong commitment to pursuing low emissions technologies.



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Adoption and development of new technologies will ensure that Australia can continue to support reliable, affordable power, local businesses and jobs while contributing to global emissions reduction targets in a responsible and sustainable way.

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## Policies and incentives for CCS

In 2017, the Coal Industry Advisory Board to the International Energy Agency recommended policies and mechanisms that would be effective in facilitating CCS investment and in supporting an international commitment to CCS. These were based on industry experiences of CCS projects, including the Boundary Dam (Canada), Callide Oxyfuel (Australia) and Petra Nova (USA) operations.

The policies are targeted at four objectives (see Figure 1):

1. Stimulating CCS market uptake
2. Supporting CCS project development
3. Enabling capital investment in CCS projects, and
4. Advancing next generation CCS technologies.

By adopting these approaches to promoting low-emissions fossil fuel technologies, Australia can:

- Support the IEA’s call for its members to advance the commercial viability of low-emissions technologies worldwide
- Contribute to global development of safe and reliable CCS
- Continue to derive economic benefit from developing our vast energy resources in a carbon-constrained world, and
- Promote a practical and effective means of significantly reducing greenhouse gas emissions.

**Figure 1:** Policies to facilitate CCS investment and underpin an international commitment to CCS ■

<b>Stimulate CCS Market Uptake</b>	<ul style="list-style-type: none"> <li>• Power purchase agreements</li> <li>• Product purchase agreements</li> <li>• Policy parity in portfolio standards</li> <li>• Policy parity in NDCs</li> </ul>
<b>Support CCS Project Development</b>	<ul style="list-style-type: none"> <li>• Project development grants</li> <li>• Streamlines permitting</li> <li>• Land rights access</li> <li>• Long-term CO<sub>2</sub> liability transfer</li> <li>• Hub storage/transport infrastructure</li> </ul>
<b>Enable CCS Capital Investment</b>	<ul style="list-style-type: none"> <li>• Improve project economics (e.g. investments &amp; production tax credits, CSS emissions trading)</li> <li>• Improve access to capital (e.g. loan guarantees or bonds)</li> </ul>
<b>Advance Next Generation CCS Technology</b>	<ul style="list-style-type: none"> <li>• R&amp;D tax credits</li> <li>• R&amp;D grants</li> <li>• Pilot and commercial scale projects</li> <li>• Storage resource characterisation</li> </ul>

Source: Coal Industry Advisory Board to the International Energy Agency, An International Commitment to CCS: Priority Actions to Enable CCS Deployment Submission to the IEA, 2017, p 13.



# The capital of coal just keeps contributing

**SENATOR THE HONORABLE MATTHEW CANAVAN  
MINISTER FOR RESOURCES AND NORTHERN AUSTRALIA**

**T**he Bowen Basin Mining Club has a lot to celebrate in 2018, with coal forecast to be Australia's number one export earner this financial year, bringing in more \$61 billion to the nation's coffers.

Coal mining is part of a larger success story in the resources sector, both in Queensland and the nation. Coal is king of Queensland's resources sector – a sector which generates one in every five dollars of the state's economy, one in every eight jobs and involves more than 1800 businesses. That is a remarkable contribution to the region, our state and the nation.

We all know the Bowen Basin is the capital of coal, being the premier coal mining region in the nation. Just consider some of the facts - the basin produces half of all coal mined in Australia, with an estimated 222 million tonnes of coal produced in 2017-18. Coal production in the basin has increased by almost 50 percent between 2011-12 and 2017-18, and mining employment has grown by 14.3 percent over the past year.

Those are impressive figures and the future is bright, with the basin holding the largest coal resources in Australia and almost all of Queensland's hard coking coal.

The naysayers argue that coal markets are in structural decline when nothing could be further from the truth. Last year, coal-generated electricity grew by much more than any other energy source in our region



“

We should be enormously proud that coal produced in the Bowen Basin is making life better for people right around the world, giving them to chance to enjoy healthier, happier and more productive lives.

”

and strong and growing demand in Asia, particularly from India and Southeast Asia, means ongoing export demand for our high-quality metallurgical and thermal coal. In recent times prices have been high, bringing a much needed boost to export revenue – but our coal also supports the economic development of other nations. We should be enormously proud that coal produced in the Bowen Basin is making life better for people right around the world, giving them to chance to enjoy healthier, happier and more productive lives.

Coal's resurgence has also supported a restart of idled operations in the basin, like Cook, Baralaba North and Gregory Crinum and driven a renewed interest in progressing new projects like Olive Downs. We've also seen Metroof

Minerals and Sojitz Coal awarded exploration authorities in the basin, between Middlemount and Blackwater, this year.

According to the International Energy Agency World Energy Outlook (WEO) 2018 Australia is the only producer projected to significantly ramp up coal production over the period to 2040, supported by our strong resource base and proximity to Asian markets. To meet this demand, Australian coal production is predicted to grow by 13 percent out to 2040.

This should be a matter of great pride for the Bowen Basin's hardworking coal families and the businesses which support the industry. Unlike coal critics, the people and the industries in the

Basin actually produce something of tangible value to their fellow Australians and people overseas. And I know you will keep on contributing.

These are exciting times to be in the resources sector and the Bowen Basin is at the centre of the action. I thank all the people and industries of the Bowen Basin for your contribution to the nation. Your contributions help us all and I am proud to support and represent you as Minister for Resources and Northern Australia. ■

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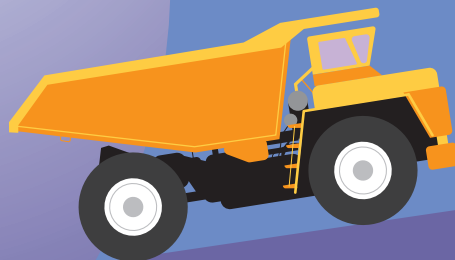
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# Optimism abounds – 2018 Exploration Scorecard shows record levels of positive sentiment

## QUEENSLAND EXPLORATION COUNCIL

**T**he Queensland Exploration Council (QEC) released its eighth annual Exploration Scorecard publication in December 2018.

The 2017 Scorecard showed a clear turning point for the Queensland exploration sector as a tide of optimism swept through industry after several lean years. Encouragingly, those green shoots of optimism have flourished in 2017-18 with mineral and petroleum exploration back on the rise.

Queensland coal exploration increased for the first time since 2011-12, mineral exploration expenditure increased by 35 percent across the year, while Queensland petroleum exploration expenditure increased by 5%. Commodity prices also continued to climb in 2017-18, with solid gains across base and precious metals, petroleum and coal benchmark prices adding further support for Queensland exploration.

Queensland's recognition on the global stage as a world-class resources region is growing. The Fraser Institute, a Canadian think tank, recently recognised our resources prospectivity by ranking Queensland as 3rd in the world in its Best Practices Mineral Potential Index, which ranks jurisdictions in terms of geological potential. Queensland has the honour of being the highest ranked Australian jurisdiction.

But it's not just Queensland's resource prospectivity that's encouraging. 2018's exploration sentiment survey revealed the highest level of positive sentiment in the industry since the Scorecard began in 2011. For the first time in the Scorecard's



history, explorers were positive about their access to investment capital and sentiment towards policy uncertainty and environmental regulations also greatly improved, albeit sentiment for both categories still remains negative. The Department of Natural Resources, Mines and Energy must take a bow for its commitment to improving exploration permit processes and once again exceeding its customer service target.

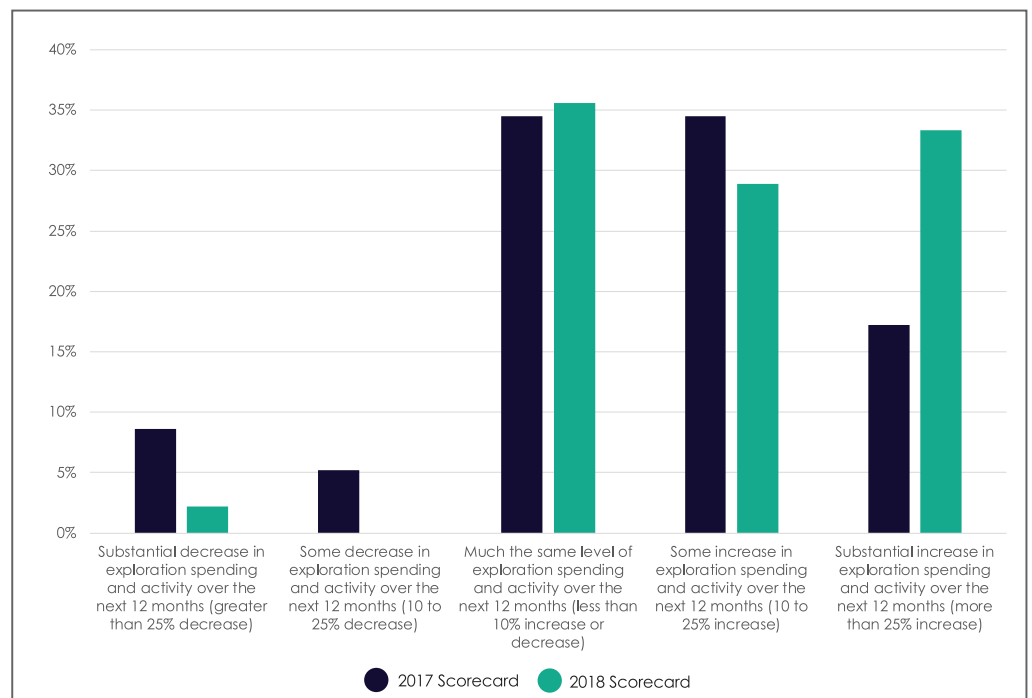
Despite the optimism, a recovering exploration sector comes with its own set of growing pains. The industry is already experiencing skill and equipment shortages, while land available for exploration remains a roadblock to growth. Industry and Government must continue to work together if we are to deliver stronger results next year. Looking ahead, we can expect further growth for the industry. Our surveys this year show 62 percent of explorers expect to increase their expenditure or activity in Queensland over the coming 12 months, and 65 percent of those in the drilling industry expect their company's activity to increase. That's great news for Queenslanders who will benefit through higher employment, increasing royalties and tax contributions in the longer term.

Highlights from this year's Exploration Scorecard are noted below. To read the full report, head to the QEC's website at [queenslandexploration.com.au](http://queenslandexploration.com.au).

### Putting the Scorecard into context

Exploration is the lifeblood of future resource development in Queensland. Without exploration success, there is no long-term growth in the industry. Exploration needs to be recognised as an investment in Queensland's future prosperity. The growing interest from investors in Queensland's opportunities in strategic minerals, rare earths and battery minerals only emphasises the growing recognition that the 21st century economy requires a smorgasbord of mineral inputs. The vision of the Queensland Exploration Council (QEC) is bringing exploration and opportunity together. The headline from this year's Scorecard is that 98 percent of Queensland explorers expect their expenditure or activity to remain stable or increase over the next 12 months. More than 60 percent of explorers expect their expenditure or activity to increase over the next 12 months—with one third of all respondents expecting to increase their activity or expenditure in Queensland by more than 25 percent (chart 1.1). Elevated prices for key commodities has helped shift the cautiously optimistic outlooks of 2017 to more substantial increases in the outlook for exploration activity and expenditure over the next 12 months.

**Figure 1: Further growth to come – 12 month outlook for exploration expenditure, 2017-18**



“

Exploration is the lifeblood of future resource development in Queensland. Without exploration success, there is no long-term growth in the industry.

”

### Operating sentiment

Companies were asked to indicate to what degree individual factors positively or negatively impacted the commercial objectives of their Queensland operations during 2017-18. Companies were also asked to respond to the same questions for the other Australian jurisdiction they are most active in outside of Queensland. The 12 core factors have remained constant since the 2011 scorecard. The survey received 35 'Queensland' and 19 'Rest of Australia' responses. Across the 2017-18 survey, the most common exploration targets of respondents were base and/or precious metals (33%), followed by coal (31%), unconventional oil and gas (24%) and conventional oil and gas (16%).

### Industry sentiment survey

The full results for 2018 shows the range of issues encompassed in the sentiment survey (Figure 2).

- Six of the 14 factors showed a net positive sentiment in Queensland. Two of the five were strongly positive:
  - ✓ resource prospectivity; and
  - ✓ pre-competitive geoscientific data.
- Six of the 14 factors showed net negative sentiment in Queensland, with three of those being strongly negative:
  - ✗ policy uncertainty;
  - ✗ conduct and compensation agreements; and
  - ✗ environmental regulations.
- Two of the 14 factors were neutral:
  - ✓ labour/skills availability; and
  - ✓ exploration permit processes.
- The eight-year trends for Queensland show a marked improvement in:
  - ✓ exploration permit processes;
  - ✓ departmental assistance;
  - ✓ industry perceptions of social licence to operate; and
  - ✓ pre-competitive geoscientific data.

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**Figure 2: Comparing Queensland to the rest of Australia 2017-18**

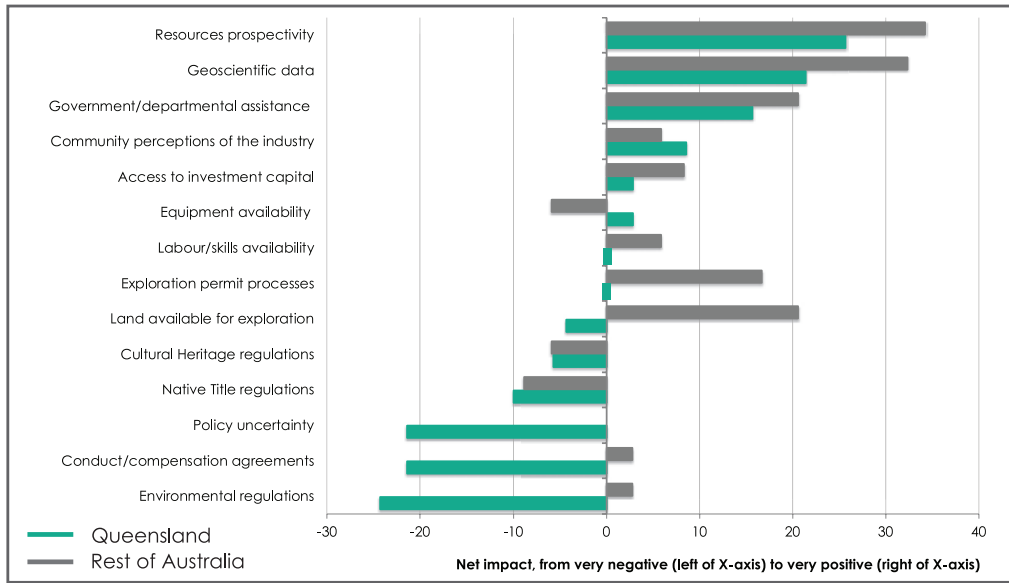
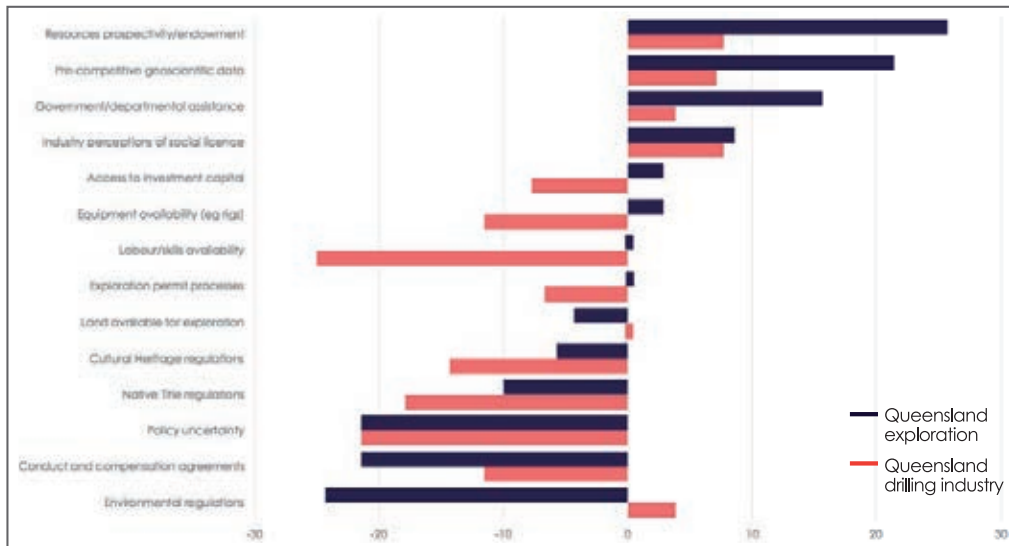


Figure 2 lists the core sentiment questions ranked in order for Queensland from the most positive to the least positive. For comparison, the results for the rest of Australia are shown. Generally, Queensland sentiment is more negative than in the rest of Australia.

**Queensland drilling industry sentiment**

The drilling industry is vital for exploring and developing Queensland’s natural resources. The Australian Drilling Industry Association asked its member companies with drilling interests in Queensland a number of question to gauge the sentiment and outlook for the industry. The online survey received 33 responses across all Queensland’s major commodity groups.

**Figure 3: Sentiment Comparison: Queensland Explorers vs. Queensland Drilling Industry, 2017-18**





# On the Horizon

## ALPHA

### Fast Facts

Proponent: GVK/Hancock Coal  
Resource Potential: >1000Mt  
Coal Type: Thermal  
Location: Galilee Basin

The Alpha Coal project is proposed for the Galilee Basin. In combination with the nearby Kevin's Corner project (also owned by Hancock Coal), the established JORC resource is 7.9 billion tonnes of thermal coal. As with other Galilee Basin projects, this project is awaiting rail infrastructure to link the Basin with export facilities.

## BLUFF

### Fast Facts

Proponent: Carabella Resources  
Resource Potential: <10Mt  
Coal Type: PCI  
Location: Bowen Basin

First coal is expected to be produced at Bluff by early 2019, with an agreement signed between Bounty Mining and Carabella for washing and processing at the nearby Cook Colliery CHPP, with a Carabella CHPP in the works for several years' time. MACA Limited secured the mining services contract for Bluff in September 2018.

## CHINA STONE

### Fast Facts

Proponent: MacMines Austasia  
Resource Potential: >1000Mt  
Coal Type: Thermal  
Location: Galilee Basin

As a greenfields project in the Galilee Basin, China Stone received Coordinator-General approval in November 2018. The project will utilise both open-cut and underground mining, with up to three longwalls and an on site CHPP.

## IRONBARK NO. 1

### Fast Facts

Proponent: Fitzroy Resources  
Resource Potential: 100-500Mt  
Coal Type: Metallurgical/Thermal  
Location: Bowen Basin

Ironbark No. 1, located near Moranbah, had its mining lease approved in November 2018. An underground longwall operation, Ironbark no. 1 will produce 6mpta of predominantly coking coal, sharing major infrastructure with nearby Carborough Downs. The mine is one of several ex-Vale assets purchased by Fitzroy Resources.

## MINYANGO

### Fast Facts

Proponent: Bounty Mining  
Resource Potential: 100-500Mt  
Coal Type: Metallurgical/Thermal  
Location: Bowen Basin

Minyango is another project from Bounty Mining, located close to the existing Cook Colliery CHPP near Blackwater. An underground operation, Minyango has an estimated 190Mt JORC resource across four coal seams. The project will produce a similar coal product to the Cook Colliery mine.

## MOORLANDS

### Fast Facts

Proponent: Cuesta Coal  
Resource Potential: 100-500Mt  
Coal Type: Thermal  
Location: Bowen Basin

The Moorlands project is currently in the mine feasibility stage, and is located near Clermont. With a 318Mt JORC resource, the mine would have a 30-year life in an open-cut mining configuration. Coal would be exported via the Goonyella Rail network, maximising opportunities to work with nearby mines like Blair Athol.

## SOUTH GALILEE

### Fast Facts

Proponent: Alpha Coal Management  
Resource Potential: >1000Mt  
Coal Type: Thermal  
Location: Galilee Basin

Another Galilee Basin project, South Galilee is not to be confused with the Alpha project. Thermal coal will be initially mined through an open-cut truck and shovel operation and then exported through the Port of Gladstone.

## SPRINGSURE CREEK

### Fast Facts

Proponent: 100-500Mt  
Resource Potential: Adamelia Resources  
Coal Type: Thermal  
Location: Bowen Basin

Purchased from Bandanna Energy in 2016, the Springsure Creek project is owned and operated by Adamelia Resources. As an underground mine, Springsure Creek is expected to have a 40-year mine life with an 11mpta output.

## WINCHESTER SOUTH

### Fast Facts

Proponent: Whitehaven Coal  
Resource Potential: 100-500Mt  
Coal Type: Metallurgical  
Location: Bowen Basin

Whitehaven Coal purchased Rio Tinto's 75 percent stake in the Winchester South project in mid-2018. Total JORC resources are estimated at 356Mt, with the coking coal to be sold into Asian markets. The project has a 20-30 year open-cut mine life, with coal to be exported via Dalrymple Bay or Gladstone.

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# What is HELE?

STEPHEN MALSS, ACALET

HELE = high-efficiency, low-emissions coal-fired power generation technology

**H**igh-efficiency, low-emission (HELE) technology enables coal-fired power stations to operate more efficiently and to reduce emissions.

HELE plants operate at higher temperatures and pressures to more efficiently convert the energy in coal into electricity. This saves on fuel and reduces CO<sub>2</sub> (carbon dioxide) emissions.

HELE plants can support increasing levels of intermittent renewable electricity generation, such as wind and solar PV. They can be designed to rapidly ramp up and down in response to changes in electricity demand, bolstering the security of the energy network, and operate round the clock to meet electricity demand 24/7, during periods when the wind isn't blowing or the sun isn't shining.

HELE plants can be readily fitted with emissions control technology that can reduce non-CO<sub>2</sub> emissions to levels comparable with natural gas power plants. CO<sub>2</sub>-related emissions can also be reduced

through the use of proven CO<sub>2</sub> capture technologies.

HELE plants provide the critical grid power security services that keep the lights on when there is a major upset or "event" on the grid, something that intermittent technologies cannot do.

## **How is HELE different to conventional coal fired power?**

Conventional coal power stations burn pulverised coal to create pressurised steam in a boiler. This pressurised steam drives a turbine and generator to produce electricity.

Older coal power stations used designs which produce pressurised steam at or less than approximately 540°C, known as sub-critical boilers.

HELE technologies include supercritical (SC), and ultrasupercritical (USC) technologies.

The difference between subcritical, supercritical and ultra-supercritical boilers is in the steam conditions created in the boiler. Supercritical boilers produce steam above 540°C, and ultrasupercritical boilers produce steam higher than approximately 600°C.

HELE (SC and USC) are preferred over subcritical units because:

- they produce electricity more efficiently by operating at higher temperatures and pressures, and therefore;
- less coal is required per unit of electricity produced – providing significant operating cost savings over the life of the asset;
- produce up to 11 percent and 16 percent fewer CO<sub>2</sub> emissions than a brand-new subcritical unit respectively.<sup>1</sup>





Hundreds of new HELE coal-fired plants are in operation, under construction or planned in Europe and East Asia/South East Asia led by China, India and Japan.<sup>2</sup>

HELE is already operating and providing essential services to the broader network in Queensland.

Deploying HELE coal-fired power plants is a key first step along a pathway to near-zero emissions from coal, with the addition of carbon capture, use and storage (CCUS) the next step.

“

## WHAT DOES IMPROVING EFFICIENCY MEAN?

Improving efficiency increases the amount of energy that can be extracted from a single unit of coal. A one percentage point improvement in the efficiency of a coal power plant results in a two - three percent reduction in CO<sub>2</sub> emissions.

”

### **HELE Technology Is Competitive**

Coal and gas technologies remain the lowest cost to build and operate, with the total system cost of a black coal supercritical plant \$67-91/MWh; a gas combined cycle \$64-91 /MWh, and brown coal supercritical \$75-88 /MWh<sup>3</sup>.

### **HELE Technology Is Flexible**

HELE technology has been proven to be flexible – rapidly changing its output to meet the customer demands of the power grid, or to support weather-dependent renewables technology when their output changes on account of changes in the available wind and sun.

## Case Study – Neurath HELE Power Station, Germany

Historically, coal-fuelled plants were slow to start, and once started, slow to change their output in response to grid conditions. Neurath, however, represents a new generation of technology which can change its output nearly as rapidly as gas-fuelled power plants.

Neurath HELE Power Station is located just outside of Cologne, Germany. The station houses seven units comprising more than 4,200 MW of net generation capacity (the photo to the right shows the water evaporated from the power station cooling towers).

Two new lignite units, among the world's most modern and rated at 1,100 MW (net) each, came online in August of 2012 and feature optimised processes that increase thermal efficiency and reduce emissions by more than 30 percent compared with the replaced units. The two new units boast improved flexibility, and can increase or decrease their output by more than 500 MW within 15 minutes to adapt to changing market conditions.

In the German electricity market, the flexibility of thermal power plants is a critical ingredient in the ability of the power grid to manage the intermittency of renewable generation. The increasing penetration of renewable generation capacity requires thermal plants to have both shorter start-up times and greater ability to “ramp”, or to rapidly change output to meet changing demand. While the ability of grid operators to predict changes in wind and solar patterns has improved over the years, there are still and will always be requirements for rapid response.

It is a misconception that coal plants are slow to react. Older coal-fuelled plants may have had that constraint, but the current generation of advanced coal plants have flexibility parameters equivalent to the most modern gas-fuelled combined cycle power plants.



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## HELE Technology Is Clean

### Case Study – Isogo HELE Power Station, Japan

J-POWER's Isogo Thermal Power Station is an exemplar for low-emission coal-fired plants. The two 600 MW units were upgraded to ultrasupercritical operation in 2002 and 2009 respectively. The new units improve the plant's gross thermal efficiency to about 45%, while reducing air emissions to those of a gas-fired combined-cycle plant.

Located in Yokohama, the second-largest city in Japan by population, Isogo Power Station is only six km from Yokohama's city centre and 30 km from central Tokyo. It is a unique, urban coal-fired power station that employs some of the most advanced clean coal technologies in the world.

Isogo ranks as the cleanest coal-fired power plant in the world in terms of emissions intensity, with levels comparable to those from a natural gas-fired combined-cycle plant.

The low levels of air emissions reached by Isogo Power Station set a new standard for coal-fired power plant design.



## HELE Technology Provides Security

HELE technology has been proven to provide security to the power grid.

HELE power plants use conventional “spinning” generators to produce electricity. “Spinning”, or synchronous generators inherently provide critical security services to a power grid which keep the lights on after a major disruption, such as the disconnection of a major power plant from the grid or the loss of a power transmission interconnector between two adjoining states.

Synchronous generators act like a “shock absorber” by inherently and rapidly providing stability when disturbances arising from abnormal events occur on the grid.

Non-synchronous generators use power electronics called inverters to connect to the grid. The physics of these non-synchronous devices mean they are unable to provide the very rapid inherent grid services called “synchronous inertial response” (or SIR) which are critical to keeping the lights on during the first second or two after a major grid disturbance.

Reliability and security have been undermined by the higher proportion of intermittent technologies in the system. Mandatory quotas for intermittent technologies are forcing out other generation sources that are needed to keep the grid stable and reliable.

Studies show the cost of integrating this intermittent power – balancing demand and supply, and additional grid and transmission costs – increases rapidly as the proportion of this form of generation increases.<sup>4</sup> ■

<sup>1</sup> IEA “Technology Roadmap High-Efficiency Low-Emissions Coal-Fired Power Generation”, March 2013, per Table 1, p15

<sup>2</sup> Platts World Electric Power Plants database

<sup>3</sup> CO2CRC, Australian power generation technology report, Nov 2015, p. 120.

<sup>4</sup> B S Fisher, S Schnittger, Implications of Australian renewable energy mandates for the electricity sector, Aug 2016. Integration costs are estimated to be in the range of A\$37 to A\$53 per MWh when wind penetration reaches 30 to 40 percent .



Synchronous generator showing “spinning” rotor (removed)

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# Global energy outlook – renewables switch but upside for Australian coal and gas

**LOUISE HORROCKS, MCCULLOUGH ROBERTSON**

WITH THE CONTRIBUTION ACKNOWLEDGED OF

**MICHAEL ROCHE, MCCULLOUGH ROBERTSON**

**T**he International Energy Agency (IEA) has released its 2018 World Energy Outlook which assesses global energy supply and demand out to 2040 under three scenarios.

In its core (New Policies) scenario, under which it is assumed that Paris Climate Agreement emission targets are implemented, global energy needs rise more slowly than in the past but still expand by 25 percent between today and 2040. The largest contribution to demand growth comes from India where energy demand is expected to double, and be half that of China's compared to 30 percent today. In Southeast Asia, energy demand grows by two-thirds.

The IEA projects a 60 percent rise in electricity demand to 2040, with nearly 90 percent of global growth occurring in developing economies.

Contrary to the expectations of many, coal's contribution to meeting overall energy demand continues to grow

slowly out to 2040, although coal's share shrinks from 27 percent today to 22 percent by 2040.

The IEA view is that once the current wave of coal power generation plant projects under construction is over, the flow of new coal power projects starting operation slows sharply post-2020. However, the IEA points out that the average age of a coal-fired plant in Asia is less than 15 years, compared with around 40 years in advanced economies.

Global trade in thermal coal is expected to flatten out but in good news for the Bowen Basin, the trade in coking coal is expected to continue to grow steadily. Indeed, the IEA states that "Australia continues to be well-positioned to serve the Asian markets with low-cost coking

“

Contrary to the expectations of many, coal's contribution to meeting overall energy demand continues to grow slowly out to 2040...

”





coal in a growing international coking coal market”.

By 2040 India will be the world’s largest importer of coal, with a 66 percent increase over 2017 import levels.

Adjusting for the higher calorific value of our coal, Australia’s coal exports out to 2040 are projected to grow by 22%. While coking coal is the sweet spot for Australia’s dominant position in global coal trade, the IEA concedes that its projections are consistent with development of new thermal coal mines in the Galilee Basin in Queensland.

The IEA says that the world will produce 40 percent of its electricity from renewables by 2040. Of the 870 GW in new power plant capacity worldwide that is currently under construction or expected to come online by the end of 2020, almost 60 percent will use renewables-based technologies.

Under the New Policies Scenario, by 2040 China will be producing 42 percent of its electricity from renewable sources (exceeding coal’s share), and India with 38 percent renewables (including 17 percent from solar).

The IEA finds that new solar PV is well placed to

outcompete new coal almost everywhere, although it struggles to undercut existing thermal plants “without a helping hand from policy”. In the New Policies Scenario, renewables and coal switch places in the power mix: the share of generation from renewables rises from 25 percent today to around 40 percent in 2040; coal moves from 40 percent to 25%. This is of course a far cry from the scenarios in the recent report from the Intergovernmental Panel (IPCC) on Climate Change which looked at what might be needed to keep global warming to under 1.5 degrees. In most of the IPCC scenarios, power generation from coal had all but disappeared by 2050.

The IEA has revised up its global gas demand estimates. Gas is forecast to grow to account for a quarter of global energy demand by 2040 (surpassing coal), and become the second-largest fuel in the global mix after oil. The IEA expects gas demand in China to grow rapidly reflecting strong policy efforts to improve air quality. Developing economies in Asia account for half of the total demand growth through to 2040. The overall gas share of global power generation is expected to remain steady at over 20%.

Finally, nuclear’s share of power generation is expected to remain stable at 10%, but with China overtaking the USA and the EU in its use of nuclear. The IEA notes that two-thirds of today’s nuclear fleet in advanced economies is more than 30 years old. The IEA observes that “decisions to extend, or shut down, this [nuclear] capacity will have significant implications for energy security, investment and emissions”.

In summary, the IEA’s latest World Energy Outlook confirms that the global switch to renewable power generation is set to continue unabated. However, it also paints a positive next couple of decades for the export of Australia’s high-quality fossil fuels, reflecting:

- China’s switch from coal to gas to meet air quality imperatives;
- the investment in new coal power generation in South East Asia which will support growth in Australian thermal coal exports; and
- Australia’s dominant position in the global trade in coking coal for steel-making. ■

# Carbon capture and storage

ALEX ZAPANTIS, GLOBAL CCS INSTITUTE

**S**ince pre-industrial times, the atmospheric concentration of several greenhouse gases (notably CO<sub>2</sub>, methane and nitrous oxides) has increased substantially. The stability of our climate is directly linked to the atmosphere, so variations in the level, or concentration, of any greenhouse gas will have an impact.

Atmospheric levels of CO<sub>2</sub> are now higher than at any time in the past 800,000 years, reaching 400 parts per million (ppm) in early 2013, compared to a pre-industrial high of 280 ppm. Reducing man-made CO<sub>2</sub> emissions, including those produced through the burning of fossil fuels, is a key element in mitigating greenhouse gas emissions and the dangerous effects of climate change.

## What is carbon capture and storage?

Carbon capture and storage, or CCS, prevents large amounts of carbon dioxide (CO<sub>2</sub>) from being released into the atmosphere. The technology involves capturing CO<sub>2</sub> at the source, compressing it for transportation and then injecting it deep into a rock formation at a carefully selected and safe site, where it is permanently stored.

Because CCS can achieve significant CO<sub>2</sub> emission reductions, it is considered a key option within the portfolio of approaches required to reduce greenhouse gas emissions. CCS technology involves three major steps:

- **Capture:** The separation of CO<sub>2</sub> from other gases produced at large industrial process facilities such as coal and natural gas power plants, steel mills and cement plants.
- **Transport:** Once separated, the CO<sub>2</sub> is compressed and transported, usually via pipelines, to a suitable site for geological storage.
- **Storage:** CO<sub>2</sub> is injected into deep underground rock formations, at depths of around one kilometre or more.

The history of CCS goes back more than 45 years when the first large-scale CCS facility, Val Verde CO<sub>2</sub>-EOR, began operating in the Sharon Ridge oilfield in Texas in 1972. Today, according to our

CO<sub>2</sub>RE global CCS database, there are now 43 commercial large-scale global CCS facilities, 18 in operation, five in construction and 20 in various stages of development.

However, this is not enough. To make deep, rapid reductions in greenhouse gas emissions and meet Paris climate change targets at least cost, CCS must be deployed swiftly and at scale.

## Meeting the climate change challenge with CCS

Much has been done in the name of reducing global emissions, but the simple reality is that despite trillions of dollars of investment, the clear majority on renewable technologies, global emissions continue their steady rise. It is also clear that climate mitigation strategies that create economic opportunity rather than dislocate and disrupt existing communities have the best chance of success. No doubt there are many facets to such a strategy. But one essential facet is, and will continue to be, CCS.

The critical role of CCS technology in mitigating climate change was reinforced in October 2018 when the Intergovernmental Panel on Climate Change (IPCC) released its highly anticipated 1.5°C report. The report was a response to a request by the UNFCCC at COP21 in Paris (2015) which called for a comprehensive assessment of what was needed to reach a 1.5°C world. The report said that global net human-caused emissions of CO<sub>2</sub> would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050.

Significantly, CCS was singled out for its ability to: "play a major role in decarbonising the industry sector in

the context of 1.5°C and 2°C pathways, especially in industries with higher process emissions, such as cement, iron and steel industries."

## A bridge to a cleaner future

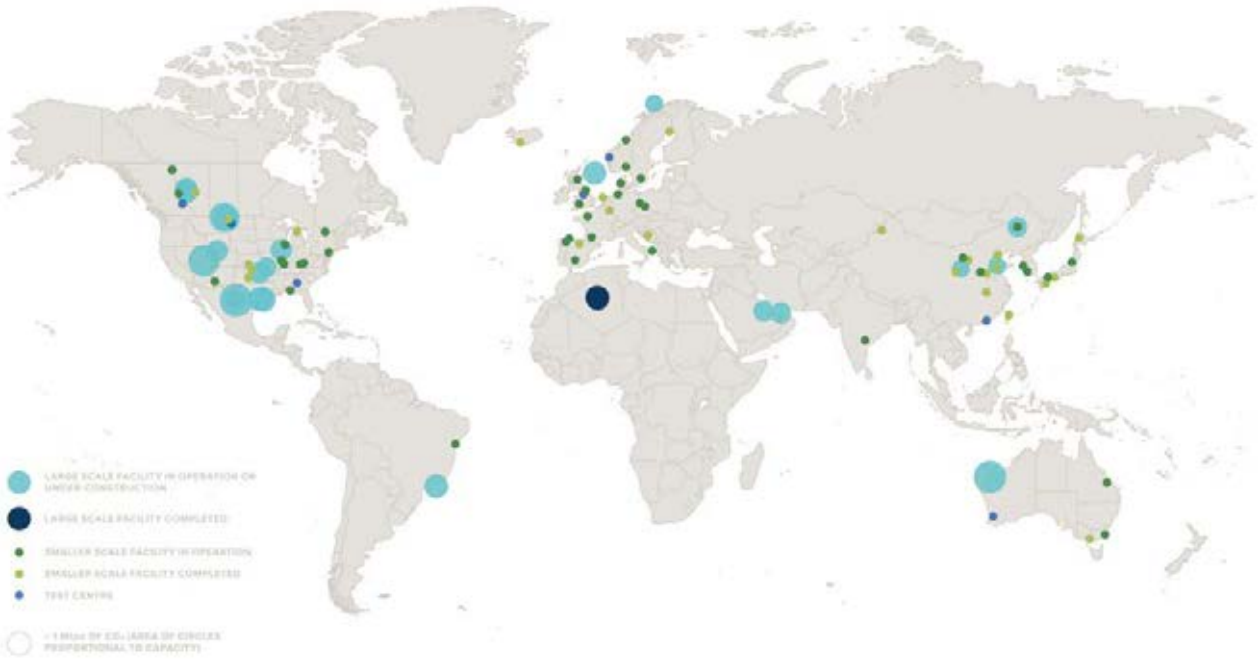
Industry lies at the heart of our everyday existence and it cannot decarbonise alone. It needs a bridge to a cleaner future – and CCS is that bridge. CCS converts older, high-emitting industries into new, low-emission industries; preserving jobs, creating new employment and keeping local economies alive.

In addition, as CCS becomes more widely deployed, and is retrofitted to existing infrastructure and built into new infrastructure, a whole new CCS industry is being created. A good example is the work Kawasaki Heavy Industries is undertaking with Iwatani, J-Power and Shell Japan to demonstrate a hydrogen energy supply chain beginning in Australia's Latrobe Valley. The opportunity to turn Victoria's brown coal into clean hydrogen is just one example of the new opportunities CCS can create.

In 2015, the Paris Agreement set the tone for stronger and concerted climate action across the globe. Alongside renewables, energy efficiency measures and other climate mitigation technologies, CCS will have a key role to play.

As the world authority in carbon capture and storage, the Global CCS Institute is fervent in its resolve that there is no single silver bullet in the fight to reduce CO<sub>2</sub> emissions, and meet Paris climate change targets. We need everything, and CCS is an essential part of that 'everything'.

**FIGURE:** Current commercial large-scale CCS facilities, smaller-scale (pilot and demonstration) CCS facilities and CCS test centres around the world. The sizes of light blue and grey circles are proportional to the CO<sub>2</sub> capture capacities of the commercial, large-scale facilities in operation or under construction and in completion, respectively. Data is drawn from the Global CCS Institute CO<sub>2</sub>E database as of 2 September 2018.



### About the Global CCS Institute

The Global CCS Institute is the world's leading authority on carbon capture and storage (CCS) – an international climate change organisation whose mission is to accelerate the deployment of CCS as an imperative technology in tackling climate change and providing energy security. The Institute believes that CCS is an integral part of a low-emission future. [globalccsinstitute.com](http://globalccsinstitute.com) ■



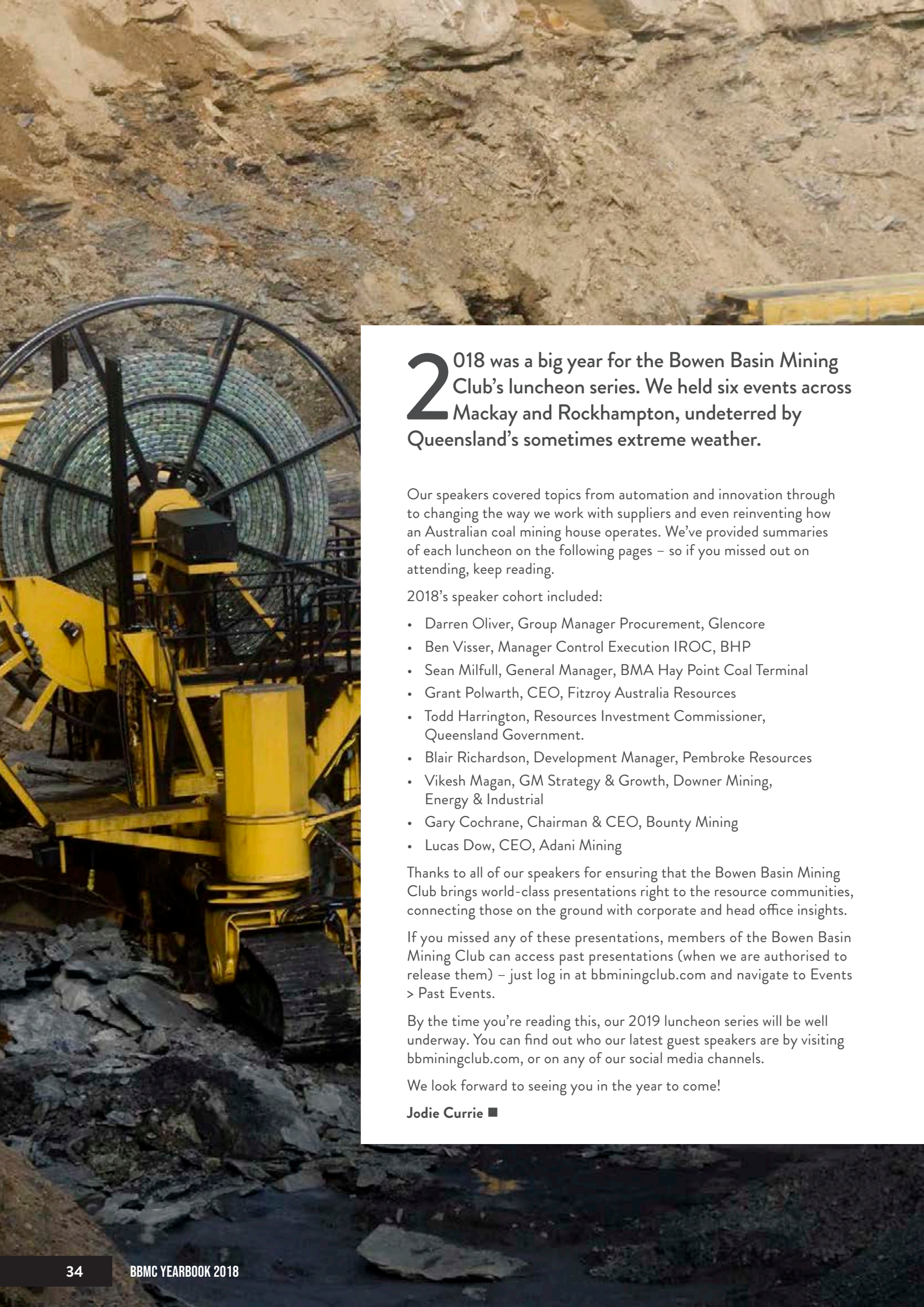
Mackay Surf Lifesaving Club

Your community is our community.  
Giving back to the Bowen Basin and Central Queensland since 2011.

The Aurizon Community Giving Fund has delivered cash grants to over 300 worthy community groups to date, across Australia. The Fund is run biannually, providing cash grants of up to \$20,000 to eligible community organisations and charities with projects focused on safety, environment, education or health and well-being.

Visit [aurizon.com.au/community](http://aurizon.com.au/community) to find out more.





**2**018 was a big year for the Bowen Basin Mining Club's luncheon series. We held six events across Mackay and Rockhampton, undeterred by Queensland's sometimes extreme weather.

Our speakers covered topics from automation and innovation through to changing the way we work with suppliers and even reinventing how an Australian coal mining house operates. We've provided summaries of each luncheon on the following pages – so if you missed out on attending, keep reading.

2018's speaker cohort included:

- Darren Oliver, Group Manager Procurement, Glencore
- Ben Visser, Manager Control Execution IROC, BHP
- Sean Milfull, General Manager, BMA Hay Point Coal Terminal
- Grant Polwarth, CEO, Fitzroy Australia Resources
- Todd Harrington, Resources Investment Commissioner, Queensland Government.
- Blair Richardson, Development Manager, Pembroke Resources
- Vikesh Magan, GM Strategy & Growth, Downer Mining, Energy & Industrial
- Gary Cochrane, Chairman & CEO, Bounty Mining
- Lucas Dow, CEO, Adani Mining

Thanks to all of our speakers for ensuring that the Bowen Basin Mining Club brings world-class presentations right to the resource communities, connecting those on the ground with corporate and head office insights.

If you missed any of these presentations, members of the Bowen Basin Mining Club can access past presentations (when we are authorised to release them) – just log in at [bbminingclub.com](http://bbminingclub.com) and navigate to Events > Past Events.

By the time you're reading this, our 2019 luncheon series will be well underway. You can find out who our latest guest speakers are by visiting [bbminingclub.com](http://bbminingclub.com), or on any of our social media channels.

We look forward to seeing you in the year to come!

**Jodie Currie ■**





# Spotlight: Glencore gets real with local suppliers

## FEBRUARY BBMC LUNCHEON PRESENTATION

**S**hortly before announcing their acquisition of Rio Tinto's Hail Creek and Valeria assets in March, Glencore presented to the Bowen Basin Mining Club's February luncheon with a focus on local supplier initiatives and investments.

Darren Oliver, Glencore's Group Manager Procurement, gave an overview of Glencore's Queensland operations, which at the time included:

- A diverse portfolio of assets in coal, copper, zinc, technology, agriculture and oil
- Over 7,000 employees as the second-largest resource sector employer in Queensland
- Nine mines, including open-cut and underground assets
- A \$5 billion contribution to the Queensland economy in 2016, paired with \$273 million in royalties
- \$3.2 million in support for over 100 community groups.

### Here to stay as part of the community

For the 2017 calendar year, Glencore invested nearly \$1 million in Bowen Basin community partnerships. These included educational scholarships for students in Emerald, Springsure, Collinsville and Clermont, as well as funding for sports programs and development grants. As a part of the Queensland Minerals and Energy Academy, Glencore has also conducted STEM workshops in Capella and Clermont schools.

Several environmental initiatives were also included in community partnerships, with a communications infrastructure and equipment upgrade for Epping Forrest National Park and a project to help reduce sediment runoff in the Great Barrier Reef.

The company also maintained its support of the RACQ CQ Rescue Helicopter, a partnership of more than 15 years that sees Glencore provide the funding for one of the service's crewmen.

Support for the Bowen Basin also extended to local supplier spend, with over \$573 million spent with regionally-based Queensland suppliers in 2017.

This increased significantly with Glencore's acquisition of Hail Creek, which is estimated to add a further \$100 million per annum to Glencore's spend with regional Queensland suppliers.


### Involving local suppliers

Local supply forms a key part of Glencore's procurement policy, and Mr Oliver's presentation also outlined the policy and strategy behind Glencore's local supplier initiatives.

While supplier entry points vary depending on category, there are several key expectations that potential Glencore suppliers need to prove their compliance with prior to being selected. These are:

- A non-negotiable focus on safety
- Value proposition and delivery of enhanced value
- Sustainable business practices
- Innovation and continuous improvement.

The luncheon presented opportunities for potential suppliers to network with Glencore's procurement team, a priceless opportunity for Bowen Basin Mining Club members. ■

A line of yellow Caterpillar haul trucks is parked in a row at a coal mine. The trucks are large, heavy-duty vehicles with large tires and metal railings. The first truck in the foreground has the number '785C' on its side and the number '93' on its front. The background shows a clear blue sky and a dirt ground.

Proud to be part of  
the Bowen Basin's  
coal mining tradition.

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**ABBOT POINT COAL TERMINAL X50 EXPANSION**  
BOWEN, QLD  
PORTS CORPORATION OF QUEENSLAND



**WIGGINS ISLAND COAL EXPORT TERMINAL GC07 AND GC08**  
GLADSTONE, QLD  
WIGGINS ISLAND COAL EXPORT



**HAY POINT EXPANSION**  
HAY POINT, QLD  
BM ALLIANCE COAL OPERATIONS PTY LTD AND BECHTEL AUSTRALIA PTY LTD



**CAVAL RIDGE GENERAL SERVICES**  
MORANBAH, QLD  
BECHTEL AUSTRALIA PTY LTD





# Spotlight: BHP Innovation, from the old to the new

## APRIL BBMC LUNCHEON PRESENTATION

**B**HP's innovation focus and culture was on display at the April Bowen Basin Mining Club luncheon, in everything from safety to operations and technology.

Attendees heard from Ben Visser, head of IROC, the newest division of BHP's Australian operations, plus Sean Milfull, General Manager of Hay Point Coal Terminal, one of the oldest divisions.

BHP has a strong presence in the Bowen Basin, with a workforce of approximately 11,000 Queenslanders, and managing coal resources of 11.1 billion tonnes. Seven operational metallurgical coal mines, and another two in care and maintenance, fall under the BMA brand, as well as the Hay Point Coal Terminal and associated rail infrastructure. Two BMC-branded metallurgical coal mines make up the remainder of BHP's Bowen Basin assets.

Sean Milfull of Hay Point Coal Terminal traced the busy port's

roots back to its construction in the late 1960s. Today, the facility sports impressive infrastructure as the main export point for BHP's Queensland metallurgical coal assets.

The latest improvements to Hay Point Coal Terminal are the construction of two new stacker-reclaimers, plus the removal of the Port's original trestle with all components completely recycled.

A strong focus on community engagement with the Hay Point, Louisa Creek, Half Tide and Salonika Beach communities keeps Hay Point Coal Terminal in good standing with its neighbours, as BHP works towards annual exports of up to 69 million tonnes in the years to come.

Ben Visser of the Integrated

Remote Operations Centre (IROC) spoke of the progress his division has made in the last 18 months, particularly as they move past the establishment phase into standardising and optimising practices.

As a 24x7 'nerve centre' connected to BHP's entire East Coast operation, IROC is based around the concept of sharing best practice and clear communications across operational silos, bringing together mining operations and fixed plant with a technology-based approach.

Shared knowledge and refining processes have led to significant productivity improvements, particularly as the birds-eye view provided by IROC eliminates major bottlenecks on site.

BHP's Coal IROC has also shown innovation through creating a diverse workplace, winning the QRC's 2017 Diversity initiative, as well as awards for indigenous employment.

Mr Milfull and Mr Visser

shared a recent example of the IROC and Hay Point's on site team integrating live video into their pre-start meetings, establishing a clear line of communication between IROC and the site.

"Our staff are the voice of innovation – the innovation and standardisation opportunities that they see on the ground are more insightful than any consultant could ever be. Our continuous improvement is about listening to them and creating forums for them to put ideas forward," said Mr Visser.

This innovation focus flows through to the supply chain, and Mr Visser says that contractors, suppliers and potential contractors should take note.

"We're always keen to see what's new in the market and how we can grow from a technological viewpoint. In terms of solutions, anything that we can deploy on all sites, perhaps with the assistance of our IROC technology, is hugely welcomed." ■



# Spotlight: Fitzroy Australia Resources doing things differently

## MAY BBMC LUNCHEON PRESENTATION

**F**itzroy Australia Resources is a new force in the Queensland metallurgical coal mining industry with a portfolio of existing operations and a pipeline of growth projects. The company's executive and management team have extensive operational experience across NSW, Queensland and internationally, with particular strength and focus in large-scale longwall and bord and pillar operations. Fitzroy's asset portfolio includes operating mines Carborough Downs and Broadlea, as well as the Ironbark No. 1 Project, Red Hill Projects and Broadlea Central Project.

Innovative thinking and decisive leadership is the hallmark of the company, along with providing a challenging and rewarding environment for our people.

When new miners enter the Bowen Basin, industry veterans are naturally curious. We sat down with Fitzroy Australia Resources CEO Grant Polwarth following his Bowen Basin Mining Club luncheon presentation in May, to find out what makes Fitzroy a different kind of Australian mining house.

### *What would people be surprised to learn about Fitzroy Australia Resources?*

While we have two operating mines, we've built a very flat and lean organisational structure. Our focus is absolutely at the coal face – we are all here so that the shearer moves up and down the face.

In building a new business, our recruitment has focused on industry high performers and our operational style gives our staff and workforce a high level of ownership over their own decisions, rather than micromanaging them. We've integrated technology into our communications, using tools like Yammer to keep staff in touch across shifts and locations. People and energy are everything in our business.

People might also be surprised to learn that we've achieved a significant turnaround at our cornerstone operation Carborough Downs, which was deemed an unviable mine by its previous owners.

### *Why did Fitzroy acquire Carborough Downs from Vale? What was special about the asset?*

We had great conviction in the metallurgical coal market, the assets and the people. Carborough Downs was a well-capitalised but underperforming mine. We saw an opportunity to enter the globally strategic Bowen Basin metallurgical coal market with a quality management team and the chance to do things differently in the way we ran our organisation.

### *You've made significant tweaks to the mine's operation since acquiring it. What's changed, and how has this made production better?*

We were fortunate to have great people – we needed to get the culture right: back to basics coal mining where we are proud of what we do and have conviction in ourselves and each other.

When we took over Carborough Downs, there was a major fault structure prohibiting access to the mine's northern resources. Within the previous mine plan, getting around this fault would have meant the longwall was out of action for over 12 months.

When Fitzroy took the asset on, we optimised the mine plan to unlock several smaller remnant longwall panels to continue production, and began bord and pillar mining to supplement ROM coal production. We also took a fresh look at that fault, with our in-house engineers finding a different way to approach it. The fault was successfully traversed in October 2017, and the mine now has a 10+ year plan with record production and longwall continuity.

Within a year of taking over Carborough Downs, we realised a 33 percent increase in ROM production, a 22 percent reduction in unit operation costs and a 100 percent increase in JORC reserves.

#### **What does the future look like at Carborough Downs?**

Transitioning into the northern reserves – a consistent and reliable longwall operation with a constant pursuit of operational improvement.

**You've said that Fitzroy is a 'people business that mines coal'. How does this set you apart in a crowded metallurgical coal mining market?**

When we established Fitzroy, we saw an opportunity to create

a coal mining business that focusses on people, culture and accountability. Our business is safe, disciplined and energised with leaders who own outcomes and drive success – this underpins every aspect of our performance.

#### **What's different about the culture you've created at Fitzroy?**

We are working to create a culture where we embrace accountability and celebrate our successes. We are proud and hungry to cut coal, and believe strongly in a mature safety culture where we are all one team.

We focused intently on the first 100 days, to create the maximum amount of change within the organisation while momentum was still fresh. We strongly believe in open communication across all levels of the business. Our leaders are very visible – safety and productivity leadership are fundamental to the way we do business.

We unapologetically seek to challenge industry norms. There are three questions we ask ourselves routinely: will it make the mine safer, will it put more coal on the belt or will it reduce costs?

#### **Looking five or 10 years into the future, where do you see Fitzroy sitting as a Bowen Basin player?**

We aspire to build the next great Australian mining house. With over 98,000ha of tenement in the central Bowen Basin, the imminent Ironbark No.1 coal mine project and a centralised hub of world-class infrastructure, we are well-placed to realise that vision. ■

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# Spotlight: Olive Downs, the Bowen Basin's Next Big Coking Coal Mine

## AUGUST BBMC LUNCHEON PRESENTATION

**W**ith a high-quality coking coal product, a planned capacity of 15Mtpa, a low cost of production and a long-term mine plan spanning more than fifty years, Olive Downs is not your garden-variety coal mine.

When the project is operational in just a few short years, Olive Downs will be one of the biggest metallurgical coal mines in the world.

At the Bowen Basin Mining Club's August luncheon, Pembroke's General Manager, Blair Richardson, presented to more than 220 attendees on the Olive Downs Coking Coal Complex.

With 813Mt of open-cut resources plus a significant underground reserve, the coal produced from Olive Downs will be more than 90 percent metallurgical coal. The project is expected to commence production in mid to late 2020, with a 50+ year mine life and a full operational workforce of nearly 1,000.

The mine will begin with excavators

and trucks, processing coal at an on site CHPP and connecting to existing Bowen Basin railway infrastructure via the Norwich Park rail spur.

For contractors and suppliers used to dealing with multinational companies and the associated layers of management, it came as a refreshing surprise to learn that Pembroke Resources is a relatively small company with the ability to make decisions quickly.

However, Blair Richardson, Pembroke's General Manager, warns that potential suppliers shouldn't underestimate the scope and scale of Olive Downs.

"Pembroke is an extremely agile company, and pushing through our approvals in a relatively short timeframe



**813Mt Open-Cut Resources**

Plus > 2 Billion tonne  
Underground target



**514Mt JORC Reserves Open-Cut**

435Mt Product Coal

“

The reinvigoration of our industry is a very good thing. When you look at mining’s significant contribution to Queensland’s economy, we should be glad that it’s an industry that’s growing and not going away any time soon.

”

shows how serious we are. The major reason for us presenting with the Bowen Basin Mining Club was to directly give suppliers an idea of the project’s scope and scale, as those who want to participate need to understand our timeline – which is first coal by Q3 2020.”

Mr Richardson also outlined a very encouraging supplier engagement strategy and project contact pathway, where registered suppliers are put directly forward to the relevant package managers when services or products come up for tender.

He says the Queensland mining industry is heading into a new phase, with Olive Downs just one of a series of new projects kicking off at the moment.

“The reinvigoration of our industry is a very good thing. When you look at mining’s significant contribution to Queensland’s

economy, we should be glad that it’s an industry that’s growing and not going away any time soon.”

Social impact and community engagement for the project began with a strong working relationship with the Barada Barna traditional owners, leading to a signed ILUA in June. Pembroke has also commenced workshops in Moranbah, Dysart and Nebo, keeping locals informed what’s going with the project and how they can participate.

“Local employees and moving people back to the region is important, filling capacity in the Isaac Region. We are here for the long-term and we want to participate in the region, engaging people and contractors who are aligned with what we believe,” said Mr Richardson.

The public consultation of the project’s draft EIS concluded in early October. ■



**100 percent Interest**  
Held by Pembroke



**Quality Product**  
>90 percent Met  
HCC / SHCC / PCI



**Projected Production**  
Est Commencement Q3 2020  
Develops to 15Mtpa  
> 50 years mine life



**Workforce**  
~500-700 during  
construction phase  
1,000 at full production

# Spotlight: Bounty Mining takes over Cook Colliery

SEPTEMBER BBMC LUNCHEON PRESENTATION



**B**ounty Mining has had a busy 2018, after hitting the ground running as the new owners and operators of the Cook Colliery underground mine near Blackwater.

Bounty restarted the 20-year-old mine on January 24th and have been ramping up production since, with the first coal railed out on April 8th.

The ramp up in production has seen the steady introduction of three development units and one sumping/secondary mining unit. This also included a rail loop upgrade to return the loop to full axle load capacity and further minor modifications at the coal handling and preparation plant.

Gary Cochrane, Bounty Mining Chairman and CEO, says the company has a number of plans for future development in the southern Bowen Basin area near Blackwater. Bounty holds tenements at Cook North and Minyango, which have approved underground mining leases and environmental authorities. This future development strategy is supported by forecast strong growth in demand for Australian coking coal from overseas markets.

“India and South East Asia are the new developing economies, and they require Australian resources including iron ore and coking coal for their GDP and infrastructure growth. Queensland has very high-quality coal, which is in strong demand internationally,” said Mr Cochrane.

“Australia is the world’s largest exporter of metallurgical coal at 54 percent of world exports in 2017 and accounts for around 17 percent of the world’s total metallurgical production. It takes 800kg of metallurgical coal to produce just one tonne of steel – and this is a fundamental driver for coking coal demand to support developing economies.”

Bounty’s operation is aiming to reach one mtpa run of mine by the end of 2018 and has spent \$64 million in Australia from January to end of September 2018, with over a third of that spent locally in the Central Queensland region. The current operation of Cook Colliery employs 250 staff and contractors, and this should rise as the operations expand over the next five years.

Looking to the future, Bounty is aiming to ramp up to a five mtpa output over the next five years, establishing the company as a mid-tier miner and developer. This will incorporate 2.2 mtpa run of mine from the existing Cook Colliery underground operation, as well as 2.5mtpa run of mine from the new Cook North output. Other opportunities and mining leases may contribute to this overall goal, including the Minyango and Wongai projects. ■



# Spotlight: Downer Mining, Energy and Industrial – success through strategic partnerships

## SEPTEMBER BBMC LUNCHEON PRESENTATION

**A**ttendees at the BBMC’s September luncheon heard an update on Downer Mining, Energy and Industrial’s Indigenous engagement strategy and strategic partnerships.

The Downer Mining, Energy and Industrial division takes the place of Downer Mining, combining nearly 8,000 employees across engineering and construction, contract mining and asset services.

Vikesh Magan, Downer Group’s GM Strategy & Growth, outlined two of Downer’s successful indigenous engagement initiatives; the award-winning Blackwater PCYC partnership and the Waanyi PBC and Downer joint venture at New Century Mine.

As the incumbent contract miner at BMA’s Blackwater mine, Downer formed a partnership with the Blackwater PCYC in 2016, donating \$50,000 per year to employ a Youth & Communities worker.

The program prepares trainees for work in the mining industry and has seen 26 participants complete the program – 24 of which are still employed with Downer. The program has seen strong results in increasing the number of Indigenous employees at the Blackwater mine, and won the QRC’s Indigenous Employment award in 2018.

“To prepare for our future needs, we’ve had to forge stronger connections with our communities. Programs like the Blackwater PCYC partnership bring people in from a non-mining background, train them and give them an opportunity to succeed.”

The Waanyi PBC joint venture has Downer working together with the traditional owners at Century Mine, across rehabilitation and mining services for a whole of mine operations capability.

The joint venture is an equal 50-50 partnership, committed to enabling social, economic and community development for the Waanyi people, and focusing on the physical and spiritual healing of the Century mine site. The uniqueness of the arrangement is in collaborating with traditional owners and rehabilitation specialists to return the land to its’ previous state, as guardians for future generations.

The joint venture project now recently signed a 52-month contract for continuation of the successful partnership, which employs 140 people.

While it’s an innovative contracting arrangement, Mr Magan says it’s a natural evolution to recognise, include and partner with traditional owners to successfully operate a mine.

“We have to keep adapting to the market as it demands new and different things from us,” said Mr Magan. ■



# Spotlight: Adani gives the green light

NOVEMBER BBMC LUNCHEON PRESENTATION

**A**dani Australia joined the Bowen Basin Mining Club's November luncheon at the Mackay Entertainment and Convention Centre to share some long-awaited and very exciting news.

Adani Mining CEO Lucas Dow announced that the Carmichael mine and rail project will be 100 percent financed by the Adani Group, and that they were ready to commence construction and operation of the mine.

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“  
I’m personally invested because I know what the Bowen Basin has done for me and my family, and it would have been a wasted opportunity to not play a part in opening up the Galilee Basin.  
”

The announcement followed decisions to simplify the plan for the rail line and the mine’s construction.

The original Carmichael project proposal incorporated a 388km rail line direct from the mine to Abbot Point Port, in a standard-gauge configuration. The new narrow gauge rail line will only run for 200km before connecting to existing rail infrastructure through to the Port. This lowers Adani’s capital investment while still opening up an export path for the Galilee Basin coal.

In terms of mine construction, Adani Mining has now taken a scaled-back approach, with the initial stage of the project projecting a 27.5 mtpa output before ramping up to the full 60 mtpa over the project’s lifespan. This means that the Carmichael mine will focus on open-cut resources first, followed by underground mining in later stages.

Mr Dow said that with only a few remaining management plans to be finalised by regulators, jobs and supply opportunities would soon start to flow to regional Queensland.

“In short, this first scaled-back phase will see us create 1,500 direct jobs. Beyond this, there will be further jobs distributed in the primary employment hubs of Rockhampton and Townsville, with benefits flowing into service centres like Mackay and the Central Highlands.”

He also emphasised that these jobs would all go to real Queenslanders, with very little automation planned in a simple, ‘old-school’ approach.

“We have secured finance and we are starting the mine – our project team is ready to commence mobilisation work. We stack up environmentally and financially, and we are raring to go to provide jobs to Queenslanders.”

When asked about why he joined Adani Mining as CEO, Mr Dow spoke passionately about the opportunity to be a part of this once-in-a-lifetime opportunity to open up new coal resources and prosperity for Queensland.

“I’m personally invested because I know what the Bowen Basin has done for me and my family, and it would have been a wasted opportunity to not play a part in opening up the Galilee Basin.

“India imports 137 million tonnes of coal each year, and only 3 million tonnes of that comes from Australia. Our existing coal mines both in the Bowen Basin and Hunter Valley are running flat-stick supplying Japan, China and Taiwan. When you look at the next-largest population base, it’s India – which makes this project a no-brainer in terms of opportunity.

“I’m an unapologetic, parochial Queensland, and if we have the choice between jobs for Queenslanders and jobs to go overseas, they should absolutely come here through projects like the Carmichael project.”

As supporters of the Queensland coal mining industry, the Bowen Basin Mining Club is extremely supportive of this project finally announcing their commencement and opening up the Galilee Basin to other projects.

Particularly with the recently announced approval for MacMines’ China Stone project in the Galilee Basin, it’s an exciting time to be in our industry, and a fantastic note to finish the Bowen Basin Mining Club’s 2018 luncheon series on. ■





# The next phase in innovation

RAG UDD, VICE PRESIDENT TECHNOLOGY GLOBAL TRANSFORMATION, BHP

**A**t BHP, we are committed to investing in our operations, our people and communities to ensure we have the right technology, skills, and culture we need to excel in the future.

Over the past 50 years, that investment has by and large focused on improving our efficiency through increased scale and speed – bigger trucks, faster trucks, and learning to operate and maintain them more effectively and safely. While this has brought many rewards, we are convinced the next phase in innovation will be driven by advances in technology and automation.

Technology offers a world of new opportunities both for our industry and for the people who make it happen. Today, there are countless occupations that no one had ever heard of a few decades ago. At the same time, the arrival of email, mobile phones, and computers has seen postmen, switchboard operators, and typists becoming less prevalent. How people perform work and the capability and

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“

In thinking about what technology and automation means for ourselves, we must also be thinking about what this means for the next generation. It's our vision that careers in mining for our children will be safer, better connected and more appealing to the digital generation.

”

culture needed is ever-evolving. Our industry is not immune to this change and we must move forward – together.

While we don't have all of the answers, at BHP we lean in to the future – not away from it – and we already have runs on the board. Our investment in Integrated Remote Operation Centres – or IROCs as we call them – in Brisbane and Perth, have helped us fast-track the replication of best practice across BHP. The Coal IROC oversees our entire East Coast Coal business from the Bowen Basin to the Hunter Valley, with big wins in productivity and cost.

Like any new technology, what we've also seen with the creation of our IROCs is an array of opportunities open up for training and developing our people. I'm proud to say over 50 percent of the mine control team working in our Coal IROC have previously operated heavy vehicles. Additionally, the Coal IROC has been a clear demonstration that investment in technology can equally be an investment in diversity, with the team achieving gender balance from the outset.

Our Mt Arthur Mine down in the Hunter Valley has led the way with the implementation of a Driver Safety System (DSS) to assist with managing fatigue and distraction. DSS is a proven solution using eye tracking and facial recognition technology to detect when equipment operators are distracted or falling asleep

at the wheel, which sets off an alarm and triggers vibration in the operator's seat. Since installing DSS, there have been no fatigue-related incidents at Mt Arthur.

Soon all our mines in Queensland will implement the same technology – creating a safer work environment.

Last year, BHP completed the rollout of a fully autonomous truck fleet at Jumblebar – one of our Iron Ore mines in Western Australia. Jumblebar has become an excellent demonstration of what can be achieved when we push new boundaries. Most importantly it is now one of the safest operations in our portfolio. Significant events are down by 80 percent, and the site's mining production team recently went 459 days injury free. That is a remarkable achievement. At the same time, production is up and costs, wear, tear and variability are all down. For these reasons, we are studying autonomous haulage on an expanded scale, including here in Queensland.

#### **Partnerships are essential**

Stronger partnerships in regional Queensland will be essential as new technology becomes available in our sector now and in the future. At BHP, it's our view that the development of a partnership model for building new skills – within our workforce, the wider community and for the next generation – will be critical for the industry.

Our peers in Western Australia are making progress in this area. Earlier this year a training alliance was established between the State Government, TAFE and industry. The alliance is putting in place the steps needed to build the autonomous capabilities of the Western Australian workforce, and will result in Australia's first nationally accredited courses aimed at secondary school students and school leavers. It's a landmark partnership – and we are committed to replicating this collaborative approach to capability-building in Queensland.

There's no doubt that these are pioneering times. In thinking about what technology and automation means for ourselves, we must also be thinking about what this means for the next generation. It's our vision that careers in mining for our children will be safer, better connected and more appealing to the digital generation.

At BHP, we want to work together - with government, community and industry leaders - with a shared vision to set up both the current and future generations of miners for success, to improve our vibrant communities, while continuing to make a leading contribution to our state and national economies.

There has never been a more exciting time to be in mining - the future is bright, it starts now and it starts with all of us. ■



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# Peabody's Coppabella mine celebrates 20 years of coal



**T**his year Peabody's Coppabella Mine celebrated 20 years of creating jobs, supporting business and operating responsibly in Queensland's Bowen Basin.

Since opening in 1998, the mine has produced approximately 65 million tonnes of coal and currently provides 435 jobs for Queenslanders – 50 percent of them coming from the local Mackay area.

The mine now ships three million tonnes of low-volatile, pulverized coal injection (PCI) coal each year to customers all over the world including Japan, Korea and Taiwan where it is used to make steel.

Peabody's Australian President George J. Schuller Jr. said the mine was proud to contribute to the economic development of local communities like Moranbah and Nebo and to generate royalties and export income that benefit all Queenslanders.

"Since opening on June 1, 1998 the miners at Coppabella wasted no time in getting their first coal out of the ground with the inaugural shipment ready to supply just five months later to Nippon Steel in Japan," Mr Schuller said.

"In the same year Coppabella signed Queensland's first ever Native Title agreement beginning a respectful relationship with Native Title Holders, Barada Barna that sees 10 indigenous trainees currently employed working 'on country'.

"From that impressive start, Coppabella has continued to form a proud part of the local community, paying its dedicated workforce \$49.8 million in wages each year and spending \$243 million with Queensland businesses.

"Together with neighbouring mine Moorvale, Coppabella is estimated to inject \$950 million in direct and indirect economic benefits to the Queensland economy."

The mine's General Manager Brandon Risner said today's 20th anniversary of the first ever shipment of coal was a great achievement for the Coppabella mining family.

"Not only is the Coppabella Mine a strong part of our local community, we're also a tight-knit community in our right," Mr Risner said.

"We have a special team that always goes above and beyond to get the mining job done, but also to look out for each other and for others in the community.

"Coppabella supports a host of community organisations from grass roots sporting teams to crucial emergency organisations like CQ Rescue as well as fundraising for charities including Black Dog, the Leukaemia Foundation and National Breast Cancer Foundation."

Mr Risner said, in conjunction with its joint venture partners, Peabody looks forward to continuing its relationship with the local community, government, Traditional Owners, and business partners and customers who have been vital to its success.

With operations assured until at least 2032, there will be many more celebrations to come. ■

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**New Hope's New Acland Mine is proud to have Queensland's largest single area of certified rehabilitation\***

\*for an open cut coal mine

“ We are committed to sustainable environmental practices, including this world-class rehabilitation, which ensures our site is progressively returned to environmentally and economically sustainable land. ”

**Shane Stephan**  
NHG Managing Director



**NEW HOPE**  
GROUP



# New Hope's environmental credentials continue to grow

**N**ew Hope has once again been recognised for its exemplary rehabilitation work with state government certification of almost 350 hectares of rehabilitated land.

Already an industry leader in the area of environmental management, the Queensland Government's certification of 349 hectares of progressively rehabilitated mined land at the New Acland coal mine has further enhanced the company's reputation.

Managing Director Shane Stephan said this is the largest single area of certified rehabilitation for an open-cut coal mine in the State.

"To put the size of the area in context, this certification covers an area of around 300 football stadiums," Mr Stephan said.

"And the majority of it already has cattle grazing on it – right up against mining operations."

New Acland mine's rehabilitation methods are an example of recently introduced Queensland State Government legislation requiring resource companies to 'clean up as they go'.

Mr Stephan said this has been standard practice at the New Acland Mine since it commenced in 2002.

"Once the pasture on our rehabilitated mined land is well established it is fenced off and handed to our pastoral operations Acland Pastoral Company (APC).

"This rehabilitated land has been a saviour for our pastoral operations which had been experiencing drought conditions in recent times.

"Apart from being the right thing to do as custodians of the land – it also makes good business sense to rehabilitate to this high standard and have economically viable productive land as soon as possible behind mining operations.

"This is a clear and practical demonstration of the successful co-existence of mining and agriculture."

Effective and holistic environmental management is crucial to the success of New Hope's operations.

The company works to identify and use the most practical and sustainable methods of environmental management to minimise the impacts of its activities on the environment and community.

An Environmental Management System guides New Hope's environmental practices, supported by advice from independent environmental consultants. This assists the company to improve environmental performance by increasing awareness, optimising operational control, monitoring compliance and enabling continuous improvement.

New Hope Group's unique approach to achieving a sustainable, economically productive and environmentally healthy post mine landscape was recognised nationally, when it was awarded the 2016 ABA100 Australian Business Award for Sustainability.

The award, which recognises organisations that execute initiatives demonstrating leadership and commitment to sustainable business practices, was a result of New Hope's submission outlining how it integrates a unique combination of three activities into daily coal mining operations at its New Acland mine:

- scientific cattle grazing trials on rehabilitated mined land;
- environmental conservation, protection and improvement works to revegetate buffer zones along local waterways to create koala habitat and wildlife corridors; and



“

It is important to us that we understand what effect our operations have on the environment and the native wildlife.

”

- the use of recycled water for mining activities.

To take advantage of its rehabilitation work, New Hope formed the company's pastoral arm, APC in 2006, as a farming, grazing and land management enterprise based at the New Acland mine.

APC has landholdings of approximately 10,000 hectares on and around its mining lease, runs more than 2,500 head of breeder cattle and conducts various cropping projects on that land.

#### **Grazing trials**

Over the past five years, APC has been running scientific grazing trials looking at livestock production performance on rehabilitated land.

The trials include livestock, pasture and soil monitoring and focused on measuring the productivity, economic viability and sustainability of beef production on previously mined land.

This industry-leading work was conducted in partnership with independent agricultural consultants Outcross

Agri-Services, the University of Southern Queensland's National Centre for Engineering in Agriculture (USQ), pasture specialists EcoRich Grazing and supported by expert veterinarian and statistician advice.

Results have shown that, on average, performance from cattle grazing the rehabilitated pastures was comparable or exceeded the performance of the control (unmined) site with an average gain of 0.7kg/day and producing 103kg beef/ha.

New Hope believes its progressive rehabilitation conversion to grazing land is industry-leading and sets an industry benchmark.

#### **Koala research**

A 12-month Koala Research Project conducted by the University of Queensland in conjunction with the Queensland Trust for Nature and New Hope Group is further evidence of New Hope's environmental credentials.

Over a 12-month period the research focused on the



koala population situated around the mine site using GPS tracking collars to track koalas as they moved around the local area.

The study has shown that Koala populations in the area of New Acland Mine have remained stable over the past two decades.

General manager of Coal Operations at New Hope, David Vink said the company was happy to provide financial and logistical support to the research team.

“It is important to us that we understand what effect our operations have on the environment and the native wildlife,” David said.

“What I find interesting about this research is how each of the koalas tracked remained in a fairly tightly defined area.

“They are quite active in that area but are happy to remain close to our operations.

“I think this is testament to the amount of work New Acland puts into its rehabilitation work and once again proves mining and the environment can coexist.”

### **Water management**

Recognising that water is a valuable resource for the community, all New Hope sites have water management plans in place.

New Acland Mine minimises its impact on the groundwater system by utilising its 45.1 kilometre pipeline to transfer recycled waste water from Toowoomba’s Wetalla Waste Water Reclamation Facility to the Acland Mine site for use in operations.

This recycled waste water is the primary source of process water for the mine site, as well as a water source for Acland Pastoral property cattle and cropping operations around the mine.

Mr Stephan said New Hope’s ultimate goal is to minimise its impact on the environment through each phase of the mining process (exploration, development, operation, rehabilitation and final land use).

“It has always been the company’s vision for the land at its New Acland mine to ultimately be returned to a sustainable, profitable agricultural enterprise.

“Not just at the end of mine life, but as mining operations progress.

“We are committed to sustainable environmental practices, including this world-class rehabilitation, which ensures our land is returned to environmentally and economically sustainable land use as mining completes.

“I congratulate our environmental and operational teams across the business for their dedication and continued demonstration of the high standards they set in all areas, especially the progressive rehabilitation of mined land at our Acland operations.” ■

# Anglo American's metallurgical coal operations get FutureSmart

**F**or the past 18 years, Anglo American has been an integral contributor to the Queensland mining industry. Today, the globally diversified mining company operates five mines in the Bowen Basin region; two open-cut and three underground. The year saw the company become Australia's largest underground coal mining company and third largest seaborne exporter of high-quality coking coal.

During 2018, Anglo American's metallurgical coal business achieved a number of milestones; welcoming a new CEO, Tyler Mitchelson, in April; launching a new company purpose and ambitious sustainability strategy; and winning an innovative industry award that has significant positive health and safety implications for the industry.

"Over the past year, our Metallurgical Coal team has gone from strength to strength. In every part of our business we're striving to live our company's purpose: to re-imagine mining to improve people's lives," Mr Mitchelson said.

"We're doing this by embracing an innovative approach to sustainable mining through our FutureSmart Mining™ program. A key part of this is introducing new technologies designed to fundamentally change how we mine, process and market our products."

One example of this is the innovative dust suppression technology, developed by Anglo American's Grasstree team, which has already delivered significant, positive implications for the underground mining industry.

"This dust suppression system has re-imagined working underground, reducing worker's exposure to respirable coal dust by 96 percent .

"We've begun to share this system with our other underground operations as well as industry counterparts."



Picture 1: The dust suppression system uses biodegradable foam is applied to coal as it moves through mining machinery during the development phase of mining. The system binds to coal and significant reduces coal dust exposure. This technology won the Queensland Health and Safety Award for Innovation in 2018

Additionally, at Anglo American's Dawson mine, a key milestone was the introduction of a semi-autonomous drill that has successfully drilled a hole operated by a controller situated four kilometres away.

"This was an important step to modernising our approach and contributing to our business being safer, more productive, and more sustainable."



Picture 2: Remotely operated, semi-autonomous drill is successfully operating at our Dawson mine.

Anglo American's sustainability strategy was also introduced this year, focusing on a number of ambitious elements, deliberately designed to challenge the company and come up with innovative solutions to build a thriving community and healthy environments.

Mr Mitchelson said the company was committed to the highest standards of environmental performance.

"Over the next five years (2019 – 2023), we're investing heavily in industry-leading rehabilitation activities across our five mine sites," he said.

"We continue to innovate and pursue best practice mine rehabilitation across our business, and this approach is already delivering outstanding results. Our Dawson Mine has been

leading the way in innovative rehabilitation approaches, including the successful rehabilitation of an area previously containing void highwall, and use of rehabilitated land for cattle grazing.

“We’re also committed to working closely with our nearby communities of Middlemount, Moranbah and Moura and surrounds. We launched our socio-economic assessment process to engage and understand how our business can meaningfully contribute to each region.

“We’re continuing to invest in our regional communities, and in 2018 opened up new shopfronts in Middlemount and Moura, in addition to our existing Moranbah community office. We also introduced rental subsidies and an industry-leading ‘buy local’ program for our community in Moura to further support the region.”

“We’re focused on helping ensure economic sustainability for regional communities, and in 2018, formalised an existing practice of 30-day payment terms for all small and medium-sized businesses. We value our relationships with supplier partners and will continue to work closely with them to ensure we deliver sustainable economic outcomes for our communities.

Anglo American is also makes strides in improving inclusion and diversity at the company, with its Moranbah North Mine commencing recruitment for a landmark Female Trainee Underground Mine Program in late 2018.

“This program is the first of its kind for a Queensland underground coal mine, and a critical step toward creating a more inclusive environment for women in underground coal mining,” Mr Mitchelson said.

“We were overwhelmed by the amount of interest in the program, and it’s clear there is a real demand for these types of opportunities.

“2018 has been an outstanding year for Anglo American in Australia and we look forward to continued growth and success in 2019,” he said.

For further information, please visit [www.angloamerican.com.au](http://www.angloamerican.com.au). ■

“

2018 has been an outstanding year for Anglo American in Australia and we look forward to continued growth and success in 2019.

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## Five Minutes with Lucas Dow CEO, Adani Mining

**Most of the Australian mining community would know you as a strategic leader, and as a BHP man through and through. What made you decide to join the Adani team?**

On a personal level, my old man was an interstate truck driver. It has always struck me how hard he worked to give us a go and how well remunerated I have been as a result of the opportunities he and the mining industry have afforded me. That was all on the back of the Bowen Basin coal industry being opened up. I started work in the coal industry at the Goonyella mine. I am a parochial Queenslander and I really want to see the Galilee Basin opened up and our Carmichael mine and rail project will do this. This is personal, there is a personal drive.

**As CEO, what is your focus for Adani Mining?**

My brief was, like any chief executive – I've got a business to run and how do you take the business forward in the environment you find it. There was not a particular direction or instruction from the Board. I just had the normal CEO mandate, which was take the business forward.

From my perspective, I'm determined to get us mining and do it safely and responsibly. It's that straightforward. We've made commitments to the people of Queensland that we are going to build the mine and the rail, providing jobs and benefits to regional communities. We're now delivering on these commitments, and just like all the other 125 coal mines across Australia, we're doing it under strict regulations and standards. We're getting on with the job.

**You've spent most of your career working in multinational organisations – is Adani any different?**

Adani Mining began in Australia eight years ago, so it's quite a young company in comparison to other mining organisations that have been established in Australia for decades. Consequently we are not bound by a bureaucratic culture. There is a high degree of entrepreneurial spirit and agility – both of which are real strengths. Above all there is commitment and conviction throughout our team to see our project delivered.

Our team consists of experienced miners, as well as highly qualified people from other industries, which gives us fresh thinking and innovative solutions to all sorts of challenges.

And those challenges that we have faced have reinforced another key attribute of our company - resilience. These qualities combine to ensure we have the capability, tenacity and capacity to deliver the Carmichael Project for regional Queenslanders.

**How can the lessons you learned as BMA's CEO and Asset President help Adani move forward?**

Given BMA's role in the development of the Bowen Basin, BMA continues to serve as a clear example as to the benefits that have flowed into regional communities and also the Queensland economy from the opening up of a new coal basin. In many ways BMA has demonstrated the means by which significant and sustainable economic development can be generated from the development of a significant coal basin. We are seeking to provide Queenslanders with similar benefits and opportunities through opening up the Galilee Basin.

# Start your engines.

**We're ready to commence work on the Carmichael Mine.**

Finance is now secured for our Carmichael Mine and we're ready to break ground and start construction. And we know the people of regional Queensland are up for it.

The project will operate under strict Australian mining rules and environmental regulations.

It will provide Queensland regional communities with new jobs and new opportunities.

We appreciate the unwavering support of the mining and resources industry.

Your continued commitment is a key factor in bringing this vital project to life.

Enough talk. Let's start mining.



**You've led a new push for the Carmichael Project, with some fairly radical changes to existing plans for the mine and rail. How was this received, and how has it made an impact on the project going forward?**

When I started we did a stock take of where we were at and then developed a pathway to take the project forward with the team. There was nothing particularly unique, just some good old-fashioned mining engineering. As with any mining project, it's always getting to the core of it – balancing risk, investment and return.

Our work in recent months has culminated in Adani Group's approval of the revised project plan that de-risks the initial stage of the Carmichael mine and rail project by adopting a narrow gauge rail solution combined with a reduced ramp up volume for the mine.

This means we've minimized our execution risk and initial capital outlay. The sharpening of the mine plan has kept operating costs to a minimum and ensures the project remains within the first quartile of the global cost curve.

We will now begin developing a smaller open-cut mine comparable to many other Queensland coal mines and will ramp up production over time to 27.5mtpa.

The construction for the shorter narrow gauge rail line will also begin to match the production schedule.

We have already invested \$3.3 billion in Adani's Australian businesses, which is a clear demonstration of our capacity to deliver a financing solution for the revised scope of the mine and rail project.

We will now deliver the jobs and business opportunities we have promised for North Queensland and Central Queensland, all without requiring a cent of Australian taxpayer dollars.

The people of regional Queensland have been incredibly positive in response, and nothing demonstrates that more than the hundreds of job applications we've received since the announcement. People in the regions need the work, so it's great to have been able to give them some good news that the Carmichael Project is going ahead.

**What has been your career highlight to date?**

I don't have a singular career highlight. However when I think about those moments during my career that I have been most proud of they generally involve seeing people achieve outcomes that they had previously thought impossible or very difficult to achieve.

**You spent several years with BHP in Chile – how is our mining industry different to Chile's?**

Generally, Chilean society is more cognisant as to the benefits that the mining industry affords the Chilean economy. Accordingly I felt that Chileans more readily supported the industry and recognised the benefits that flow from mining. Project development and encouragement of new projects was also very strong in Chile.

**You're a mining engineer by trade – do you see the current skills shortage of engineers as a big problem for the industry's future? What made you decide to become an engineer?**

Meeting skills requirements across the entirety of the industry will continue to be a challenge as we move forward. We have to think differently as to how we capture and retain talent moving forward. This requires a collaborative industry approach coupled with educational and vocational training institutions.

I was attracted to mining engineering by the prospect of being involved within an industry that is fundamentally responsible for the provision of the building blocks of society.

**In your opinion, what are some of the breakthroughs over the last 10 years that have been instrumental in changing the way we operate today? What's the next big change on the horizon?**

In some ways I consider the last decade somewhat of a lost opportunity for the industry. Despite record commodity pricing we saw productivity and costs spiral out of control and whilst some inroads have been made there is greater opportunity to improve the competitiveness of our industry. Our industry has a track record of losing focus on cost and productivity when commodity prices are good – which ultimately leads to a boom and bust volatility. This volatility in turn impacts employment stability which has real and lasting consequences for families.

Consequently the challenge for our industry is to improve our cost and productivity in a sustainable and consistent manner so that we provide the sort of stability that enables people to build careers and raise families within our industry.

**What do you think are the biggest challenges for the Queensland coal industry over the next 10 years?**

Despite our industry being the engine of the Queensland economy, there is little recognition of the contribution of our industry outside of the regions in which we operate. Collectively we as an industry need to do a better job of communicating the role we play in driving the Queensland economy through our contributions to such things as employment, infrastructure, taxes, royalties and the rest. This ultimately means that we need to play a larger and more engaged role in societal debate. ■



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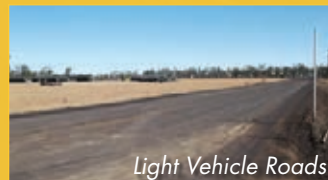
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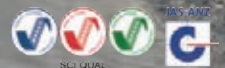
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# Delivering Smiles - CSR in practice for QCoal Group

NICOLE IRELAND

Over the last two decades, the mining sector has increasingly embraced the significant opportunity it has to shape and contribute to regional communities across Queensland and the rest of the country.

Across the state, mining companies are asking their communities how they can contribute, how they can partner, and how their long-term contribution will make a real difference to those communities.

In response, mining companies have developed projects, programs and initiatives that go beyond direct cash contributions to address community wellbeing, the continued sustainability of the regions, employment, education and health.

While some of this vast contribution is driven by compliance and regulatory demands and expectations, a greater portion stems from company-led commitments that embrace the principles of corporate social responsibility and exemplify the role of partnership.

Companies are proud of their contributions and partnerships and

are continually auditing, reviewing and enhancing outputs and outcomes.

## Case Study

One such company is Queensland's own QCoal Group. Since its inception, independent, private coal producer QCoal Group has approached its commitment to corporate social responsibility and community engagement on a Queensland-wide basis.

Stemming from founder Christopher Wallin's own experience working across rural and remote Queensland, the organisation has taken a unique and multifaceted approach to community contribution and partnership.

QCoal Group operates the Northern Hub near Collinsville, incorporating the Drake, Jax and Sonoma mines and the newly-constructed Byerwen operation near Glenden in the Bowen Basin. In addition, the company has

been continuously active in exploration across the state since 1989. The company employs approximately 1000 workers, including five percent Indigenous workers.

The QCoal Group provides extensive philanthropic support through direct programs, including local sponsorships and donations and as Principal Partner of the Royal Flying Doctor Service (RFDS) but more significantly through the QCoal Foundation.

Established in 2011, the Foundation's mission is to build resilient regional and remote Queensland communities by developing innovative, community-focused programs that deliver sustainable improvements in the key areas of health, liveability and education.

A public foundation, the QCoal Group is Founding Donor to the QCoal Foundation.

The QCoal Foundation has adopted a "social venture" approach based on recognising community need, identifying innovative solutions, supporting those solutions during the trial stage, measuring their effectiveness by gathering

data to monitor performance against defined targets and finally, achieving sustainable funding outcomes using data from the trial stage to ensure improvements continue to be made over the long-term.

The QCoal Foundation's flagship program is the QCoal Community Dental Service, now known as the RFDS Dental Service. In 2013, the QCoal Foundation recognised the need for improved oral healthcare outcomes in regional and remote Queensland communities and partnered with the RFDS to address this need.

The Service was developed to prove the effectiveness of mobile oral health delivery to address the lack of service in remote communities without compromising standards of patient care. The innovative design comprises of two state-of-the-art dental surgeries and a mobile orthopantomogram (OPG) in a purpose-built semi-trailer. When the Service was designed, the OPG was the only mobile unit in the southern hemisphere.

During the four-year trial period the Service travelled over 54,000 kilometers and provided over \$4 million of treatment





to over 8000 patients in 20 Queensland communities.

The QCoal Foundation approach to philanthropy consistently reinforces the need for sustainability to be built into all programs. For the Dental Service, the successful application of the social venture model and the trial outcomes resulted in Commonwealth Government funding the service from 2017. In recognition of that funding contribution, the Service is now known as the RFDS Dental Service.

In 2017, the social venture approach was extended to financial literacy with a partnership between QCoal Foundation and Financial Basics Foundation. The aim of this partnership is to develop an innovative pathway to raise standards of financial literacy education in rural Queensland communities. This project has created the Ca\$hED Up financial literacy program involving rural, remote and regional schools implementing a five-lesson trial with all Year Seven students, typically through a Life Skills or Pathways class. The trial is already showing progress.

Creating sustainable

improvements to build resilient regional and remote community outcomes is key to the QCoal Foundation's social venture model, which places a strong emphasis on data collection and the development of sustainable funding models during any program trail. The ongoing support of QCoal Group as Founding Donor allows the QCoal Foundation to commit to long-term initiatives and fund significant trial periods. The result of this approach is the development of long-term solutions to community challenges.

The QCoal Foundation also operates a community grant program and provides the \$30,000 QCoal Foundation Scholarship which assists rural and remote students who plan to study at James Cook University and who have demonstrated an enthusiasm for returning to work in rural and remote communities.

By creating a public foundation, QCoal Group has worked to broaden its scope and enhance its contribution. QCoal demonstrates philanthropic leadership and initiative through ongoing communication and engagement with donors, government and members of the philanthropic community.

In 2018, as part of Philanthropy Week, the QCoal Group was named the Queensland Community Foundation's Corporate Philanthropist of the Year Award.

In accepting the award, QCoal Group Managing Director Christopher Wallin said the award demonstrated the many ways in which corporate Queensland could make a sustainable impact in their communities across the state.

"I am particularly pleased that this award will highlight the importance of philanthropy in rural and remote communities and a more innovative role for mining companies," Mr Wallin said.

"This award also recognises the contribution of our partners as well as our employees, contractors and suppliers who support us through both the QCoal Foundation and with active participation in programs and events." ■



# Whitehaven Coal: Diversifying into the Bowen Basin

INTERVIEW WITH PAUL FLYNN, MANAGING DIRECTOR AND CEO, WHITEHAVEN COAL

**W**hitehaven Coal is one of the Bowen Basin's newest players, after acquiring Rio Tinto's interest in the Winchester South coking coal project in early 2018.

Winchester South is a high-quality coking coal project, located 30km south east of Moranbah. Whitehaven is an ASX-100 listed company with a historic focus in the Gunnedah Basin in North West NSW, where it operates five open-cut mines and one underground mine. Former Resources Investment Commissioner for the Queensland Government Todd Harrington has stepped into the role of Project Director for Winchester, lending a familiar Queensland face to the project. In a year marked by plenty of mines and development assets changing hands, we spoke to Whitehaven's Managing Director and CEO Paul Flynn about the miner's entry into the Bowen Basin and its future plans.

**Whitehaven has grown impressively over the past few years. What's the secret to your success?**

The past few years have seen a lot of growth, we've quadrupled our output in the space of five years. I think the key to that success was firstly having a pipeline of projects that were executable, and executing on those development plans. It's one thing to buy undeveloped

assets and put them into your pipeline, and it's another thing to be able to bring them through approvals processes, and build them cheaply and run them economically. And we've been able to do all three.

**What brought you to the Bowen Basin?**

Our merger with Aston Resources was about consolidating our influence over the Gunnedah Basin, which is the only new or emerging high-quality coal basin in the country. Looking at what we've got exposure to in the Gunnedah Basin, there are limitations in terms of the product suite we can produce from those mines. Our desire has been to put more metallurgical coal into our portfolio of products and when you're talking about hard coking coal, the logical place to go is the Bowen Basin. It was really about finding the right opportunity as an entry point into the Bowen Basin for us, and Winchester South provides exactly that.

**Give us an update on Winchester South. What is the timeline you are working to?**

At the moment, having just recently acquired the keys, we're doing the

ground truthing, and assessing the needs of that project from the physical perspective. There's a lot of information we've acquired from Rio Tinto as part of the data transfer that comes with completing the transaction; we're working our way through that and with a fresh set of eyes looking at the development plan scenarios, so size, location, pit extremities, infrastructure and so on. We're doing lot of our initial work that's required to lodge an EIS, hopefully in about 12 months' time. We think there's probably a period of 12-18 months assessing the project, and then there's hopefully a construction phase that flows quickly then after. It's four to five years away from seeing production coming out of it, and four to five years passes very quickly in this business.

**Why are you heading into the Bowen Basin when other miners are leaving?**

The reasons why those parties are retreating from this, and Rio in this instance, is a decision for them. We're obviously the beneficiaries of that, and by the time Winchester South is up and running, we believe it's got the makings of an excellent investment for our shareholders –

its large-scale, its low strip ratio, it's proximate to both rail and port, and it's in the right coal measures in the right basin where there's lots of human capital. I think that will be a real boon for our shareholders in the long-term. Once that is up and running, we'll actually have three assets that historically have come from Rio, so while they're retreating, it has been to the great benefit of our shareholders in our Maules Creek and Vickery projects in NSW, and now Winchester South. I look back on the outlook for demand and see that as a great prospect. The pie for coal demand is growing in our region and we'll be ready to take advantage of it with more capacity once Vickery and Winchester South are up and running.

**What differences do you see in the operating conditions between NSW and QLD? What is the biggest change Whitehaven will need to adjust to?**

Our business currently is centred in a discrete basin, so in a sense we are able to run a hub structure where we can service the needs of our various mines out of a central location in Gunnedah. That's a great advantage to us; branching out into Queensland challenges our ability to do that. Having said that, exposure to Queensland is a very positive thing. The coal mining industry is very deep from an entry perspective, and it's big as a proportion of the total economy in Queensland, so the focus on mining is very strong. Talent-wise it's a very positive thing to be moving into the Queensland market, but it is removed from the hub of our operations today, so we've had to stretch

ourselves and we've set up our office presence in Brisbane. The approvals process looks a little bit different for us in Queensland than it does in NSW; we're hoping it's shorter than what it takes in NSW, another positive in diversifying into another jurisdiction.

**What do you see as your biggest challenge for 2019?**

My biggest immediate challenge in 2019 is getting the approval of Vickery through the various regulatory hurdles. But concurrently, we're going through the process of evaluating and optimising the Winchester South project so that, by the end of calendar year 2019, it would be nice to be in the final stages of EIS preparation and hopefully lodgment soon then after.

**Where do you see the Australia sector heading in the next 10 or 20 years?**

The Australian coal sector is really well-positioned; we are located geographically right in the middle of the growth centre of the world. Historically the country was oriented towards the northern hemisphere, and what was seen as the burden or challenge of distance has now become the benefit of proximity. I think the needs there for both metallurgical and thermal coal are enormous and if you look at the International Energy Agency's forecast out to 2040, in our region in particular, incremental demand is measured in the hundreds of millions of tons per annum. Australia's in a great position to be able to service a lot of that need given than everyone wants higher quality over time, so we're well-positioned to be able to meet that.

# WHITEHAVEN COAL FAST FACTS

**W**hitehaven Coal is Australia's largest independent coal producer and the leading coal producer in North West New South Wales' Gunnedah Basin.

Whitehaven mines coal that is high in energy and low in ash, sulphur and other impurities.

Existing mines:

- Maules Creek
- Tarrawonga
- Rocglen
- Werris Creek
- Sunnyside
- Narrabri

Pipeline:

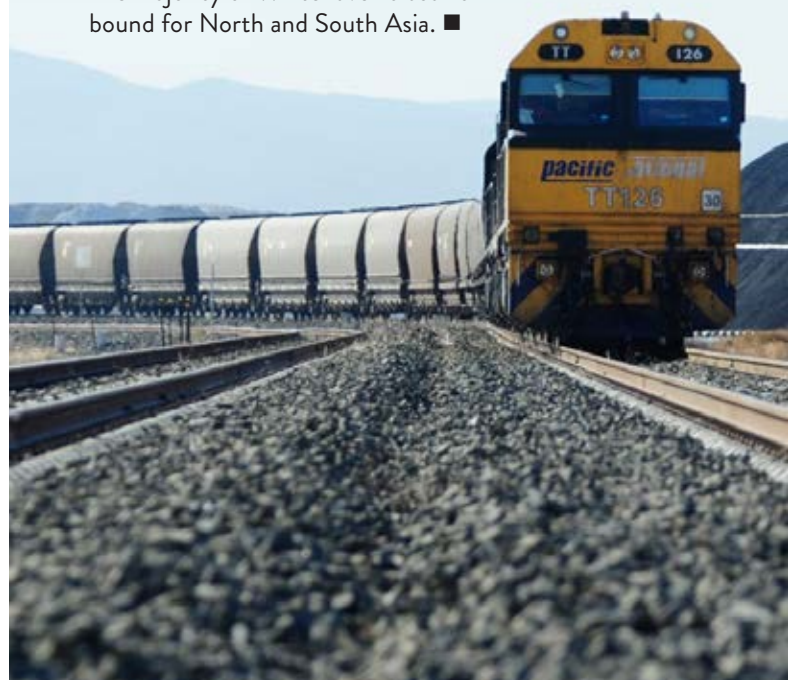
- Vickery Extension Project (NSW)
- Winchester South (QLD)

The only two new large-scale Australian thermal coal mines, Narrabri and Maules Creek, are both Whitehaven assets.

Around 75 percent of Whitehaven's workforce of more than 1,700 people live in the local communities around its operations.

The thermal and metallurgical coal Whitehaven mines is processed at the Gunnedah CHPP and shipped out through Newcastle's port network.

The majority of Whitehaven's coal is bound for North and South Asia. ■



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QUREX, brought to you by the QEC



# Our mining and exploration automations will be attacked – here are the risks you should know about

ALEX HUTCHENS, PARTNER, MCCULLOUGH ROBERTSON

**A**utomation is the way of the future.

And it's not just in the mining and resources sector – everyone is talking about digital disruption now, so all industries are moving towards automation and increasing their network of connected devices to ultimately improve processes and connectivity to extract greater value and reduce costs. Automation can enable things that weren't even possible before. The productivity benefits can be huge. But it is something that you have to do properly.

Of course, every solution is different and every business is different. But what's most important to note is that while the positives all sound very glossy and impressive, there are actual risks. And it's important to take the time to understand those risks because they can have real world impact. Physical damage, reputational and company valuation impact can all start with a computer virus in this new high-tech way of operating in business.

## Know what the risks are in context to your business

In security lingo, they talk about the 'attack surface' and this vastly increases when

you've got a network of devices connected to each other to facilitate operations and processes, whether that's on a work site or a mining exploration operation.

As more and more devices get connected, you've got more and more endpoints that need to be protected. Because now instead of just having a computer sitting in a corner that might hold your company's information – whether it's valuable records, proprietary information, intellectual property or something else – you've got multiple endpoints connected to the internet and potentially with USB ports that can be used as attack vectors.

If it can be accessed via the internet, then it can be accessed from anywhere.

One of the main ways external threats may attempt to target vulnerabilities is through understanding what operating systems are in use or what access protocols they're using. There are many ways, but finding a vulnerability and targeting it is the main one.

“

In security lingo, they talk about the 'attack surface' and this vastly increases when you've got a network of devices connected to each other.

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There could be a conveyor belt running coal driven by computer programs that tell it things like what speed to operate at to carry a certain weight, and if the safety measures are overridden through software code that could go out of control, break or overload other systems it works in sync with and so on.

Of course, an area that is very hot right now in the resources sector is automation in vehicles, because there are a lot of safety and productivity benefits that come from deploying vehicles in remote or



The Queensland Resources and Exploration Gateway (QUREX) is the Queensland Exploration Council's (QEC) flagship project. Launched in late 2017, it is a collaboration between the QEC and the Queensland Government.

The QUREX vision is to become a catalyst for development and growth in our resources rich state by attracting and facilitating business and investment in the resources exploration industry. It is a go-to "one stop shop" that brings together the hard-to-find yet essential information that explorers and investors need to know before digging in.

QUREX plays an important role in connecting investors with the resources sector, government, industry associations and business partners by providing information, tools, resources and support. This is through the Gateway's four pillar platform – learn, explore, invest, connect.

This year a new monthly email publication from QUREX was introduced. The Gateway is a place where people from the wider business community can find compelling, authoritative storytelling and opinions about the resources industry in Queensland.

dangerous locations that can be controlled from a centralised office, or which apply machine learning to analyse their own performance and optimise their own productivity.

As well as attack from sources that are external to the business, there are always internal threats to consider, including employees or contractors who are working for you and have access to parts of your network.

Whether it's through malicious intent – say if an employee's gone rogue or has been fired and wants to get revenge or who is setting themselves up for their next job by stealing information – or just through negligence or unawareness of the risks of what they're doing when working with connected systems, all risks need to be considered.

### **Effective management of potential risks is paramount**

Whether internal or external, the risks are definitely manageable. I don't think you

can ever completely eliminate risk in automation – just because technology moves so fast, so it's impossible to ensure it's 100 percent secure. If you're searching for that, then you're searching for an impossibility because it all comes down to lines of code, and people are always searching for ways to get around the code.

There's this constant to and fro: there are cyber risks and then that risk gets patched, then a new risk emerges and then that gets patched, and so it goes on.

The key measure to take is to understand what your network is and the value of what you have and making sure that you have implemented appropriate security so that those things are all covered by your firewall.

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There are always internal threats to consider, including employees or contractors who are working for you and have access to parts of your network.  
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Take practical measures such as patching frequently so you've always got the most current protection, making sure that you have appropriate virus protections, making sure that you have sufficient training for all staff

and then also that you have processes and procedures in place to back up when needed, to have a failsafe.

Manual override is also important. When systems go wrong or they break it's important to be able to override it so that you're not there stuck looking at some automated system that's gone crazy. So it's possible to actually, physically intervene – whether that's by having kill switches on production lines, or manual overrides on automated vehicles, or some sort of administrator access on software so that you can take over and do real time control.

### **Learning from experience and testing is key**

Also, remember that any incident that might occur offers a learning opportunity. Do a thorough review to work out actually what happened. Where was the vulnerability? How was it exploited? What have you done to patch or fix

that vulnerability so it doesn't happen again and what is it in your response that you would have done differently? Do you need a different reporting line? Do you need a different part of the business to be involved in the response? Was something missing? Answer those questions. Then actually go and update your policies and procedures so you can benefit from the lessons that you've learned.

Another vital piece of the puzzle is testing. Much the same as you do fire drills, you can do safety tests and just see whether everything works as it's intended to, and so people know where to go and what to do. It does involve management time, costs and disruption to the business, but the idea is that involves less disruption than having an actual disaster go and run out of control

because you haven't tested the response that you thought was going to work, and then you find out that it doesn't.

Throughout the journey of transitioning to an automated environment, seeking the right advice can never be underestimated. Have all relevant internal departments fully involved and source external advice if you don't have the sufficient skills and knowledge internally.

Often, this will involve third-party vendors. In that case, remember to make sure that the contractual arrangements with these vendors are appropriate in that they require the vendors to take on the right amount of risk and give you the right protections based on who can manage those risks best.

### Consider cyber risk insurance

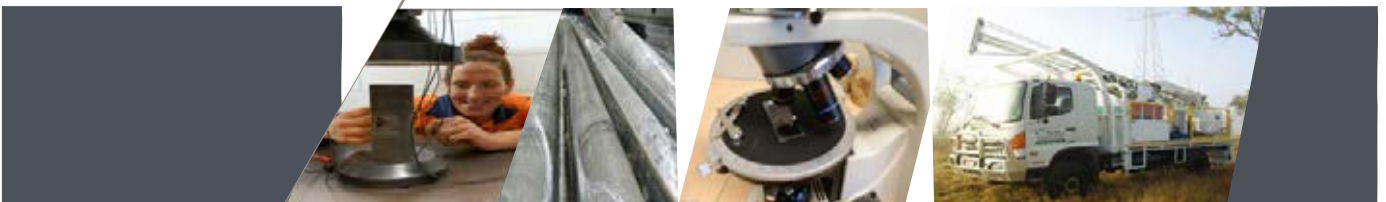
The only other thing I would keep in mind is that it's possible to insure for your risks. Cyber risk is one the fastest growing areas of insurance globally, and certainly in Australia. It covers all sorts of things, and depends on the wording of the policy of course, but generally it can cover the costs of having to notify a regulator, the costs of restoring data and the cost of the business interruption that you may experience as a result of an incident. It's very important to look at whether your insurance coverage is appropriate and sufficient.

It's certainly an exciting time for business, as automation becomes more and more ingrained in the way the world operates. But you must take practical steps to try to reduce any and all risks so that you do it once, and you do it right. ■



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- > Point Load Index

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- > All laboratory tests are NATA accredited.

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## Collaborating is faster than competing when it comes to exploration innovation

IAN DOVER, GENERAL MANAGER – INDUSTRY IMPLEMENTATION, METS IGNITED

In Europe and North America, the term ‘cluster’ has been used for 25 to 30 years to denote the coming together of suppliers, customers, researchers, government and community to do things within industry sectors much faster than they’ve ever been done before.

Here at METS Ignited, we want to introduce that into Australia’s mining equipment, technology and services (METS) industry to help make it more internationally competitive.

We have a saying within our organisation. We pose it as a question: Why should people collaborate? And the answer is, because it’s faster than competing. There’s no denying that collaboration enables you to achieve an end solution much, much faster than when trying to do it alone with limited resources and limited capability.

One of our key objectives is to accelerate the rate of commercialisation of Australian innovation in the METS sector. And that comes from the fact that, in Australia over the last certainly 30 to 40 years, there’s been a lot of money going into research but the country hasn’t really seen the benefits of that in terms of commercial outcomes as a result.

We need to move right away from this concept that the researchers do the research and then commercialise it, and instead move towards a collaborative approach

to innovation where we understand the customer needs right from the start.

Involve them in identifying the main challenges, really understand what problems need to be solved – which customers would be willing to put money on the table to solve – and then develop a solution.

That way there’s a very high likelihood that it’s going to end up in industry and be commercialised. Now that’s a great foundation for successful innovation.

But first you have to understand what your 'core competency' is. What is it that really sets you apart from everybody else? And then if you get numbers of companies that have different core competencies to come together, you can bundle their products and services together to open new markets. That's what the Europeans have done – and done really well.

They started off with focusing in local areas and regions – maybe supplying an industry like the North Sea oil, or automotive in Germany – but when they come together, they really understand what the problems are that the industry has. While solving these problems they can join forces and sell totally new things that open markets outside of their region.

Australian industry – particularly our SMEs – are very competitive and fiercely independent. And while that might be fine within Australia, it means that we're not really going to be highly competitive against other suppliers from overseas on the international market.

Of course, the thought of collaboration can seem a little intimidating to some businesses and one of the biggest reasons for that is intellectual property. Australians don't like talking to others if they think they're going to give away some secrets about their innovation or their business model.

Innovation is not only technical. A lot of innovation is around business models. You've only got to look at, say, the likes of Airbnb. Their success is not around the technical stuff – but around their business model and the way they've applied technology.

Another barrier we need to overcome is that traditional view that our market is just Australia. Many companies aren't that inspired at looking to international business.

What we're finding though is that the younger demographic – METS companies where the founders are probably in their 30s and 40s, or even 20s and 30s – are much more inclined to have a different view of intellectual property and international opportunity.

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In particular, they understand that IP can change very rapidly and if they don't act to capitalise on it within a reasonable time frame, they're likely to lose their edge anyway.

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Because if you're not capitalising on your IP – and you get a relatively short space of time to do that, maybe one or two years – the chances are that someone else is going to come up with something similar.

But even in the big companies, a shift is starting to occur.

There's a saying that used to be around in the mining industry: "the big miners like to be first to be second". That they're never going to risk innovation in the first instance – that they're always going to look to someone else to do it and then they'll become a fast follower.

That feeling, that philosophy, is starting to change. A number of the big companies now are realising that if they're going to compete with other miners internationally – and the mining industry is becoming more competitive now – that they really need to find a new way to

engage with small- and medium-sized innovative companies in order to get a faster and better result.

So, the mining companies themselves are starting to realise that they need to be competitive and they need to be adopting innovations before others, otherwise they'll get locked out of certain mining opportunities too.

Every couple of years, we run a survey through one of the consulting groups that works with the international resources sector and mining executives around the world. In it, there's a question: How critical will innovation be over the long-term?

In 2013, it was 37 percent of executives who said innovation was critical. In 2015, it was 41 percent.

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In 2017, 62 percent of executives surveyed said innovation was critical to their success going forward. That's nearly doubled in four years.

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While a handful of the big companies do invest in innovation, often it is outsourced to SMEs.

So they're going to be looking to their suppliers to provide that innovation. It's up to suppliers to then attract the attention of their customers with innovative solutions that are safe, extremely cost effective and integrate well.

Ready or not, innovation is the way forward. And a collaborative approach is going to be essential to get there. ■

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# Coal Workers' Pneumoconiosis and the Coal Mine Dust Lung Diseases

DR DAVID CLEVELAND, SONIC HEALTHPLUS

**C**oal workers' pneumoconiosis or CWP, also known as 'black lung', is part of a group of diseases known as 'coal mine dust lung diseases' or CMDLD, caused by long-term occupational exposure to high concentrations of respirable dust produced when coal mining.

Other diseases within this group include Silicosis, Mixed Dust Pneumoconiosis (MDP) and Chronic Obstructive Pulmonary Disease (COPD). Typically it can take more than 10 years of prolonged elevated dust exposure to develop, but disease can develop sooner. Disease severity is linked to the length of exposure and composition of the respirable dust; the longer the exposure and higher the concentration the more serious the disease.

Black lung was re-identified in Queensland in 2015. Presently the prevalence of CMDLD is not known in Australia, but in the USA it is as high as 10.8 percent in underground coal mine workers. In 2013, CWP resulted in 25,000 deaths globally. Currently on the Department of Natural Resources Mines and Energy (DNRME) website there

are 87 cases of CMDLD listed; 30 CWP, 26 MDLD, 11 Silicosis, and 20 COPD. Other potential cases are currently under investigation.

It is the penetration of the ultrafine respirable dust which leads to disease development. At 0.005mm in diameter, respirable dust is able to infiltrate deep into the lung tissue, where the body's defenses are unable to clear it. As it accumulates it irritates the lungs and causes scar tissue (fibrosis) to form as part of an immune response. These changes to the lungs tissue reduce its ability to transfer oxygen into the bloodstream, leading to the development of symptoms such as breathlessness, coughing and wheezing. As the dust and scarring collects, these changes are visible on a chest x-ray and CT scan.

The CMDLD can be split into

two groups based on whether there are fibrotic nodules (small areas of scarring) present or not. There are three nodular CMDLD diseases: CWP, Silicosis and MDP. Pulmonary massive fibrosis (PMF) occurs when the fibrotic nodules join together, leading to a large mass of fibrotic (scar) tissue. COPD is non-nodular.

The type of dust inhaled determines which disease develops. In CWP there are two types; simple and complex. The diagnosis is based on the burden of disease; simple CWP being the earlier stages with milder symptoms and complex or 'Pulmonary Massive Fibrosis' (PMF) being the later, more severe form with a poorer prognosis. Even more concerning is the fact the disease can still progress even when the dust exposure has ceased.

Silicosis is caused by the inhalation of respirable crystalline silica dust that is often found in high quantities of dust associated with coal mining. It's considered more dangerous than CWP because it develops faster than the other CMDLD and has the ability to cause lung cancer.

Chronic Obstructive Pulmonary Disease (COPD) is the term now used to describe chronic obstruction of lung airflow and encompasses the previously used 'chronic bronchitis' and 'emphysema' terms. COPD related to coal mine dust exposure has been previously under recognised in Australia. A significant number of studies from around the world have shown the association between exposure to coal mine dust and the development of COPD. The studies have also identified that the effect of coal mine

dust and smoking on lung function is additive.

Importantly, the burden of disease from COPD as part of the CMDLD spectrum is expected to eclipse that of the nodular CMDLD. Relating the loss of lung function to the amount of dust exposure is the focus of ongoing research and is relevant for the setting of occupational exposure levels (OEL) and compensation. It is complicated by the need to take into account smoking and other non-occupational sources of variation in lung function. It is known from studies in the USA that exposure to coal dust increases emphysema faster in smokers than non-smokers as it interferes with the lungs ability to remove dust and hence increases the risk of developing a CMDLD.

There is ongoing research into why some individuals develop

CMDLD whilst others do not, despite being in the same conditions. The Wesley Dust Disease Research Centre is currently undertaking a case review of all cases of CMDLD in Queensland and is due to release its findings in early 2019. This study will show the spectrum and severity of CMDLD in these Queensland cases and hopes to identify any unifying occupational factors, which may improve screening and prevention of CMDLD.

From 1 January 2017, amendments to the Coal Mine Safety and Health Regulation 2017 require all Queensland coal mines to provide quarterly respirable dust data to the DNRME's Chief Inspector. This data is available on the Queensland Government website. On 23 August 2017, the Queensland Parliament passed legislation which improved the workers' compensation scheme for

workers who have been diagnosed with CWP.

As of 20 July 2018, the frequency of respiratory screening (including chest x-rays) has been aligned in both surface and underground workers to at least once every five years. The DNRME has also appointed Lungscreen Australia to provide the Australian-based dual reading service, which was previously provided by the USA. The Lungscreen Radiologists have achieved the same B-reader accreditation and the transition to dual reading has commenced. Once complete, all x-ray reads will be completed in Australia. It's important to also note that with this new system, coal mine workers are able to register and view their ILO report online.

Commencing on 1 November 2018, the occupational exposure limit (OEL) for

respirable dust at coal mines has been reduced to 2.5mg/m<sup>3</sup> from 3mg/m<sup>3</sup>. The OEL for respirable crystalline silica remains at 0.1mg/m<sup>3</sup>.

Beginning on 1 March 2019, all medical providers need to be approved by the DNRME in order to supervise assessments. NMAs will be retitled as AMAs (Appointed Medical Advisor) and all employers will need to appoint an approved AMA to supervise their health assessments.

Finally, a presentation by Fritz Djukic (Inspector of Mines) at the recent Dust and Respiratory Health Forum convened by the DNRME showed the significant progress that has been made by the ongoing tripartite approach (DNRME, Union and Industry), but that improvements are still required in dust control to eradicate CMDLD. ■



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# Australian Coal Exports – Boom or Bust, or is it all about the Lag?

GARY COCHRANE, RESOURCE MANAGEMENT INTERNATIONAL

**C**oal investment in Australia is widely misunderstood. It is a large bulk commodity business with long cycles of boom and then often a major bust. These cycles can extend for periods of at least 15 years, as with the last big cycle from 2001 to the end of 2015 when commodity prices hit lows after periods of spectacular highs in 2011 and 2012.

The cycles are characterised by periods of no investment and contraction of balance sheets and employment, and then late-cycle bursts of investment, new construction and increases in infrastructure, new mine supply and strong employment.

There are long but steady cycles of demand, and the Australian export

sector has been growing since early days of expansion in the late 1950's and early 1960's. Since that time, there have been at least three major boom/bust cycles. After each bust the industry picks itself up and continues to respond to the Asian growth story over the last 50 years, at first Japan, then Hong Kong, Taiwan, South Korea, China and now India and South East Asia, including Vietnam.

The bust is triggered by oversupply and then falling commodity prices.

There is investor and developer denial and up to a one-year lag before investors really are convinced that the good times are over. For many it is too late. The late investors and mine developers now suffer the pain of new supply and investment into an oversupplied market and falling commodity prices. The smart investors recognised the signs and sold out early, without waiting for the lag.

The low commodity prices have serious consequences for companies that completed high priced acquisitions with debt, in the preceding boom (often at prices five times real value). The late stages of the bust are often the cause of financial distress, and in extreme cases,

company liquidation for those that can't ride out the down cycle. The bust can last three to five years. Share prices are smashed and often debt is written off through Chapter 11 or Company Administration events.

The cycle then starts again, and this is where the story gets interesting.

This time, despite a boom in commodity prices, there is a lag caused by over-cautious investors and mine developers, so few people react. Entrepreneurial investors pick up cheap assets and those companies that survived the downturn experience a period of strong profitability with trimmed production costs and high commodity pricing. Asset prices may be a fifth of real values during the boom, so while there are some good bargains, these are high risk for brave investors.

Overall, most investors miss this opportunity and many boards are reluctant to develop new projects. The lag can last more than four years. Some great stories have already been seen in this current boom cycle are Whitehaven Coal and Stanmore Coal; both either survivors or entrepreneurs

showing stellar returns for their investors since early 2016.

The lag still continues for mine developers and conservative investors. Many companies were severely harmed during the last downturn and balance sheets are only now rebuilding and boards are slowly becoming more optimistic. These will be the best years of the boom.

The next phase is not far off, and we should soon see the strong development and new supply at the end of the lag. Most bulk commodity projects have development and construction phases of between five to eight years. This middle phase slowly turns from one of high commodity prices, to one of oversupply, and then a return to falling commodity prices.

Before too long, the cycle will turn again, from boom to oversupply and then bust.



Due to a lag or denial of falling commodity prices being a real trend there will still be projects in construction and also many new investors will be just entering the final phase – this is the portent of the next downturn.

The saying is that no one rings the bell at the bottom or the top of the cycle. However, most money is made or lost in the lag phases, when the investors and mine developers are in denial as to whether the turnaround – either up or down – will last. ■

“ There are long but steady cycles of demand, and the Australian export sector has been growing since early days of expansion in the late 1950’s and early 1960’s. ”



# Advancing technology to reduce diesel particulate matter

**T**he combustion process in a diesel engine produces a number of by-products, several of which can be harmful to humans when inhaled. Among the most harmful by-products is diesel particulate matter (DPM).

Mine operations must be carried out so that the level of risk is As Low As Reasonably Achievable (ALARA), and the ongoing development on new engine, fuel and DPM monitoring technology make it possible to continually improve conditions and maintain risk at a level that is ALARA.

## What is Diesel Particulate Matter?

DPM consists mostly of carbon with other organic molecules, sulphates and ash agglomerating on the surface. DPM particles are generated across a range of sizes, from PM10 (<10µm) down to nanoparticle (<50 nm). DPM monitoring is standard across the industry with rugged, mine suitable equipment available from suppliers such as Pinssar, Bosch and Maha, to monitor both personal exposure in operational areas and machine emissions at the tailpipe.



Awareness of the risk of nano-DPM is increasing, although, industry regulation has yet to catch up with the current focus of DPM monitoring remaining on mass emissions and opacity measurements.





**What is nano-Diesel Particulate Matter?**

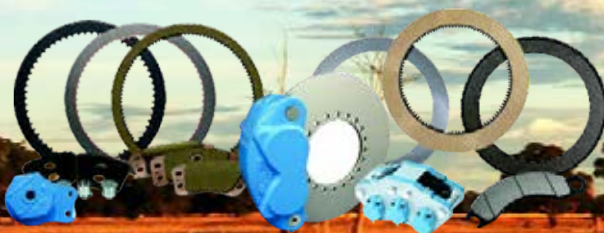
Nanoparticles are a particular concern as while damage to the body's cells is impacted by a number of factors, and particle size is a key contributor, as the smallest nanoparticles are able to penetrate deeply into the lungs and potentially cross from the alveoli, into the blood and migrate around the body. Further, small size particles have more specific surface area. This increases the number of active sites on surface for oxygen attack making them more harmful due to higher reactivity. Until recently, the monitoring of nanoparticles in mining environments has not been possible. However, recent technological advancements have made portable nano-DPM monitoring equipment available to the mining sector.

Awareness of the risk of nano-DPM is increasing, although, industry regulation has yet to catch up with the current focus of DPM monitoring remaining on mass emissions and opacity measurements.



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## Who is at risk?

In short, any person exposed to diesel emissions is at risk, however those working in confined areas such tunnels, workshops and underground mines are most at risk due to the higher concentrations of particles and reduced ventilation to dilute the concentration.

There are multiple strategies currently in use to mitigate the risk of DPM inhalation to mine workers. From the perspective of the **hierarchy of control** (commonly referred to in industrial environments to assess and manage risk), the most basic is Personal Protective Equipment (PPE), such as dust masks and ventilators. Administrative Controls such as tag boards are commonly implemented to limit the number of machines or total engine capacity below set levels. Engineering controls include modifications to machinery including diesel particulate filters (DPFs), scrubbers and pressurised cabs with HEPA filters; however the filters still allow a significant amount of nano-DPM to pass. At the Substitution level, advanced fuel technology is able to significantly impact both DPM mass and nano-DPM particle count resulting from combustion, while the ultimate solution to eliminating DPM will be to move to all electric vehicles, which is the focus of a number of underground OEMs.

The majority of fuel suppliers are focused on premium fuel products which contain detergent based additives. These products provide a cleaning effect which maintains system cleanliness, allowing the fuel injector to operate in “near new” condition, ensuring accurate timing and an ideal injector spray pattern. They are, however, limited in their effectiveness at changing the DPM characteristics of the engine. In fact, some additives have been shown to produce higher emissions (particularly higher DPM) than additive free ultra-low sulphur diesel.

New advanced fuels, such as Pumamax’s Next Gen diesel (Next Gen) are able to modify the combustion process in the engine, allowing more complete combustion of the fuel and providing dual benefits of improved energy extraction from the fuel – meaning better fuel economy – and also more complete combustion, reducing DPM emissions.

Puma Energy has carried out multiple testing programs in the past year, including internal operational trials, customer trials and lab-based dynamometer testing with Queensland University of Technology to verify the benefits of Next Gen in different conditions. While the benefits vary depending on engine technology and mode of operation, typical improvements seen are:

1. fuel economy benefits of five – 10%,
2. DPM mass reductions of 20 – 50 percent
3. Nano-DPM count reductions up to 80 percent

In addition to health and safety improvements, the dual benefits of improved combustion allow significant financial benefits to miners, by reducing the load of diesel particulate filters, extending time between changes and reducing filtration costs and operational benefits.

It is expected that the use of electric vehicles will lead to the elimination of diesel equipment in underground mines. In the interim, mine operators remain obliged to provide a safe work environment for employees, including the mitigation of risk associated with Diesel Particulate Matter.

While advanced engine technologies are becoming more common in underground mines, most operators are still using standard diesel or detergent based premium fuels, which maintain cleanliness but may not have a significant impact on DPM emissions.

The adoption of advanced fuels with combustion modifying additives represents the next step to maintain DPM levels at ALARA levels, while reducing the cost of diesel exhaust filtration. ■



Figure 1 – Typical Hierarchy of Controls  
(source: [www.healthandsafetyhandbook.com.au](http://www.healthandsafetyhandbook.com.au))



While advanced engine technologies are becoming more common in underground mines, most operators are still using standard diesel or detergent based premium fuels, which maintain cleanliness but may not have a significant impact on DPM emissions.



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# Glitz, glam and trophies – the 2018 Queensland Mining Awards

**E**very two years, the Bowen Basin Mining Club holds the Queensland Mining Awards, recognising the state's hardest-working contractors, suppliers and producers. The 2018 Awards culminated in a glittering presentation dinner, sponsored by Stanwell Energy, in July 2018.

The Queensland Mining Awards were co-hosted by the BBMC and the Queensland Resources Council, awarding mining industry contractors, suppliers and producers across eight peer-judged categories. The 22 finalists represented the true diversity of the industry – with big players like Glencore, Anglo American and Rio Tinto right through to small businesses only employing a few staff.

The full list of winners (see over page) included Wolff Group, Quarry Mining, Downer Blasting Services, Mine Energy Solutions, Rio Tinto, Control Systems Technology, Greyhound Australia, Unearthed/Origin Energy/Advance Queensland.

The 520+ attendees at the gala were treated to speakers including Rag Udd, Asset President of BHP Billiton Mitsubishi Alliance (BMA), Ian Macfarlane, Chief Executive of the Queensland Resources Council, and Senator Matt Canavan, Minister for Resources and Northern Australia.

Senator Canavan emphasised the resource industry's importance, saying that despite popular opinion, it's an industry that is here to stay as a key pillar of Queensland's economy.

"Thanks to growing global demand and resilient businesses, mining in Queensland isn't going away anytime soon."

Mr Macfarlane gave the industry address, advocating for the industry which contributes \$4.3 billion to Queensland's bottom line each year.

"Tonight is about acknowledging the innovative businesses who make up the fabric of our industry. The mining industry is crucial to Queensland, and as a group we need to stand up and be proud of the opportunities we provide. We also need to decide to stand up next time someone tells a falsehood about our industry and be proud of what we do to keep the fabric of regional Queensland together," said Mr Macfarlane.

Bowen Basin Mining Club Director Jodie Currie was thrilled with the event, saying increased attendance reflected an upswing in industry confidence.

"The Awards are a celebration of the Queensland mining industry, and this year they were particularly sweet given some of the hard times we've seen in previous years. As a key part of the Queensland Mining and Engineering Exhibition (QME), we are proud to partner with both Reed Exhibitions and Mackay Regional Council to bring this fantastic event to Mackay," said Ms Currie.

The 2018 Awards were made possible by industry supporters and sponsors including QME, Mackay Regional Council, BHP, Anglo American, METS Ignited, Austmine and Stanwell Energy. ■





## Greyhound Australia Cost Saving Initiative Award

This category recognises the contractor or supplier whose cost effective, value for money project or innovation/new process resulted in a cost saving outcome for a client.

### FINALISTS

#### **Coxons Group Australia Nosecone Module Exchange for 797F Overhauls**

In this project, Coxons Group Australia worked with BHP's Maintenance Centre of Excellence to increase the efficiency of 797F nosecone overhauls. Coxons reduced the cost by 35%, taking the entire overhaul in-house and using their service exchange concept to shorten overhauls to just one shift.

#### **Onsite Rental Group Onsite Connect - Smarter Rental Equipment Control**

Working at Rio Tinto Yarrow, Onsite Rental Group implemented a smart tracking system to condense their rental fleet for maximum efficiency. This resulted in a client cost reduction of \$2 million per annum, while increasing productivity.

### WINNER

#### **Quarry Mining Underground Roof Support Drilling Methodologies**

By streamlining the drilling methodology at Glencore's Oaky Creek mines, Quarry Mining saved over \$800,000 and increased productivity. This project replaced obsolete drilling technologies, bringing in new equipment to improve safety. The original cost saving was estimated at \$400,000, but Quarry Mining went above and beyond to double that. Crews now enjoy a quicker, safer, and easier drilling process.

Judges said that this project showed clear cost savings, improved safety of drilling crews and applied an innovative process.



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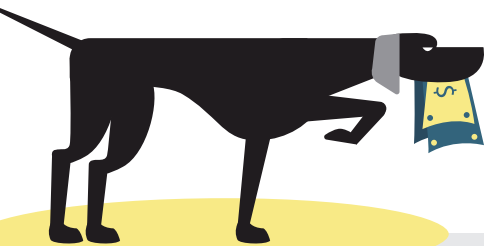
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## EconomX Time Saving Initiative Award

This category recognises a contractor or supplier that has completed a project which through an innovation or new process resulted in a significant reduction in initial estimated timeframes.

### FINALISTS

#### McLanahan Lake Vermont Feeder Breaker Project

McLanahan worked with Thiess to customise the Lake Vermont CHPP's feeder breaker, reducing maintenance delays by hundreds of hours per year. By engineering and installing a front-end access to the ROM bin, McLanahan cut the maintenance time and improved safety outcomes.

#### QCCS Concrete Remediation – Ship Loading Berth

Rather than demolishing and rebuilding the Hay Point ship loading berth, QCCS implemented a 24-hour workforce and applied process innovations to modify the existing structure to the necessary standards. Labour for concrete removal was reduced by 90%.

### WINNER

#### Downer Blasting Services DBS Speedloader

Focusing on reducing downtime of MPU's, Downer Blasting Services eliminated the need to return to the reload facility by delivering product on the blast bench. A blasting cycle with the Speedloader is now 15 minutes, compared to 75 minutes.

By cutting MPU reload time to just 15 minutes and creating a productivity increase of up to 23%, Downer Blasting Services created genuine time savings. The Speedloader has now been implemented on several sites, following its successful trialling. Judges said the Speedloader was an obvious solution to a real problem.



## QME Best Product Launch Award

This category highlights the most innovative product launched during 2017/2018.

### FINALISTS

#### HMA Wear Solutions SiTech Technology – Cyclone Shrouds

HMA Wear Solutions modified the design of existing alumina lined cyclone shrouds and introduced a new lining material, SiTech. This new material increases the service life of a cyclone shroud, decreasing both maintenance costs and downtime.

#### Wolff Mining Semi-Autonomous Dozers

Wolff Mining collaborated with Caterpillar and Hastings Deering to pilot the Command for Dozing module at Curragh Mine. The Command for Dozing module makes mine automation possible in a low-cost environment, while increasing productivity.



### WINNER

#### Control Systems Technology IoT Virtual Weigh Frame – IntelliRoll

Intelliroll is an autonomous, remotely accessible, plug and play conveyor belt weigher. The Intelliroll allows belt weighing without wiring, without a PLC, and without being fixed to a gantry structure.

The product is affordable, uses technology well with a smartphone app incorporated, and enables mine operators to have greater control. Judges said the technology was promising – with local development and innovation a great example of Australia's METS industry.

## McLanahan Safety Award

This category recognises the most outstanding initiative to make safety a priority on site, including continuous improvement and full integration into a project/initiative, with real results able to be demonstrated.

### FINALISTS

#### J.E.S.I JESI Journey Management Software

JESI's software prompts users to check in by simply replying to a text message, with automated escalation alerts if travellers fail to check in. Most importantly, users are consistently reminded of driving risks, with positive organisational behaviour outcomes.

#### Hastings Deering No-Harm Fatigue Technology Solutions

Working at BMA's South Walker Creek mine, Hastings Deering trialled a holistic fatigue management system, tracking employees' sleep and fatigue-related performance on shift. Using a data-backed system, Hastings Deering reduced fatigue related incidents on site by 94%.



### WINNER

#### Greyhound Australia Safer Transport Solution: TECHBUS

Greyhound Australia retrofitted a regular bus to create the TechBus. Using simple but effective improvements like seat belt alarms, fatigue management systems and the Advanced Driver Assistance System, Greyhound set a new standard in best practice, demonstrating their commitment to the mining industry.

Bus accidents are one of the biggest material risks for a mine, so for a contractor to recognise and solve that shows initiative. The judges said that this solution takes the on site safety message well past the mine gates, something that should be taken on across the industry as a standard.



## Hastings Deering Community, Staff Engagement or Equal Opportunity Initiative Award

This category recognises the most outstanding community or internal consultation and engagement project OR the most outstanding initiative to promote equal opportunity.

### FINALISTS

#### New Hope Group LifeFlight Partnership

New Hope Group partnered with LifeFlight to develop the Rural Safety Program, improving rural health and safety in the communities near New Acland. LifeFlight paramedics conduct first response medical training, and New Hope's safety team conduct safety and awareness training.

#### Clermont Coal Operations ACDF Conservation and Land Management Course

Clermont Coal developed a Rangers Training Program for the local Wangan & Jagalingou People. The program was created around Indigenous content and traditions. Twenty students have already graduated with a Certificate II, with several going on to find employment.

### WINNER

#### Rio Tinto Amrun Project - Sustaining Indigenous Employment

Rio Tinto has taken on a mandate to create and sustain indigenous employment over the whole life of the Amrun Project. Indigenous people have filled 320 roles at the project, including 108 local Wik-Waya people. The Project has also recorded \$1.3 billion in local spending, including 71 Western Cape businesses.

The Amrun Project made a continued and focused effort to not only create but to sustain indigenous employment. Attention through the whole project lifecycle, including recruitment, onboarding, training and local supplier development, has created real community change. Judges said that these efforts showed a long-term vision and a sustainable employment program, unique in mine construction.



## JCB CEA Project Innovation Category

This category recognises the most original and ground-breaking approach to a project including new concept, technology and/or innovative process that was instrumental in increasing operational efficiency or improving project delivery.

### FINALISTS

#### Createnergy OilBox Waste Oil Management

Createnergy developed OilBox, an automated solution to reuse its own waste oil as a diesel substitution for blasting operations. The OilBox saves cost, helps the environment and reduces B-double movements in removing waste oil and transporting diesel to site.

#### Puma Energy Pumamax Next Gen Diesel

Puma created a new diesel additive which increases fuel consumption by 5-10%, and reduces diesel particulate matter by up to 80%. Not only does this save money, it increases machine availability and minimises carbon footprint.



### WINNER

#### Mine Energy Solutions Dual Fuel (HDCNG) Durability Trial

Mine Energy Solutions successfully trialled using both natural gas and diesel as fuel sources for off-highway mining trucks at New Acland Coal Mine. The fuel worked to normal diesel parameters with no adverse effects on engine power or performance, reducing diesel cost by up to 25%.

Tackling fuel efficiency addresses a large industry issue, and the demonstrated savings and innovation in this project are clear. The HDCNG fuel has now been integrated into another caterpillar 793F at New Acland Mine, with the patented technology paying dividends.

Judges appreciated the industry-wide implications of this project's demonstrated fuel savings and promising advances in technology.



## METS Ignited Collaboration Award

This category recognises the most outstanding collaborative effort between producers and contractors/suppliers, delivering results and enhancing cost saving, time saving and/or innovative outcomes.

### FINALISTS

#### Anglo American/Nome Services Real Time Tailgate Monitoring

Anglo American worked with Nome Services to implement the remote reading tell-tale system at Moranbah North, following a significant roof failure. The tell-tales (or remote mechanical monitoring devices) allow Anglo to understand the condition of roof stability without putting staff at risk.

#### Anglo American/Jennmar Goliath Cable Bolt System

Anglo American collaborated with Jennmar to develop a 100-tonne cable bolt to replace the existing 60-tonne bolts and improve development cutting rates. The resulting 'Goliath' bolt fit this brief, and introduced an innovative hydraulic tensioner design that further improves cable bolt application.

#### Rio Tinto/Bechtel/Jacobs/McConnell Dowell Amrun Project - Chith Export Facility

Rio Tinto collaborated with major contractors to revolutionise the design, fabrication and construction of its wharf infrastructure. The export facility's jetty and wharf was modularized, saving over 300,000 labour hours and reducing build time by 12 months.

### WINNER

#### Unearthed/Origin Energy/Advance Queensland Unearthed Accelerator

Unearthed aimed to identify and develop four new resources industry startups, bringing new technology to market. The four startups: Canaria, Flowpay, Sitesec and Modulr Tech, all focused on disrupting existing industry technology.

Showing true collaboration, the Unearthed Accelerator program was supported by an industry partner and a government partner. The four startups have all secured paid site trials and are continuing development, creating jobs and engaging with industry.

Judges said this project demonstrated results and genuine innovation, as a valuable program for the whole resources industry that deserves to be encouraged.



## Bowen Basin Mining Club Queensland Mining Contractor of the Year Award

### WINNER - WOLFF MINING

Wolff Mining collaborated with Caterpillar and Hastings Deering to pilot the Command for Dozing module at Curragh Mine. The Command for Dozing module makes mine automation possible in a low-cost environment, while increasing productivity.

Wolff Mining demonstrated innovation and a willingness to collaborate with OEMs to solve a consistent industry issue – and this shone through their submission. Their remote dozer operations trial was smart, collaborative, innovative and had a strong safety element.

“Wolff Mining is leading the industry in this space, solving a consistent industry issue by working with OEMs and taking a risk. This project ticked all the boxes.” – Peter Kane ■





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Humes offers a range of solutions for bridges and platforms, road and rail infrastructure, tunnels and shafts, retaining walls, pipeline systems, water treatment, reuse and detention, and traffic management.

Quality and reliability are the foundation of our success.

Visit [www.humes.com.au](http://www.humes.com.au) or call (07) 4758 6000.

## ENGINEERING PRODUCTS & SERVICES



Jennmar Australia is the leading supplier of ground control solutions throughout the country. Jennmar specialises in the design, development, manufacture and distribution of strata reinforcement and ground control products for the mining, tunnelling and civil construction industries.

For further information visit: [www.jennmar.com.au](http://www.jennmar.com.au)

# Mining Services Directory

## ENGINEERING PRODUCTS & SERVICES



Patcol Group are locally based and ready to assist with all of your engineering needs. We specialise in Civil & Structural design, Project Management & asset management. We currently undertake Satural Audits, Drainage design, workshop modifications, building tie down certification etc. for many mining contractors and companies and are ready to help you!

Call 0447 672 924 or visit [www.patcol.com.au](http://www.patcol.com.au)

## ENGINEERING PRODUCTS & SERVICES



Weldlok® from NEPEAN Building & Infrastructure has served the mining, industrial, civil and fabrication industries for over 60 years. Our specialised product offering encompasses quality grating, industrial and modular handrail systems, steel flooring, stair stringers and drainage grates and covers. We also focus on delivering custom solutions for mining projects.

Call us on (07) 3633 1333 or visit [www.weldlok.com.au](http://www.weldlok.com.au)

## ENGINEERING PRODUCTS & SERVICES



Tailings Consulting - 30 years experience in Evaluation, Re-Mining (Hydraulic, Dredging, Dry Mining), Re-Processing, Studies and Strategy

Processing for high yield and low ash products of traditionally uneconomic or Fine Grained Coking Coals (Girrah Seam, Fort Coopers, Burngroves, etc) - consulting and contracting - completed over 3,000 pilot trials.

Call us on 0409 789 877 or visit [www.tradd.com.au](http://www.tradd.com.au)

## ENVIRONMENTAL



C&R Consulting are an environmental consulting firm that has serviced the Australian mining industry for over 15 years. C&R assist clients through the full life of a project, from feasibility and approvals stages to compliance monitoring through to end of mine rehabilitation.

For further information visit [www.candrconsulting.com.au](http://www.candrconsulting.com.au) or call (07) 4725 3751.

## ENVIRONMENTAL



Dust-A-Side is a leading global provider of haulroad and Dust Control Management solutions for the mining industry, providing tailored pit-to-port solutions for haulroads, LV roads, stockpiles, CHPPs and more.

Operating since 1973, we operate across four continents and have accumulated over 500 years of project experience with a single-minded focus.

Call us on 1800 662 387 or visit [www.dustaside.com.au](http://www.dustaside.com.au)

## ENVIRONMENTAL



Ecosure is one of Australia's largest fully-certified environmental consultancies. Working in South East Queensland, Central Queensland, Townsville, Coffs Harbour, Adelaide and Sydney, with over 90 in-house specialists, Ecosure is committed to working for clients who share our vision of quality service leading to good environmental outcomes.

Visit [www.ecosure.com.au](http://www.ecosure.com.au)

## EQUIPMENT & SERVICES



Central Highlands Equipment are your mine-specification equipment supplier for JCB, Atlas Copco and Hiab in the central and northern Bowen Basin. Located in Paget, our teams are quick to site and able to provide servicing, sales and ongoing product support with qualified, site-inducted technicians.

To learn more about our products, visit [chequipment.com.au](http://chequipment.com.au) or call our team on 4952 6061.

## EQUIPMENT & SERVICES



Central Queensland Equipment provides mine-spec equipment sales and service for Kobelco, Atlas Copco, Hiab and Auger Torque, plus servicing and breakdown maintenance on all ancillary equipment and plant. Located in Rockhampton, we service the southern Bowen Basin and can provide quality, site-compliant equipment quickly.

For more information on our product range, visit [cqequipment.com.au](http://cqequipment.com.au) or call our team on 4839 8400.

## EQUIPMENT & SERVICES



Focused on performance, Doherty are leaders in innovation, safety and quality for quick couplers, buckets & other earthmoving attachments. We're also one of the few manufacturers globally to offer fully automatic quick couplers 100 percent compliant to Australian standard AS4772-208, European EN474 standard, ISO 13031 international standard & all major contractor policies.

For more information visit [dohertydirect.net](http://dohertydirect.net) or call 1800 057 021.

## EQUIPMENT & SERVICES



Filter Technology Queensland provides fluid and air filtration units as fixed or mobile configurations.

Our on-board filtration systems keep fluids consistently clean with reduced contamination. Using filtration extends oil life and increases component life, while lowering fuel consumption and reducing wear with less environmental impact and less downtime.

For more information call 07 4837 1271 or email [sales@filtertechnologyqld.com.au](mailto:sales@filtertechnologyqld.com.au)

## EQUIPMENT AND SERVICES



HTG sells reliable world renown brands of petrol, diesel and hybrid generators and lighting towers. Manufactured to the highest quality standards to ensure long life reliability. In addition, we supply & service professional engine driven compressors and pumps to customers large and small throughout Australia.

Call 1300 743 529 or visit [www.hightechgenerators.com.au](http://www.hightechgenerators.com.au)

## EQUIPMENT & SERVICES



Lube Technology supplies pump-free field and workshop lube exchange systems. Our systems are virtually maintenance-free, eliminating contamination, waste and spills, and our fully epoxy-lined tanks are ideal for capturing & replenishing coolant.

We will work with you to develop a lubricant exchange model to suit your business.

For more information call 0409 061 950 or email [sales@lubetechnology.com.au](mailto:sales@lubetechnology.com.au)

# Mining Services Directory

## EQUIPMENT & SERVICES



As Australia's #1 and largest professional tool retailer now with 74 stores Australia wide and growing fast, you can be confident in receiving the best deals, competitive prices, quality products.

We are specialists in leading brands such as Makita, Sidchrome, Hikoki, Bosch, Stanley, Cigweld, Lincoln, Flexovit, 3M, Milwaukee, DeWalt, Sutton and many more.

Call (07) 4963 9500, email [sales.mackay@totaltools.com.au](mailto:sales.mackay@totaltools.com.au) or visit [www.totaltools.com.au](http://www.totaltools.com.au)

## EQUIPMENT HIRE



Abelift Hire is a long established Dry hire supplier specialising in purpose-built welding service trailers, diesel welders, and accessories. Our fleet of mine compliant fully equipped welding trailers and AirPack diesel welders carry current site compliance for most Bowen Basin mines. Accommodating short or long-term hire arrangements.

For more information call 0407 639 679 or visit Local Search.

## EQUIPMENT HIRE



FleetCo is a leading dry hire provider of heavy mobile equipment, but we're not about simply renting plant. Our focus is ensuring you get a tailored, total asset solution. We offer Australia's most comprehensive range of reliable equipment to move the earth – from bulk earthworks to ultra-class mining plant.

For more information visit [fleetco.com.au](http://fleetco.com.au) or call 1300 353 382.

## EQUIPMENT HIRE



iHire Queensland provides heavy and medium parts hire and exchange, to keep your equipment operating while parts are being overhauled or repaired. Our range and support is second to none, covering most Bowen Basin standard equipment and keeping your fleet productive at all times.

To see if we have the part you need, call 1300 SMW GROUP.

## EQUIPMENT HIRE



On site Rental Group are your specialist B2B equipment rental partners. We have 30+ years' industry experience and 50,000+ pieces of equipment across 30 national branches and targeted co-locations. We're strategically placed in the Bowen Basin with branches in Gladstone, Emerald and Moranbah - fulfilling our customers' requirements on time and on-budget.

Visit [www.onsite.com.au](http://www.onsite.com.au) or call 13 40 40.

## FABRICATION



Located in Mackay and operating for over 30 years Consolidated Plastics and Epoxy have been supplying industrial plastic fabrications, epoxy flooring, rubber and polyurethane components to the mining, sugar, ports, fertilizer and associated industries. CPE's range includes polyethylene tanks, launders, conveyor guards, pump guards, epoxy coatings, chute linings, nylon gears and bushes.

Visit [www.cpeql.com.au](http://www.cpeql.com.au) or call (07) 4957 2472.

## FABRICATION



DIACON Conveyor Improvement System is designed to reduce spillage, clean up costs and improve safety around conveyors.

By predominantly manufacturing its products with colour fast, UV stable, high density polyethylene plastic and ultra high molecular weight polyethylene plastic, their products offer significant long-term maintenance savings over the more traditional steel and aluminium guarding alternatives.

Visit [www.diaconaust.com.au](http://www.diaconaust.com.au) or call (07) 4957 2472.

## FABRICATION



Weldlok® from NEPEAN Building & Infrastructure has served the mining, industrial, civil and fabrication industries for over 60 years. Our specialised product offering encompasses quality grating, industrial and modular handrail systems, steel flooring, stair stringers and drainage grates and covers. We also focus on delivering custom solutions for mining projects.

Call us on (07) 3633 1333 or visit [www.weldlok.com.au](http://www.weldlok.com.au)

## FUEL & LUBRICANTS



East Coast Lubes supply the full range of quality Mobil oils and greases to local distributors, auto parts stores, resellers, automotive workshops, mining, power generation, industrial, marine, agricultural and retail customers throughout Queensland, available from small packs sizes right through to bulk oil and grease deliveries in their own fleet of specialised delivery vehicles.

Visit [www.eclubes.com.au](http://www.eclubes.com.au) or call 1800 069 019.

## FUEL & LUBRICANTS



Puma Energy is committed to Fuelling Journeys for our customers. When we say we fuel journeys, this goes beyond the petrol pump and providing high-quality fuel to some of the world's largest airlines, shipping companies and power suppliers. It means we are a 'one stop shop' for our business customers globally, supplying them with a full range of products and services that meet their needs.

For more information visit [pumaenergy.com](http://pumaenergy.com) or call 1300 723 706.

## GEOLOGICAL & SURVEYING



Through our suite of laser scanning solutions Veris can deliver high resolution complete data sets without disruption to workflow. We can provide accurate mapping of infrastructure for projects and infrastructure of all types. When accuracy is paramount, Veris offers a tailor-made solution to ensure assets remain safe, operational and efficient.

Visit [www.veris.com.au](http://www.veris.com.au) or call Scott on 0473 259 090.

## HEAVY MACHINERY / EQUIPMENT



Construction Equipment Australia (CEA) is a leading distributor for world-renowned capital equipment brands. We are the national distributor for JCB mining and construction equipment as well as Dynapac rollers and pavers. CEA is a privately owned business with five branches, over 70 dealer outlets and more than 170 employees.

Visit [www.jbccea.com.au](http://www.jbccea.com.au)

# Mining Services Directory

## HEAVY MACHINERY / EQUIPMENT



GraysOnline are Australasia's largest industrial valuation and asset realisation specialist, with a proven track record of providing total project solutions to the mining sector. GraysOnline's key staff are experienced and qualified valuers, project managers and auctioneers, who possess an intimate knowledge of all mining sectors, processes and related equipment.

For more information visit [graysonline.com](http://graysonline.com)

## HEAVY MACHINERY / EQUIPMENT



Mining & Construction International provides quality Equipment and Parts to the Mining & Construction Industries Worldwide. We can provide alternative sourcing of new, used and reconditioned Equipment & Parts depending on your requirements and budget through many reliable international contacts. We strive to establish long-term relationships with our clients.

Call us on +356 7965 5366  
or visit [www.macint.net](http://www.macint.net)

## HEAVY MACHINERY / EQUIPMENT

### NATIONAL GROUP

The National Group comprises of leading companies from the mining, resource, transport, logistics and personnel supply industries. Our services include whole of mine operations and contract mining, plant and equipment hire including satellite dozers, parts and attachments, heavy haulage of any size, auctions, valuations and disposal of assets.

Call us on 1300 794 448 or visit  
[www.national-group.co](http://www.national-group.co)

## HEAVY MACHINERY / EQUIPMENT



Offroad Trucks Australia is the national dealer for Tatra trucks and THT fire appliances, both of which have been built in the Czech Republic for over 100 years. With a strong military background, Tatra's heavy duty off-road vehicles have proved extremely valuable in the hardest of terrains.

Visit [www.offroadtrucks.com.au](http://www.offroadtrucks.com.au)

## HEAVY MACHINERY / EQUIPMENT



pewag - strong is not enough

pewag's business is mainly tyre protection chains, hoist and conveyor chains, engineering, lifting and lashing chains plus forestry chains, Military operations.

Please visit the group website at  
[www.pewag-group.com](http://www.pewag-group.com) or call  
(02) 4260 0200.

## LOCAL COUNCIL



Mackay Regional Council is proactive in facilitating development and investment in the region. Council is a big supporter of the resources and METS sectors and is an ideal first point of contact for companies looking to expand or relocate to the region.

Contact 1300 MACKAY, or find more information at [www.investmackay.com](http://www.investmackay.com)

## MAINTENANCE & REPAIR SERVICES



Alloys International is a privately-owned Australian company, specialising in the sale of wear resistant welding consumables and chrome carbide weld overlay wear plate. We have 40+ years of experience at providing expert welding and wear-prevention advice.

For more information visit [www.alloysint.com.au](http://www.alloysint.com.au)  
or call Rob on 0432 407 666.

## MAINTENANCE & REPAIR SERVICES



Clean Team is a specialist division of SMW Group dedicated to industrial cleaning of draglines, shovels, excavators and other heavy equipment. We are quick to site and able to handle complex shutdown cleans. Our experienced industrial cleaners possess all necessary qualifications and are ready for shutdown mobilisation now.

To book the Clean Team, call  
1300 SMW GROUP.

## MAINTENANCE & REPAIR SERVICES



Coxons Group Australia specialises in the maintenance and supply of mining, rail, transport and industrial cooling components and heat transfer solutions. We own Australia's largest range of exchange cooling components and have the largest geographical coverage of any cooling component specialist on Australia's east coast.

For more information visit  
[www.coxonsgroup.com.au](http://www.coxonsgroup.com.au) or call 1300 COXONS.

## MAINTENANCE & REPAIR SERVICES



We honour our word, we say what we mean and mean what we say. Working within the heavy industrial sector, Haynes Group is the most responsive and reliable, solutions-driven provider of labour hire, and equipment management, servicing, and maintenance in today's market.

Innovate. Support. Respond.

Visit [www.haynesgroup.com.au](http://www.haynesgroup.com.au) or call  
(07) 3426 3800.

## MAINTENANCE & REPAIR SERVICES



More Air Group is a specialised supplier, service agent and maintenance provider for all things compressed air and pneumatics. As locally based mining industry specialists, we offer a 24/7 on-call service, as well as OEM equipment from the leading brands and distributors of air, pneumatics and breathing air equipment.

Call us on (07) 4952 5251 or visit  
[www.moreair.com.au](http://www.moreair.com.au)

## MAINTENANCE & REPAIR SERVICES



SMW Group's Heavy Fabrication and Engineering division provides a full end-to-end equipment maintenance service for the Bowen Basin and mining sector. We pride ourselves on innovative design and engineering for all major and minor fabrication projects, mechanical repairs and rebuilds, either on your site or in our fully-equipped Parkhurst workshop.

To see our latest projects, visit [smwgroup.com.au](http://smwgroup.com.au)  
or call us on 1300 SMW GROUP.

# Mining Services Directory

## MATERIALS HANDLING



For over 30 years Kinder has earned the strong reputation of being a leading global independent supplier and manufacturer of innovative and practical solutions to improve and maintain the running efficiency of conveyor and bulk materials handling equipment used to convey a variety of products.

Call (03) 8587 9111, visit [www.kinder.com.au](http://www.kinder.com.au) or email [conveyorsolutions@kinder.com.au](mailto:conveyorsolutions@kinder.com.au).

## MATERIALS HANDLING



Now manufacturing in Queensland, Australia. Decades of experience allow us to provide you with a cleaner, safer and more productive operation.

At Martin Engineering, our technicians and engineers have been solving bulk material handling problems globally for over 70 years and are available to provide expert advice on all of your bulk material handling questions.

For more information visit [www.martin-eng.com](http://www.martin-eng.com) or call us on 07 5522 0841.

## MATERIALS HANDLING



More Air Group is your local Festo Partner and the one stop air shop for pneumatics. From fittings, tubing, solenoid valves, and air preparation to valve terminals, process automation, valve assemblies and mining control cabinets. We've got you covered. We keep a large range of products in store and can help with customised solutions to suit your application.

Call us on (07) 4952 5251 or visit [www.moreair.com.au](http://www.moreair.com.au)

## MATERIALS HANDLING



NEPEAN Conveyors is an Australian owned company specialising in design, in-house manufacture, installation and service of overland, underground and belt conveyor products, systems and bulk materials handling projects for over 30 years. We are an expert conveyor components and conveyor systems OEM, with manufacturing facilities in Australia, Germany, Sweden, Finland, South Africa and Brazil, servicing 66 countries.

Visit [www.nepeanconveyors.com](http://www.nepeanconveyors.com) or call 1800 NEPEAN.

## MATERIALS HANDLING



Shipping Container Rentals leases and sells shipping containers, site accommodation and dome shelters. We also modify containers to spec. Stock includes general purpose containers, side opening, dangerous goods storage, insulated, workshops, portable crib rooms and offices. The company services the whole of Queensland through regional depots including Mackay, Moranbah, Proserpine, Rockhampton and Brisbane.

Visit [www.scr australia.com](http://www.scr australia.com) or call 1800 006 162.

## MATERIALS HANDLING



Ultrahaul is a cost-efficient, innovative and lightweight tray for heavy haulage. Developed by SMW Group, the Ultrahaul is custom-designed for your site's payload, giving the maximum value in haulage per spend. In the field, Ultrahaul trays have increased our clients' productivity by up to 40%.

For a customised quote, email [info@ultrahaul.com.au](mailto:info@ultrahaul.com.au) or call 1300 SMW GROUP.

## MEDICAL & EMERGENCY SERVICES



CQ Workfit specialises in employment medicals, providing priority healthcare service to the mining, construction and corporate arena. We have a team of Nominated Medical Officers approved to complete Coal Board Medicals. With our new dedicated centre, services are delivered in a modern centrally located facility at 11 Archer Street, Rockhampton (opposite City Centre Plaza).

Call us on 1800 CQ WORKFIT.

## MEDICAL & EMERGENCY SERVICES



MSS Strategic Medical and Rescue is a specialist paramedical, emergency response and rescue division of MSS Security. Providing fully qualified and trained Paramedics, Emergency Response and Rescue personnel to the mining and resources sector including specialised Clinical Emergency Response Advisory, Clinical Governance and Medical Consultation Services.

Call us on 0417 688 812 or visit [www.msssecurity.com.au/market-sectors/strategic-medical-and-rescue/](http://www.msssecurity.com.au/market-sectors/strategic-medical-and-rescue/)

## MEDICAL & EMERGENCY SERVICES



STAR Radiology is the first DNRME accredited company that can provide ILO chest x-rays, other x-rays and medical services to the mine site. Call to enquire about our services today.

Call us on (07) 3186 8542 or visit [www.starradiology.com.au](http://www.starradiology.com.au)

## OEM

Hastings Deering



Hastings Deering is one of the leading Cat® dealers globally. The company has the exclusive distributor rights for the sale of Cat equipment, technology solutions, parts and service in Queensland, Northern Territory, Papua New Guinea, the Solomon Islands and New Caledonia.

Call 1300 980 915 or visit [www.hastingsdeering.com.au/bbmc](http://www.hastingsdeering.com.au/bbmc)

## PARTS & ACCESSORIES



Bridgestone Mining Solutions Australia

Combining a specialised Tyre Repair Facility, Award-Winning Wheel Repair Facility, RTO Training, Technical Engineering, Topy OTR Wheel Product Distribution and Support Centre, On and Off Site Tyre Fitting, Exactra Valve Facility and Tyre and Rim Life Additive Supply.

Bridgestone Mining Solutions Australia: tyres are just the beginning.

For more information, visit [www.bridgestoneminingolutions.com.au](http://www.bridgestoneminingolutions.com.au)

## PARTS & ACCESSORIES



The Kal Tire Mining Tire Group delivers innovative solutions to maximise tire life and increase productivity.

With over 45 years of experience and global operations on five continents, The Kal Tire Mining Tire Group is the only tire service provider capable of handling all of your tire requirements on a daily basis.

To find out more, visit [kaltiremining.com](http://kaltiremining.com)



# Mining Services Directory

## PARTS & ACCESSORIES



A trusted business partner since 1985, TechPlas has offered safer, smarter plastic solutions for all industries; including products such as the TechBoard, a lighter-weight and more durable plastic scaffold plank, non-conductive safety star posts and complete, custom profile-extrusion with Australian manufacturing capabilities.

Contact us today on (02) 9636 6755 or via our website [TechPlas.com.au](http://TechPlas.com.au)

## PROFESSIONAL SERVICES



AAM is a leading provider of geospatial technology services.

Our global team consists of experienced professionals in surveying, mapping and geographic information system (GIS). With offices located across Australia, New Zealand, South East Asia and Africa, AAM is renowned for its excellence in the geospatial industry for over 50 years.

Call us on (07) 3620 3111 or visit [www.aamgroup.com](http://www.aamgroup.com)

## PROFESSIONAL SERVICES



Inspire are not your typical accountants. We advise you on how to legally minimise your tax, provide regular advice on how to maximise your profitability, help you to make smart decisions with your after-tax earnings to enhance your personal wealth and achieve your business and personal goals.

Visit [www.inspirebusinessservices.com.au](http://www.inspirebusinessservices.com.au) or call (07) 4914 2400.

## PROFESSIONAL SERVICES



Mine Super is an industry super fund owned for the exclusive benefit of members. We've been helping deliver exceptional retirement outcomes to miners and their families for over 77 years.

Turn to Mine for award-winning super and pension products, advice, and insurance tailored for workers in the mining and supporting industries.

For more information refer to the PDS and FSG available at [mine.com.au](http://mine.com.au) or call 13 64 63.

## PROFESSIONAL SERVICES



The team behind Strategic Mining Communications have years of experience in creating relationships between key mining industry businesses and stakeholders. With the ability to help you present your business (through websites, capability statements, events and more), our specialty is getting you in front of the people who matter.

For more information, visit [www.strategicminingcomms.com](http://www.strategicminingcomms.com)

## PROFESSIONAL SERVICES



TCLH delivers high-quality catering, labour hire and camp management services to remote locations across Australia, throughout the mining, oil & gas and remote construction industry. We have the capability to deliver to various project specifications, whilst providing an efficient, personalised and excellent quality service.

Visit [www.tempchflabourhire.com](http://www.tempchflabourhire.com) or call (07) 5526 7700.

## PROFESSIONAL SERVICES



The Invoice Market ("tim.") is Australia's leading provider of flexible funding solutions for Australian businesses. tim. thinks outside the box to find a funding solution that will work for your business.

Our mission is to help your business grow through fast and flexible funding, so if you have a business supplying goods or services to other Australian businesses on trade terms then we'd love to help with your cash flow needs.

For more information, visit [www.theinvoicemarket.com.au](http://www.theinvoicemarket.com.au) or call 1300 694 686.

## PROFESSIONAL SERVICES



Managers & suppliers of mining and manufacturing spare parts trust Vueterra to deliver material availability and on time delivery solutions by improving supply chain flow. Vueterra specialises in material and procurement data management with specialist consultants that can guide and execute transformation activities which improve delivery to supply chain and maintenance customers.

Visit [www.vueterra.com.au](http://www.vueterra.com.au) or call 0400 955 532.

## RECRUITMENT & TRAINING



Civil Safety is the leading civil and mining training organisation in Queensland. With seven High Risk Training Facilities at key locations throughout Queensland, we can provide for all your training needs, VOCs, inductions and safety audits. Our in-house Resource and ICT teams can design custom or contextualised online resources to ensure that your training obligations always remain compliant.

Call 1300 CIVIL S or visit [www.civilsafety.edu.au](http://www.civilsafety.edu.au)

## RECRUITMENT & TRAINING



MEGT – your local apprenticeship experts.

We are an Australian not-for-profit organisation that has been committed to providing real employment and training opportunities to our local communities for over 35 years.

As Australia's largest and only national Apprenticeship Network Provider, we are your local apprenticeship experts.

Call 13 MEGT or visit [www.megt.com.au](http://www.megt.com.au)

## RECRUITMENT & TRAINING



On Common Country (OCC) is a project engagement company which supports project proponents and forms administrative arrangements with local organisations, indigenous stakeholders and industry employers. OCC works in conjunction with Civil Safety to provide Safety advice and training programs and will source additional training services. Our representatives also work in conjunction with traditional owners.

To find out more, visit [www.oncommoncountry.com.au](http://www.oncommoncountry.com.au) or call 0429 920 693.

## SAFETY & SECURITY



Corporate Protection Australia Group

Corporate Protection Australia Group is a Queensland based organisation with over 20 years' experience providing premium medical, security and fire & rescue staffing services to the oil & gas, energy, mining, maritime and critical infrastructure industries. As a pioneer of the bundled services model, we tailor solutions to mitigate client risk.

Visit [www.cpagroup.com.au](http://www.cpagroup.com.au) or call (07) 3393 9977.

# Mining Services Directory

## SAFETY & SECURITY



Embroidery Collective is a local Moranbah-based workwear, uniform and gym wear supplier.

We provide a range of services from embroidery to vinyl-based transfer. All of our embroidery and printing is completed in-house in Moranbah with industrial-grade embroidery equipment. Drop in or call us for a no-obligations quote.

Call us on 0459 752 261 or visit [embroiderycollective.com](http://embroiderycollective.com)

## SAFETY & SECURITY



With more than 6,000 staff and infrastructure in every state and territory providing true national coverage, MSS Security has the capacity and capability to provide wide-ranging security and paramedic services to all market segments. This scope provides our customers with easy and flexible solutions with regard to their resourcing needs.

Visit [www.msssecurity.com.au](http://www.msssecurity.com.au) or call 0401 776 402.

## SAFETY & SECURITY



Weldlok® from NEPEAN Building & Infrastructure has served the mining, industrial, civil and fabrication industries for over 60 years. Our specialised product offering encompasses quality grating, industrial and modular handrail systems, steel flooring, stair stringers and drainage grates and covers. We also focus on delivering custom solutions for mining projects.

Call us on (07) 3633 1333 or visit [www.weldlok.com.au](http://www.weldlok.com.au)

## SAFETY & SECURITY



Operating for nine years, Triple A is a provider of Health and Safety services. We develop risk based safety systems specific for your business, across all industries. We facilitate risk assessments, investigations, inspections and complete legislative compliance audits. Triple A is the one stop shop for support for your business.

Visit [www.tripleagroup.com.au](http://www.tripleagroup.com.au) or call (07) 4819 2111.

## SOFTWARE



4PS SOFTWARE

4PS Software takes you from error prone spreadsheets, into a real time cloud based software that manages people, plant, procedures and processes. Automated notifications, equipment registers and training matrixes. Australian developed software.

4P Mobile for digital Inspections, Incident Reporting, Timesheets, Change Management, Risk Assessment, Training, Meetings, Observations, Permits and more...

## SOFTWARE



Take control of your remote workforce travel with our online solution, that's easy to implement and even simpler to use.

Book Air & Coach charter, Self-drive and Site accommodation bookings, all on the one platform. Improves processes, supplier integration, communications, tracking, reporting and can be tailored to your specific needs.

For more information visit [www.upliftlogistics.com](http://www.upliftlogistics.com) or call 07 3180 0914.

## TRANSPORT & LOGISTICS



Centurion delivers flexible and reliable national supply chain solutions with end-to-end visibility for customers in the resources, mining and energy sectors. We're specialists in heavy haulage movements and general freight logistics. With 50 years' experience, Centurion has developed into a full logistics solutions provider delivering a comprehensive range of distribution, warehousing, and project services.

Call us on (08) 9278 3000 or visit [www.centurion.net.au](http://www.centurion.net.au)

## TRANSPORT & LOGISTICS



Greyhound Resources is a division of Greyhound Australia catering to the transportation needs of the mining and resources industry. Where there is mining and resources activity, you'll probably find us. From the Bowen Basin in the east to Onslow in the west, we're helping to move workers safely and on time.

Call us on 1300 304 199 or visit [www.greyhound.com.au/extra-services/mining-and-resources/](http://www.greyhound.com.au/extra-services/mining-and-resources/)

## TRANSPORT & LOGISTICS



Australia wide freight deliveries – hotshots our specialty!  
Operating since 2006, 24/7 on call 365 days, with a fleet of 1t utes, 3t flatbed, 0-15 Tilt Trays. Our vehicles are mine site-compliant, as well as serviced and inspected regularly for reliability. For peace of mind our vehicles are GPS tracked and comprehensively insured.

For bookings, call 0429 859 127 or visit [www.kgbpilotsandfreight.com](http://www.kgbpilotsandfreight.com)

## TRANSPORT & LOGISTICS



ORIX Australia is one of Australia's leading providers of fleet management, novated leasing and telematics solutions. Our success is built on developing strong relationships with our clients to understand their business and then ensure their vehicle fleets are fully optimised.

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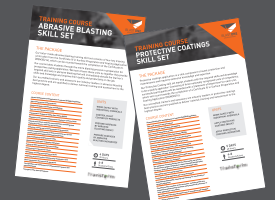
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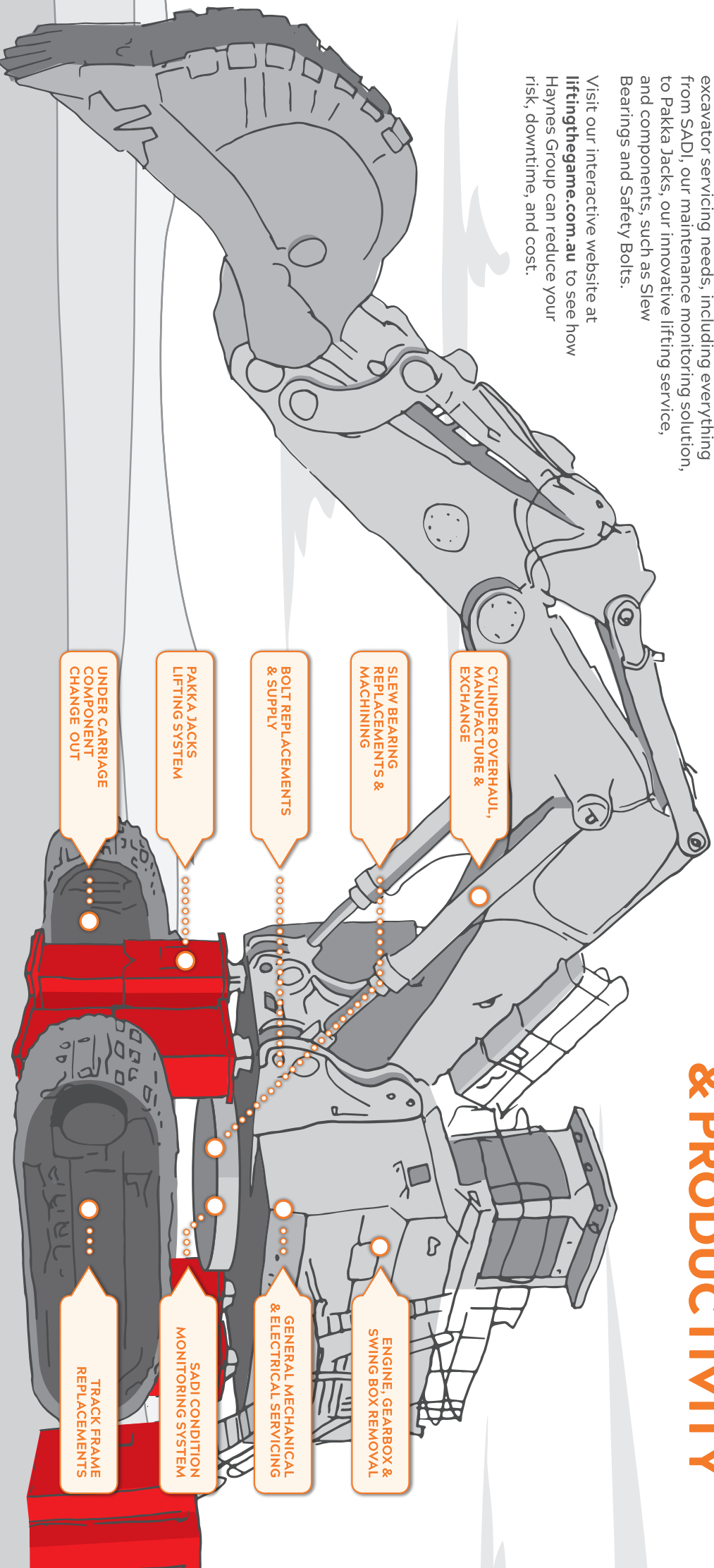
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