
MINING SECTOR UPDATE

AUGUST 2019



INTRODUCTION

Welcome to the August edition of the Mining Sector Update from Corrs Chambers Westgarth. This briefing keeps you up-to-date with recent mining deals, market rumours, potential opportunities and relevant regulatory updates.

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IN THIS EDITION

This month we look at:

- how the change of Prime Minister in Papua New Guinea will affect major resource projects
- what a National Hydrogen Strategy means for Australia
- the year so far for coal

RECENT ANNOUNCEMENTS

St George completes funding for its Mt Alexander Project

Australian miner, ASX listed **St George Mining Limited**, confirmed on 29 July 2019 that it has completed funding for its **Mt Alexander** high-grade nickel-copper sulphide project located in the Goldfields region of Western Australia. This additional funding has come through the issue of A\$3.3 million worth of fully paid ordinary shares, A\$500,000 of which was funded by ASX listed gold explorer, **Moho Resources**.

The company says that this new funding will support an expansion of their exploration programs at Mt Alexander at a time when there is 'heightened investor interest in the nickel sulphide market'.

You can read St George Mining's ASX announcement [here](#).

You can read Moho Resources' ASX announcement [here](#).

Blackham Resources to sell its Lake Way assets

ASX listed **Blackham Resources Limited** announced on 23 July 2019 that it will sell its Lake Way tenements to ASX listed **Salt Lake Potash Limited** for A\$10 million cash. The Salt Way tenements form part of the **Williamson Mine**, an open pit gold mine in Western Australia.

As part of the sale, Blackham will retain certain gold mining rights in regards to the tenements and will provide Salt Lake Potash with groundwater rights for their sulphate of potash project. The A\$10 million cash consideration is in the form of a A\$3 million non-refundable deposit and A\$7 million payable to Blackham at completion, which is expected to occur this quarter.

You can read the full ASX announcement [here](#).

South32 Limited assessing offers for South Africa Energy Coal

On 18 July 2019, ASX listed **South32 Limited** announced that it is assessing bids received for South Africa Energy Coal (**SAEC**) during the June 2019 quarter. South32 holds 92% of the shares in SAEC.

SAEC has four coal mining operations and three processing plants in Mpumalanga Province, South Africa. SAEC expects to provide a further update to the market in the December 2019 half year.

You can read the full ASX announcement [here](#).

Allegiance Coal to acquire Colorado coking coal mine

On 15 July 2019, ASX listed **Allegiance Coal Limited** announced that it has entered into a binding terms sheet to acquire all the shares of **New Elk Coal Company** which owns the **New Elk Coal Mine** in southeast Colorado. The mine, which has an estimated resource of 656 Mt of hard coking coal, has been on care and maintenance since 2012 after a fall in coking coal prices which led to the previous owner, **Cline Mining Corporation**, filing for bankruptcy.

Allegiance says that the mine is fully constructed, permitted, and has good quality hard coking with thicker coal seams than what is typically seen in North American coal mines. As the mine was previously operational, initial capital and operating expenditure is expected to be low.

Completion of the sale is contingent on a number of conditions precedent being satisfied, but needs to occur before 14 July 2020.

You can read the full ASX announcement [here](#).

Mineral Resources and Albemarle Corporation enter into revised arrangements for Wodgina Lithium

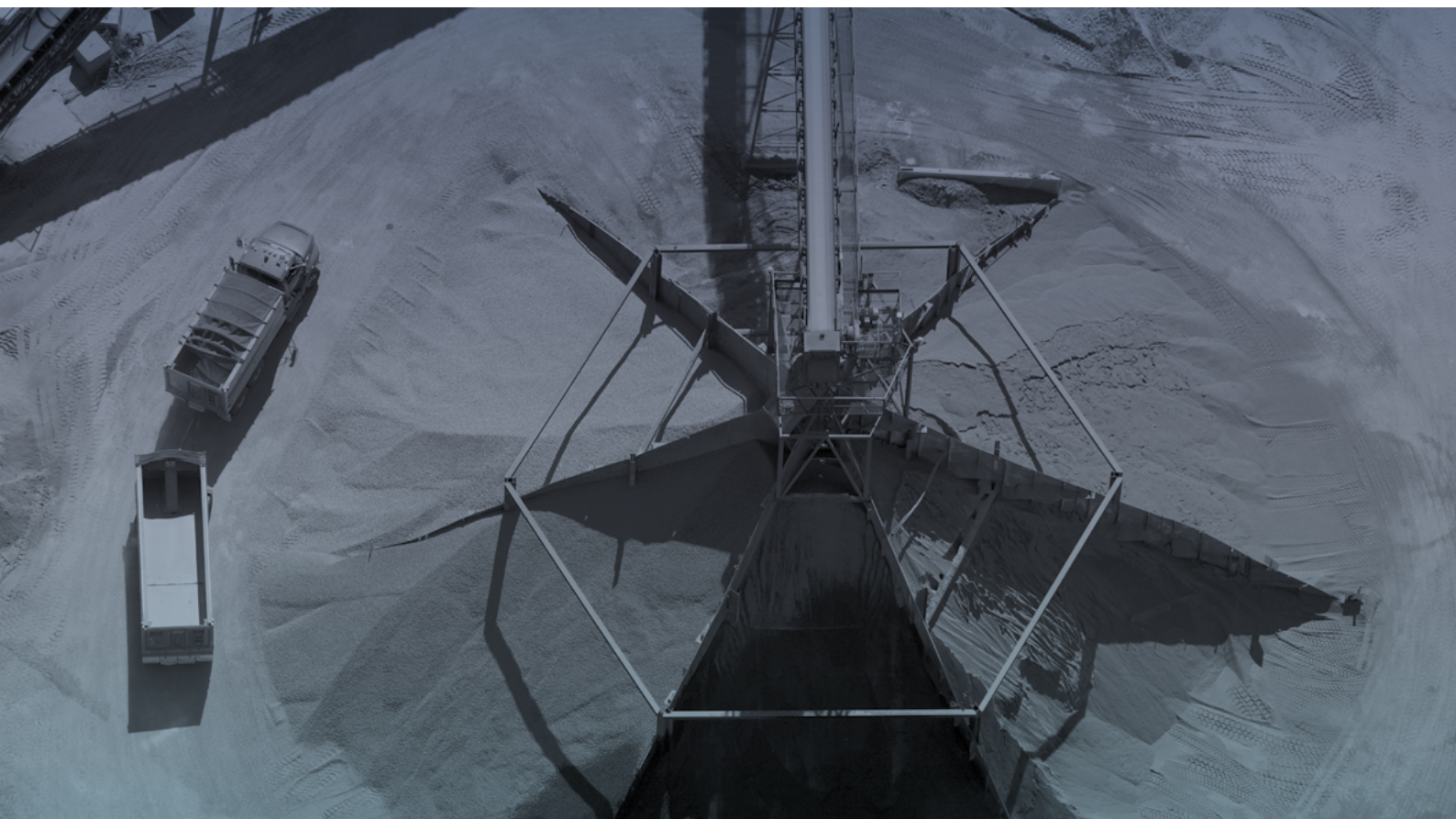
On 14 December 2018, ASX listed **Mineral Resources Limited** announced that it entered into a binding Wodgina Asset Sale and Share Subscription Agreement with **Albemarle Corporation**, whereby Mineral Resources sold a 50% interest in the Wodgina Lithium Project to Albemarle.

On 1 August 2019, Mineral Resources announced that it has entered into revised arrangements with Albemarle, which allow Mineral Resources the opportunity to participate in the **Kemerton** lithium hydroxide plant, located in Kemerton, Western Australia.

The revised arrangements are contained in the Kemerton Sale Agreement, an agreement for the sale of a 40% interest in the Kemerton Modules to Mineral Resources, and an Amendment Deed to the Wodgina Asset Sale and Share Subscription Agreement, an agreement for the sale of a 60% interest in the Wodgina Lithium Project to Albemarle. The purchase price payable by Albemarle is US\$1.3 billion which includes US\$820 million in cash payable upon completion and a 40% interest in the Kemerton Modules.

Albemarle and Mineral Resources will also form an unincorporated joint venture to operate the Wodgina Lithium Project and Kemerton Modules, with Albemarle holding a 60% interest and Mineral Resources holding a 40% interest.

You can read the full ASX announcement from 14 December 2018 [here](#) and from 1 August 2019 [here](#).



MARKET RUMOURS AND OPPORTUNITIES

BHP is looking
at options for
its thermal coal
operations

BHP exploring options for its thermal coal operations

Following on from our last Mining Sector Update, the *Financial Times* reported on 11 July 2019 that ASX listed BHP is looking at options for its thermal coal operations, including disposal.

According to unnamed sources, the process is at an early stage with no guarantee that BHP will divest its assets. BHP's two main coal assets include the **Mount Arthur** mine in the NSW Hunter Valley (also known as **New South Wales Energy Coal**) and **Cerrejon**, a mine in Colombia. A Deutsche Bank report cited in the article valued BHP's thermal coal assets at US\$2.5 billion.

According to unnamed sources in an article in *The Australian* on 16 July 2019, BHP has hired Macquarie Capital to undertake a scoping study to determine whether to sell Mt Arthur and Cerrejon.

On 18 July 2019, *Mergermarket* reported that sector advisors said that Australian based coal producer and developer, ASX listed **Yancoal Australia Ltd** along with companies in India are the most likely buyers for BHP's thermal coal assets. The sector advisors said interest in BHP's thermal coal assets could also come from Indonesia, China, Japan and South Korea.

Indian government may spin off Coal India Limited's units into five separate listed entities

Bloomberg reported on 17 July 2019 that state-owned **Coal India Limited**, the world's largest coal miner, and the Indian government's coal ministry are said to be evaluating a proposal submitted by India's Department of Investment and Public Asset Management to list four production units as well as Coal India's Central Mine Planning and Design Institute. The article identified the four production units as being Northern Coalfields, Central Coalfields, South Eastern Coalfields and Mahanadi Coalfields.

The driver behind spinning off Coal India's units into five separate listed entities is said to be raising government funds and boosting competition.

The Indian government holds a 71 percent stake in Coal India, which has an estimated market capitalization of US\$20.6 billion.

Pilgangoora sale may not live up to previous lithium asset divestments

The Australian reported on 17 July 2019 that the auction process for sale of between a 20 to 49 percent stake in ASX listed **Pilbara Minerals'** Pilgangoora Lithium-Tantalum Project in Western Australia is moving slowly and may not live up to previous sales of lithium assets. The article said that final bids may have been submitted in June and there has been 'radio silence' since.

In its market update on 17 June 2019, Pilbara Minerals said it expects to provide an update and a potential outcome from the partnering process in the September quarter, as parties continue with due diligence.

You can read the full market update [here](#).

Barrick Gold said to have engaged advisors to sell Massawa gold project

Bloomberg reported on 6 July 2019 that **Barrick Gold Limited**, a Canada-based mining group, has engaged advisors to locate a buyer for its Senegal-based Massawa gold project for up to US\$500 million. Barrick holds an 83 percent stake in the Massawa gold project.

Civeo Corporation seeking to acquire accommodation operations in Australia

Mergermarket reported on 5 July 2019 that **Civeo Corporation**, a Houston-based provider of workforce accommodation, is seeking to acquire accommodation operations for miners that are owned by third party providers such as mining or real estate companies. According to Civeo's Senior Vice President for Australia, Peter McCann, Civeo is seeking to scale its network around Australia. Civeo has a market capitalization of US\$269.2 million.

Nathan Tinkler appears to be looking to return to Australian resources sector

The Australian reported on 5 July 2019 that Nathan Tinkler appears to be seeking to return to the Australian resources sector. Disclosure documents list Nathan Tinkler's **Bentley Resources**, a group registered in Singapore, as having submitted a A\$1 bid to buy the **Lady Annie Copper Mine** located in north Queensland.

The Lady Annie copper mine has been owned and operated by the **CST Group Limited**, a group registered in Hong Kong, since 2010. The CST Group obtained approval from its shareholders to sell the Lady Annie copper mine to Bentley Resources and unlisted Australian company **Kombi Mining**.

Under the terms of the sale, Bentley Resources and Kombi Mining will pay A\$1 for Lady Annie and assume up to A\$22.7 million of the A\$262.6 million in inter-company loans owned by CST Group's Australian arm to its parent company.

Glencore looking at Rio Tinto's aluminum assets

Reuters reported on 4 July 2019 that at least three companies, including commodity trader and miner **Glencore**, have expressed interest in purchasing ASX listed **Rio Tinto's** aluminium assets in Iceland, Sweden and the Netherlands.

In late 2018, Rio Tinto re-started the sale process after Norwegian company **Norsk Hydro** pulled out of buying these assets.

Glencore has expressed interest in Rio Tinto's aluminium assets

REGULATORY UPDATES



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Papua New Guinea's new Prime Minister is focused on growing the economy and ensuring equitable distribution of benefits from major projects

Papua New Guinea's National Parliament has recently elected a new Prime Minister, Hon James Marape, in an orderly and democratic process – Mr Marape becomes only the third person to be appointed to the top post since 2002 highlighting the relative stability of leadership within PNG over the best part of two decades.

In his maiden speech, Mr Marape has flagged the need to review Papua New Guinea's resource laws with a view to achieving a more equitable distribution of the wealth generated from resources projects to the country and its people. It is unlikely that this review will be rushed, with the Prime Minister indicating that the new legislative framework may not be implemented until 2025, the year in which Papua New Guinea will celebrate 50 years of independence.

Significantly, Mr Marape has signalled that there would be consultation with industry on the changes, noting the important role foreign investment plays in driving economic growth. Mr Marape has also stated that existing project agreements, lawfully entered into by the State, will be honoured.

Papua New Guinea is blessed with bountiful natural resources including oil, gas, gold, nickel and copper. It is also home to the USD19 billion, ExxonMobil operated, PNG LNG Project which commenced production in 2014 and demonstrated that large scale projects can be developed in Papua New Guinea. Such projects, however, require very substantial capital expenditure, only possible with foreign investment. The proposed review of resource laws will need to strike the right balance between the interests of investors and the people of Papua New Guinea to ensure that investment continues with the support of the people.

The proposed review of resource laws will need to strike the right balance



INSIGHTS

A NATIONAL HYDROGEN STRATEGY – WHAT DOES IT MEAN FOR AUSTRALIA?

Last year, the Council of Australian Governments' (**COAG**) Energy Council formed the Hydrogen Working Group (**HWG**) under the leadership of Australia's Chief Scientist, Dr Alan Finkel. This follows a worldwide trend which has seen governments and industry seriously investigate the potential avenues of producing or scaling up production of hydrogen as an alternative energy source.

The HWG released a discussion paper in March this year outlining the feasibility of a hydrogen industry in Australia and after subsequent stakeholder consultation, released a series of issues papers on 1 July 2019 discussing the potential of a 'National Hydrogen Strategy'. State-level hydrogen strategy papers have also been developed in Queensland, South Australia and Western Australia, with other States also committing to funding various hydrogen-related programs and projects.

The idea of a National Hydrogen Strategy is premised around leveraging Australia's current gas and renewable energy capabilities to develop a large-scale hydrogen export industry with the potential to add billions to our economy, while also increasing energy efficiency and reducing greenhouse gas (**GHG**) emissions both here and abroad. A big proponent of hydrogen, Alan Finkel, has high hopes for the plan and has indicated that if it succeeds, it will signal a major shift in Australia's energy landscape.

What is hydrogen gas?

Hydrogen is the most abundant chemical element in the universe but is not freely available in its gaseous form. It instead exists in nature bound into compounds like water and fossil fuels, and accordingly needs to be extracted in order to be used as a gas.

Similar to natural gas, hydrogen gas can be used as a heat source, an electricity generator and a fuel to power vehicles. Hydrogen powered vehicles run via an electrical 'fuel cell' which gives similar mileage and performance to a petrol or diesel vehicle, rather than a standard battery powered electric car. A major benefit of hydrogen is that when it is used as a fuel (for example in a hydrogen powered car) there are none of the emissions you would expect from a traditional internal combustion engine; instead only water vapour is produced. Hydrogen also has an impressive energy potential of around 2.4 times that of natural gas, which when combined with its potential for reduced GHG emissions makes it a desirable energy alternative for industrial and household uses.

How is hydrogen produced?

The HWG have been pursuing the idea of hydrogen with a clear focus on reducing GHG emissions. The reports and issues papers only deal with production of 'clean' hydrogen, which they define as being produced either purely by using renewable energy and water, or by using fossil fuels combined with carbon capture and storage technologies (**CCS**). These two methods of producing 'clean hydrogen' are illustrated on the next page.



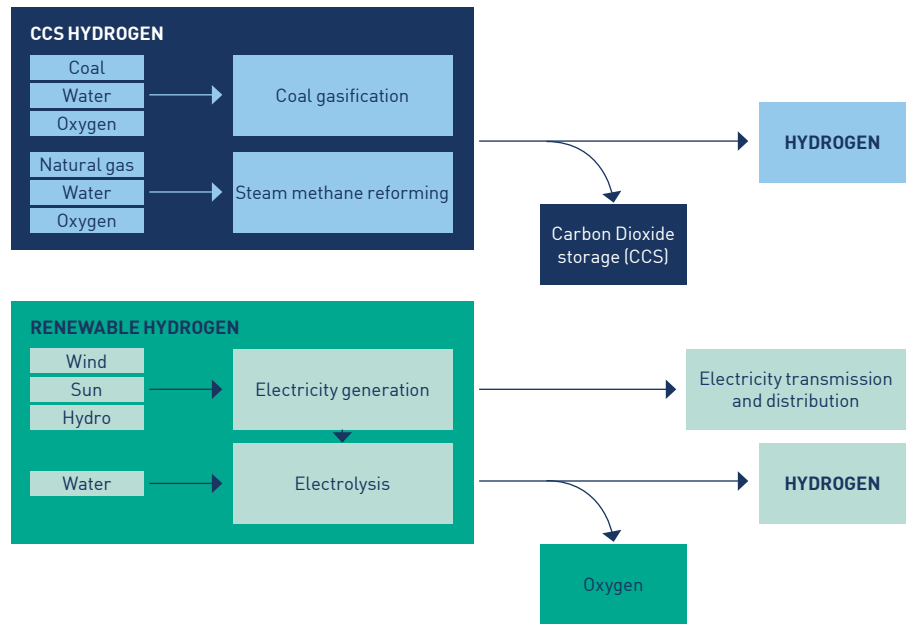
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INSIGHTS

Hydrogen molecules are able to store energy much like a battery



Source: Hydrogen for Australia's Future, Commonwealth of Australia (2018)

There are two 'commercially feasible' production pathways currently being considered by the HWG to produce hydrogen. These are referred to as **thermochemical** pathways and **electrochemical** pathways.

Thermochemical pathways involve heating a fossil fuel feedstock to produce hydrogen, and therefore require concurrent CCS in order to be considered 'clean' hydrogen production. Typical thermochemical methods are steam methane reforming (**SMR**) which uses natural gas and steam, and gasification which uses coal or waste biomass. The majority of hydrogen produced at the moment is produced through these methods, and SMR is currently the cheapest and most common form of hydrogen generation.

Electrochemical pathways, on the other hand, use an electrical current to split purified water into hydrogen and oxygen in a process called **electrolysis**. As this process runs off electricity, it has the potential to be powered off purely renewable sources such as wind or solar. The process is however quite water-intensive, with typical electrolysis requiring an input of 9 kg of purified water to produce 1 kg of hydrogen. Methods for mitigating the considerable impact that large-scale electrolysis would have on existing water demands include utilising desalination plants and recycled water treatment plants to supply the water needed for the process.

Hydrogen production methods can be coupled with renewable energy systems to create clean energy with the ability to significantly abate carbon emissions. The benefit of producing hydrogen through renewable electricity is that the hydrogen molecules are able to store energy much like a battery, which can then be used when those renewables are not producing electricity. This has led to hydrogen advocates, like Finkel, likening an Australian hydrogen export industry to 'exporting sunshine'. Once produced, the hydrogen can be compressed and stored as a gas or liquefied, much like natural gas, for transport via truck, rail, ship or pipeline.

Why Australia? And why now?

The HWG describes Australia as being in a prime position to become a world leader in hydrogen exports. They point to Australia's abundant renewable energy resources, access to gas infrastructure and expertise in LNG exports as a reason for pursuing a hydrogen industry. The HWG does not shy away from the other clear driver, which is the potential for a huge hydrogen export market in Asia, specifically in Japan and Korea. Australia is conveniently positioned nearby both geographically and economically as an already valued energy provider and partner in the region to capitalise on this emerging market.

Both Japan and Korea are highly dependent on imported energy, which make up 94% and 81% of their total energy use respectively. Both countries have a strong focus on hydrogen as part of transitioning away from fossil fuels while at the same time ensuring energy security and diversity. However, there are currently no large-scale exporters of hydrogen able to meet this demand.

Japan released its 'Basic Hydrogen Strategy' in 2017 which outlines the country's commitment to emissions reduction and an increased focus on imported hydrogen as an energy source. Korea's 'National Basic Plan for New and Renewable Energies' similarly includes policies likely to increase the uptake of hydrogen in the country. The HWG suggests an aspirational target of Australia securing 50% of Japan and Korea's hydrogen supply by 2030.

Importantly, both of these countries have made commitments to their hydrogen imports being of sustainable origin, with Japan stating their imports need to be 'carbon free' from 2030 and Korea indicating that imported hydrogen should come from water electrolysis and be 'CO2 free' by 2040.

An analysis done in June 2019 by the International Energy Agency found that by 2030 it would be cheaper for Japan to import Australian hydrogen produced using renewable energy than to produce it onshore. This analysis determined that even when the costs of transport in this scenario made up between 30% and 45% of the total end cost of the hydrogen, renewables-powered electrolysis in Australia would still be the cheaper option.

What would an Australian hydrogen industry look like?

While the National Hydrogen Strategy is still in its consultation phase, Alan Finkel and the HWG have quite a clear direction of what they envisage for the future. The vision is that of large-scale hydrogen for export as well as domestic consumption being produced through electrolysis using renewable energy, with fossil fuel-reliant pathways coupled with CCS being an intermediate step on the way to achieving this.

The recent issues papers released by the HWG focus on nine different aspects that need to be considered in developing a National Hydrogen Strategy. They explore questions such as how hydrogen production can work at scale, how to attract foreign investment in Australian hydrogen, how to develop a successful export industry, and where hydrogen would fit in with Australia's current gas network.

The HWG identify a number of measures already established by the Australian Government that could assist in launching the industry including the Australian Renewable Energy Agency, the Clean Energy Finance Corporation, the Clean Energy Innovation Fund, the Emissions Reduction Fund and the Climate Solutions Fund.

The HWG describes Australia as being in a prime position to become a world leader in hydrogen exports

INSIGHTS

A National Hydrogen Strategy remains very much on the cards

As it stands, a number of hydrogen demonstration projects have already been established around Australia including the Hydrogen Energy Supply Chain (**HESC**) project in the Latrobe Valley in Victoria. The HESC project officially commenced construction on 19 July 2019 and aims to produce hydrogen through gasification of brown coal combined with CCS. The hydrogen is then to be exported to Japan beginning in 2020 using a world-first specialised hydrogen shipping vessel.

What are some of the current barriers?

While the HWG would ideally like renewables-powered electrolysis producing hydrogen in Australia, the reality is that currently 98% of hydrogen produced globally is through SMR or gasification of coal. This is largely due to the very high cost and inefficiency of current electrolysis processes, which require large amounts of both electricity and purified water to produce hydrogen. Further, if the electricity being used for the electrolysis is not 100% from renewable sources, it generates significant GHG emissions during production which negates the potential benefits of the end product.

Using SMR or coal gasification combined with CCS comes with several issues of its own. Carbon dioxide is still produced from these processes and current CCS technology typically only captures 60% to 90% of the emissions produced. CCS technologies are still in their infancy in Australia and come at a considerable cost to build and operate. There are also practical issues of actually storing carbon underground. By way of example, the multi-billion dollar ZeroGen Project in central Queensland never got off the ground, largely due to a failure to find adequate underground storage areas to keep the captured carbon. When a suitable storage area was found, the cost of transporting the carbon to this remote location ended up increasing the cost of the project exponentially. On top of this is the significant risk that the carbon storage will eventually prove ineffective, and the gas leaks back into the atmosphere making the whole operation redundant.

Where to from here?

While the ambitious plan from Australia's Chief Scientist does have the potential to reshape our energy landscape, current hydrogen production in Australia is nowhere near the scale envisaged by the HWG, and reaching this goal is going to involve overcoming some serious hurdles.

It may be a while before we start seeing hydrogen fuel cell vehicles hitting the mainstream or Australian hydrogen exports to Asia overtaking LNG, but a National Hydrogen Strategy remains very much on the cards. The amount of political power behind this and the number of hydrogen projects already in motion nationally is testament to the potential this industry is perceived to have.

Once the HWG considers the submissions from this latest round of consultation which closed at the end of July, we can expect a draft strategy to be considered by State and Federal Energy and Resources Ministers in August and be released for public consultation in September this year. The HWG aims to have a completed National Hydrogen Strategy by the end of 2019.

COAL – THE YEAR SO FAR

It's been a roller-coaster year for coal so far.

While prices have remained strong and margins are good, thanks in part to the years of disciplined cost-cutting during the most recent down-turn, the winds of change are blowing hard, creating a head-wind of almost gale-force proportions.

Coal - a once much loved energy source and driver of Australian economic prosperity - has been on the outer for quite some time. But in the first half of 2019 the momentum has gathered pace.

Rocky Hill coal mine case

The decision of the Planning and Environment Court in New South Wales in early February 2019 to reject the proposed Rocky Hill coal mine is a very hot topic (pun intended). For the opponents of the mine to argue that all fossil fuels that are still in the ground should stay in the ground, so that Australia can meet its global carbon budget, is mind boggling. While the court did not endorse that proposition in such broad terms, the court did accept that, in the circumstances of this particular case, climate concerns weighed in favour of the mine not proceeding.

Simple economic theory (the law of supply and demand) would tend to suggest that restricting the supply of coal from Australia will not make the demand for coal go away. Rather, restricting supply will simply result in prices increasing, and eventually new sources of supply will come online from other (lower quality) sources around the world. And when this happens, the sad thing for Australia and the global environment is that by forcing the substitution of our high quality Australian coals with much lower quality foreign coals in the power generators of the world, we are exporting jobs and economic prosperity overseas while at the same time doing more harm to the very environment that we are seeking to protect.

Add to this the Court rejecting the argument that coking coal (the type of coal used to make steel) is critical for steel production - because the demand for coking coal can be met from existing and already approved mines - and things go from bad to worse.



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Coal ... has been
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INSIGHTS

New mines will be needed here in Australia and abroad

Sensible and rational business folks want to build new coking coal mines, and that would not be the case if there was not an ongoing (and increasing) demand for coking coal that cannot be met from existing and approved mines. And it seems that there is.

According to a recent Commodity Insights report prepared for the Minerals Council of Australia, the global coking coal import demand is expected to increase by almost 100 million tonnes between now and 2030 – from 275 million tonnes per year now to 372 million tonnes per year in 2030. That 36% increase in annual global import demand – or 100 million tonnes of additional coking coal each and every year – cannot be met from existing and approved coking coal mines. New mines will be needed both here in Australia and abroad. As the world's largest exporter of coking coal (supplying 147 million tonnes of the 275 million tonnes of coking coal traded globally in 2017), Australia will have some heavy lifting to do to help the world meet this increasing demand.

Perhaps surprisingly – given all of the talk about the death of coal - it is a very similar story in relation to thermal coal (the type of coal used in power stations to make electricity).

Despite renewable energy playing an increasingly significant role in the world's energy mix, the demand for thermal coal imports in Asia is expected to increase by more than 400 million tonnes (or a whopping 54%) between now and 2030. This is an increase from 740 million tonnes per year now to more than 1.1 billion tonnes per year in 2030. Drivers of that growth include a move away from nuclear power in Japan, Korea and Taiwan following the Fukushima accident in 2011, strong electricity demand growth in India and South East Asia driven by industrialisation and urbanisation, and strong population growth across much of Asia.

Once again, this increased demand for thermal coal from our Asian neighbours cannot be met from existing and approved thermal coal mines, and new mines will be needed here in Australia and abroad. Given that our thermal coal is generally far superior in quality (and therefore less polluting in terms of greenhouse gas) than coal from Indonesia, South Africa and other coal producing countries, it will be a far better outcome for the global environment for the increasing demand for thermal coal to be met by Australian producers.

Glencore cap on global coal production

Hot on the heels of the Rocky Hill decision in February came the Glencore announcement in March that Glencore will cap its total global coal production at the current level of about 145 million tonnes per year.

Glencore, Australia's largest coal miner, announced this cap in response to shareholder pressure to take action to address climate change, including pressure from global investors and major Australian super funds. Glencore had only recently completed a series of major acquisitions from retiring coal major Rio Tinto – including the Clermont coal mine in June 2014, Hunter Valley coal mines in June 2017, and Hail Creek coal mine and Valeria coal project in March 2018 – in a \$4+ billion coal buying spree. As a coal trader and dominant market player in the market, a restriction on incremental global supply into a future with increasing demand and restricted supply can only lead prices in one direction. Hence why the decision has been acknowledged as an astute commercial one.

Last year coal
overtook iron ore
as the nation's
biggest export
earner

The 2019 federal election and BHP withdrawal

As we headed into April the Morrison Government announced that the unwinnable election would be held on 18 May, and coal again took centre stage.

In the lead up to the election 'Stop Adani' T-shirts and earrings were worn by school children and environmental activists alike, as much a fashion statement as a political statement, while the Bob Brown anti-coal convoy wound its way north towards the coalfields of Queensland.

While the proposed changes to negative gearing and the capital gains tax discount, and the abolition of tax refunds for franking credits, were no doubt significant factors at the ballot box, the Labour party's alliance with the Greens and increasingly hostile attitude towards the coal sector at both Federal and State levels has been credited with the LNP's shock election win. While that may be something of a stretch, there is no doubt that the voters in coal dependent regions of Queensland and New South Wales voted for their jobs, along with Scott Morrison's so-called '*silent majority*'.

The month of May also saw BHP's CFO Peter Beaven make his now-famous speech which has since been interpreted by many as the beginning of the end for thermal coal in the BHP portfolio, and marking the unofficial start of the sale process for BHP's Mt Arthur coal mine in New South Wales and one-third interest in the Cerrejon coal mine in Columbia. While Rio Tinto exited coal entirely, and Glencore stayed but put a cap on production, BHP has landed somewhere in the middle by looking to exit thermal coal while remaining invested in coking coal.

Adani

The surprise outcome of the federal election provided a swift and tangible shot in the arm for the beleaguered coal sector, with Adani's Carmichael coal mine receiving the two last outstanding approvals from the Queensland Government in mid-June. What Greens Senator Larissa Waters described as a 'dodgy process', and other activists called a 'rushed' and 'tick-and-flick' approval, was actually an approvals process that spanned more than 9 years, with countless legal challenges along the way.

It may be all over bar the shouting, but the shouting appears to be increasing in volume. The end of June and early July has seen a series of anti-Adani protests in the Brisbane CBD as protesters seek to cause maximum inconvenience to Brisbane commuters trying to get in and out of the city during the peak hour commute. The legal battles may be over for now, but the battle for public opinion continues.

Rays of sunshine

With all of the negativity around the coal sector in the first half of 2019 some of the positives have gone almost unnoticed.

An important and indisputable fact that Australian governments of all persuasions, and the Australian people as a whole, should bear in mind is that last year coal overtook iron ore as the nation's biggest export earner – at a record \$66.2 billion. This is an industry on which Australia has been built, and our current and future prosperity is still closely tied.

Significant work has also been carried out on advancing technologies that will provide a long term future for coal – and some of this work is starting to bear fruit.

INSIGHTS

The breakthrough offers a means for safely and permanently removing CO2 from the atmosphere

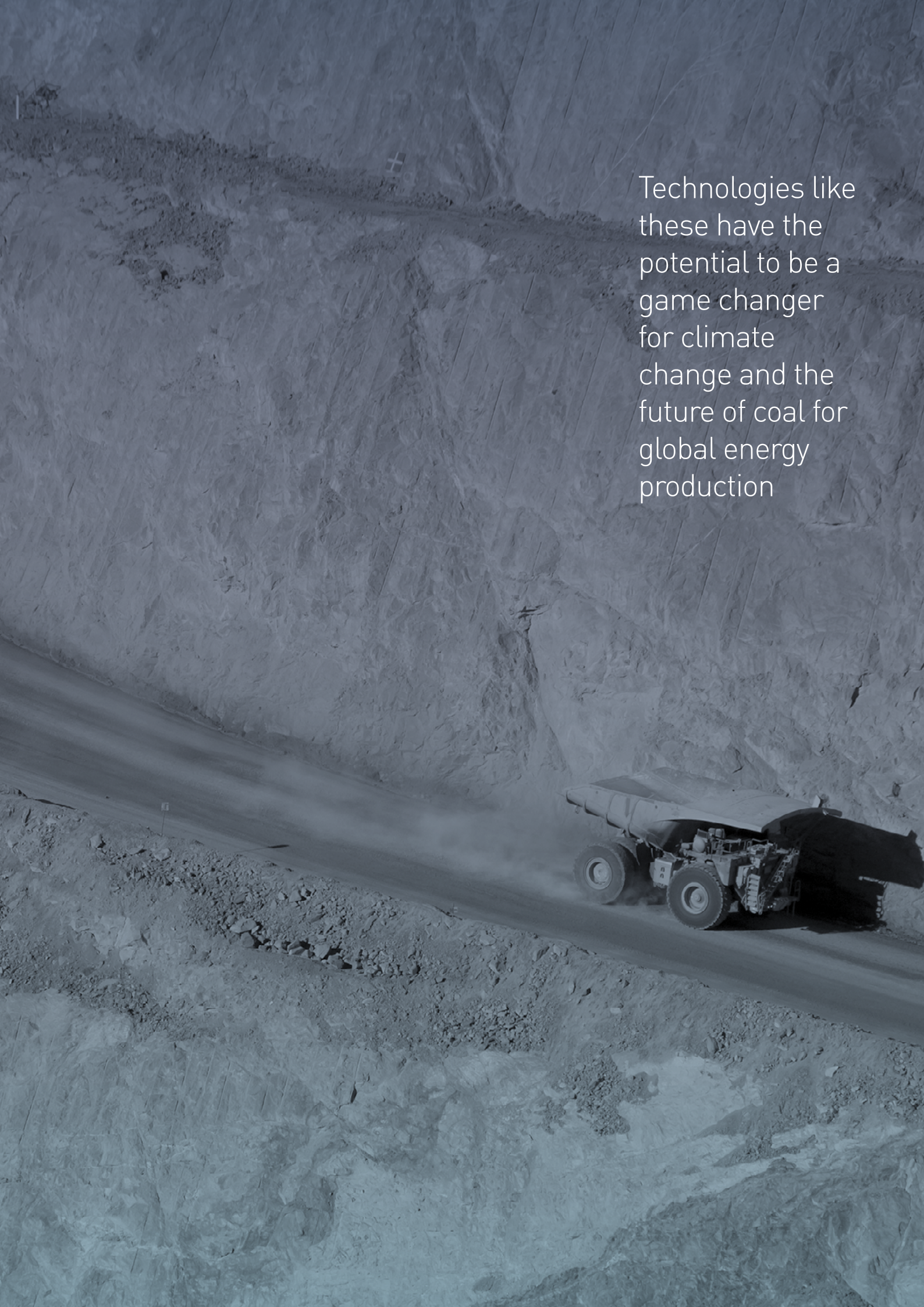
In March BHP joined Bill Gates, Chevron and others when it invested in Carbon Engineering, a Canadian company that is developing emerging technologies that have the potential to lead to material reductions in greenhouse gas emissions. Carbon Engineering is leading the development of direct air capture (**DAC**), an innovative technology that has the potential to deliver large-scale emissions reductions by removing carbon dioxide from the atmosphere at the source of CO2 emissions (such as steel mills and power stations).

DAC is a technology that captures CO2 from the atmosphere and provides it in a purified form for use or storage. Carbon Engineering's DAC technology does this in a closed loop where the only major inputs are water and energy, and the output is a stream of pure, compressed CO2 that can then be turned into a clean, affordable transportation fuel.

Closer to home, in February a research team led by RMIT University in Melbourne made a world-first breakthrough - a new technique that can efficiently convert CO2 from a gas into solid carbon in a process that is both efficient and scalable. The solid carbon can then be used for commercial purposes or can be safely and conveniently transported and stored. The breakthrough offers a means for safely and permanently removing CO2 from the atmosphere, and in doing so paves the way for an ongoing future for coal as a reliable and low cost source of fuel for base load power generation. While more research needs to be done, the breakthrough is a crucial first step in achieving the solid storage of carbon dioxide extracted from the atmosphere. A side benefit of the process is that the solid carbon is excellent at holding an electrical charge, making it a supercapacitor that could potentially be used as a component in future electric vehicles.

Technologies like these have the potential to be a game changer for climate change and the future of coal for global energy production.

Perhaps the future of coal will be more like Apple than Kodak after all - with a seemingly terminal decline turning into a stellar re-birth.

A large mining truck is driving on a dirt road in a quarry. The truck is moving from right to left. The background shows a steep, rocky cliff face with a white cross marker. The overall scene is in a monochromatic blue-grey color scheme.

Technologies like these have the potential to be a game changer for climate change and the future of coal for global energy production

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