



GOVERNMENT OF
WESTERN AUSTRALIA



A world-leading resources sector

Western Australia's mineral and petroleum
resources development strategy

September 2021

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Gruyere gold project, a 50:50 joint venture between Gold Road Resources and Gold Fields Limited.
Image: Gold Road Resources.

Inset photos:

Rio Tinto Operations Centre, Perth, Western Australia. Image: Rio Tinto.

Carey Mining, a 100 per cent Indigenous owned business, provides mining services, construction and nationally accredited training programs for Indigenous people entering the mining industry. Image: Carey Mining

North Rankin Complex, North West Shelf Project, Western Australia. Image: Woodside Energy Ltd.

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Premier's foreword



Western Australia is internationally recognised as having one of the world's most successful resource sectors.

This is due to many factors, particularly the diversity and abundance of our natural resources, and history of effectively promoting Western Australia's prospectivity and development opportunities.

The State's resources sector has grown to become not only the driving force behind Western Australia's economy, but the national economy.

Never has the importance of the sector's economic contribution been so clearly demonstrated than in its response to COVID-19. The mining and petroleum industries' success in trading uninterrupted through the critical early stages of the pandemic has allowed us to manage as well as we have the impact of the pandemic by continuing to provide

needed jobs and revenue to support the community and keep us safe. It has also enhanced our global reputation as a reliable supplier, and this is set to position Western Australia with a significant competitive advantage as the world's economy recovers.

The opportunity to continue to grow and diversify our resources sector as a significant contributor to global advancements in the digital age, and the shift to reducing greenhouse gas emissions, are immense, and are expected to continue to provide outstanding economic and social benefits to the community well into the future.

The McGowan Government looks forward to continuing to work in partnership with the industry and the community to ensure that the resources sector continues to be developed responsibly, while maintaining our unique competitive advantages.

Mark McGowan MLA
PREMIER OF WESTERN AUSTRALIA

Minister's foreword



Western Australia's mineral and petroleum resources development strategy demonstrates the McGowan Government's policy priorities that are designed to uphold our reputation as one of the world's most advanced and successful resources sectors.

In an uncertain world, one thing that can be counted upon is the continuing demand for Western Australia's resources.

The McGowan Government is committed to ensuring that the greatest value is obtained from the responsible development of our resources, and that sustained prosperity and social development is achieved for the wider Western Australian community.

A key focus of the Government is to capitalise on our resources, particularly critical and battery minerals, including opportunities to produce value-added products and grow participation in global supply chains.

This will allow us to maximise the benefits of the State's resources for the benefit of all Western Australians.

Central to this strategy is promoting our comparative advantages and investment opportunities, catering for current and future skills gaps, facilitating access to infrastructure, and investing in research and development.

Expanding the diversity of the resources sector also benefits wider industry sectors, as demonstrated through the success of the State's Mining Equipment, Technology and Services sector.

I would also like to recognise the leading role industry is taking in responding to climate change.

The foundation for the success of the resources sector will, however, always be centred upon the State's ability to continue to attract exploration investment.

This is why the McGowan Government recently announced that as from 2021-22 the Exploration Incentive Scheme will increase by \$2.5 million a year from \$10 million to \$12.5 million.

With exciting technological advancements in this area, the true potential of the State's resources sector is only beginning to be discovered.

The Honourable Bill Johnston
MINISTER FOR MINES AND PETROLEUM

Introduction

Western Australia is home to one of the most diverse and successful resources sectors in the world.

For over a hundred years, the State's resources sector has been the major driving force in shaping the State's economy, particularly in regional areas.

The production of key commodities, including iron ore, alumina, gold, liquefied natural gas (LNG) and nickel, has led an extraordinary increase in the value of the State's resources sector in recent years. Between 2006 and 2020, the value of the sector more than tripled, from \$49 billion to \$174 billion (Figure 1).

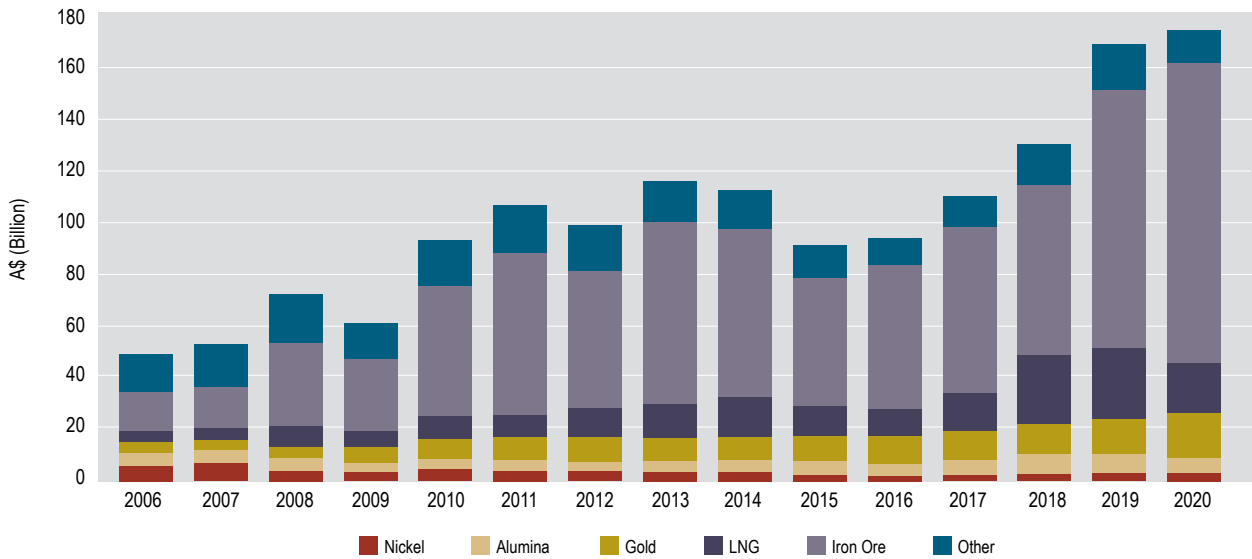


Figure 1. Value of Western Australia's resources sector, 2006 to 2020

Source: Department of Mines, Industry Regulation and Safety

Western Australia is the global leader in the production of iron ore and lithium, the second largest exporter of LNG, and amongst the top five producers of gold, nickel, alumina, cobalt, rare earths and salt. The State is also a major supplier of mineral sands.

With respect to minerals, Western Australia accounts for 60 per cent of Australia's total value of production and its output exceeds the entire production of some other significant producers including Canada, the United States, South Africa and Brazil.

The resources sector dominates the State's export earnings, provides substantial direct and indirect employment, supports downstream and service industries, and delivers essential revenue to both the State and Commonwealth governments.

In addition to substantial deposits of known resources, Western Australia's leading position is supported by several key strengths. These include advanced technical mining expertise, a skilled workforce, a world-class services sector, an enabling and robust legislative framework, and our proximity to key Asian markets. Future opportunities to mine and process minerals including battery-related metals such as lithium, cobalt and nickel will also be supported by a secure energy supply, including a strong domestic gas policy.

The entrepreneurial nature of the State's resources sector has also seen local companies successfully develop resource projects all over the world.

The continuing strength of the resources sector is evidenced by \$20 billion in capital expenditure in 2020, representing 72 per cent of all investment in the State.¹ A further \$140 billion worth of investment for the expansion of existing projects, or development of new projects, is currently under varying stages of development.²

Demand for Western Australia's resources is expected to continue to grow, driven by factors including the global transition to a low carbon future.

The Western Australian Government's vision for the resources sector is:

**Western Australia is recognised as a world-leader
in the sustainable development of its outstanding
mineral and petroleum resources**

Western Australia's mineral and petroleum resources development strategy outlines the measures the McGowan Government has taken to ensure this occurs, through targeted actions within the following strategic priorities:

Strategic priority 1: A leading global destination for exploration investment

Strategic priority 2: An environmentally and socially responsible industry

Strategic priority 3: An industry that is efficiently and effectively regulated

Strategic priority 4: An evolving industry

Strategic priority 5: An innovative industry

Strategic priority 6: Maximising benefits for all Western Australians

1 Australian Bureau of Statistics (ABS), (2020). Private New Capital Expenditure and Expected Expenditure, Australia, Dec 2019. Canberra: ABS

2 Department of Mines, Industry Regulation and Safety (DMIRS), (2020). 2019 Review of Mineral and Petroleum Industry Activity. Perth: DMIRS

Strategic Priority 1: A leading global destination for exploration investment

Western Australia has some of the most diverse and prospective geology in the world, including the majority of Australia's known resources of key economic minerals and several critical minerals³ (Figure 2).

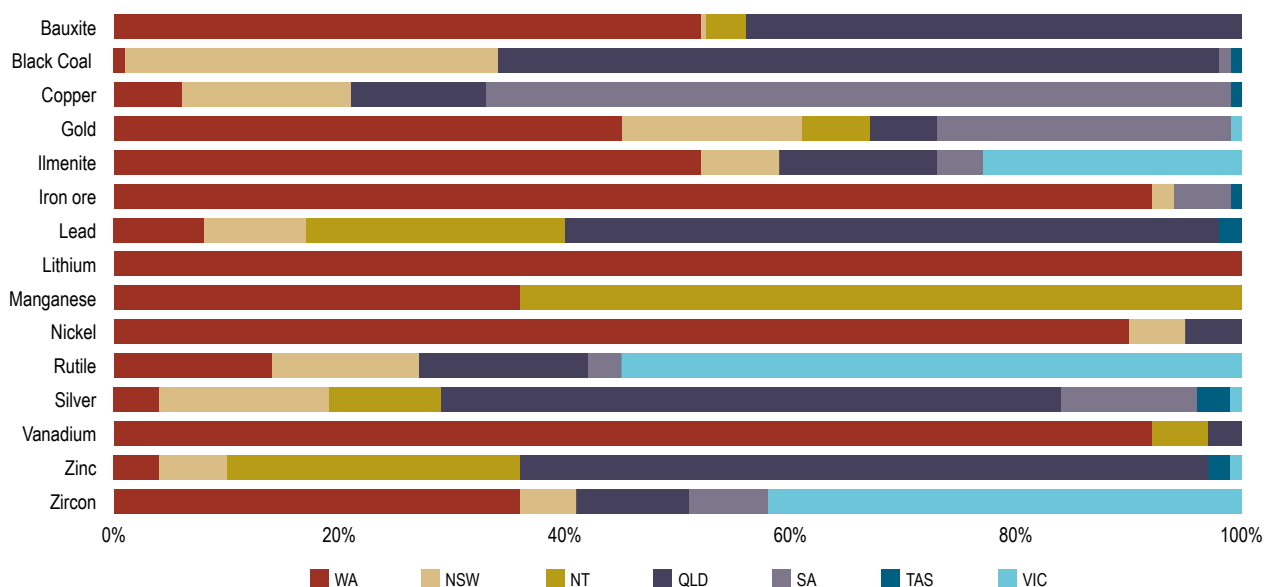


Figure 2. Western Australia's share of resources compared to other Australian jurisdictions, for selected commodities (as at 31 December 2018)

Source: Geoscience Australia

The exploration sector represents a significant industry in its own right. In 2020, \$1.7 billion was spent on mineral exploration and \$379 million on petroleum exploration in Western Australia, representing 57 per cent of Australia's total,⁴ and employed nearly 4000 people, many of which are based in regional areas.

While ongoing exploration success is essential for the sustainability of the resources sector, exploration is a costly and risky business – only about one in every hundred mineral exploration projects leads to the development of a new mine.

The State Government recognises that Western Australia is competing with other resource-rich jurisdictions to attract exploration investment and strongly supports programs that continue to provide the State with competitive advantages in this area.

The Geological Survey of Western Australia (GSWA) has been highly successful, over many decades, in amassing a wealth of high-quality geoscience information for use by explorers, resource companies and researchers.

One of GSWA's core business functions is to provide pre-competitive geoscience data, free-of-charge, to reduce the financial risk of exploration activities.

³ Critical minerals are metals and non-metals that are considered vital for the well-being of the world's major and emerging economies, yet whose supply may be at risk due to geological scarcity, geopolitical issues, trade policy or other factors (Source: Geoscience Australia).

⁴ Australian Bureau of Statistics (ABS), (2020). Mineral and Petroleum Exploration, Australia, June 2020. Canberra: ABS

This service is critical, because most of the major deposits close to the surface have already been discovered. While approximately 80 per cent of Western Australia's geology is hidden beneath some form of cover (sand, soils or sedimentary basins), there remains immense potential for further resources to be found in less accessible regions and at depth below the surface.

Unearthing Western Australia – GSWA's strategic plan to 2030 – sets out the organisation's long-term strategic priorities to encourage the investment in exploration required to find these new resources.

This includes maintaining support for the Exploration Incentive Scheme, the State's flagship program to encourage exploration in underexplored areas of the State, and a plan to transform, modernise and rationalise GSWA's vast collection of geoscience data.

Coupled with the State's strong legislative framework, which provides explorers with secure tenure and guaranteed rights to the resources they discover, the Western Australian Government's commitment to ensuring that GSWA remains a world-leading geological survey organisation is set to present substantial development opportunities for the State in the years to come.

Government actions:

Description	Benefits	Date of announcement
1.1 Exploration Incentive Scheme		
<p>The highly successful Exploration Incentive Scheme (EIS) is a State Government initiative that aims to encourage exploration in Western Australia for the long-term sustainability of the resources sector.</p> <p>Since 2017, the State Government has provided ongoing funding of \$10 million per year for the EIS.</p> <p>An additional \$5 million in funding was provided in 2020-21 to support the industry as an industry recovery measure in response to the impact of COVID-19.</p> <p>Additionally, starting in 2021-22 the State Government increased EIS funding to \$12.5 million per year.</p>	<p>The provision of geoscience data and exploration incentives reduce the financial and technical risks of exploration, and has been shown to increase the level of industry investment in exploration.</p> <p>Continuing to attract investment in exploration is vital to the State's future. Without exploration, no new mining or petroleum operations would be developed.</p>	August 2017
1.2 Expansion of the Joe Lord Core Library		
<p>The Joe Lord Core Library in Kalgoorlie stores 'drill core' samples that contain valuable geoscientific information for mineral exploration companies in the Goldfields region.</p> <p>The core library contains an historic collection of drill core as well as new core generated through government-funded drilling programs, including the EIS co-funded drilling program, and core donated by industry.</p> <p>A commitment by the State Government to expand and upgrade the core library, at a cost of \$7 million, will ensure sufficient storage space until around 2037. Joe Lord Core Library is expected to be completed in November 2021.</p>	<p>The expansion project will provide better access, more space and improved facilities for explorers and researchers to view and analyse drill core generated in the Goldfields region.</p> <p>Core information can assist in reducing the technical and financial risk of exploration activities.</p>	August 2020

Description	Benefits	Date of announcement
1.3 Provision of funding for specialist geoscience equipment		
<p>The State Government provided funding of \$3.2 million to leverage \$5 million in Commonwealth funding from AuScope for the purchase of a new state-of-the-art CAMECA IMS 1300-HR³ ion microprobe that will be housed at the John de Laeter Research Centre at Curtin University.</p> <p>The ion microprobe is one of only five in the world, and will be an Australian first once it is delivered and installed (expected in 2021).</p>	<p>The ion microprobe will provide Western Australia with a unique competitive advantage in the provision of pre-competitive geoscience information to industry.</p> <p>The instrument will also be used to support the Australian Space Agency's interest in increasing Australian participation in international deep space sample return missions.</p>	August 2020
1.4 Development of <i>Unearthing Western Australia</i> – the Geological Survey of Western Australia's strategy to 2030		
<p><i>Unearthing Western Australia</i> outlines GSWA's long-term strategic priorities:</p> <ul style="list-style-type: none"> • building on the geological understanding of the State • modifying the way geoscience data is stored, analysed and delivered to ensure it can move fluidly with emerging technology and innovation • employing and developing highly skilled staff • continuing to deliver trusted geoscientific information to government, the community and the resources sector. 	<p>Implementation of <i>Unearthing Western Australia</i> will:</p> <ul style="list-style-type: none"> • ensure GSWA is at the forefront of pre-competitive geoscience data delivery, increasing the State's attractiveness for exploration investment • enable the government to make evidence-based decisions in relation to the use of its natural resources to support a strong economy, resilient society and a safe and sustainable environment. 	November 2020

Government action in focus:

Continuing support for the Exploration Incentive Scheme

The Exploration Incentive Scheme (EIS) is a State Government initiative that aims to encourage exploration in Western Australia for the long-term sustainability of the State's resources sector.

The EIS supports five high-level programs: 3D prospectivity mapping, geophysical surveys, encouraging exploration through cover, strategic research with industry, and innovative drilling that includes government-industry co-funded drilling.

The Co-funded Drilling Program provides refunds to industry of up to a 50 per cent (capped to a maximum of \$200,000) for drilling programs in underexplored areas, with refunds offered through competitive application rounds. Each year, about half of the \$10 million in funding provided by the State Government is invested in the Co-funded Drilling Program. Refunds are offered through a competitive application series, twice a year.

To better address the requirements of petroleum and geothermal companies, a new co-funded program was introduced in 2021. The Energy Analysis Program has been designed to support analysis of existing State resources (such as drill core, sidewall core and cuttings, and oil, condensate, water and gas samples), as well as for the re-analysis of existing data. A total of \$500,000 per year has been allocated to provide 50 per cent refunds (up to \$50,000) for successful applicants.

Since its inception in 2009, the EIS has proven to be a successful and important component in developing the knowledge of Western Australia's geology and encouraging investment.

A recent independent economic impact assessment⁵ found that every \$1 million invested in the EIS generates \$31 million in benefits to the State.

The EIS has contributed to at least 25 new discoveries. An example is the Gruyere gold project, a 50:50 joint venture between Gold Road Resources and Gold Fields. The mine, located 200 kilometres northeast of Laverton, is one of the largest gold discoveries in Western Australia in more than a decade.

Officially opened in December 2019, Gruyere is set to produce around 300,000 ounces of gold per year over a 12-year mine life and provide direct employment for 250 people.



Gruyere gold project. Image: Gold Road Resources.

⁵ Fogarty, J.J, (2021). An Economic Assessment of the Exploration Incentive Scheme: 10 years from 2009 to 2019, Prepared for the Department of Mines, Industry Regulation and Safety.

Strategic Priority 2: An environmentally and socially responsible industry

The development of mining and petroleum projects has the potential to impact not only the environment in which they operate and the health and safety of their workers, but wider communities and even the global climate.

As Western Australia's resources sector continues to grow and evolve, so have societal expectations. In order to maintain their social licence, resource companies will increasingly be required to demonstrate that they are performing beyond their legislated obligations.

The State Government is committed to ensuring a best-practice regulatory framework is in place that facilitates responsible resources development, in line with these changing expectations. This is achieved through an increasing focus on implementation of risk-based and transparent regulation and the implementation of key policy decisions.

Key policy decisions include a commitment to review the State's Aboriginal heritage legislation, increased regulatory oversight of hydraulic fracture stimulation activities, developing a greenhouse gas emissions policy for major projects, and modernisation of worker health and safety legislation.

The State Government also encourages the industry to strive to perform above and beyond regulatory requirements by celebrating leadership in environmental management, community partnerships and occupational health and safety through annual Resources Sector Excellence Awards.

Positioning Western Australia as a world-leader in sustainable development will ensure our position as a preferred supplier to global markets and as a sought-after destination for investment.

Climate change – challenges and opportunities

The Western Australian Government is committed to working with all sectors of the State's economy to achieve net zero greenhouse gas emissions by 2050. This is supported by requirements for mineral and petroleum development proposals assessed under the *Environmental Protection Act 1986* to set interim and long-term emission reduction targets consistent with the State's net zero aspiration.

As a significant contributor to greenhouse gas emissions, and the need to address the implications of a changing climate on operations, many resource companies are responding to this test.

While climate change presents challenges for the industry, increasing demand for the critical minerals required for the global transition to clean energy will present significant new opportunities for Western Australia's resources sector for decades to come.



**GLSC Aboriginal Ranger Program, Kanowna Belle Mine Site.
Image: Northern Star Resources Ltd.**

Government actions:

Description	Benefits	Date of announcement
2.1 Review of Western Australia's Aboriginal heritage legislation		
<p>A review of the <i>Aboriginal Heritage Act 1972</i> began in early 2018. It comprised an extensive three-phase process to help identify issues and gaps in the legislation and involved consultation with Aboriginal people, industry representatives, heritage professionals and the Western Australian community.</p>	<p>The new Aboriginal Cultural Heritage Bill will replace the current Act. The objective of the modernised Bill is to transform how Aboriginal heritage is identified, protected and managed.</p>	<p>March 2018</p>
2.2 Hydraulic fracture stimulation policy		
<p>Western Australia's policy on hydraulic fracturing is based on the recommendations of the <i>Independent Scientific Panel Inquiry into Hydraulic Fracture Stimulation in Western Australia</i>.</p> <p>The policy maintains a ban on hydraulic fracturing in the South West, Peel and Perth metropolitan regions, and prohibits its use within two kilometres of gazetted public drinking water source areas, in national parks, towns and the Dampier Peninsula.</p> <p>All hydraulic fracturing proposals will be referred to the Environmental Protection Authority for assessment, and consent from relevant traditional owners and private landowners will be required before production hydraulic fracturing can be carried out on their land.</p>	<p>Development of the policy provides certainty to all stakeholders.</p> <p>It also ensures industry is accountable for its practices and that risks associated with hydraulic fracture stimulation are low and manageable.</p>	<p>November 2018</p>
2.3 Adoption of the World Bank's "Zero Routine Flaring by 2030" initiative		
<p>Worldwide, flaring by petroleum companies burns about 140 billion cubic metres of natural gas and emits more than 300 million tonnes of carbon dioxide into the atmosphere every year.</p> <p>The Zero Routine Flaring initiative focuses on eliminating routine wellhead flaring during production. This will be strengthened and reflected in amendments to legislation governing petroleum activities.</p> <p>In February 2019, Western Australia became the first Australian state or territory to adopt the initiative.</p>	<p>This initiative will ensure natural gas resources are managed more efficiently, while greenhouse gases are reduced.</p>	<p>February 2019</p>

Description	Benefits	Date of announcement
2.4 Development of a code of practice for mentally healthy fly-in fly-out workplaces		
<p>The State Government launched the <i>Mentally healthy workplaces for fly-in, fly-out (FIFO) workers in the resources and construction sector</i> code of practice in April 2019. It is the first of its kind in Australia, and aims to help organisations address psychosocial hazards and risk factors in FIFO workplaces, through adopting a risk management process.</p>	<p>The Code of Practice encourages positive mental health outcomes for all FIFO workers, including encouraging employers to establish a positive and supportive workplace culture, and provide suitable accommodation and rosters with sufficient time for rest and recreation.</p>	<p>April 2019</p>
2.5 Implementation of a Greenhouse Gas Emissions Policy for major projects		
<p>In April 2020, the Environmental Protection Agency released the Environmental Factor Guideline – Greenhouse Gas Emissions to communicate how greenhouse gas emissions will be considered by the Environmental Protection Authority (EPA) in the environmental impact assessment (EIA) process.</p>	<p>The guideline supports the Government’s Greenhouse Gas Emissions Policy for Major Projects subsequently announced in August 2019. This policy applies to significant new proposals and existing projects undergoing expansion, supporting the development of Greenhouse Gas Management plans for proponents which outline strategies contributing towards the State’s net zero 2050 target.</p>	<p>April 2020</p>
2.6 Leading the push to establish an LNG fuelling hub in the Pilbara		
<p>With trading vessels needing to reduce their greenhouse gas emissions due to International Maritime Organisation regulations, the international shipping industry is turning to LNG as a transition fuel as it works towards clean hydrogen and other carbon-free fuels.</p> <p>The Government is supporting the development of a Pilbara LNG fuelling hub by offering a 50 per cent discount on port dues to bulk vessels bunkering with LNG at Pilbara Ports. This saving is worth around \$20,000 for each vessel. Discounts could be worth up to \$5.3 million by 2025. To help kick-start the shift to LNG fuelling, the Pilbara Ports Authority executed Australia’s first ship-to-ship LNG bunkering services licenses to Woodside Energy at Port Hedland and Dampier.</p>	<p>The development of a fuelling hub could position Pilbara Ports as the preferred fuelling hub for the next generation of low-emissions ships. It has the potential to create up to 125 jobs in the Pilbara, including skilled mariners and support administration.</p> <p>Transitioning iron ore exports shipped from the Pilbara from heavy fuel oil vessels to LNG-fuelled vessels could reduce carbon emissions by up to six million tonnes per annum.</p>	<p>May 2020</p>

Description	Benefits	Date of announcement
2.7 Development of modernised occupational safety and health legislation		
<p>The new <i>Work Health and Safety Act 2020</i>, based on national model legislation, replaces three outdated acts: the <i>Occupational Safety and Health Act 1984</i>, the <i>Mines Safety and Inspection Act 1994</i>; and the <i>Petroleum and Geothermal Energy Safety Levies Act 2011</i>.</p> <p>The new Act will also largely harmonise Western Australia's laws with those of other Australian states and territories (except Victoria), and will come into force once the supporting regulations are finalised.</p>	<p>The new legislation represents the most significant overhaul of work health and safety laws in Western Australia in decades.</p> <p>While offering greater protection to Western Australian workers, the legislation has also been designed to ensure consideration of mental health and wellbeing in addition to physical safety.</p> <p>Importantly for the resources sector, sector-specific regulations will enable the continuity of existing risk management approaches to work health and safety for the mining and petroleum industries.</p>	November 2020
2.8 Western Australian Climate Policy		
<p>The State Government is committed to adapting to climate change and working with all sectors of the economy to achieve net zero greenhouse gas emissions by 2050. The Western Australian Climate Policy details the Government's climate change initiatives and commitments to support the policy.</p> <p>The Policy encompasses initiatives to support net zero emissions across the public sector; increased adoption of low carbon energy; reduced emissions from mining and agriculture industries; and actions to guide decarbonisation across the rest of the economy.</p>	<p>The Western Australian Climate Policy will guide Western Australia to a prosperous and resilient low carbon future.</p> <p>The Policy will leverage innovation and technology to reduce emissions from the resources sector through initiatives such as the <i>Green Steel</i> and <i>Net Zero Emission Mining</i> projects led by the Minerals Research Institute of Western Australia.</p>	November 2020
2.9 Accelerating net zero emission mining		
<p>The first actions of the Minerals Research Institute of Western Australia's Net Zero Emission Mining Challenge have been launched, with up to \$1.5 million to be invested in co-funded research and development projects that address challenges to reducing emissions in the mining industry. The funding includes up to \$500,000 in matched funding (\$20,000 to \$50,000 per grant) for small to medium businesses in the Mining Equipment, Technology and Services (METS) sector that participate in the CSIRO's <i>Innovate to Grow</i> online program.</p>	<p>The Net Zero Emission Mining Challenge aims to reduce the carbon footprint, lower overall energy costs and improve the energy efficiency of the Western Australian mining sector through harnessing collective efforts, enabling decarbonisation to become an opportunity for the sector, rather than a cost.</p>	May 2021

Government action in focus:

Hydraulic fracture stimulation policy

Hydraulic fracture stimulation (otherwise known as “fracking”) is a technique used to extract natural gas from unconventional sources, including dense shale rock (shale gas) or compacted stone (tight gas). Hydraulic fracturing involves pumping fracking fluids (a mixture of chemicals, sand and water) under pressure into the rock formations in order to create small fractures to release the gas.

In September 2017, the Western Australian Government announced that hydraulic fracturing would be prohibited in the Perth metropolitan area and the South West and Peel regions. A moratorium was also placed on the use of hydraulic fracturing in all other areas of the State pending the outcome of an independent scientific inquiry.

The *Independent Scientific Panel Inquiry* into Hydraulic Fracture Stimulation in Western Australia handed its report to the Western Australian Government in September 2018, and the State’s policy on hydraulic fracture stimulation was announced the following month.

Prohibited areas were extended to include all areas within two kilometres of gazetted public drinking water source areas, national parks, regional towns and the Dampier Peninsula. The only areas where hydraulic fracturing can occur is on land covered by existing petroleum titles, or about two per cent of the total area of the State,.

Following amendments to the State’s petroleum legislation in September 2019, the Government announced the lifting of the moratorium on existing petroleum titles. All hydraulic fracturing proposals will be referred to the Environmental Protection Authority for assessment, and consent from relevant traditional owners and private landowners will be required before production can commence.

Royalties earned from these projects will be used to support renewable energy projects through the Clean Energy Future Fund, which has been designed to support implementation of innovative clean energy projects in Western Australia that reduce greenhouse gas emissions.

Industry focus:

Community Partnership Resources Sector Award Winners



Community Partnership Resources Sector Award

Two winners shared the Department of Mines, Industry Regulation and Safety's Annual Community Partnership Resources Sector Award in 2020: the Alcoa Maths Enrichment Program and the Midwest Mobile Dental Clinic.

Developed in partnership with Scitech, the Alcoa Maths Enrichment Program helps students gain the science, technology, engineering and mathematics ('STEM') skills needed for the future workforce. The program has been applied at more than 60 primary schools in the Kwinana, Peel and Upper South West areas reaching more than 14,500 students, 2250 teachers and 14,500 parents/guardians. The program is attracting international interest with another 78,000 teachers around the world reached by its digital platforms.

The Midwest Mobile Dental Clinic was developed by the Royal Flying Doctor Service in partnership with Karara Mining and the shires of Mingenew, Morawa and Perenjori.

The clinic provides free dental services to patients, many of whom do not have the capacity to travel and pay for dental services in distant towns, for 25 weeks of the year. The clinic has resulted in a strong improvement in dental health.

A special commendation award was also presented to Glass Jar Australia Ltd and St Barbara Ltd for the Leonora Shooting Stars program. The program uses sport to encourage and improve education and career pathways for young local Aboriginal girls. The Shooting Stars program empowers Aboriginal girls in regional and remote communities to make informed choices about their education and employment journey, in order to affect genuine change.



Royal Flying Doctor Service dental assistants with the Midwest Mobile Dental Clinic.
Image: Royal Flying Doctor Service.

Industry focus:

Responding to climate change

As a significant contributor to greenhouse gas emissions, the resources sector is increasingly facing pressure from governments, investors and the community to reduce emissions. At the same time, the industry recognises that climate change poses risks to physical assets and infrastructure, as well as supply chains through disruption to transport networks, the availability of water and energy resources and the health and safety of site-based employees. These risks amplify the already challenging geographies and climates in which many projects are located.

Addressing this issue is now a priority for many companies. Actions to reduce emissions already being taken by the industry are focused on technical innovations that often have the added benefits of improving productivity and environmental and safety outcomes.

The resources sector is leading the way in using renewable energy to reduce the carbon footprint of industrial projects in Western Australia. Industry participants are harnessing innovations and expertise through the many future-focussed energy companies operating in the State, and have been successful in securing significant funding support from the Commonwealth Government's Australian Renewable Energy Agency (ARENA), Clean Energy Finance Corporation (CEFC) and the Northern Australia Infrastructure Facility (NAIF).

Installation of Australia's largest hybrid renewable microgrid, for example, was completed at Gold Fields' Agnew gold mine in May 2020. The 56 megawatt microgrid incorporates five wind turbines, a 10,710-panel solar farm, battery system and off-grid gas/diesel engine power plant, which will deliver up to 70 per cent of the mine's power requirements.



Wind turbines at the Agnew gold mine. Image: Gold Fields Limited.



Agnew's solar farm. Image: Gold Fields Limited.

The resources sector is also investing in the development of new technologies to abate carbon emissions. In August 2020, Fortescue Metals Group announced a \$32 million investment in hydrogen buses and a renewable hydrogen production and refuelling facility to replace a fleet of diesel buses at its Christmas Creek iron ore mine in the Pilbara, an initiative which was partly funded by the State Government's Renewable Hydrogen Fund. As well as investing in traditional renewable energy solutions in order to achieve net zero emissions by 2030, this initiative is part of Fortescue's goal to enable the development of green electricity, green hydrogen and green ammonia projects in Australia.

In May 2021, Alcoa announced that it was successful in receiving \$11.3 million in ARENA funding from towards a \$28.2 million project to trial the application of renewable energy in the alumina refining process at the company's Wagerup refinery located 120 kilometres south of Perth. Alumina refining is an energy-intensive process that, in 2019, accounted for nearly one-quarter of Australia's direct manufacturing emissions, or about 14 million tonnes of carbon dioxide. Electrifying the generation of process heat using renewable energy, and thereby displacing fossil fuels, has the potential to reduce carbon emissions by 70 per cent, and represents an important step towards decarbonising metals production.

Carbon offset programs, such as tree planting programs, have also made significant contributions to the resource sector's commitment to addressing emissions from its operations. Woodside, for example, has invested more than \$100 million over the past decade to develop its own carbon offset project as part of the Pluto LNG project. This project has resulted in the planting of more than 40 million Australian blue mallee trees across more than 17,000 hectares of Western Australia, including 2400 hectares in 2020 alone. Since 2008, these plantations have sequestered over 850,000 tonnes of CO².

Strategic Priority 3: An industry that is efficiently and effectively regulated

Developing new resource projects typically involve large capital investments and long lead times between initial investments in exploration to final commissioning.

Given the complexity of many resource projects, it is not surprising that the regulatory framework is also complex, with a large variety of State and Commonwealth legislation, standards and processes.

The State Government recognises that an efficient and effective regulatory framework is essential for providing industry with the certainty required to make investment decisions, and is committed to support measures to streamline regulation while not compromising on environmental and social standards.

The State Government is committed to improving regulation and regulatory practice through:

- reviewing and updating laws and regulations so they are contemporary, effective and risk-based;
- pursuing process improvements through IT solutions; and
- working across key approval agencies, both within the State Government and at the Commonwealth and local government level, to reduce points of duplication and overlap.

Government actions:

Description	Benefits	Date of announcement
3.1 Streamline WA		
<p><i>Streamline WA</i> is a whole-of-government initiative aimed at improving regulation, thereby making it easier to do business. A key focus is improving mining environmental approvals while maintaining environmental protection standards.</p>	<p>This initiative will improve the accessibility of information for both industry and the community.</p> <p>It will aid in removing regulatory duplication and increase the efficiency of State mining environmental approvals.</p>	December 2018
3.2 Pursuit of an approval bilateral agreement for environmental approvals with the Commonwealth Government		
<p>The State Government has welcomed moves by the Commonwealth to enter into an approval bilateral agreement with Western Australia.</p> <p>Such an agreement would provide a single avenue for industry to achieve Commonwealth and State environmental approvals, while maintaining the highest environmental standards.</p>	<p>Implementation of an approval bilateral agreement will result in faster, clearer and more consistent environmental approvals.</p> <p>It is estimated to result in an average six-month reduction in decision-making timeframes.</p>	August 2020

Description	Benefits	Date of announcement
3.3 Environment Online		
<p>The Department of Water and Environmental Regulation is developing Environment Online, a straightforward, simple-to-use online platform for water and environmental regulatory processes.</p> <p>Development commenced in 2021, with the first release expected early in 2022. Subsequent releases are expected over three years.</p>	<p>Environment Online will be accessible by industry and allow users to apply, submit, monitor, and review submissions and approvals related to water and environmental permits and licenses, as well as Environmental Protection Authority environmental impact assessments, resulting in cost and time savings.</p> <p>Environment Online will also improve the transparency, certainty and consistency of water and environmental approvals, and provide a quality experience for staff, industry, and customers.</p>	<p>May 2020</p>
3.4 Amendment of planning legislation to cut red tape for significant development proposals		
<p>Phase 1 amendments to the Planning and Development Act 2005 introduced a temporary significant development application pathway which will be superseded by applications of state or regional significance being determined by a Special Matters Development Panel from early 2022. Further regulatory change and development of supporting guidance will consider what will be projects of state or regional significance and how they will be processed. Streamlining the process and reducing any unnecessary red tape will be considered as part of this work.</p>	<p>In November 2020, a \$50 million LNG plant in Mount Magnet was the first significant development to gain approval through the temporary significant development application process. The project is anticipated to inject approximately \$100 million of investment into the State's regional economy, creating 70 jobs during construction and 30 jobs once operational.</p>	<p>July 2020</p>
3.5 Reform of the <i>Environmental Protection Act 1986</i>		

Description	Benefits	Date of announcement
<p>The Environmental Protection Act is Western Australia's primary environmental protection legislation. It provides the legal framework for environmental impact assessments by the Environmental Protection Authority as well as regulating emissions, discharges and the clearing of native vegetation.</p> <p>Amendments to the Act, passed by Parliament in November 2020, represent the most significant reform of the State's environmental legislation in more than 30 years.</p>	<p>The amendments to the Environmental Protection Act will simplify and reduce unnecessary regulation, while maintaining strong environmental protection and standards. This will encourage business development and create jobs, while protecting Western Australia's environment.</p>	<p>November 2020</p>
<p>3.6 New rules to fast-track construction of mine sites</p>		
<p>Many large mining projects rely on infrastructure corridors to connect their mines to processing facilities and other essential services. These corridors can extend for hundreds of kilometres, and are used to build haul roads, power lines, pipelines and conveyor systems.</p> <p>Mining companies were previously required to have all land access licences granted prior to lodging applications for environmental approval. This meant that for long infrastructure, construction could not commence until land access was approved along the entire corridor.</p> <p>The Department of Mines, Industry Regulation and Safety has implemented new processes to enable construction in a staged manner along the corridors, while land access licences are still pending.</p>	<p>Environmental assessments of the whole mining infrastructure corridor can now be conducted as part of a holistic mining proposal at the start of the project, rather than delaying the assessment of the infrastructure corridor until land access licences have been granted.</p> <p>This new approach has the potential to cut months off the construction timeline, while not impacting environmental, safety or heritage standards.</p>	<p>December 2020</p>

Government action in focus:

Streamline WA



Launched in December 2018, *Streamline WA* is a whole-of-government initiative to make it easier to do business in Western Australia by improving regulation and regulatory practice.

A priority focus of *Streamline WA* is environmental approvals for mining. A series of workshops were held with representatives from state and local governments, industry and environmental consultants to develop a set of practical and implementable recommendations for consideration by the Streamline WA Steering Committee.

The *Streamline WA* Mining Environmental Approvals Project Board, a partnership between key approvals agencies (the Department of Water and Environmental Regulation and the Department of Mines, Industry Regulation and Safety), is focused on delivering initiatives to improve and clarify regulation of mining environmental approvals. Improvements being progressed to date include:

- the development of an online “one-stop-shop” that acts as an entry point for users to find whole-of-government information on mining environmental approvals processes, inclusive of approval journeys that outline the steps required to be completed for exploration/prospecting and mining activities;
- continuing work on legislative amendments to introduce a framework for automated assessments and authorisation for certain low impact mining activities, and the introduction of a single approval instrument for mining activities;
- reducing the reporting burden for industry through the introduction of a single streamlined annual environmental report that requires reporting by exception rather than compliance reporting against individual tenement conditions; and
- clearly defining the regulatory roles of the key approvals agencies in order to reduce duplication and improve administrative efficiencies.

Government action in focus:

Working with companies to expedite approval processes for new mining operations

The development of new mining operations involves a complex and lengthy series of steps, encompassing initial exploration, followed by further detailed geoscientific work to define the resource. Each potential mine's economic viability then needs to be demonstrated before companies commit to investing in the assessments required under the State's comprehensive approvals process.

World-wide, it is generally accepted that the start-up phase for mines, from exploration and mine development to production, may take up to 10 years or even longer.⁶

The ability of Western Australia's regulatory system to allow for the expeditious approval of new mining operations has been demonstrated in recent years through the development of mines including IGO Limited's Nova nickel-copper-cobalt project and Beacon Minerals Limited's Jaurdi gold project.

Nova, located in the Fraser Range approximately 360 kilometres southeast of Kalgoorlie, is IGO's flagship mining operation.

It took only four years and three months for the project to progress from discovery to the production of its first nickel concentrate in October 2016.

The total length of time taken for the Jaurdi project, located near Coolgardie, to progress from initial exploration drilling to the production of its maiden gold bar in September 2019 was less than three years.



Nova's processing plant. Image: IGO Limited.

⁶ International Council on Mining & Metals, (2021). Operating Mines. [online] ICMM. Available at: www.icmm.com/en-gb/metals-and-minerals/producing-metals/where-and-how-does-mining-take-place [Accessed 12 January, 2021].

Strategic Priority 4: An evolving industry

The State Government is committed to building upon Western Australia's outstanding natural resources and established expertise in mineral processing operations that will help to diversify the economy and create jobs.

Amongst Western Australia's existing downstream processing operations are:

- the Perth Mint – Australia's largest fully-integrated precious metals enterprise;
- Alcoa and South32s' alumina operations, which account for two-thirds of Australia's alumina production, and are among the lowest cost producers of alumina (the primary source of most of the world's aluminium production);
- IGO/Tianqi Lithium – Australia's first lithium hydroxide facility;
- Tronox's mineral sands mining, processing and pigment plant operation – the world's largest integrated titanium dioxide project; and
- BHP's Nickel West – one of the world's leading battery metal suppliers.

The changing nature of demand for resources has resulted in renewed interest in the development of particular commodities as well as opportunities for the development of new industries.

Global demand is increasing for metals, energy and petroleum products for both traditional applications and those brought about by the digital age and the requirements of future renewable energy technologies. This is resulting in renewed interest in the development of particular commodities.

Already the world's largest producer of lithium, Western Australia is one of the only jurisdictions in the world that has commercially viable reserves of all of the minerals required for the manufacture of new battery technologies.

To position the State as a world leader in future battery production, the Western Australian Government implemented its Future Battery Industry Strategy in 2019. Western Australia has already successfully attracted investment into value-adding activities such as the processing of battery-grade lithium hydroxide and nickel sulphate.

Demand for critical minerals, including rare earth elements is also increasing due to the expansion of their use in renewable energy, aerospace, defence and other high-end technological applications.

Western Australia holds the majority of Australia's rare earths resources, and is home to Lynas Rare Earth's Mt Weld operation in the Goldfields. This mine is the only significant miner and processor of rare earths in the world outside China. Several new rare earths projects are also currently under development.

A greater focus on ethical and sustainable supply chains by the end users of technology products, concerns regarding security of supply, the quality and consistency of production, and ethical production standards has also resulted in increasing international interest in Western Australia's potential as a producer and processor of these important minerals.

The State's transparency and evolving policy and regulatory settings, particularly relating to labour and environment laws, also make commodities from Western Australia among the most ethically mined and processed in the world.

The world's leading car manufacturers including BMW, Tesla and Ford are exploring ways to certify their supply chains and have each taken steps to ensure they are sourcing minerals from ethical producers in the future. BMW, for example, has identified Western Australia as an ethical and sustainable producer of lithium and cobalt, and has negotiated supply contracts with Western Australian miners directly to ensure its products are sourced responsibly.

Another new industry under development, following the provision of special consideration by the Western Australian Government, is potash from brine. Potash is a premium fertiliser that significantly increases agricultural yields and productivity, and is not currently produced in Australia. While Western Australia has significant potash resources, development has been held back by the costs associated with holding the large areas of land required for these projects.

Support for a new brine industry, through the introduction of a concessional rental rate for mining leases in 2019, has resulted in the fixed costs imposed by government now being at a comparable level with conventional operations. Several projects are now under development.

The State Government has also introduced measures designed to support the development of a renewable hydrogen industry, which has significant synergies with the resources sector.

Government actions:

Description	Benefits	Date of announcement
4.1 Provision of support for a new brine industry		
<p>Sulphate of potash, a mineral found in brine, is used as a premium fertilizer that significantly increases agricultural yields and productivity, but is not currently produced in Australia. The nature of brine industry projects means that they require mining tenure over expansive areas of land, up to 10 to 20 times larger than large conventional mining operations.</p> <p>To facilitate the growth of the industry, the State Government introduced a concessional rental rate for mining leases for minerals derived from brine. The Mining Rehabilitation Fund Regulations 2013 are also being amended in order to specifically accommodate the industry's unique disturbance features.</p>	<p>The lower rental rate for brine mining leases means the fixed costs imposed by government are at a comparable level with conventional mining operations, and the Mining Rehabilitation Fund amendments will ensure the levy contributions are equitable and proportional.</p> <p>These initiatives will assist the development of this new industry in Western Australia, creating employment and community development opportunities, particularly in remote Aboriginal communities.</p>	December 2018
4.2 Future Battery and Critical Minerals Industries Strategy		
<p>The Future Battery and Critical Minerals Industries Strategy is focused on growing and diversifying the State's battery and critical minerals industries to capture emerging opportunities across the value chains through a range of clear and coordinated actions.</p> <p>Originally established as the Future Battery Industry Strategy, this Strategy's scope was widened to include critical minerals in November 2020.</p>	<p>The Strategy supports the Government's vision that, in 2025, Western Australia will have a world-leading, sustainable, value-adding future battery industry that provides local jobs, contributes to skill development and economic diversification, and benefits regional communities.</p>	January 2019

Description	Benefits	Date of announcement
4.3 A Renewable Hydrogen Strategy for Western Australia		
<p>The Renewable Hydrogen Strategy sets out the State's approach to become a significant producer, exporter and user of renewable hydrogen.</p> <p>To date, the State has invested \$35.5 million to support the development of the Western Australian renewable hydrogen industry.</p> <p>This investment includes up to \$15 million to rounds 1 and 2 of the Renewable Hydrogen Fund for capital works projects and feasibility studies across the four strategic focus areas, \$8.3 million for WA Recover Plan initiatives to boost the hydrogen industry, \$7.5 million election commitment to construct safe road access into the Oakajee Strategic Industrial Area, and \$4.7 million for Horizon Power's Denham Hydrogen Microgrid Demonstration Project. The original renewable hydrogen targets were also brought forward by a decade, from 2040 to 2030.</p>	<p>The development of the renewable hydrogen industry will provide substantial benefits for industry and communities, in both decarbonisation and new economic opportunities.</p>	<p>July 2019</p>
4.4 Provision of funding to attract investment in the manufacturing of cathode active materials		
<p>The State Government has committed \$13.2 million in project funding to attract a global pre-cursor cathode active materials manufacturer to establish a production facility in Western Australia.</p> <p>The cathode active manufacturing initiative includes incentives to offset project costs, such as land lease rates on industrial land.</p>	<p>The initiative will see Western Australia take the next step in the local battery industry beyond downstream processing and into advanced manufacturing. It will also strengthen the State's position as an alternative supplier of battery minerals, materials, technology and expertise in global battery supply chains.</p> <p>This action supports the implementation of the Western Australian Future Battery Industry Strategy.</p>	<p>August 2020</p>
4.5 Royalty rebate scheme for lithium miners		
<p>Temporary assistance has been provided by the State Government to three lithium mineral producers in Western Australia: Galaxy Resources' Mt Cattlin operations, Pilbara Minerals' Pilgangoora operations and Altura Mining's Pilgangoora operations.</p> <p>Spodumene – the mineral from which lithium is derived – has seen a fall in prices over the last two years, putting these companies' operations at risk. They will receive a 50 per cent royalty rebate on spodumene concentrate for up to 12 months.</p> <p>The rebate is only available where the companies have an operating project and the employee count does not drop significantly from current numbers. In the case where prices improve significantly (equal to or greater than US\$550 per tonne for a given quarter), the rebate will not be provided.</p>	<p>This industry support measure is designed to assist in preventing the loss of more than 600 jobs and save more than \$20 million in annual royalty revenue over the coming years.</p> <p>At the conclusion of the assistance period, the companies will fully repay the rebates over a period of two years, ensuring that there will be no cost to the State Government.</p>	<p>December 2020</p>

Description	Benefits	Date of announcement
4.6 New Western Trade Coast Industrial Precinct		
<p>The State Government has committed to establishing a global strategic industrial hub south of Perth within the Western Trade Coast. The Western Trade Coast is WA's premier industrial heavy industrial zone, which comprises of four key areas: the Australian Marine Complex in Henderson, Latitude 32 Industry Zone, and the Kwinana and Rockingham Strategic Industrial areas.</p> <p>The Western Trade Coast capitalises on the area's transport links, deep-water bulk port facilities, freight routes and access to heavy rail. It is also the location for Westport, WA's future container port, to be developed in Kwinana near Anketell Road. The proposed precinct is expected to become a dedicated hub for high-tech manufacturing to support developing industries like batteries, hydrogen, renewable energy and defence.</p> <p>The initiative will involve the development of a masterplan and project-ready approvals to coordinate the development of the precinct and maximise the benefits of work already underway to develop industry.</p>	<p>The new precinct will provide an investment and trade strategy, land planning framework, and skills and workforce planning to support economic diversification, investment and local jobs.</p>	<p>March 2021</p>
4.7 Renewable Hydrogen Precinct - Oakajee Strategic Industrial Area		
<p>The State Government announced a commitment to assist developing the Oakajee Strategic Industrial Area into a globally competitive renewable hydrogen precinct.</p> <p>The Government will construct important road infrastructure to the site. As a greenfields site, such infrastructure will assist in fast-tracking its development.</p>	<p>This initiative will capitalise on Oakajee's world-class wind and solar energy potential, which can be utilised for the production of renewable hydrogen for domestic and commercial use, advanced manufacturing and export.</p> <p>Revitalising the Oakajee Strategic Industrial Area as a renewable hydrogen precinct will put the Mid West at the forefront of a new industry and deliver employment opportunities to Geraldton.</p>	<p>March 2021</p>

Government action in focus:

Future Battery and Critical Minerals Industries Strategy

The uptake of electric vehicles and battery-based energy storage systems around the world is driving global demand for lithium-ion batteries, which is expected to grow tenfold by 2030. Electric vehicle and battery manufacturers are now seeking to secure sources of minerals, materials and components to ensure supply chain certainty.

Western Australia is the world's leading producer of lithium and is ranked among the top five global producers of nickel, cobalt and rare earth elements. Western Australia is the only jurisdiction to mine, or have reserves of, all the minerals used in the manufacture of rechargeable batteries and energy storage systems.

The Future Battery and Critical Minerals Industries Strategy recognises Western Australia's unique comparative advantages in battery and critical minerals industries, and the intent to reap the full potential of the State's battery minerals, processing and manufacturing capability.

The Strategy's vision is for Western Australia to host a world leading, sustainable and value adding battery industry that provides local jobs, contributes to skill development and economic diversification and benefits regional communities.

The Strategy identifies five key priority areas including:

- growing Western Australia's participation in global supply chains;
- promoting Western Australia's investment opportunities;
- certifying Western Australia's battery minerals;
- supporting the uptake of energy storage systems in Western Australia; and
- developing Western Australia's local capability.

A key focus of the Government is attracting investment in the next step of the battery value chain: precursor cathode active materials manufacturing, as well as supporting value-add activities in the downstream segments of the value chain, including manufacturing, assembly and recycling.

These efforts will ensure Western Australia leverages its mineral resources, processing and manufacturing capability and technical expertise and research capability to become a key global player in battery and critical minerals value chains.

Industry focus:

Value-adding Western Australia's battery minerals

Western Australia has successfully attracted investment into the processing of its battery minerals to produce battery-grade lithium hydroxide and nickel sulphate. Three of the world's largest producers of lithium are developing downstream processing projects in Western Australia, including Tianqi Lithium (China), Albemarle (US) and SQM (Chile).

Tianqi Lithium (Australia), now in joint venture with IGO, has developed a lithium hydroxide plant in the Kwinana Industrial Area, south of Perth, to meet the rapidly growing demand for rechargeable batteries. Upon completion, the Kwinana plant will be the first of its kind in Australia and the most technically advanced anywhere in the world. It will have two individual production trains that will produce a total of 48,000 tonnes of battery-grade lithium hydroxide per annum once fully operational.

Albermarle has commenced construction of its lithium hydroxide plant in Kemerton in the State's South West, while Covalent Lithium (SQM and Wesfarmers) has made a conditional final investment decision on its proposed lithium hydroxide plant in Kwinana, subject to the granting of its environmental approvals.

BHP Nickel West will mark the completion of its nickel sulphate plant in 2021, co-located at its Kwinana Nickel Refinery south of Perth. The nickel sulphate plant will be one of the world's largest producers and will serve the electric vehicle battery market, initially producing 100,000 tonnes of nickel sulphate per annum.

EcoGraf plans to build a graphite processing plant in Rockingham capable of producing an initial 5000 tonnes per annum of battery (spherical) graphite with plans for expansion to 20,000 tonnes per annum. The Rockingham plant will import natural flake graphite from existing producers and process it into battery graphite using its company-patented, environmentally friendly EcoGraf process.

FYI Resources is progressing definitive feasibility studies and pilot plant production studies to support a planned high purity alumina processing facility, producing 8000 tonnes per annum of 4N (99.99% Al_2O_3) and 5N (99.999% Al_2O_3) high purity alumina. High purity alumina has many new age applications, including battery technologies and static power storage.

FYI's strategy is to develop an innovative refining process which will re-engineer the processing route by producing 99.99 per cent alumina directly from an ore source – not from already refined aluminium metal.



Tianqi's Kwinana lithium hydroxide plant. Image: Tianqi Lithium (Australia).

Strategic Priority 5: An innovative industry

Western Australia is recognised as a world-leader in resources industry research and development (R&D). The combination of forward thinking producers, cutting-edge service and supply companies, world-leading universities and scientific institutes, and a culture of excellence, come together to create a unique and productive innovation environment.

R&D is critical to maintaining the resource sector's future viability and, importantly, addressing the challenges inhibiting Western Australians from benefiting from the resources industry to its fullest extent. New resources need to be located, and improvements are required at every stage of the value chain to ensure that new resource projects are developed efficiently, effectively, and in line with community expectations.

Western Australia is home to one of Australia's global innovation precincts the *National Resource Sciences Precinct*, a collaboration between CSIRO, Curtin University and The University of Western Australia, which brings together Western Australia's world-leading research infrastructure and state-of-the-art facilities. Perth is also home to one of only two high-performance supercomputing facilities in Australia dedicated to research, the Pawsey Supercomputing Centre.

The State is a key partner in national R&D via the Commonwealth Government's Cooperative Research Centre (CRC) program. CRCs involve a concentrated, collaborative effort by participants across Australia, comprising researchers, industry and Commonwealth and State governments, on key challenges facing various industries including the resources sector.

The Western Australian Government, through the Minerals Research Institute of Western Australia (MRIWA), plays a vital role in driving minerals research to support the State's globally competitive mining sector. MRIWA's priorities span the entire mining lifecycle, from finding more viable resources to improved processing technologies and value-adding, through to mine closure and rehabilitation. It achieves this primarily through awarding grants for research projects designed to deliver tangible economic, environmental or social benefits for Western Australia, and attract a significant level of industry co-funding. In 2019-20, MRIWA supported R&D projects valued at over \$74 million. MRIWA is also a key participant in the national R&D landscape, and plays an important role in the Future Battery Industries CRC, which is headquartered in Perth.

Western Australian R&D is bringing about practical advancements to the industry. In 2018 a node of the Optimising Resource Extraction CRC was created, known as the Kalgoorlie-Boulder Mining Innovation Hub, in order to translate leading Australian mining research into real economic outcomes for the region and the country. Kalgoorlie-Boulder was selected due to its proximity to several operating mine sites as well as being home to a range of geological and mineralisation styles. Access to this diversity is important for technology development and enables tailoring to Australian conditions. The Innovation Hub, which transitioned to Curtin University in September 2020, brings together important players in the region such as MRIWA, Curtin's WA School of Mines, the Chamber of Minerals and Energy WA and METS Ignited, to solve common problems within the sector.

Government actions:

Description	Benefits	Date of announcement
5.1 WA Data Science Innovation Hub		
<p>The WA Data Science Innovation Hub is a State Government initiative led and supported by Curtin University, which aims to ensure Western Australia remains at the forefront of the digital revolution. It is focused on increasing the uptake, education, training and awareness of data science in the State.</p> <p>The Hub serves the resources industry, as well as a range of other existing industries, by connecting businesses and start-ups to the university's ongoing research and existing acumen. The State Government provided \$1,000,000 to establish the Hub.</p>	<p>The WA Data Science Innovation Hub provides the practical training to develop the skills needed to meet the challenges of the data science industry, helping grow Western Australia's existing industries such as the resources sector. This assists in creating and supporting jobs by harnessing the increasing availability of large volumes of data in the State.</p>	<p>August 2018</p>
5.2 Secured headquartering of the Future Battery Industries Cooperative Research Centre in Perth		
<p>The State Government ensured Western Australia was recognised as a global leader in the production of future battery materials, technologies and expertise, through securing Perth as the headquarters for the Future Battery Industries Cooperative Research Centre (FBICRC).</p> <p>FBICRC will provide industry-led research capability to grow Australia's competitiveness and contribution in the next wave of global battery industries.</p> <p>The State Government is contributing funding of \$6 million over six years to the FBICRC, primarily through the Minerals Research Institute of Western Australia.</p>	<p>The growth of the battery industry's activities and the adoption of battery technologies in Western Australia will spur domestic investment in R&D. This will make the State more competitive and innovative in meeting the needs of the electric vehicle and energy storage markets, and help make the State a 'one-stop shop' for battery materials.</p>	<p>April 2019</p>
5.3 Provision of funding to support the FEnEX CRC		
<p>The State Government is providing \$10 million over 10 years to support the Future Energy Exports Cooperative Research Centre (FEnEX CRC), a priority initiative for the LNG Jobs Taskforce. The Commonwealth Government is also providing \$40 million over 10 years to the FEnEX CRC.</p> <p>The FEnEX CRC will execute cutting-edge, industry-led research, education and training to help sustain Australia's position as a leading LNG exporter, and enable it to become a leading global hydrogen exporter. The State Government, in collaboration with the FEnEX CRC, is investigating the development of a "Futures Facility" (a microscale research and teaching plant to allow testing of new LNG and hydrogen processes) in Kwinana.</p>	<p>The FEnEX CRC was established to help industry partner with the research sector to solve industry identified problems. Its research program will help position the State as a leading global LNG and hydrogen exporter as markets and technology change over the coming decade.</p>	<p>April 2019</p>

Description	Benefits	Date of announcement
5.4 Providing support for software developers to meet international standards		
<p>The Energy and Resources Digital Interoperability (ERDi) TestLab is a collaboration between The University of Western Australia, South Metropolitan TAFE, Enterprise Transformation Partners and Amira Global. The TestLab provides a state-of-the-art facility which allows software developers in the resources sector to test their software to determine if it meets international interoperability standards.</p> <p>An initiative of the Commonwealth Government, it is also supported by METS Ignited and NERA (National Energy Resources Australia).</p>	<p>This initiative will promote the accelerated adoption of automation technologies in the resources sector, and provide significant economic benefits and job opportunities.</p>	<p>February 2020</p>
5.5 Investing in autonomous technology for the space industry in Western Australia		
<p>Building upon the mining and petroleum's world leading industry expertise in remote operations, the State is seizing the opportunity to take part in the new generation space industry through the 'Australian Remote Operations for Space and Earth', known as <i>AROSE</i>.</p> <p>A consortium of industry, research and space companies has been formed, supported by a \$1.5 million investment from the State Government.</p> <p>Supporting <i>AROSE</i> are three space projects:</p> <ul style="list-style-type: none"> • <i>Australian Space Automation, Artificial Intelligence and Robotics Control Complex</i>: Perth-based Fugro has partnered with the Australia Space Agency to build and operate a new robotics control complex. Funding of \$3.5 million and \$4.4 million is being provided by the State and Commonwealth Governments respectively. • <i>Australian Space Data Analysis Facility</i>: the State's Pawsey Supercomputing Centre, in partnership with the WA Data Science Innovation Hub, is establishing a new national space data analysis facility in Perth. Funding of \$750,000 and \$1.5 million is being provided by the State and Commonwealth Governments respectively. • <i>Curtin University's Binar Space Program</i>: Under this program, Curtin University will be launching seven Binar cubesat spacecraft into space. 	<p><i>AROSE</i> will create a world-class hub of knowledge and expertise in space technology, potentially sparking an additional \$196 million in gross state product for Western Australia annually, and an increase of 1540 jobs within the next five years.</p> <p>These investments not only strengthen Western Australia and Australia's role in the global space sector, but grow the industries the State has a natural advantage in, like the resources sector.</p>	<p>February 2020</p>

Description	Benefits	Date of announcement
5.6 Supporting the development of the Australian Automation and Robotics Precinct		
<p>The State Government has committed \$20 million to support the development of an Australian Automation and Robotics Precinct at Neerabup. The test facility, being established by DevelopmentWA, will be used for testing, research and development, and training in autonomous, remote operations, and robotic systems and equipment.</p>	<p>The establishment of a world-class automation and robotics test facility in Western Australia will provide stimulus for further cluster development in the sector.</p>	<p>August 2020</p>

Industry focus:

Autonomy in action

The benefits of technology in mining are numerous. It can remove people from some of the more hazardous jobs, while improving the ability to more efficiently find, extract and process resources, with less impact.

Western Australia's iron ore sector is a leader in the adoption of autonomous technologies, hosting around 75 per cent of all autonomous haul trucks currently in use across the globe. While their use is predominantly associated with the major iron ore producers in the Pilbara, the technology is spreading to other sectors. In April 2021, Newmont's Boddington gold mine became the world's first open pit gold operation to produce gold delivered from an autonomous haul truck fleet.

Such technology is not limited to trucks, with Western Australia home to the world's first autonomous train, Rio Tinto's AutoHaul™. At 2.4 kilometres in length, it is the world's heaviest robot. Other high-tech solutions operating in the State's mining sector include autonomous drilling rigs, drones, advanced data analytics, artificial intelligence and machine learning. The major iron ore companies control their autonomous technology through state-of-the-art operations centres located in Perth, some 2000 kilometres away from the mine sites. This provides real-time information across operations – from the pit to the port – allowing optimisation of mining, maintenance and logistics activities at a central metropolitan hub.



Autonomous truck hauling Pilbara iron ore. Image: Rio Tinto

Western Australia's oil and gas industry also leads in autonomous technology capabilities.

Woodside has partnered with NASA and others to advance robotics tools that enable the company's operators and engineers to make their tasks safer and more effective. Staff on sites in Karratha have adopted a fleet of remotely-operated robots to assist with surveillance and inspection tasks, emergency response procedures and asset management procedures. [Link paragraphs](#)

Fugro, a global Geo-data company whose Australian headquarters are located in Perth, has a remote operations centre based at the Telstra Advanced Communications Facility in Gnangara, which specialises in the use of robotics. The company remotely runs subsea inspection, repair and maintenance activities at depths of up to 4000 metres.

The wealth of autonomous expertise has seen Perth chosen as the headquarters for the Australian Remote Operations for Space and Earth, known as 'AROSE'. AROSE is a not-for-profit, industry-led consortium with a vision for Australia to be the leading, trusted provider of remote operations science, technology and service, on Earth and in Space. Standing at the forefront of knowledge and technology transfer between Australia's traditional industry sectors and the burgeoning international Space sector, AROSE brings these sectors together to collaborate on targeted, industry-led projects with Australia's world-leading remote operations expertise at their core. These projects deliver high-end, niche solutions and technology for applications from Earth to Space and back again; solutions and applications that can transform industries, explore Space, and return benefits to our economy, workforce, communities and planet, now and for future generations.

Supporting AROSE are three space projects which will further help a range of industries across Australia grow:

- Fugro has partnered with the Australian Space Agency to build the Australian Space Automation, Artificial Intelligence and Robotics Control Complex. The complex will be a world-class facility in Australia that trains, tests and controls remote and autonomous operations in space and other harsh environments, and a world-recognised commercial facility for innovation, security and collaboration.
- Perth will be home to the Australian Space Data Analysis Facility, at one of Australia's high-performance computing and data research facilities, the Pawsey Supercomputing Centre. The new facility builds on the State's competitive advantage and expertise in data analytics, and will assist Australian SMEs and researchers in enhancing their ability to leverage space data.
- Curtin University's Binar Space Program will launch seven Western Australian designed and manufactured CubeSat spacecraft into space. The seven spacecraft will form Australia's first homegrown constellation of satellites in space and position Western Australia as the national leader in the development and operation of active spacecraft.

Industry focus:

Entrepreneurship in the junior mining sector

Large Australian companies have operated in Australia and other resource-rich nations for many years. More recently, these larger companies have been joined by not only mid-tier explorers and miners, but by 'junior' mining companies.

These companies have helped to open up new, largely untapped, resources regions in countries such as Mozambique, Peru, Mongolia and the Philippines.

This has led to rapid globalisation of the Australian exploration and mining sector, transforming it from being predominantly domestic in focus, to being one of the leading investor nations in all of the world's resource-rich regions.

To put this into perspective, Australian mining companies have discovered four times more wealth overseas than they have at home.

Despite increasing demand for electric vehicles in Europe, there is no domestic lithium supply, even though there are significant resources.

In recent developments, several Perth mining juniors, including European Metals Holdings, Vulcan Energy Resources, European Lithium and Infinity Lithium, have been progressing the development of European lithium mining and processing projects.

These companies are all seeking to produce lithium hydroxide from hard-rock or brine sources in the Czech Republic, Spain, Germany and Austria to meet demand from European electric vehicle and battery manufacturers to secure sources of minerals, materials and components.

Vulcan Energy also aims to become the first Zero Carbon Lithium™ producer for electric vehicle batteries.

One of the most advanced projects, European Lithium's Wolfsberg Lithium Project in Austria, is aiming to be the first local lithium supplier into an integrated European battery supply chain, with production potentially commencing by the end of 2023.

Strategic Priority 6: Maximising benefits for all Western Australians

Through the payment of royalties, as well as taxes, fees and charges, the resources sector helps to maintain high levels of health, education, law and order, infrastructure, and other essential services in Western Australia. More than \$9.1 billion in royalties alone were paid by the resources sector to the State Government in 2020, providing about one-quarter of total government revenue.

From prospectors to major resource projects, the sector is a significant employer. It directly employs more than 140,000 people, and plays a critical role in underpinning jobs and economic growth, particularly in regional communities.

Workers are well paid, with wages in the resources sector the highest of any industry sector.⁷ The mining sector also has the highest proportion of Aboriginal employees of any industry sector in the State.

This helps to drive spending by the people of the State and further enhances our quality of living.

A sustainable resources sector, however, provides wideranging benefits to the wider Western Australian community – well beyond those directly employed and the royalties paid.



Prospectors, both professional and recreational, are important contributors to regional economies.

⁷ Australian Bureau of Statistics (ABS), (2021). Average Weekly Earnings, Australia, November 2020. Canberra: ABS

Realising opportunities for Western Australia's future

The State Government is focused on leveraging the strengths of the industry to create more job opportunities for Western Australians.

Initiatives such as the LNG Jobs Taskforce are focused on State's existing competitive advantages – in technology, education, R&D and operations expertise – to further develop the LNG sector and amplify opportunities in complimentary sectors.

The State is also diversifying the economy through expanding into new mineral commodities and valueadding activities like battery minerals, as well as by becoming a sought-after supplier of the goods and services that go into producing minerals and petroleum.

The Mining Equipment, Technology and Services sector, known as the 'METS' sector, supplies the cutting edge technology, software, equipment, and engineering and construction services, required for this globally-competitive industry to operate.

The State and Commonwealth Governments are also supporting the growth of the METS sector through the establishment of an export hub (the Austmine METS Hub). A similar export hub (the Subsea Energy Australia Export Hub), for the petroleum services sector is also receiving government support. These hubs will help hundreds of small to medium companies get export ready.

While METS companies service and supply the resources sector, many cater to other industries in the economy, most notably space, as well as agriculture, defence and IT. These innovations work to provide the rich benefits of diversification across the Western Australian economy and are anticipated to only grow in the future.

A significant benefit from the development and application of cutting-edge resources technology is the opportunity to expand the State's international economic footprint. The State's first Asian Engagement Strategy, supported by Invest and Trade WA, will assist resource companies and the associated services sector in realising development opportunities with key trading partners.

The Western Australian Government is also keenly aware of the importance of a highly skilled workforce to drive Western Australia's future and create new job opportunities. This involves working with industry to ensure future and current workers receive the education, training and up-skilling needed as job requirements evolve. It necessitates a concentrated effort on knowledge and skills relating to science, technology, engineering and mathematics, known as 'STEM', as the nature of work continues to change and the world becomes more technologically advanced.

In 2019, the State Government released Western Australia's first-ever State STEM Skills Strategy, *Future Jobs, Future Skills: Driving STEM skills in Western Australia*, with the goals of ensuring students have STEM skills, reskilling the current workforce with STEM skills and breaking down barriers for under-represented groups to ensure everyone has the opportunity to participate in a STEM future.

The STEM Skills Strategy has been supported by the establishment of ground-breaking resource automation education and training. South Metropolitan TAFE has partnered with Rio Tinto to develop vocational courses in automation, including Australia's first Certificate IV in Remote Operations. The success of this partnership has been recognised through the achievement of a gold award at the World Federation of Colleges and Polytechnics Awards of Excellence in 2020.

This work is being complemented by WesTrac's Collie Training Facility – the southern hemisphere's first autonomous Caterpillar training facility.

Partnering directly with industry ensures the curriculum futureproofs jobs by training Western Australians with the skills industry needs. It also promotes the State's resource education and training as a specialised area in its own right.

Government actions:

Description	Benefits	Date of announcement
6.1 Collaboration with industry to develop new ground-breaking automation courses		
<p>Two courses are being delivered at the South Metropolitan TAFE Munster campus: Certificate II in Autonomous Workplace Operations; and a microcredential course, <i>Working Effectively in an Automation Workplace</i>, with Rio Tinto contributing \$2 million towards the new training programs.</p> <p>These courses were developed by the Resource Industry Collaboration, led by Rio Tinto, the State Government and South Metropolitan TAFE.</p> <p>In late 2019, the partnership further announced that TAFE would offer Australia's first Certificate IV in Remote Operations.</p>	<p>These Australia-first automation courses will allow Western Australian workers to take full advantage of the opportunities provided by automation to the industry and economy. It will further ensure the State maintains its competitive advantage as a leader in automation technology.</p> <p>Partnering directly with industry on the curriculum ensures Western Australians are provided with the skills that are needed by the sector.</p>	October 2017
6.2 LNG Jobs Taskforce		
<p>The State Government is leading a collaboration, the LNG Jobs Taskforce, with some of the world's largest oil and gas producers to establish Western Australia as a global LNG Hub.</p> <p>The Taskforce established groups tasked with developing initiatives related to education and operations, business development and diversification, and technology and decarbonisation.</p>	<p>The LNG Jobs Taskforce is the first of its kind in Australia and demonstrates a new standard for industry and government collaboration.</p> <p>The vision of the Taskforce is to establish Western Australia as a recognised global leader in LNG collaboration, innovation, maintenance and support, exporting services across Australia and internationally, and generating local jobs and local business opportunities.</p>	March 2018
6.3 Steel Fabrication Roundtable		
<p>In February 2019, the Premier hosted the Steel Fabrication Roundtable to support increased opportunities for local steel fabricating businesses at the State's major projects.</p> <p>The Roundtable included representatives from steel fabrication businesses, Western Australian iron ore producers, unions and industry bodies.</p>	<p>The Steel Fabrication Roundtable enabled key stakeholders to better understand each other's needs and work constructively to identify future opportunities presented by the iron ore sector for the local steel fabrication industry.</p>	February 2019

Description	Benefits	Date of announcement
6.4 Supporting Collie's transition from its historic reliance on coal mining		
<p>Renewable energy and storage technologies are set to play an increasing role in generating the State's electricity, reducing the need for coal-fired power stations.</p> <p>Building on existing initiatives to diversify Collie's economy, such as the \$20 million Collie Futures Fund, the State Government announced implementation of the \$60 million Industry Attraction and Development Fund (IADF) in May 2019, with a further \$20 million committed in 2021.</p>	<p>This IADF aims to attract large-scale initiatives that will promote economic diversity, job creation and sustainability in Collie. This is in addition to the Collie Futures Fund, which will contribute up to \$2 million to support significant industry-led proposals that create jobs and contribute to economic development and diversification in the region.</p>	<p>May 2019</p>
6.5 Regional local content initiative to boost jobs in the regions		
<p>The Regional Local Content Initiative will receive \$300,000 over three years to assist regional small to medium sized enterprises (SMEs) to compete for public and private supply tenders and contracts.</p> <p>The initiative will be delivered via the Department of Primary Industries and Regional Development's Local Content Advisers network, based in Regional Development Commissions throughout the State, who work with regional SMEs and communities to cultivate business expertise and opportunities.</p> <p>The initiative will reach across the State, encompassing rural and remote communities and a range of SMEs, including Aboriginal businesses.</p>	<p>By supporting business growth in the regions, the investment will generate flow-on benefits, creating employment opportunities, improving the local economies and boosting the social well-being of regional communities.</p>	<p>June 2019</p>
6.6 Western Australia's Asian Engagement Strategy		
<p>Eight of Western Australia's top ten trading partners are in Asia.</p> <p>The State developed the <i>Asian Engagement Strategy 2019-2030: Our future with Asia</i> to assist regional communities and businesses to deliver products and services into Asia. This includes key sectors such as minerals and petroleum, the METS sector, renewable energy and elements of the battery supply chain.</p>	<p>The Asian Engagement Strategy will assist businesses in developing stronger relationships with Asia and in opening the doors to new markets.</p>	<p>June 2019</p>

Description	Benefits	Date of announcement
6.7 Provided facilitation support for the establishment of the Subsea Energy Australia export hub		
<p>In May 2020, Subsea Energy Australia (SEA), the peak body for subsea supply and services companies in Australia, received a commitment of \$1.4 million in matched funding from the Australian Government for the establishment of an export hub to better help small and medium businesses access international markets.</p> <p>In collaboration with Subsea Innovation Cluster Australia, the SEA hub will work to promote services, conduct trade missions and develop export strategies for Australian subsea technology.</p> <p>A commitment by the State Government to provide facilitation support (through Invest and Trade WA - a part of the Department of Jobs, Tourism, Science and Innovation) helped to secure the Commonwealth Government grant.</p>	<p>The SEA hub will help to bring Australia's energy industry to the international stage, increasing competitiveness and facilitating access to export markets and global supply chains.</p> <p>It has the potential to result in accelerated, sustainable growth and value creation for Australian subsea supply and services companies, resulting in greater economic value generated from resource sector projects operating in Western Australia.</p>	<p>May 2020</p>
6.8 Strengthened the Western Australian Domestic Gas Policy		
<p>The WA Domestic Gas Policy requires LNG exporters to make gas available in the local market. In August 2020, the State Government updated the policy to improve monitoring and transparency of LNG exporters' domestic gas commitments. It also clarified that the Government would not agree to export via the WA pipeline, network other than in exceptional circumstances, in order to ensure gas is available for local industrial and economic development.</p>	<p>The Domestic Gas Policy ensures a secure supply of gas for Western Australian communities and industries.</p>	<p>August 2020</p>
6.9 Provided funding for the establishment of Austmine's WA METS Digital Mining Export Hub		
<p>Austmine's Mining Equipment, Technology and Services (METS) Digital Mining Export Hub has received \$500,000 in funding from the Australian Government, as well as \$350,000 and in kind support of \$50,000 from the State Government.</p> <p>The Hub will assist Western Australia in building strong digital mining capability networks through collaborations and connections between regional, remote and metropolitan small to medium enterprises.</p>	<p>Promoting the unique value proposition of the METS sector to the world will bring numerous benefits to the economies of Western Australia and Australia, including increased investment and development opportunities.</p>	<p>September 2020</p>

Description	Benefits	Date of announcement
6.10 Launched <i>Working in WA's Resources Sector</i> webpage		
<p>The State Government has partnered with the Chamber of Minerals and Energy and the Australian Petroleum Production & Exploration Association, to launch the <i>Working in WA's Resources Sector</i> webpage.</p> <p>The online tool, accessed through the State Government's Jobs and Skills website, provides information on current and future training and employment opportunities in the resources sector, and advice on how they can be accessed.</p> <p>It includes information on TAFE courses, with a focus on courses that relate to the resources sector, including those that have had fees reduced as part of the Lower Fees Local Skills initiative. Specific information is also available on opportunities for Aboriginal people and women who are interested in working in the sector.</p>	<p>This online resource will ensure Western Australians have all the information they need to prepare for a career in the resources sector. The new webpage will link Westerns Australians to employment opportunities and will ensure they have the right training to enter the workforce.</p>	<p>October 2020</p>
6.11 New specialist training facility to be built		
<p>A dedicated \$2 million facility is being constructed at North Metropolitan TAFE to train industrial conveyor belt technicians required in the mining and logistics industries.</p> <p>Specialist industry-standard equipment will support the delivery of a Certificate III in Polymer Processing.</p> <p>It is anticipated construction will be completed in October 2021, with training commencing in Semester 1, 2022.</p>	<p>More than 200 new and existing workers are set to train in the facility, helping to meet industry demand and address skills gaps.</p>	<p>December 2020</p>
6.12 Development of an LNG Operators Skills Framework		
<p>The LNG Jobs Taskforce is supporting the development and execution of the LNG Operator Skills Framework, a set of 15 units delivered as part of the existing Certificate III in Process Plant Operations.</p> <p>A grant of \$800,000 will be provided to South Metropolitan TAFE towards developing teaching, learning and assessment resources for the LNG Operators Skills Framework.</p>	<p>Developing the learning materials will ensure operators are taught in a consistent manner across training providers. It will help solve the problem of increasing costs for companies and frustration for workers who currently have to undergo new training each time they start at a new LNG facility.</p> <p>Having the course available in Western Australia will not only benefit the local LNG industry but attract students from companies operating plants Australia-wide and overseas.</p>	<p>December 2020</p>

Description	Benefits	Date of announcement
6.13 Investing in modern equipment for Kalgoorlie's Central Regional TAFE		
<p>As part of the State Government's commitment to invest in new state-of-the-art equipment across the State's TAFE network, Central Regional TAFE in Kalgoorlie is set to receive a range of modern new equipment.</p> <p>The Heavy Plant and Engineering Trades Workshop Project will include new petrol and diesel engines on stands, a hybrid vehicle and balancing gear for automotive and light vehicle apprentices and pre-apprentices; as well as a 5 tonne excavator, integrated tool loader and bobcat for mining and civil construction students.</p>	<p>The replacement of outdated equipment will assist in skilling mining and civil construction students, as well as apprentices and trainees in the horticulture, conservation and land management and Aboriginal ranger programs.</p> <p>This investment will ensure students are able to train on equipment that mirrors that used by industry, making them jobready when they graduate.</p>	February 2021
6.14 Plan to boost iron ore rail car manufacturing		
<p>Western Australia's iron ore is mainly transported to port via rail in 32,000 iron ore wagons, which require extensive replacement of parts over their 25 to 30 year lifespan.</p> <p>As part of its <i>WA Jobs Plan</i>, the State Government announced a commitment to establish a Local Manufacturing Investment Fund to help local manufacturers re-tool their workshops to manufacture iron ore rail wagon parts and undertake research and development on innovative manufacturing techniques.</p> <p>It will include the development of a full feasibility study that identifies critical rail wagon parts and their manufacturing requirements, and matches them with the technology, skills and workforce development options required.</p>	<p>The initiative will prepare local businesses to bid for major periodic overhauls of wagon components, such as coupler assemblies, bogies and wheelsets. In the longer term, it will position the industry to bid for complete rail cars for new resource projects or expansion projects.</p> <p>Local manufacturing of critical rail car components will reduce the State's exposure to international supply chain disruption for critical parts and equipment. It will also help build the local manufacturing industry, creating further long-term employment opportunities.</p>	February 2021
6.15 MRIWA introduces scholarships for Aboriginal post graduates		
<p>A new scholarship is being made available through the Minerals Research Institute of Western Australia for Aboriginal and Torres Strait Islander students undertaking research relevant to the minerals industry. The scholarship complements the MRIWA's existing program that is currently supporting 12 PhD students.</p>	<p>The new scholarship, valued at up to \$40,360 per annum, promotes diversity and recognises the important contribution Traditional Owners play in the development of the State's mining industry.</p>	June 2021

Government action in focus:

LNG Jobs Taskforce

Natural gas plays a major role in the world's energy mix, particularly as more countries commit to reducing greenhouse gases and seek alternatives to higher emission fossil fuels. As the second largest exporter of LNG in the world, the State Government is collaborating with industry to leverage our existing strengths to grow the LNG sector and establish Western Australia as a global LNG hub.

The Premier announced the formation of the LNG Jobs Taskforce at the Australasian Oil & Gas Conference and Exhibition in March 2018.

The Taskforce is comprised of the Minister for State Development, Jobs and Trade and heads of Woodside Energy, Chevron Australia, Shell Australia, Santos and INPEX Australia, as well as representatives from the Australian Petroleum Production and Exploration Association and UnionsWA. Its vision is to establish Western Australia as a global leader in LNG collaboration, innovation, maintenance and support, exporting services across Australia and internationally, and generating local jobs and business opportunities.

To achieve this aim, the Taskforce has established three working groups:

- Education and Operations – identifying the skills required for the success of the LNG sector, ensuring that the necessary talent is developed within the Western Australian community; establishing Western Australia as a global leader in remote operations and automation.
- Business Development and Diversification – maximising the participation of local businesses, including small to medium enterprises and Aboriginal owned businesses in the LNG sector during both construction and operations.
- Technology and Decarbonisation – encouraging the use of innovative technology, building partnerships between the LNG sector and other industry sectors, and collaborating on opportunities for decarbonisation.

An example of a priority initiative arising from the work of the Taskforce is the “Forward Work Plans” initiative that commenced in March 2020. Under this initiative, Chevron, Woodside, Shell and Santos have volunteered to release two-year procurement plans on an annual basis so that local businesses can plan their participation in future tender and contracting opportunities. The initiative has expanded in 2021 to include a range of prime contractors from the oil and gas sector, reaching further into the supply chain. The plans are made publicly available on a dedicated LNG Forward Work Plans project page on the ICN Gateway website.



Pluto LNG plant. Image: Woodside Energy Limited.

Industry focus:

Building a high-tech workforce

WesTrac's new Technology Training Centre, the second only such training facility in the world, was officially opened in August 2020. The \$7 million facility represents an opportunity to position Collie and Western Australia as a world leader in advanced technology and skills development in automation and autonomous operations.

The Technology Training Centre has been developed on land in Collie's Coolangatta Industrial Estate, and includes a new fully autonomous Cat 789D offhighway truck, an autonomous operations zone and training room facilities.

The Western Australian Government supported the project through \$2.7 million in grants from the Collie Futures Fund.

The initial focus will be to provide training in fit-out and maintenance requirements for the conversion and operation of existing Caterpillar haulage vehicles, with the view to expanding the range of courses over time to ensure the facility caters for the recognised skills of the future that will be in demand.

The facility, which commenced operating in 2020, is expected to train over 300 students by its third year of operation, delivering training course to technicians and operators of autonomous equipment to support the growth of this technology in mining.

Government action in focus:

Strengthening Western Australia's Domestic Gas Policy

Around 90 per cent of Australia's estimated recoverable conventional gas reserves are located off Western Australia's north west coast in the Carnarvon and Browse Basins. These gas fields underpin Western Australia's LNG export industry and domestic supply. In recent times, the Perth Basin in the State's Mid West has also proven prospective.

The Western Australian Government has maintained a domestic gas policy ever since helping underwrite the North West Shelf (NWS), Australia's first LNG project, in 1979. Today, the Domestic Gas Policy secures the State's long term energy needs and ongoing economic development by ensuring LNG export project developers also make gas available to the local market.

In August 2020, the Government strengthened the policy to improve monitoring of LNG exporters' commitments and ensure transparency on gas availability to the local market. It also clarified that the Government will not agree to the export of gas via the State's pipeline network other than in exceptional circumstances. Gas in the pipeline network is accessible for local consumers and is needed to support Western Australia's energy needs and ongoing economic development.

The update to the policy is reflected in domestic gas arrangements for projects to fill the NWS LNG facilities. In December 2020, the Government agreed to the export of half the Waitsia gas field, located in the State's Mid West, via the NWS. The rest of the gas is for the domestic market and Waitsia infrastructure will support further development in the Perth Basin. In February 2021, Woodside also agreed to a domestic gas commitment for processing Pluto gas at the NWS. The new arrangements are published on the Department of Jobs, Tourism, Science and Innovation's website.

The State's gas market is presently well-supplied. Ensuring Western Australians have access to reliable and affordable gas is a priority for the State Government, and the Domestic Gas Policy will enable this to occur for decades to come.

Industry focus:

Global excellence in METS

Given the size of Western Australia's mining industry, it is not surprising that the Mining Equipment, Technology and Services sector is recognised globally as the market leader.

METS companies include those that offer professional and technical services; technical equipment manufacturing; and information and operational technology. While some companies may provide services to other industries, such as the construction or petroleum sectors, many are specialist METS companies that provide services solely to the mining industry.

The State's METS sector encompasses a diverse array of organisations, including multinationals like Caterpillar and Hitachi, large firms like Ausdrill and Fugro, consulting companies like CSA Global and DRA, innovative manufacturers such as Safescape and BIS Industries, and a host of smaller, highly innovative, high-tech firms that provide a range of solutions for next-generation resource development.

Of the top 100 specialist METS companies operating worldwide, 22 of these are headquartered in Western Australia, with another 55 operating here, creating an internationally significant METS presence. This is just a small part of the 27,000 specialised METS companies now operating in Western Australia, building skills and capability that also helps to diversify the economy.

The wider METS sector has evolved as a major industry in its own right, adding an estimated \$27 billion in value to Western Australia's economy. For each person directly employed in the resources sector, it is estimated that at least three jobs are supported via supply and service industries.⁸

Many METS companies have developed from humble beginnings in Perth to go on and establish themselves as world leaders in the industry. METS is an evolving sector where Western Australian firms excel, with many opportunities now available to local companies to further grow the State's presence on the international stage. Examples of some local METS companies are featured below.

Simulation and virtual training solutions for workforce optimisation

Immersive Technologies is the world's largest supplier of advanced equipment simulators to optimise training for operators of mining equipment ranging from haulage vehicles to drill rigs in both surface and underground mining operations. The company, headquartered in Osborne Park, is helping mining companies increase their equipment operators' safety, as well as mine site profitability, through the effective alignment of "People, Process and Technology".

Immersive employs over 250 people in 14 offices around the world and has worked with more than 320 global mining clients. Over 1000 of its simulator modules are deployed in 45 countries, training over 150,000 equipment operators. The company has more than 85 per cent of the global market share in mining sector training simulators.



Advanced Equipment Simulators for surface and underground mining. Image: Immersive Technologies.

⁸ AlphaBeta Strategy Economics for METS Ignited and NERA, (2019) Staying Ahead of the Game, April 2019. Available at: <https://metsignited.org/wp-content/uploads/2019/11/Staying-Ahead-of-the-Game-Final-Report-WEB.pdf> [Accessed 21 January, 2021].

Biggest gear-making operations in the southern hemisphere

Hofmann Engineering is one of the largest gear-making operations in the southern hemisphere. With its head office located in Bassendean, Hofmann operates from six cities in Australia and employs over 500 Australian workers. The company also has international operations in Chile, Peru, India, US, Canada and China.

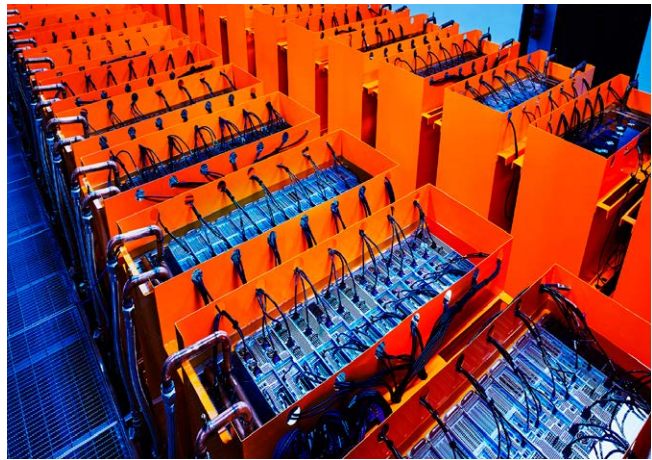
Hofmann was started in 1969 by two brothers from Germany, who set up a small toolmaking shop in a backyard in Perth. One of the key elements to the company's longevity and success has been continual innovation and investment in materials science research. New metals and continuous improvements to engineering design have enabled Hofmann to improve both the cost of production and durability of components manufactured, from years to decades in some products.

Provider of analytical software and reliable, green, high-performance computing (HPC) services

DUG Technology designs, owns, and operates one of the largest and greenest supercomputer networks on Earth. Innovating at the forefront of HPC, the company provides software, compute, and storage solutions that enable clients to leverage large and complex data sets such as seismic data processing for the resources sector.

From humble beginnings in a suburban shed, DUG is now a global company with offices in Perth, London, Houston and Kuala Lumpur.

In 2019 the company launched the integrated DUG McCloud platform which has enabled it to offer HPC, scientific data analysis, and software solutions to a diverse industrial client-base that includes radio-astronomy, biomedicine, and meteorology as well as the resources, government and education sectors.



The DUG Cool immersion-cooling solution reduces power consumption by up to 51%, and increases the life and efficiency of computer hardware. Leveraging this innovative technology allows DUG to operate some of the greenest HPC facilities in the world. Image: DUG Technology.

Drilling faster and smarter

Index is an ASX-listed company headquartered in Balcatta, in Perth. The company answers the questions 'where to drill next?' and 'how can blasting and processing be optimised?' in real time or near real time.

This is performed through cloud-connected sensors, downhole devices which collect geological data, and drilling optimisation products. This technology enables precision mining; companies can drill faster and deeper, with more accurate geological data, cost savings and less labour, and improved safety and environmental performance.

Index has 20 offices internationally, sales in 102 countries and a presence on 70 per cent of mineral drilling projects globally. The company has a 50-strong R&D team of world-class hardware, electrical, mechanical, firmware and software engineers, to ensure it continues to deliver higher quality technology solutions in the future.

