

# MINING<sub>the</sub>VALUE

BUSINESSNEWS

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**GREAT** *for the* **STATE**  
SERIES 2 – EDITION 5

12-PAGE FEATURE



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**in focus**

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**downstream**

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## How do we capture the missing value?



Partners



## SERIES 2 – EDITION 5

# Value adding

One of WA's long-standing industry development goals has been to add more value to the state's mineral resources through downstream processing. This 12-page liftout reviews WA's performance, from disappointment in iron ore to relative success in sectors such as nickel and mineral sands. We also look in-depth at measures to achieve more value adding in the emerging battery minerals sector.

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**Trevor Hart**

Australia & global mining  
leader  
KPMG



**Tim Mazzarol**

Winthrop Professor  
Faculty of Arts, Business,  
Law and Education  
UWA

About 3.8 billion people, or just on half the world's population, live in the geographical slice of Earth that is Perth, Mumbai, Beijing and Tokyo. Each city is within a 10-hour flight of the others.

WA is now the largest exporter of LNG, iron ore and lithium to the world. Our gold industry is also one of the largest, together with others including rare earth elements, nickel and copper. While other countries may have the benefits of a localised, affordable labour force, I believe WA has a significant opportunity to harness technology and innovation and become the mining and energy Silicon Valley of the world.

(See page 6) ■

Despite public perceptions that Australia's manufacturing sector died along with the closure of local car making, it is still playing a key role. However, like all industries, it must continue to embrace new technologies as we adapt to a post-pandemic world.

(See page 11) ■

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### ADVANCED

US company Tronox  
employs more than 300  
people at its Kwinana  
titanium dioxide plant.

**BUSINESSNEWS**



# Investments target value add opportunities

We're very confident  
we will meet all the  
milestones we set

-Tim Shanahan

**An array of companies, from blue chip miners to SMEs, is pursuing downstream processing of WA's battery minerals, despite the sharp downturn in the lithium market.**

**POTENTIAL** Stedman Ellis (left) and Tim Shanahan are leading the Future Battery Industries Cooperative Research Centre, which has 48 industry and university members.  
Photo: Gabriel Oliveira

BUSINESSNEWS

Story by Mark Beyer

**T**iming has not been kind to the two men leading the Future Battery Industries Cooperative Research Centre.

When Tim Shanahan and Stedman Ellis signed up to lead the CRC in 2018, the lithium market was booming and billions of dollars were being invested in lithium processing plants in Western Australia.

There was also a growing recognition WA was richly endowed with the minerals needed to make batteries, such as nickel, vanadium and rare earths, as well as lithium.

With demand for batteries expected to expand rapidly on the back of increased production of electric cars, it seemed all the pieces were falling into place for WA to host new industries manufacturing battery compo-

nents (and possibly assembling batteries).

A collapse in the lithium market, as supply grew much faster than demand, has put a big dent in these aspirations.

Tianqi Lithium has halted commissioning of its lithium hydroxide plant at Kwinana, Albemarle Corporation has scaled down its project at Kemerton, and Wesfarmers subsidiary Covalent Lithium has deferred its project.

Despite all this, the CRC has funding commitments that would make other research and development organisations envious.

More than \$110 million has been committed in cash and in-kind support over the CRC's six-year program.

The cash support includes \$25 million from the federal govern-

ment, \$6 million from the WA government, \$17 million from 30 industry partners, and \$5 million from research participants.

Mr Ellis acknowledges this is less than originally expected.

"In the middle of last year, we thought we had a pool of perhaps \$130 million cash and in-kind," Mr Ellis told Business News.

"That reduction reflects the ability of the lithium sector to commit at this time."

Despite the shortfall, Mr Ellis remains strongly positive about the CRC's prospects.

"The overwhelming feedback is that people remain committed to the work of the CRC," he said, citing the recent decision by German manufacturer BASF to sign up.

Continued on page 4



# Opportunities in value add

**The development of the new land-backed port at Kwinana will enhance our capacity to export our product**

—Russell Austin

**VALUE** Russell Austin says Tronox's vertical integration and technology help it stay competitive with Chinese competitors.  
*Photo: Gabriel Oliveira*

*Continued from page 3*

"They have joined us as a contributor at the most senior level.

"They have reiterated the view that Australia is strategically important in the battery value chain."

Mr Shanahan, who chairs the CRC, said it remained largely on track.

"We're very confident we will meet all the milestones we set," he said.

"There may be some re-sequencing of those [milestones] and some vulnerability to the market, which is self-evident."

## Strategic driver

Their positive outlook is helped by the growing international consensus about the strategic importance of battery minerals, also known as critical minerals.

"The disruption to global supply chains, and the questioning of our reliance on supply through one country, in the case of battery industries China, is clearly a very significant opportunity for the aspiration behind our CRC to

grow a battery industry in Australia," Mr Ellis said.

This strategic backdrop is a significant factor in new rare earth projects backed by listed companies Lynas Corporation and Iluka Resources.

Perth USAsia Centre research director Jeffrey Wilson said there were six minerals frequently identified as the core raw materials required for the battery manufacturing: cobalt, graphite, lithium, nickel, rare earths, and vanadium.

"Having a geological endowment of all of these commodities and significant existing production of three of them, Australia is uniquely positioned to capture more value in the midstream and downstream processing of battery materials," Dr Wilson said.

Some of these minerals are also critical to high-tech defence and computing applications, hence the term critical minerals.

A single country accounts for between half and three-quarters of all global supply for each of these minerals.

For lithium this is Australia (58

per cent), and for cobalt it is the Democratic Republic of Congo (61 per cent).

More significantly, Dr Wilson said, China was the dominant producer of three out of the six battery minerals: graphite (70 per cent), rare earths (80 per cent), and vanadium (56 per cent).

"In fact, only in nickel production is there a diversity of supply options around the globe," he said.

"The current concentration at the extraction stage exposes downstream manufacturers to a heightened degree of supply risk."

Dr Wilson said the critical minerals industry did not operate like a normal open market and therefore securing production and processing of these commodities under Australian ownership was important for this country's future energy security, as well as that of its strategic allies.

He said the next step was to adopt policies to help de-risk investment by new market entrants.

"There is a pressing need for reform-minded governments to augment their efforts to improve

security in critical material value chains," Dr Wilson said.

"This should involve deploying financial support mechanisms to help de-risk private sector investment, and strengthen the international cooperation required for cross-border value chains."

## Research priorities

Stepping down from that high strategic level, the CRC and its 48 members have spent recent months finalising their research priorities.

From a portfolio of 16, the CRC has commissioned initial investment on five projects.

These include a national battery testing facility, to be run from Queensland University of Technology.

"We've moved ahead with that project because we can see it's foundational to a number of others and there is a strong degree of industry support," Mr Ellis said.

The goal of the facility was to help industry participants seeking to produce battery materials get a better technical understanding of the market, he added.



"You are doing so in a value chain that is relatively opaque in terms of where the technology currently resides," Mr Ellis said.

"Investing in battery testing capability can allow miners to better understand the capabilities of their raw materials, and shift some of the know-how to the miners."

Another priority project is a pilot plant to produce precursor material for battery cathodes.

This will be undertaken at the facility in Waterford, near Curtin University, where BHP Nickel West did the development work for the commercial-scale nickel sulphate plant it is currently building at Kwinana.

The laboratory and pilot plant will be repurposed for the cathode precursor project.

"From the outset and still today, that is one of the most strongly supported projects," Mr Ellis said.

"It's a large commercial opportunity and a large industry development opportunity."

Mr Shanahan said the CRC's work would encompass numerous opportunities across the battery industry value chain, including anodes, electrolytes, the life cycle of battery elements, and the provenance of the minerals.

"We're awake to all of those opportunities," he said.

Mr Shanahan said the push from mining companies wanting to move downstream was opposed by a pull from battery manufacturers wanting to secure their supply chains.

"There are a range of battery manufacturers that would like to come to Australia to assemble batteries, even if it's from imported materials in the first instance," he said.

Mr Ellis said there were some unique aspects to the value chain for battery minerals compared to other resources.

In iron ore and liquefied natural gas, more than half the value is made at the mine or well.

"Battery industries, by comparison, go something like \$1 of commodity metal makes \$1.50 of battery chemical, which makes \$7 of battery precursor materials," he said.

Mr Ellis said battery grade chemicals were not a giant leap for the industry, and provided value add.

He acknowledged that while battery grade precursors would be more difficult to get right, they provided a very solid value add opportunity.

"As the majority of the value add in battery supply chains comes at the midstream and downstream processes, these stages will offer the best returns for the Australian economy, instead of simply maintaining its

historic reputation as a reliable exporter of raw or upstream-processed ingredients for manufacturing," Mr Ellis said.

He commended the work being done by smaller companies in the sector, such as ASX-listed FYI Resources and EcoGraf.

West Perth-based EcoGraf is seeking to develop a vertically integrated business that includes production of high-purity graphite for the battery anodes.

It has plans to invest about \$100 million building a manufacturing plant at Kwinana.

FYI Resources plans to invest a larger amount, \$US189 million, on a project to produce high-purity alumina.

The feedstock for its refinery in Kwinana would come from a kaolin mine at Cadoux.

## Processing rare earths

Several larger ASX companies, including Iluka Resources, Lynas Corporation and Northern Minerals, are also investing in new projects, particularly in rare earths.

Rare earths are a group of 15 elements in the periodic table, including neodymium, praseodymium, dysprosium and terbium.

A single smartphone typically contains eight different rare earth materials.

Lynas operates the Mt Weld mine in the Mid West and is the only major producer of rare earths outside of China.

The company has run into political controversy in Malaysia, where its material is processed into end products.

The Sydney-based company plans to bring first-stage processing of its rare earth concentrate to Australia by building a cracking and leaching plant at Kalgoorlie.

It aims to have the plant operational by early 2023.

State and federal governments have enthusiastically embraced the proposal, even though the plant will have a modest economic impact, with about 100 ongoing jobs.

In contrast to the noise surrounding Lynas, Perth-based Iluka has quietly moved into rare earths.

Managing director Tom O'Leary said entering the rare earth industry represented a logical and important diversification for the company, which had extensive mineral sands mining and processing operations in WA.

Iluka started production of a simple monazite concentrate (containing rare earth elements) in April.

Its deposit at Eneabba has a unique stockpile of monazite resulting from the company's his-



toric mineral sands processing operations.

It has invested a modest \$10 million so far in the project, while the next phase could include an investment of up to \$40 million.

"Phase two would produce a higher value monazite, and we are looking to fast-track this development as a priority," Mr O'Leary said.

"Beyond phase two, Iluka is actively exploring the possibility of producing refined rare earth oxide products."

This would require the establishment of a cracking and leaching plant, as well as solvent extraction.

Mr O'Leary said Iluka's incremental approach provided the means to establish credibility in a market in which it had not participated for many years.

He said the company had received strong encouragement from governments.

"This is particularly the case for our rare earth projects, the development of which aligns with the Commonwealth's critical minerals policy," Mr O'Leary said.

He said he expected state governments across the country to refine their policy settings in support of more domestic value adding.

"Any measures that streamline approvals processes and reduce duplication between state and Commonwealth administrations are obviously welcome, and we strongly support the Commonwealth's review of the Environmental Protection and Biodiversity Conservation Act," Mr O'Leary said.

US-based mineral sands producer Tronox already has exten-

sive experience in downstream processing and supports policy reforms that would encourage more investment.

"When we built the Kwinana pigment plant in the late 1980s, we were supported by a government that saw the benefit of a self-contained, vertically integrated value chain," managing director Australia Russell Austin told *Business News*.

"Long-term strategic planning, as well as support on approvals and securing utilities, will go a long way to attract more organisations to process minerals right here in WA."

Mr Austin said infrastructure planning was a key factor.

"The challenges around physical distances between mines and

potential processing sites could be mitigated by improved infrastructure, or even industry cooperation," he said.

"Let's get some diverse minds on this problem."

Specifically, he backed development of the outer harbour at Cockburn Sound.

"The development of the new land-backed port at Kwinana will enhance our capacity to export our product," he said.

"We're planning on being around for the long term, so any plans for significant infrastructure investment is welcome news to us."

Mr Austin is also focused on labour force development.

*Continued on page 11*

# \$110m Cash and in-kind support to battery industries CRC

**ADVANTAGE** Perth USAsia  
Centre research director  
Jeffrey Wilson believes  
Australia is uniquely placed  
to capture more value in the  
processing of battery minerals.  
*Photo: Gabriel Oliveira*



# Iron ore miners stumble downstream

The history of value adding in the iron ore sector is a litany of missed opportunities.

**FELL SHORT** Rio Tinto shuttered the Hismelt plant in 2008, at the height of the GFC.



Story by Mark Beyer

**A**ustralia's largest mining sector is arguably the biggest failure when it comes to value adding.

However, that's not to say the big iron ore miners have ignored downstream processing altogether.

The sector has invested billions of dollars in a succession of iron and steel projects, none of which have stood the test of time.

These projects were designed to meet commitments to downstream processing made under state agreements.

One of the earliest state agreements was signed in 1952 by BHP, which subsequently built

a steel-rolling mill in Kwinana, followed by a blast furnace and pig iron mill in the late 1960s.

These plants processed iron ore mined at Cockatoo Island and Koolyanobbing, in the days when the Pilbara was just emerging as an iron ore province.

The iron and steel plants lasted until the 1980s, when they were shut down as part of a major restructuring of the sector nationally.

BHP's rivals focused on the Pilbara for their early investments in downstream processing.

Hammersley Iron (now Rio Tinto) built a 2 million tonnes per annum pellet plant at Dampier in the late 1960s.

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# World's New Silicon Valley – How Western Australia can become the global centre for mining and energy sector excellence



Mining and Energy lie at the heart of Western Australia's future. WA Department of Mines figures show the State's minerals sector employed +124,000 individuals in 2018 – 2019 and WA accounts for almost 50% of the country's \$218 Billion export earnings. What's more, the sector is also a key innovator delivering new transport solutions, production technologies and massive investment in large, complex engineering projects. It makes sense for WA's mining and energy sector to deliver not just the commodity itself but also value-adding opportunity by driving technological development and innovation.

State government initiatives like the Exploration Incentive Scheme, and Streamline WA, have helped improve the way our industry is supported and regulated. In looking to the future, a key question is around how government and business can stimulate activity. We might shape a vision whereby WA can become

the Silicon Valley to the mining and energy sectors. How? We need to seize our opportunity to revolutionise energy – in a clean, smart, value added way.

Perth is said to be the sunniest and third windiest capital city in the world; it's closer to Asian markets than Sydney and offers outstanding higher education, health and lifestyle options to half the world's population who live less than a 10 hour flight away. These facts should inform our thinking about revolutionising processing and manufacturing in WA – and which global businesses should be based here.

A first step is to look at the downstream supply chain and rethink both resourcing and manufacturing. We may want to create high tech battery plants adjacent to assets where there is a key transformation story or deliver componentry for technologies that need our commodities. We must become clever about the unique things Western

Australia enjoys but also the opportunities of the current energy revolution

With a greater focus on innovation and technology there will be improvements delivered across the mining, energy and engineering sectors in WA. These might be seen in new plant and equipment approaches, harnessing renewables, utilising AI and machine learning; they might be about time efficiencies or health and safety improvements. Sector participants seek a competitive edge but they must also protect their intellectual property. A key approach is to register patents locally so they reside within WA. With improvements migrated nationally or globally, we must invest in ensuring the benefits and value-adds achieved locally, circulate back into the local economy.

**Trevor Hart**  
KPMG Australia & Global  
Mining Leader





# \$US2.6bn

## FMG Iron Bridge magnetite project

Cliffs Robe River Iron Associates (also now part of Rio Tinto) followed with construction of a similar plant at Cape Lambert.

Both pellet plants were shut down in the late 1970s when high oil prices pushed up their costs.

BHP tried something similar at Port Hedland in the 1990s, when it invested \$2.5 billion in its ill-fated Boodarie Iron project.

Boodarie was designed to convert iron ore 'fines' (with about 62 per cent iron content) into 'clinkers' (90 per cent content), an ideal feedstock for steel mills.

Built between 1996 and 1999, the project never ran smoothly

– it faced cost over-runs, commissioning difficulties, and operational issues.

Designed to produce 2.3mtpa, its peak output was 1.7mtpa in 2004.

By that stage, BHP had completely written-off the value of the project.

The last straw was an explosion in 2004 that killed a worker and led to the plant's immediate shutdown, with 490 employees and about 500 contractors losing their jobs as a result.

Boodarie was on its last legs when Rio proceeded with its next attempt at downstream processing: its ambitious Hismelt pig iron project.

Rio and three joint venture partners invested about \$1 billion in Hismelt over 25 years.

Most of that time was spent on research and development and running a test plant, before they committed in 2002 to build a full-scale commercial plant – on the same plot of land as BHP's old steel mill.

Officially opened in 2005, Hismelt was designed to produce around 800,000tpa of high quality pig iron (96 per cent iron content). Its actual production was about half that.

Hismelt never stacked up commercially and Rio pulled

the pin in 2008, at the height of the GFC.

While the Kwinana plant is history, the Hismelt technology is not.

China's Shandong Steel Group has recently reported technical success with its Molong Hismelt plant, though its commercial performance is not clear.

Looking ahead, an opportunity for the sector lies in the processing of low-grade magnetite ore to produce a high-quality feedstock for steel mills.

Chinese companies CITIC Pacific and Karara Mining pioneered magnetite production in Australia. It has not been a happy story, however, with massive cost

blowouts during construction and big losses during production.

Despite that history, Fortescue Metals Group will begin construction of its \$US2.6 billion Iron Bridge magnetite project later this year.

Iron Bridge is designed to produce 22mtpa of product with a high (67 per cent) iron content, which will be blended with the lower grade ore from the company's existing hematite mines.

That combination would deliver a substantial pricing premium.

If FMG succeeds where others have failed, it will put pressure on Rio and BHP to consider similar moves. ■

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# Where mining is m

**There are five major commodities mined in WA that have substantial downstream processing. Credit for most of the value adding can be attributed to investment decisions taken decades ago, as Mark Beyer reports.**



## Gold – 1890s

The Perth Mint was established in 1899, just a few years after the discovery of gold in Kalgoorlie triggered a mining boom that transformed Western Australia.

It was Australia's third branch of Britain's Royal Mint, the others being in Sydney and Melbourne.

While they have closed, the Perth Mint has become the producer of Australia's official bullion coin program and a substantial player in the global gold market servicing miners, investors and collectors.

Still operating from its original location in East Perth, the mint had sales of close to \$18 billion last financial year.

The simplest and best measure of its value adding capacity is its trading profit, which was \$96 million.

That's the difference between the cost of gold it buys from miners and the price at which it sells the end product after its value adding activities.

As the world's largest refiner of newly mined gold, Perth Mint refines almost all of Australia's gold production and a substantial amount mined overseas.

The unrefined gold 'dore' delivered to the mint can be anywhere from 60 per cent to 95 per cent gold.

The mint refines this material to a minimum 99.5 per cent gold so it can be traded on the major exchanges around the world.

It also produces gold bars, coins and other minted products with 99.99 per cent gold.

"That's really where the value adding starts," general manager refining Nathan Edwards said.

The bullion bars are sold into overseas markets, mostly in Asia but also the US.

Perth Mint produces and markets about 8 million gold and silver coins each year.

One of the biggest markets for these precious metal coins is Germany; in fact, the Perth Mint is Australia's largest exporter by value to Germany.

The Perth Mint is also the 'Fort Knox' of the Southern Hemisphere, with about 37,000 investors from 130 countries using its deposit services.



## Mineral Sands – 1950s

When people drive from Perth to the beaches at Busselton or the wineries at Margaret River, most would be oblivious to the substantial mining operations they have passed in the South West.

The mining of mineral sands began near Busselton and Capel in the 1950s and continues to the present day.

New York-based Tronox and Perth-based Iluka Resources, which dominate the industry, have since expanded to new mines in the Mid West, as well as interstate and overseas.

More significantly, they have extensive processing operations in the South West.

Unlike smaller miners that sell heavy mineral concentrate to third-party processors, often in China, Tronox and Iluka capture much of the value add in Australia before selling refined products to overseas manufacturers of paint, ceramics and plastics.

Iluka's major facilities include the Narngulu plant near Geraldton, one of

the largest of its kind in the world, where it produces zircon, rutile and ilmenite.

It conducts further processing at Capel, where the ilmenite is upgraded to synthetic rutile. This increases the titanium component of ilmenite from 50-60 per cent to more than 90 per cent.

Similarly, Tronox produces zircon, ilmenite, leucosene and synthetic rutile at its Chandala plant, just off the Brand Highway at Muchea.

Tronox goes a step further, converting its synthetic rutile into titanium dioxide at pigment plants at Kwinana, Kemerton and Australind.

Its Western Australian operations form the world's largest integrated titanium dioxide project.

They also have a long history, with the Bunbury operations commencing in 1961.

Together, the two companies employ about 1,500 people across their WA operations.

# Circa \$18bn

## Perth Mint sales last FY



# ore than just a quarry

## Alumina – 1960s

Alcoa of Australia and Worsley Alumina are two of the biggest employers in Western Australia's South West, thanks to investment decisions made decades ago.

Both Alcoa and Worsley run integrated operations that encompass bauxite mining and alumina refineries.

The mining and refining are co-dependent – they would not exist without the other.

The extensive bauxite deposits in the Darling Range are low in grade but they are easy to mine and close to the refineries, which in turn have good access to power supplies, ports and skilled labour.

Development of Alcoa's WA operations began in 1961, and its Kwinana refinery came on stream in 1963.

That was followed by refineries at Pinjarra in 1972 and Wagerup in 1984, supported by two bauxite mines.

Collectively, these operations employ about 4,000 people.

South32 subsidiary Worsley Alumina operates further south, with its bauxite mine near Boddington and an overland conveyor taking the ore 50 kilometres to the refinery at Collie.

Its operation started in 1984 and capacity has been increased four-fold since then, employing 2,000 staff and contractors.

There has occasionally been talk of WA taking the next step in value adding, with construction of an aluminium smelter.

However, most aluminium smelters around the world use subsidised power, and consequently their economic value has been hotly debated.

A case in point is Alcoa's smelter at Portland in Victoria, which faces an uncertain future as its power supply is renegotiated.



## Nickel – 1970s

Nickel production emerged rapidly in the 1970s to become a substantial part of Western Australia's resources sector, and most of its downstream processing facilities date from that time.

The sector has several major producers, including Western Areas, IGO, and Glencore; but the big player, especially from a value add perspective, is BHP Nickel West.

Nickel West is a vertically integrated business with more than 3,500 employees and contractors.

On the brink of closure a few years ago, it's now on a growth path as it seeks to take advantage of increasing demand for battery metals.

Nickel West operates several mines and concentrators in the Goldfields, including at Mt Keith, Leinster and Kambalda, and

processes ore from its own mines as well as ore from third parties.

The concentrate is sent to its Kalgoorlie smelter, which uses a flash furnace to produce granulated nickel matte.

Next step is Nickel West's Kwinana refinery, which turns the matte into premium-grade powder and briquettes containing 99.8 per cent nickel.

More than three quarters of BHP's nickel is sold to global battery material suppliers.

Two years ago, Nickel West committed to move further up the value chain by building a nickel sulphate plant at Kwinana.

Stage one is expected to produce up to 100 kilotonnes per annum of nickel sulphate, a product used in the lithium-ion batteries that power electric vehicles.



Continued on **page 10**



# Mining more than just a quarry

Continued from page 9



## Ammonia – 2000s

The Burrup Peninsula has long been touted as a downstream processing hub, ideally placed to take advantage of the abundant gas production in Western Australia's north-west.

Despite the high hopes, there is only one established value adding facility on the Burrup.

Norwegian fertiliser giant Yara International owns an ammonia plant that was originally developed by Pankaj Oswal's Burrup Fertilisers.

It is one of the world's largest ammonia plants, but as a highly capital-intensive facility is not a big employer, with only about 190 workers.

Yara Pilbara has also teamed up with explosives manufacturer Orica to build a \$US800 million technical ammonium nitrate (TAN) plant next to its existing facility, to further process the ammonia.

Construction of the TAN plant was completed in 2016 and at its official opening, then premier Colin Barnett said its output would be up to 10 or 12 times that of the raw material inputs.

However, like many projects in the Pilbara, there were major problems during construction and commissioning, with Yara and Orica needing to make big investments in rectification works over the next three years.

In its most recent update, in May this year, Orica said the plant was finally operational and ramping-up to commercial levels this calendar year.

The TAN plant will compete with other producers of ammonium nitrate, including Wesfarmers CSBP, which operates a processing plant at Kwinana.

Despite this setback, Yara is pursuing a new opportunity on the Burrup.

It has teamed up with energy company ENGIE to assess the development of a solar powered hydrogen plant that would allow it to produce 'green' ammonia. ■

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# Investments target value add

Continued from page 5

"It would be great to see more government and industry cooperation to encourage under-represented groups to join the STEM industry, or support to upskill and reskill," he said.

Mr Austin said one of the keys to Tronix's success in Australia was its vertically integrated structure, from mines through to production of titanium dioxide.

"China has inherent labour cost advantages over competitors, but the power of vertical integration along with technology helps us to be highly competitive," he said.

"When other stakeholders realise this value, I think it's natural that markets will be created within WA for more downstream processing and manufacturing."

Chamber of Minerals and Energy of Western Australia policy director Rob Carruthers said the industry was developing poli-

cy proposals to support more downstream processing.

He said any strategy needed to build on WA's competitive strengths.

"We've got long-term certainty, we've got stability from a political and regulatory environment, we have proximity to a lot of key markets, and an abundance of energy," Mr Carruthers said.

He said the CRC provided an opportunity for better coordination.

"Where we've missed out in the last couple of years, when prices have been up for lithium and nickel, we've had multiple plans from multiple parties, whether it be from an industry side, from a state government side [or] from a national side, and there hasn't been a tremendous amount of coordination through that," Mr Carruthers said.

"That [CRC] gives us an opportunity for a much more consoli-

dated push, to bring on that next phase of investment."

Mr Carruthers called for better infrastructure planning, raising the example of transport links between the lithium mine at Greenbushes, Albemarle's Kermerton processing plant, and the port at Bunbury.

"There hasn't been a strategic overlay. At the moment we are looking at it in components," Mr Carruthers said.

At a national level, he said the risk and high capital intensity in downstream processing meant financial assistance should be looked at.

"Maybe you have to pick winners in certain areas, but if there's a strategic focus on critical minerals, why not have an investment allowance that will make it more attractive?" Mr Carruthers asked.

"There are always going to be particular opportunities that arise where assistance is required." ■



**POTENTIAL** Tom O'Leary says Iluka is actively assessing a refined rare earth oxide plant.

## SPONSORED CONTENT

# In a post-pandemic world, it is time for Australia to focus on value adding its economy



The COVID-19 pandemic has impacted global health and economic activity, exposing the weaknesses and strengths of our political and social systems, and accelerating forces that were already transforming the world's economies.

The forced isolation and disruption to global supply chains has triggered renewed discussion over the need to revive our local manufacturing sector, and to become more self-sufficient. These

calls have merit, because economic recovery will require greater investment in productivity and value adding within industries.

Value adding to products at each stage of their production is a foundation of manufacturing, and remains a key measure of economic performance.

To many people, the closure of local car manufacturing from 2014 was a sign that Australia had become a country that no

longer made things. At the time, I wrote an article in *The Conversation* explaining the history of car making in Australia, highlighting the importance of manufacturing to national economic growth.

The good news is that Australia still has a strong manufacturing sector. As the Australian Industry Group reported in 2019, it is the nation's seventh-largest industry sector in terms of employment, and the sixth in terms of output, contributing around 11 per cent of our annual exports. More importantly, it is the most significant sector in relation to business expenditure on research and development (BERD), which is a key measure of how innovative a country is.

One of the challenges facing manufacturing is the digital transformation of the Fourth Industrial Revolution. This is the introduction of digital technologies such as cyber physical systems (CPS), artificial intelligence, the Internet of Things, 3D printing, machine learning and big-data analytics.

Australian manufacturing is already

embracing these technologies, but they will have an impact on all industries. However, these technologies are only tools within a wider framework of how organisations innovate their existing business models.

This requires a mindset for adaptive change, innovative thinking, and a willingness to 'bundle' physical, intellectual and human resources into new combinations that can add value throughout the production process.

This can be applied to all organisations including services. Let's get started.

**Winthrop Professor Tim Mazzarol**  
Faculty of Arts, Business, Law  
and Education  
The University of Western Australia



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AUSTRALIA



**REPUTATION** Argyle is renowned for the large number of coloured diamonds it produces.

# Marketing adds to diamonds' sparkle

Story by Mark Beyer

**R**IO Tinto subsidiary Argyle Diamonds provides a case study in how marketing and product development can deliver an alternative path to value adding in the mining sector.

Most of the production from Argyle was originally categorised as brown diamonds and earmarked for industrial uses.

The small, coloured diamonds at Argyle were, on average, low quality and a far cry from the clear, colourless diamonds that traditionally dominated the sector.

Argyle set about creating a new market for its diamonds, most of which are in colours now known as champagne and cognac.

Its output also includes the rare pink diamonds, which comprise less than 0.1 per cent of Argyle's output.

Argyle's investment in global promotions and market development helped position its diamonds as affordable fashion jewellery.

This was a big change from the traditional positioning of diamonds as once-in-a-lifetime

bridal jewellery – the promotional approach favoured by South African producer De Beers, which formerly dominated the industry.

The global profile of Argyle's diamonds, especially its pink diamonds, has been a boon for tourism marketing in Western Australia, especially the Kimberley region where the mine is located.

The number of jobs at Argyle has been miniscule compared to the tens of thousands of people

employed in India cutting and polishing its diamonds.

The number of cutters in India working on Argyle diamonds is estimated to have peaked at 200,000.

But the successful repositioning of its output, along with the mine's large reserves and high-grade ore, has helped sustain the Argyle mine since 1983, when alluvial mining commenced.

The start of open-pit mining

in 1985 doubled the volume of world diamond production almost overnight.

Argyle has produced more than 825 million carats of rough diamonds.

It has been a fully underground mine since 2013, employing 400 people, and is due to be shut later this year, bringing an end to a unique chapter in WA's mining history. ■



## FIFO families to boost WA's building recovery

Interstate fly-in, fly-out (FIFO) workers relocating to Western Australia will share in the \$117 million Building Bonus package recently announced by the McGowan Government.

Eastern states-based FIFO workers will be able to access the \$20,000 Building Bonus grant, which is available to any homebuyer who wishes to build a new house in Western Australia.

"Interstate FIFOs play a key part in building our state, and it is an ideal time for them to enjoy the WA lifestyle, bring up their kids safely and cut their travel time by living in the state in which they work," Premier Mark McGowan said.

"Western Australia is a great place to live. We expect by offering the Building Bonus to these workers, it will provide even more incentive for these workers to make the move to WA, and build a new home.

The grant is available for new homes that will be built throughout

WA, ensuring that FIFO families will be able to choose the location and lifestyle that best suits them. Grants are available until December 31, 2020.

With the closure of WA's interstate borders in March, some mining and petroleum companies have already assisted hundreds of workers and their families to relocate to WA.

Paul Everingham, Chief Executive of peak resources industry group, the Chamber of Minerals and Energy of WA (CME), said a number of its members were also offering attractive incentives to encourage interstate FIFO workers to permanently relocate to WA to complement the federal and state government's home building stimulus packages.

"These incentives offered by companies include relocation financial assistance, mortgage payment support and assistance to travel to their state of origin

once or twice a year. In addition, many companies will provide a regional living allowance to encourage workers to reside in the communities in which their company operates. The resources sector is keen to see more jobs in the State as we emerge from COVID-19 with a focus on supporting WA's economic recovery," Mr Everingham said.

The \$20,000 grant builds on the Commonwealth Government's announcement to provide \$25,000 for some owner-occupiers who build a new home.

This means those Western Australians who are eligible for the Commonwealth grant, could receive up to \$45,000 for new residential builds.

"It's no surprise to Western Australians that COVID-19 has had an immediate and serious impact on confidence and activity in the residential building sector," said Mr McGowan.



"My Government has worked with the Commonwealth on these measures to ensure our incentives will drive confidence, stimulate activity and keep thousands of Western Australians in jobs."

"By relocating to Western Australia permanently, we can further support Western Australian small businesses and continue to grow our economy as we continue the recovery from the COVID-19 pandemic."

The McGowan Government has also expanded the 75 per cent off-the-plan transfer duty, capped at \$25,000, to the purchase of residential unit or apartments, in a multi-tiered development, where

construction has commenced. This package is valued at \$7 million, and will be in place until December 31, 2020.

In addition, the State government is investing \$319 million investment to build, buy and renovate public housing across the State, bringing the total commitment for COVID-19 stimulus and relief measures to \$2.3 billion.

The residential building sector is an important part of the state's economy, employing an estimated 66,000 people and accounting for \$5.2 billion in Gross State Product in 2018-19.