



Australian Government

Department of Industry, Science,  
Energy and Resources

# AUSTRALIA'S GLOBAL RESOURCES STATEMENT



Reliable, Responsible, Ready for the Future

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*Responsible, Reliable, Ready for the Future - Australia's Global Resources Statement*,  
Australian Government Department of Industry, Science, Energy and Resources.

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## FOREWORD



*Australia's resources sector is innovative, strong and resilient. We are maintaining our well-deserved reputation as a consistent supplier of energy and resources. Our industries are reliable, responsible and ready for the future.*

Despite the effects of the COVID-19 pandemic across the globe, Australia's resources exports continue to break records. We expect to see this trend continue in coming years. Australia's vast resources, world-class production operations and established supply chains mean we can competitively supply resources and energy around the world. Today, Australia is a world leader in the export of iron ore, coal and LNG and we are at the forefront in pursuing export opportunities for new energy technology related commodities - including rare earth elements and critical minerals.

The Australian Government is committed to delivering the strongest and most business-friendly investment environment for the Australian resources sector. We offer a strong, stable and transparent regulatory environment as well as research and development incentives to support innovation.

Our proximity to Asia and high quality resources have seen us become the supplier of choice in ever-expanding global supply chains.

The Australian mining industry is a world leader in sustainable resource management and mine safety. The government has invested in world-leading geoscience institutions, cooperative research centres and industry-led growth centres. This will enable the sector to remain a global leader as a reliable supplier and innovative player for the future. The government also has invested in our Mining Equipment, Technology and Services (METS) sector through our dedicated industry growth centre, METS Ignited.

We are well positioned to supply new markets interested in downstream processing for emerging technology products using critical minerals and new energy sources such as hydrogen. The government supports Australia's highly-skilled and innovative resource workers through targeted educational programs, ensuring our workers have the diverse and complex skills that new advanced technologies in the sector require.

This Global Resources Statement is the first instalment of the Global Resources Strategy. The Statement sets out the strengths and opportunities of our resources sector. It highlights Australia's position as a reliable, responsible and future-ready player for new and existing trading partners. I commend this Statement to our global trading partners and look forward to working together with other governments, industry and the community.

A handwritten signature in black ink, appearing to read 'K. Pitt', with a stylized flourish at the end.

**The Hon Keith Pitt MP**

Minister for Resources, Water and Northern Australia





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# INTRODUCTION

*The Australian resources sector is sophisticated and one of the most technologically-advanced in the world, with strong long-term growth potential.*

- Australia has some of the world's largest mineral resource deposits which will support exploration and production for decades to come
- Australia has a strong and resilient economy, placing the sector in a globally competitive position
- Australia is in close proximity to our major markets in Asia and has mature trade links with key markets
- Australia is a low risk environment to invest and do business in. The resources sector is supported by government policies and a sound regulatory framework, including strong safety and environmental protections
- As the world's leading Mining Equipment, Technology and Services (METS) development hub, Australia is an exceptional resources investment destination and supplier
- The sector has a highly skilled workforce with ongoing investment in training and development for jobs of the future
- Australia is home to some of the world's largest resources companies, participating in all stages of the supply chain
- Australia is taking advantage of new opportunities presented by emerging low emissions technologies, such as hydrogen and CCUS

*This Global Resources Statement builds on these facts and promotes Australia's strong resources credentials. Australia is a reliable, responsible and ready partner for resources exploration, investment and supply.*



**Figure 1:** Australia’s Global Resources Strategy in its strategic policy context.



# A Global Resources Strategy

*Global demand for resources and energy commodities is expected to recover from the economic impacts of the COVID 19 pandemic, and even expand. To support this, the Australian Government is developing a Global Resources Strategy to diversify and strengthen Australia's export markets.*

We are also investing in improving access to new markets through promotion of Australia's resources and increased engagement with our trading partners.

The Strategy is part of a whole-of-government effort to build Australia's resilience to trade shocks such as the COVID-19 global pandemic. It includes a series of measures to build export markets and develop new partnerships. This Global Resources Statement, the first of these measures, sets out Australia's resources landscape.

The Strategy will strengthen Australia's relationship with regional partners by:

- promoting our resources sector as a reliable supplier of energy resources and critical minerals to new and existing trading partners
- developing industry partnerships and supporting research and development by the resources technology and critical minerals sectors
- enhancing government-to-government and business-to-business linkages in key markets in our region.







## Proximity to Growing Markets in the Indo-Pacific

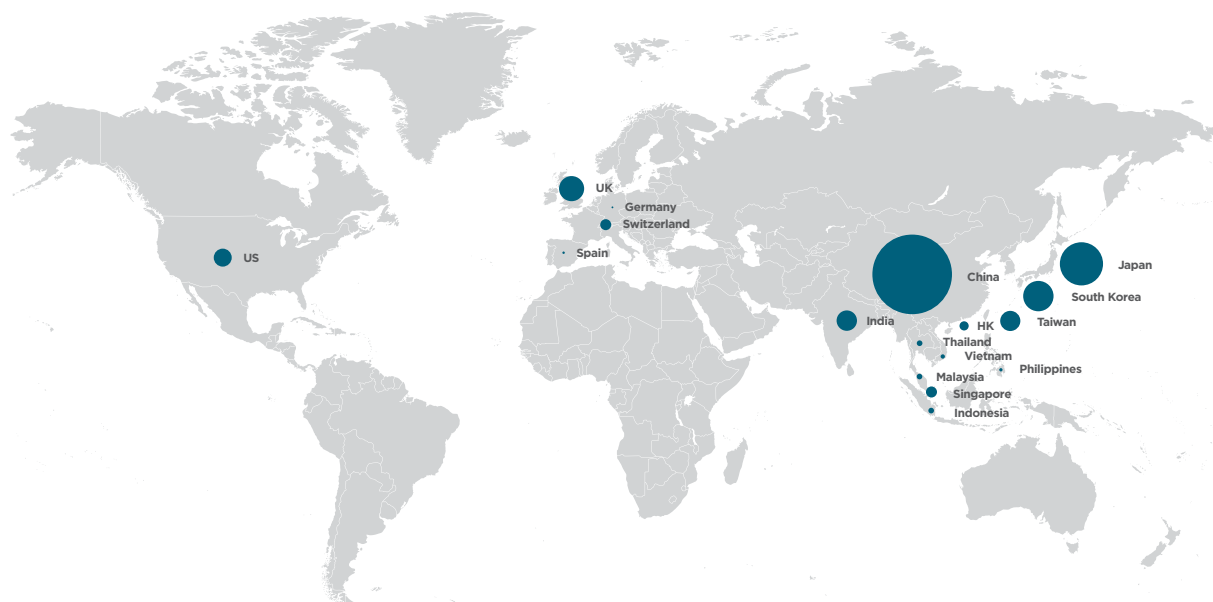
Australia's close proximity to growing markets in the Indo-Pacific gives our suppliers the advantage of lower transport costs and shorter timeframes, making us an ideal supplier of emerging energy resources to these growing markets.<sup>1</sup>

Australia's proximity to high-growth Asian markets makes it an excellent base from which to export commodities, services and technologies. Exporters from Australia access these crucial markets through:

- mature export links
- free trade agreements
- a strong logistics and shipping network

**Map 1:** Australia's major commodity exports in 2020 (A\$m) by export destination.

### Principal markets for Australia's commodity exports, by value (Calendar Year)



Australia's total commodity export value: market (\$m/2020)

China – 121,042	Japan – 35,627	South Korea – 17,624	UK – 12,059	India – 7,942	Taiwan – 7,764	US – 6,174	Singapore – 2,328
Switzerland – 2,311	Hong Kong – 1,612	Indonesia – 612	Thailand – 611	Malaysia – 601	Vietnam – 355	Philippines – 210	Spain – 113
							Germany – 65

Australia's commodity export value: commodity (\$m/2020)

Iron ore – 116,296	LNG – 36,233	Metallurgical coal – 27,119	Thermal coal – 16,618	Gold – 25,492	Aluminium (ingot metal) – 3,466
Copper – 7,056	Copper: refined – 3,380	Oil – 6,634	Zinc – 1,923	Zinc: refined – 1,277	

**Source:** Resources and Energy Quarterly, March 2021

<sup>1</sup> Geoscience Australia (2020), *Australian Energy and Minerals Resources Investor Guide 2020*. Australian Government, Canberra.  
[https://d28rz98at9fiks.cloudfront.net/133857/133857\\_00\\_0.pdf](https://d28rz98at9fiks.cloudfront.net/133857/133857_00_0.pdf)







# Reliable

## A desirable, stable investment destination and partner

*Our investment attractiveness has strengthened our trading relationships with major global economies, leading to continued prosperity for Australia's economy.*

Before 2020, the Australian economy had only experienced two years of negative growth during the previous six decades – in 1983 and 1991.<sup>2</sup> This performance is unmatched by any other advanced economy in the world. Since 1991, our growth rate has averaged 3.2 per cent – higher than every other developed economy in the world.

Australia is one of the most business-friendly countries in the world, ranking 14th in the World Bank global matrix in 2019.<sup>3</sup> This demonstrates Australia's desirability as an investment destination. Australia works to streamline government policy and regulation to better support resource exploration, mining and production.

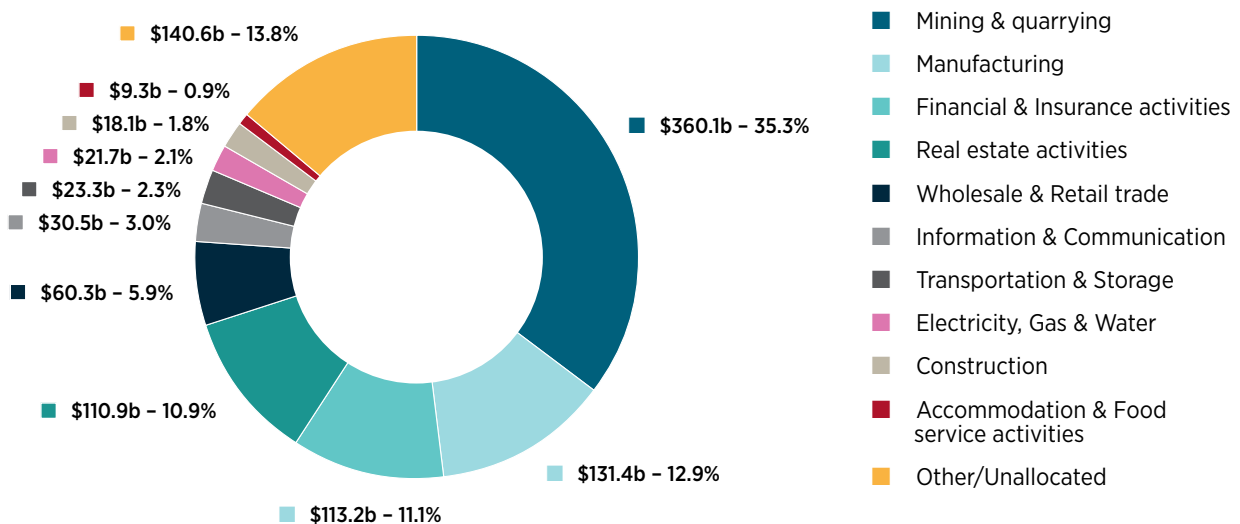
Australia consistently rates highly as an investment destination. The Fraser Institute, through its Annual Survey of Mining Companies, has shown Australia to be a preferred investment partner.

The 2020 Survey showed Australia as the most attractive region in the world for mining investment.<sup>4</sup>

Australia also welcomes foreign investment, which has helped build Australia's economy and continues to enhance the wellbeing of Australians. Foreign investment will support economic growth and innovation into the future.

Foreign investment in Australia increased by A\$97.1 billion in 2020, reaching A\$3,990.9 billion, reinforcing our position as a stable and reliable destination for investment. The mining and quarrying industries were Australia's top industries attracting foreign direct investment.<sup>5</sup>

**Figure 2:** FDI in Australia in 2019 by sector.



**Source:** DFAT (2019), foreign direct investment statistics - Australian industries and foreign direct investment <https://www.dfat.gov.au/trade/resources/investment-statistics/Pages/australian-industries-and-foreign-investment>

2 Austrade (2021), *Why Australia Benchmark Report 2021 - Resilient Economy*. Australian Government, Canberra. <https://www.austrade.gov.au/benchmark-report/resilient-economy>

3 The World Bank (2019) *Ease of Doing Business Rankings - Economy rankings*. <https://www.doingbusiness.org/en/rankings>

4 *Survey of Mining Companies 2020*. Fraser Institute International, Canada. <https://www.fraserinstitute.org/sites/default/files/annual-survey-of-mining-companies-2020.pdf>

5 Australian Bureau of Statistics (2019) *International Investment Position, Australia: Supplementary Statistics, Cat. No. 5352.0*, Australian Government, Canberra <https://www.abs.gov.au/statistics/economy/international-trade/international-investment-position-australia-supplementary-statistics/latest-release>

Australian businesses also invest significantly in other economies. At the end of 2020, the total amount of Australian money invested overseas was over \$A3 trillion. Australian investment in Asia has also increased dramatically over the past decade: between 2009 and 2019, our investments to major Asian economies has increased from A\$120 billion to A\$472 billion.<sup>6</sup>

## Government support for commercial success

Australia has billions of dollars of resources opportunities ready for exploration and development. We produce the world's most advanced pre-competitive exploration data to underpin private investment decisions. This data details the continent's potential mineral, energy and groundwater resources. Over A\$310 billion worth of new projects expansions has been completed in the last five years. There are also projects worth billions more in the pipeline.

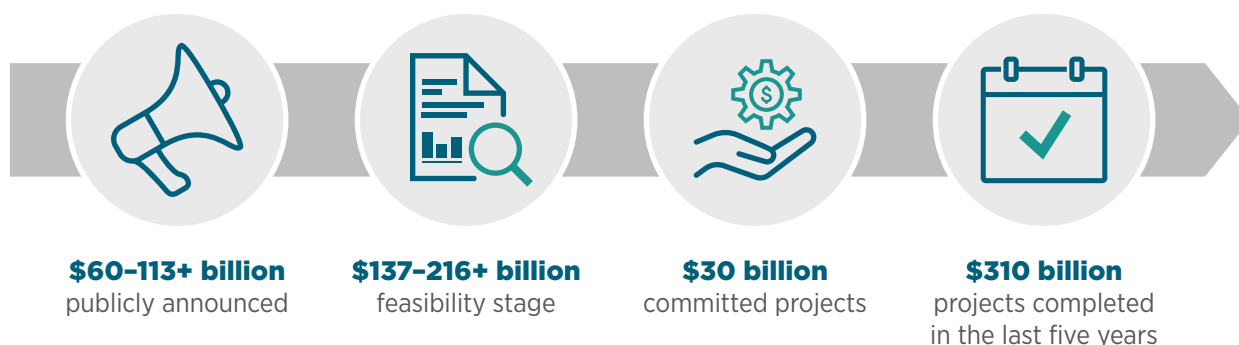
Australia's federal, state and territory governments make significant investments to better understand opportunities in our resources sector. We use this information to assist investors in their commercial success. The Department of Industry, Science, Energy and Resources' Office of the Chief Economist releases the Resources and Energy Quarterly,<sup>7</sup> containing up-to-date forecasts of the values, volumes and prices of Australia's major resources and energy commodity exports. Australia's Northern Territory, Tasmanian, and South Australian state governments also have state-specific investor guides to provide targeted support.

Australia's Geological Survey, Geoscience Australia, has developed an Energy and Mineral Resources Investor Guide,<sup>8</sup> outlining investment opportunities in Australia's resources sector. It also provides fundamental geographic information to all parties, free of charge.<sup>9</sup> Geoscience Australia also publishes Australia's Identified Mineral Resources, an annual assessment of Australia's mineral reserves and resources for major and minor commodities.

Geoscience Australia's A\$225 million Exploring for the Future Program provides pre-competitive data about potential mineral, energy and groundwater, used widely by Industry to inform investment decisions. Exploring for the Future has already mapped around 39 per cent of Australia, with more on the way. Its publicly-available data could drive an estimated A\$2.5 billion in economic benefits and jobs in Northern Australia. It has already resulted in more than twenty-five companies taking up new investments, covering over 150,000 square kilometres of exploration acreage across Queensland and the Northern Territory.

In addition to supporting commercial decision-making, the government has committed an additional A\$100 million to extend the Junior Minerals Exploration Incentive (JMEI) until 2025. The JMEI attracts new investors by allowing explorers to access tax incentives, and has already helped companies raise over A\$340 million in additional capital.

**Figure 3:** Project pipeline for the Australian mining sector



**Source:** Geoscience Australia, *Australian Energy and Minerals Resources Investor Guide 2020*

<sup>6</sup> Based in ABS catalogue 5352.0. (Last updated May 2020)

<sup>7</sup> Department of Industry, Science, Energy and Resources, *Resources and Energy Quarterly*, March 2021. Australian Government, Canberra. <https://www.industry.gov.au/data-and-publications/resources-and-energy-quarterly>

<sup>8</sup> Geoscience Australia (2020), *Australia's Energy and Mineral Resources Investor Guide*. Australian Government, Canberra. [https://d28rz98at9flks.cloudfront.net/133857/133857\\_00\\_0.pdf](https://d28rz98at9flks.cloudfront.net/133857/133857_00_0.pdf)

<sup>9</sup> Geoscience Australia (2020) *Our Projects – Providing Fundamental Geographic Information*. Australian Government, Canberra. <https://www.ga.gov.au/about/projects/geographic>



## Vast Supply of Resources

### Iron ore

Australia has a mature, efficient and low-cost iron ore industry. This makes it a supplier of choice for the world's steel makers. Export earnings are forecast to hit a record of A\$136 billion in 2020–21, accounting for 22 per cent of Australia's total goods and services exports. The iron ore industry was Australia's largest export earner in 2020, valued at A\$115 billion. The industry accounts for over 46,000 direct jobs, the majority being in regional areas of Western Australia.

Australia is the world's largest iron ore producer, with 36 per cent of global production. Australia's iron ore resources account for about 30 per cent of global deposits, with a considerable potential supply-life.<sup>10</sup> Iron ore resources occur in all the Australian States and Territories, but the vast majority (92 per cent) of Australia's iron ore production occurs in Western Australia with almost 80 per cent in the Pilbara.<sup>11</sup>

Transport of iron ore to overseas destinations has become highly efficient and cost effective due to the massive operational scale. A typical heavy-haul train is over 2.5 kilometres long, or 264 ore cars and delivers ore to three main export ports along the Pilbara coast. Australian iron ore continues to be in strong demand from China in 2020–21. We have also seen a recovery in American, Japanese, South Korean and European demand.

This, coupled with the impact of ongoing supply problems in Brazil, makes Australia well-placed to continue to be the world's pre-eminent supplier. Export earnings are forecast to exceed A\$100 billion every year for five years.

### Oil and gas

Australia's LNG sector started in 1989 when the North West Shelf LNG export project came online. Since then, Australia has become the world's largest LNG exporter. We accounted for 22 per cent of global LNG trade in 2020 worth A\$36.2 billion, making it Australia's second largest energy export commodity. The oil and gas industry directly supports about 22,000 jobs.

Gas continues to be important as a feedstock to industry, for electricity generation, and for residential use within Australia and in our LNG export markets. The government's Gas-Fired Recovery Plan is focused on:

- increasing gas supply
- improving the capacity of gas transportation networks
- empowering consumers, and
- easing pressure on east coast gas supply and price

<sup>10</sup> Geoscience Australia (2020), *Commodity Summaries*, Australian Government, Canberra.

<https://www.ga.gov.au/digital-publication/aimr2020/commodity-summaries#iron-ore-section>

<sup>11</sup> Geoscience Australia (2018), *Australian Resource Reviews – Iron Ore*. Australian Government, Canberra

<https://www.ga.gov.au/scientific-topics/minerals/mineral-resources-and-advice/australian-resource-reviews/iron-ore;>

Geoscience Australia (2016), *Australian Mineral Facts*. Australian Government, Canberra

<https://www.ga.gov.au/education/classroom-resources/minerals-energy/australian-mineral-facts/iron>



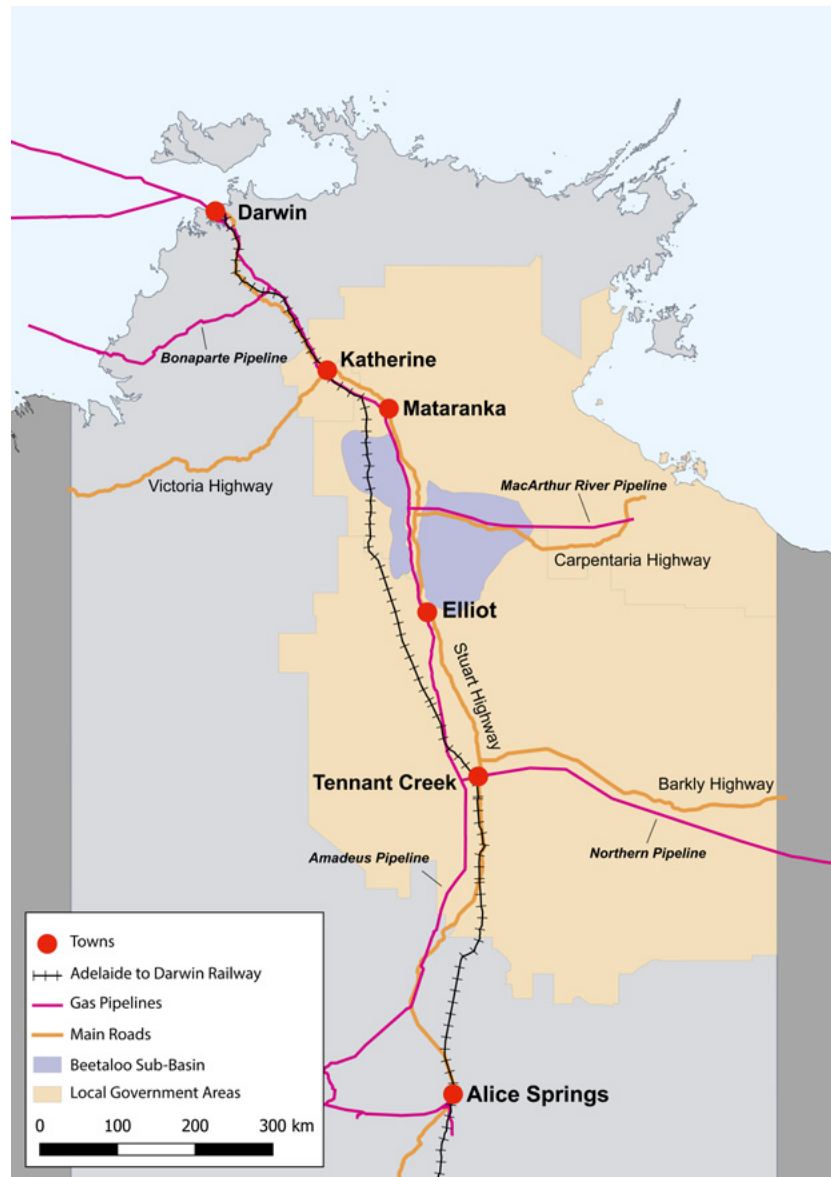
The government is developing Strategic Basin Plans to unlock and develop key gas basins. The first of these, for the Beetaloo Sub-basin in the Northern Territory, was released on 14 January 2021. Beetaloo has the potential to be a world-class gas province and the plan commits A\$224 million of new funding for exploration incentives and road upgrades to pave the way for industry investment. The second plan being developed is for the North Bowen and Galilee Basins in Queensland.

The LNG sector on the East Coast of Australia uses onshore coal seam gas reserves for exports. Around two-thirds of gas produced on the East Coast is exported as LNG to customers in Asia. Queensland's coal seam gas reserves along with further exploration and development of new gas basins will be increasingly important in maintaining exports and gas for the east coast domestic market.

The proximity of Australia's West Coast offshore resources to the Asian market underpins our position as a major reliable LNG exporter to the Asia-Pacific region. Over 70 per cent of Australia's LNG is produced from gas resources off the coast of Western Australia and the Northern Territory. The Carnarvon, Browse and Bonaparte basins all contain significant (multi-trillion cubic feet) undeveloped offshore gas resources, which can be developed competitively to meet global gas demand and new market opportunities.

Global gas and LNG demand is expected to increase by 30 per cent by 2040, with demand in the Asia Pacific region expected to increase by 82 per cent over the same timeframe.<sup>12</sup> Australia is well-placed to meet this growth. Demand in the next five years is expected to be driven by China, India, Bangladesh and other emerging Asian economies with expanding manufacturing and industrial sectors. LNG plays an important role as a stable and flexible fuel. LNG, in combination with Carbon Capture and Storage (CCS), will be a critical enabler of emerging low emissions energy technologies such as hydrogen and ammonia. This technology will increase the value of gas as a transition fuel, and is key to Australia's role as a technology leader in emissions reductions.

**Map 2:** The Beetaloo Basin, Northern Territory.



**Source:** Department of Industry, Science, Energy and Resources

<sup>12</sup> World Energy Outlook 2020 – Analysis - IEA, Stated Policies Scenario.



## Coal

The coal industry remains a major contributor to the country's prosperity and economic wellbeing. The industry was one of Australia's largest export earners in 2020, valued at nearly A\$44 billion. It also pays more than A\$5 billion annually in royalties and accounts for over 48,000 direct jobs.

Coal will continue to play an important role in the world's energy mix for years to come. The International Energy Agency projects coal demand in developing economies, particularly in Asia, to remain strong in the short-medium term to 2030.<sup>13</sup> This is to meet demand for electricity and increasing industrial output. Growth is highest in India, accounting for over 14 per cent of global demand for coal by 2030.<sup>14</sup>

Nine major terminals along the East Coast of Australia service the coal export industry. Port Waratah in Newcastle (New South Wales) is the largest coal export port in the world and Hay Point (Queensland) is one of the largest coal-loading facilities in the world.

Queensland has major coal deposits in the Surat, Bowen, Galilee and Clarence-Moreton basins. New South Wales contains a number of large high-quality resources for coal, including major deposits in the Hunter Valley, Gunnedah, Illawarra and Lithgow regions. Major deposits of brown coal are in Gippsland in eastern Victoria

Opportunities also exist to invest in research, development and commercialisation of alternative uses for high-emissions resources, including coal. The government is committed to a technology-led approach to lowering emissions through projects such as the Hydrogen Energy Supply Chain (HESC) pilot project.

This world-first project recently commenced its Australian operations and aims to safely produce and transport low emissions hydrogen from Australia to Japan. When combined with CCS, the coal to hydrogen project has the potential to create a high value, low emissions use for Australia's abundant brown coal reserves. This project is discussed in detail in the Ready for the Future section later in this Statement..

<sup>13</sup> International Energy Agency. *Coal 2020 Report*.

<sup>14</sup> International Energy Agency. *World Energy Outlook 2020*.

## Key Partnerships

Australia has established strong and long-running partnerships with key trading and investment partners across the globe. We have a proven track-record as a reliable supplier of resources over many decades.

The government is ambitiously committed to building on existing trade agreements and relationships with emerging partners to enhance investment and trade opportunities. We also keep working to ensure that Australia has a competitive business environment and regulatory frameworks. These frameworks maintain our position as a leading investment destination. All Australian jurisdictions seek to streamline business settings that are inefficient, particularly where they cut across more than one level of government.<sup>15</sup>

Australia seeks to expand and diversify its markets for resources, including for critical minerals, in the Indo-Pacific region and globally. To help Australia's resources companies, especially mid-tier companies, turn this opportunity into success, the government will undertake comprehensive market analysis of the region's opportunities and how Australia can meet them.

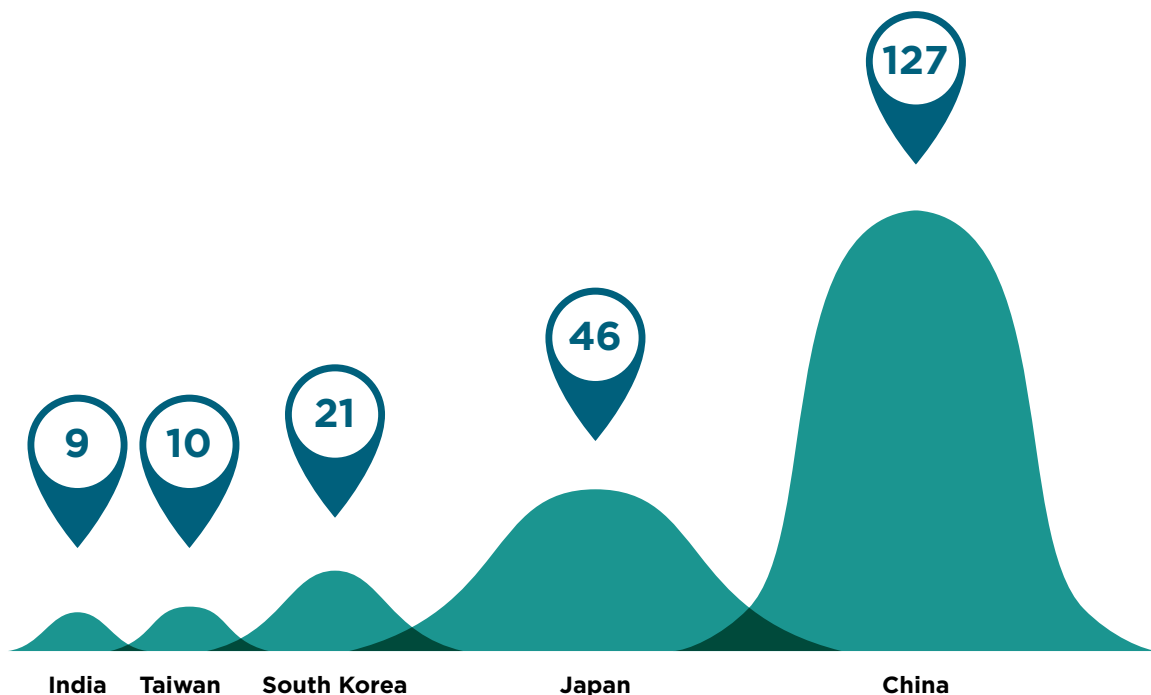
## Secure Resources Supplier

Energy security is a major concern for many economies as access to secure and affordable energy increases. Australia is well positioned to support countries seeking to achieve energy security, by being a reliable investment destination and supplier.

Australia's resources sector has proven resilient during times of crisis and economic downturn, with resources exports remaining reliable during the COVID-19 pandemic and associated economic disruptions. All Australian governments and industry peak bodies, including the Minerals Council of Australia, state resources chambers, and the Australian Petroleum Production and Exploration Association, worked together to develop a National COVID-19 response protocol for the sector, to manage key operational, health, and safety issues.

In spite of global challenges related to the pandemic, and disrupted operations across the globe, Australia's resources and energy export values are expected to rise to a record all-time high in 2020–2021 of A\$296 billion. This increase follows growing trade volumes and strengthening prices. Australia's resources sector is likely to capture the growth benefits in demand for new and low emissions technologies.<sup>16</sup>

**Figure 4:** Major markets for Australia's resources and energy exports in 2019–20.



Source: *Resources and Energy Quarterly*, March 2021

<sup>15</sup> Department of Industry, Innovation and Science (2019), *National Resources Statement*. Australian Government, Canberra <https://www.industry.gov.au/sites/default/files/2019-02/national-resources-statement.pdf>

<sup>16</sup> *Resources and Energy Quarterly – March 2021*. Australian Government, Canberra <https://publications.industry.gov.au/publications/resourcesandenergyquarterlymarch2021/documents/Resources-and-Energy-Quarterly-March-2021.pdf>





## Technologically Advanced Resources Sector

Australia is one of the most creative countries in the world. Overall spending on research and development (R&D) has grown by 7 per cent per year since 2001. Business is the driving force, with commercial R&D rising almost 2 percentage points faster than Australia's GDP.<sup>17</sup> In 20 out of 22 fields of academic research, Australia's research publications achieve an impact that is at least 20 per cent above the global average. Australia's ten strongest categories of published research are: space sciences; physics; computer science; clinical medicine; multidisciplinary areas; engineering; molecular biology/genetics; materials science; environment/ecology; and plant & animal science. These categories neatly reflect Australia's diverse research capability and economic strengths.

To provide strategic support and investment confidence to the sector, the government has developed the *Resources Technology and Critical Minerals Processing National Manufacturing Priority road map*.<sup>18</sup> The road map aims for Australia to become a global centre for commercialising and manufacturing cutting-edge technology products for the resources sector.

Australia's resources sector is supported by its advanced Mining Equipment, Technology and Services (METS) industry, which is an important economic driver and underpins the international competitiveness of Australia's resources sector. There are approximately 6,000 Australian companies which directly serve the mining sector, and many more technology vendors that do not identify as METS. The METS sector is a strong regional employer, estimated at directly employing over 300,000 people and METS exports are estimated to be worth approximately A\$15 billion annually to the Australian economy.<sup>19</sup>

METS capability and development as a globally competitive sector is a priority for Australia. The government supports METS companies through METS Ignited, an initiative of the Australian Government. METS Ignited works with Australian mining industry suppliers, global miners, researchers and capital providers to improve competitiveness and productivity of the sector. The METS industry was identified in the 2017 Foreign Policy White Paper as a priority export sector and is also a key area of focus in Australia's Services Exports Action Plan (2021).<sup>20</sup> This was developed to enhance the international competitiveness of Australia's services sector.

National Energy Resources Australia (NERA) was established in 2016 to maximise value to the Australian economy by developing an energy resources sector that is globally competitive, sustainable, innovative and diverse. NERA is engaged across the value chain to achieve significant industry efficiencies; identify and support digital, automation and other innovative technologies; develop future workforce skills; and ensure that there are regulatory frameworks that support future investment, innovation, productivity and global trade.

Australian resources companies collaborate with research organisations to remain competitive. Mining3 (previously the Cooperative Research Centre for Mining Technology and Equipment), Newcrest Mining, Rio Tinto, and Elexon have collaborated to create the Cave Tracker system.<sup>21</sup> The Cave Tracker System improves exploration productivity and safety through detecting the formation of air gaps and managing them before they pose a threat, and shortens timeframes by increasing the efficiency of cave mapping.

17 Austrade (2021), *Why Australia – Innovation and Skills*. Australian Government, Canberra. <https://www.austrade.gov.au/benchmark-report/innovation-skills/innovation-and-skills>

18 CSIRO (2020), *The Resources Technology and Critical Minerals Processing National Manufacturing Priority Road Map*, Australian Government, Canberra <https://www.industry.gov.au/sites/default/files/March%202021/document/resources-technology-and-critical-minerals-processing-national-manufacturing-priority-road-map.pdf>

19 Various including: Department of Industry, Science and Energy Resources and Austmine, 2018

20 *Services Exports Action Plan*. [www.services-exports.gov.au](http://www.services-exports.gov.au)

21 Elexon Mining (2017), 'Cave Tracking' CSIRO, *Resourceful – Data Mining*. Issue 13, Canberra, pg8.

## Highly Skilled Workforce

The Government's National Resource Workforce Strategy links a range of programs being led across government, the resources sector, and education providers to equip workers with the diverse and complex emerging skills required by new advanced technologies, ensuring the sector continues to grow and modernise.<sup>22</sup> In Australia, technologies such as robotics, automation, GPS technologies and big data, are being incorporated throughout resources project lifecycles and across the METS sector.

The government's support for the training of the resource sector's workforce ensures that environmental management and the health and safety of workers can be improved while the efficiency and productivity of resource projects are increased. For example, remote operating centres offsite from mining projects increase worker safety, as they provide direct connectivity to mines without the need to be on site. Government and community expectations hold industry to the highest safety standards. Safety is critical in maintaining effective and reliable operations, as well as supporting workers and communities, and attracting new employees.

**Figure 6:** Australia's Innovation Credentials



**Sources:** 1. Economist Intelligence Unit, 2018, Preparing for disruption: Technological Readiness Ranking. 2. Shanghai Ranking Consultancy, 2020, Academic Ranking of World Universities. 3. Global Entrepreneurship and Development Institute, 2019, Global Entrepreneurship Index 2019. 4. Commonwealth Scientific and Industrial Research Organisation, 2020, CSIRO Annual Report 2019–20. 5. Department of Innovation, Industry and Science, 2020, Australian Innovation System Monitor. 6. Australian Bureau of Statistics, 2020, Education and Work, Australia, Table 13. 7. Austrade

**Source:** Austrade – *Why invest in Australia-Innovation and Skills*

<https://www.austrade.gov.au/International/Invest/Why-Australia/innovation-and-skills>

22 Department of Industry, Science, Energy and Resources (2021), *Australia's National Resources Workforce Strategy*. Australian Government, Canberra  
[https://www.industry.gov.au/sites/default/files/2021-02/australias\\_national\\_resources\\_workforce\\_strategy.pdf](https://www.industry.gov.au/sites/default/files/2021-02/australias_national_resources_workforce_strategy.pdf)



# Responsible

*The Australian Government supports the safe, ethical and environmentally responsible exploration, extraction, processing and supply of resources.*

Australia recognises the benefits offered by a prosperous resources sector to the economy and the Australian people, and understands that to maintain and maximise this prosperity we must protect and secure the health and safety of workers in the resources industry. The government has a role to ensure that all industrial and resources activities are undertaken in a manner that is consistent with the principles of ecologically sustainable development.

## Safety

Australia's offshore and onshore resources industry is renowned for delivering best practice health and safety solutions that support high levels of productivity. The health and safety of offshore and onshore workers are protected by a world-leading regulatory and policy framework, with industry, government and other stakeholders working together to achieve 'zero harm' or reduce risk so that they are 'as low as reasonably practicable'.

## Onshore

Onshore mining is governed by state and territory legislation, which imposes a general duty of care, and requires the operator of a mine to ensure the health and safety of workers and other persons is not at risk as a result of activities at the mine. All legislation is based on a risk management approach which requires the ongoing identification, mitigation and monitoring of all risks present at a mining operation to ensure hazards are eliminated or controlled.

Some of Australia's mines use innovative technology to enhance worker safety whilst also improving the site efficiency. For example, haulage automation at BHP's Jimblebar operation in the Pilbara has reduced heavy vehicle safety incidents by 80 per cent.<sup>23</sup> There are over 369 autonomous trucks operating in Australia, which operate alongside the world's largest robot, Rio Tinto's self-driving train. This automated system, operated from over 1000km away, hauls iron ore from mine to port in the Pilbara, making a safer and more productive journey. Technologies developed in Australia, such as 'Life' by Smart Cap (a portable fatigue monitoring software), help workers manage fatigue and avoid possible fatigue-related accidents.

## Offshore

The Australian Government manages over 10 million km<sup>2</sup> of ocean, one of the largest marine jurisdictions in the world. Consistent with modern safety regimes, Australia's offshore regulatory regime sets out broad performance objectives for the identification and management of hazards and risks. Oil and gas activities in Australian Commonwealth waters are regulated under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGGS Act). The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) independently regulates offshore oil and gas health and safety, well integrity, and environmental management.

The safety performance of Australia's offshore petroleum industry continues to outperform other comparable industries, both domestically and internationally.<sup>24</sup> The International Regulators Forum (IRF) performance measures for offshore activities amongst member countries demonstrate that Australia consistently shows low levels of fatalities, major injuries, gas releases, collisions and loss of well control incidents.<sup>25</sup>

23 BHP (2019), Automation data is making work safer, smarter and faster. <https://www.bhp.com/sustainability/community/community-news/2019/07/automation-data-is-making-work-safer-smarter-and-faster/>

24 This refers to jurisdictions which have similar offshore regimes to Australia (Canada, the Netherlands, Norway and the UK).

25 International Regulators' Forum – Global Offshore Safety (2019), *Country Performance*. <https://irfoffshoresafety.com/country-performance/>



Water quality testing.

**Source:** Glencore – courtesy of the Minerals Council of Australia

## Environment

Australia is a world leader in sustainable mining and has strong environmental and safety regulations as well as industry-led voluntary codes of practice. This has created a broad framework of ongoing demand for innovative technologies and services in sustainable mining practices.

Australia has effective regulation to ensure that extraction, transportation and export of natural resources has a controlled and limited impact on the natural environment. Because of strong environmental regulation at both state and federal levels, the Australian resources sector has developed world-class competencies in ecological restoration, remedial actions and biodiversity offsets.

Improving the efficiency of governments' collective oversight of environmental approvals can reduce regulatory burden and also improve environmental outcomes. In 2019, the government initiated two reviews to identify regulatory improvements to the resources sector: the Productivity Commission Study into Resources Sector Regulation, and the Independent Review into the *Environment Protection and Biodiversity Conservation Act 1999*. The Productivity Commission released its final report on Resources Sector Regulation on 10 December 2020, recommending measures to reduce regulatory burden, increase investor confidence and maintain environmental standards in the resources sector.

The government is currently implementing the first tranche of reforms of the EPBC Act. These reforms focus on reducing duplication in approval processes between the Commonwealth and states and territories and establishing an Environment Assurance Commissioner to oversee bilateral agreements between states and territories.

Mining companies operating in Australia recognise the need to operate in accordance with established environmental and social governance principles. The Minerals Council of Australia's Enduring Value Framework for Sustainable Development, together with the recently adopted Towards Sustainable Mining (TSM) accountability framework, provide guidance to mining companies covering all stages of the mining process, from initial exploration to mine rehabilitation and closure.<sup>26</sup> These initiatives are supported by the Leading Practice Sustainable Development Program for sustainable mining, which sets out best-practice procedures encompassing all stages of mining processes and the key issues affecting sustainable mining.<sup>27</sup>

<sup>26</sup> Minerals Council of Australia (2021) *Towards Sustainable Mining*. <https://minerals.org.au/towards-sustainable-mining>

<sup>27</sup> Department of Industry, Science, Energy and Resources (2011), *Leading Practice Handbooks for sustainable mining*. Australian Government, Canberra <https://www.industry.gov.au/data-and-publications/leading-practice-handbooks-for-sustainable-mining>



## CASE STUDY

### A research partnership to support responsible mining practices

Australia is reducing the environmental impacts of mining activities through dedicated research programs. For example, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in partnership with small gold miner, **Clean Mining Ltd.**, recently poured the first 'green' gold that uses a cyanide-free process. Cyanide is used in 90 per cent of global gold production and can have substantial environmental impacts. The Australian Government and mining industry are leading the way to more environmentally sustainable gold production.

The successful trial took place in Western Australia, and led to **Clean Mining**, now part of the Clean Earth Technologies Group, acquiring the patented technology from CSIRO. With the rights to produce, distribute and develop the technology worldwide, **Clean Mining** has now embarked on a global sales and distribution program, recently signing its first 2 contracts in Western Australia – enabling miners around the world to access the solution that will transform their operations.



CSIRO has produced the first gold using its cyanide-free process.

*Source: CSIRO*







Aerial view of Rio Tinto's Weipa Solar Plant in northern Queensland—generating electricity for its remote bauxite operation.

**Source:** *Rio Tinto*

## Climate Change Mitigation

Australia is committed to the Paris Agreement and is taking practical and ambitious action to reduce emissions. Australia's resource sector has an important role to play in positioning Australia to be competitive in a global low emissions economy. This includes in supply chains for new and emerging low emissions technologies, which will contribute to global efforts to cut emissions while driving economic growth. The Minerals Council of Australia's Climate Action Plan supports the industry taking action to reduce emissions in line with the Paris Agreement.<sup>28</sup>

The Australian Petroleum Production and Exploration Association supports a national climate change policy that delivers greenhouse gas emissions reductions, consistent with the objectives of the Paris Agreement.<sup>29</sup>

<sup>28</sup> Minerals Council of Australia (2020), *Climate Action Plan*.  
[https://minerals.org.au/sites/default/files/MCA%20Climate%20Action%20Plan\\_22\\_June\\_20.pdf](https://minerals.org.au/sites/default/files/MCA%20Climate%20Action%20Plan_22_June_20.pdf)

<sup>29</sup> Australian Petroleum Production & Exploration Association (2021), *Climate change policy principles (third edition)*.  
<https://www.appea.com.au/wp-content/uploads/2021/02/2021-APPEA-Climate-Change-Policy-Principles.pdf>



## Investment in low emissions technology

In 2020, the government released the Technology Investment Roadmap (the Roadmap) setting out a strategic view to guide future investments in low emissions technology and ensure we remain at the forefront of the global transition to the new energy economy.

The Roadmap and annual Low Emissions Technology Statements together form the cornerstone of Australia's technology-led approach to reduce emissions while ensuring reliable, affordable energy and supporting transformation of energy-intensive industries.

The nation's first Low Emissions Technology Statement, released in September 2020, identifies economic 'stretch goals' for five priority low emissions technologies, including hydrogen and carbon capture and storage. To reach these goals, the government delivered a A\$1.9 billion dollar low emissions technologies investment package in 2020.

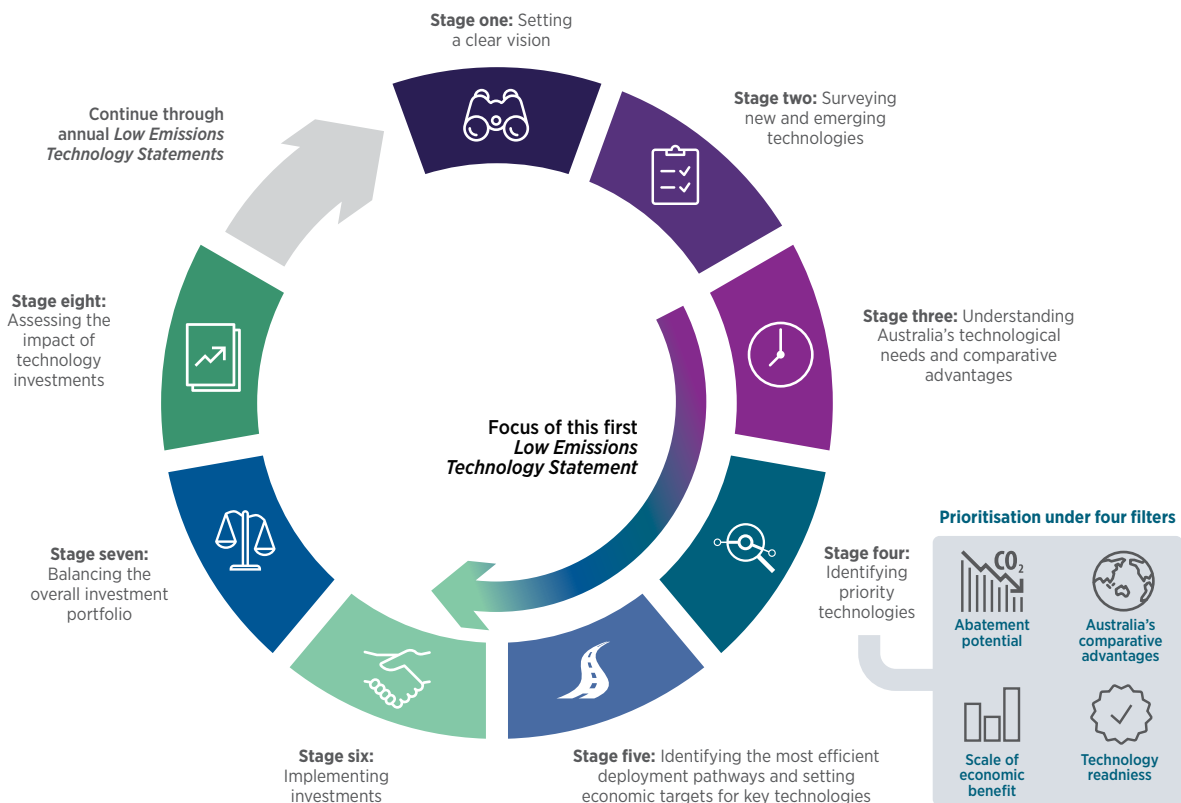
Building on this investment, in April 2021 the government committed A\$1.6 billion to develop low emissions technology deployment such as hydrogen hubs and international low emission technology partnerships.

This significant investment includes:

- Totalling A\$539.2 million for new clean hydrogen and carbon capture, use and storage (CCUS) projects in 2021-22<sup>30</sup> including:
  - \$275.5 million for additional clean hydrogen hubs, a certification trial and legal reforms to facilitate trade
  - \$263.7 million to establish a new CCUS Hubs and Technologies Program and help develop a National CCUS Technology Emissions Abatement Strategy. This will fund CCUS projects and hubs, including carbon recycling technologies with export potential, and help improve policy frameworks and coordination strategies to deploy CCS hubs.
- a commitment of \$565.8 million to support practical international partnerships to accelerate deployment and export of home grown low emissions technologies, unlock new economic opportunities and push down energy costs.

This funding will ensure that Australia continues to provide cutting edge emissions reduction technologies, and be able to supply low cost, clean energy, while permanently and safely storing emissions underground.

**Figure 7:** The Technology Investment Roadmap



30 Prime Minister of Australia Scott Morrison (2021), *Jobs Boost From New Emissions Reduction Projects*, Australian Government, Canberra media release 21 April 2021, <https://www.pm.gov.au/media/jobs-boost-new-emissions-reduction-projects>

## CASE STUDY

### Carbonet

The CarbonNet Project is investigating the potential for a commercial scale carbon capture and storage network in Victoria's Latrobe Valley. If proved viable, CarbonNet could enable the development of new industries, including a commercial scale clean-hydrogen export industry alongside a commercial scale Hydrogen Energy Supply Chain Project. CarbonNet is co-funded between the Commonwealth and Victorian Governments and is at Stage 3 of its work program. Appraisal of its preferred storage site, Pelican, indicates a storage capacity of 125 million tonnes. The Australian Government has committed \$95 million to the CarbonNet Project through the CCS Flagships Program.



Example of developing large scale CCS hub infrastructure to help decarbonise multiple emitters within proximity to a central storage site.

**Source:** Carbonet





## CASE STUDY

### Carbon capture and storage.

Santos has successfully injected approximately 100 tonnes of carbon dioxide deep underground into depleted gas reservoirs as part of the final field trial for the Moomba Carbon Capture and Storage (CCS) Project in South Australia, which has the potential to store up to 20 million tonnes of carbon dioxide per annum.

The Chevron Australia-Operated Gorgon natural gas facility is also using carbon capture and storage to reduce project emissions. In August 2019, the Carbon Dioxide (CO<sub>2</sub>) Injection Project, known as the Gorgon Emissions Reduction System, in Western Australia commenced operation. The project is one of the world's largest carbon dioxide injection projects, capable of injecting 3.4–4 million tonnes of reservoir CO<sub>2</sub> per year. This is the equivalent of removing 1.25 million cars from the roads each year. It will inject around 100 million tonnes of CO<sub>2</sub> over the life of the project. To date As at Q1 2021, the project has successfully extracted and buried over four and half million tonnes of CO<sub>2</sub> under Barrow Island.



Examples of commercial uptake of and application of CCUS technologies in Australian resources sector.

**Source:** Chevron Australia



## Supporting ethical international governance

Australia advocates international standards supporting the responsible and ethical extraction and trade of resources globally. This includes our promotion of the OECD's Due Diligence Guidance for Responsible Mineral Supply Chains, the Kimberley Process Certification Scheme, and Voluntary Principles on Security and Human Rights.

The government promotes human rights and security in the resources industry through the Voluntary Principles Initiative. The Voluntary Principles provide a practical human rights framework for natural resource and energy industries. Implementing the Voluntary Principles advances human rights while ensuring a positive social licence. This creates certainty for investors, enhancing commercial outcomes, increasing community engagement and maximising the economic return of resource projects to local communities. Companies operating in Australia and abroad, including BHP, Rio Tinto, MMG, Newcrest Mining Limited, PanAust, and Woodside, are signatories to the Voluntary Principles Initiative.

Australia is also a founding member of the Energy Resource Governance Initiative (ERGI), along with the United States, Canada, Peru and Botswana, which supports sound governance in energy mineral resource mining and resilient energy mineral supply chains.

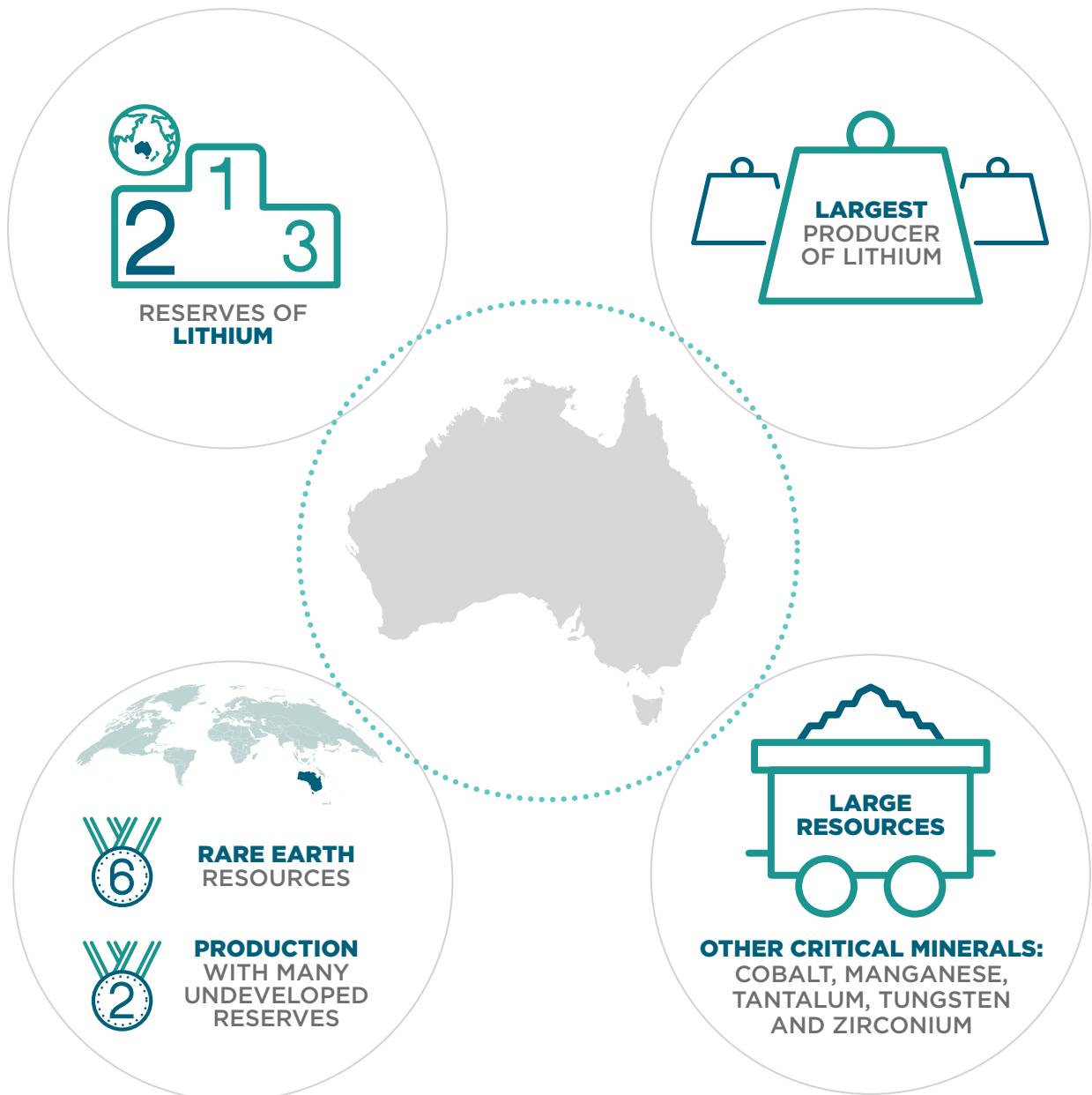


## Ready for the Future

*From a position of strength Australia's resources landscape is ripe with untold opportunities for investment in commodities, critical minerals and the technologies of the future. The Australian Government is supporting the research, technology, and data to help bring those opportunities to the surface.*

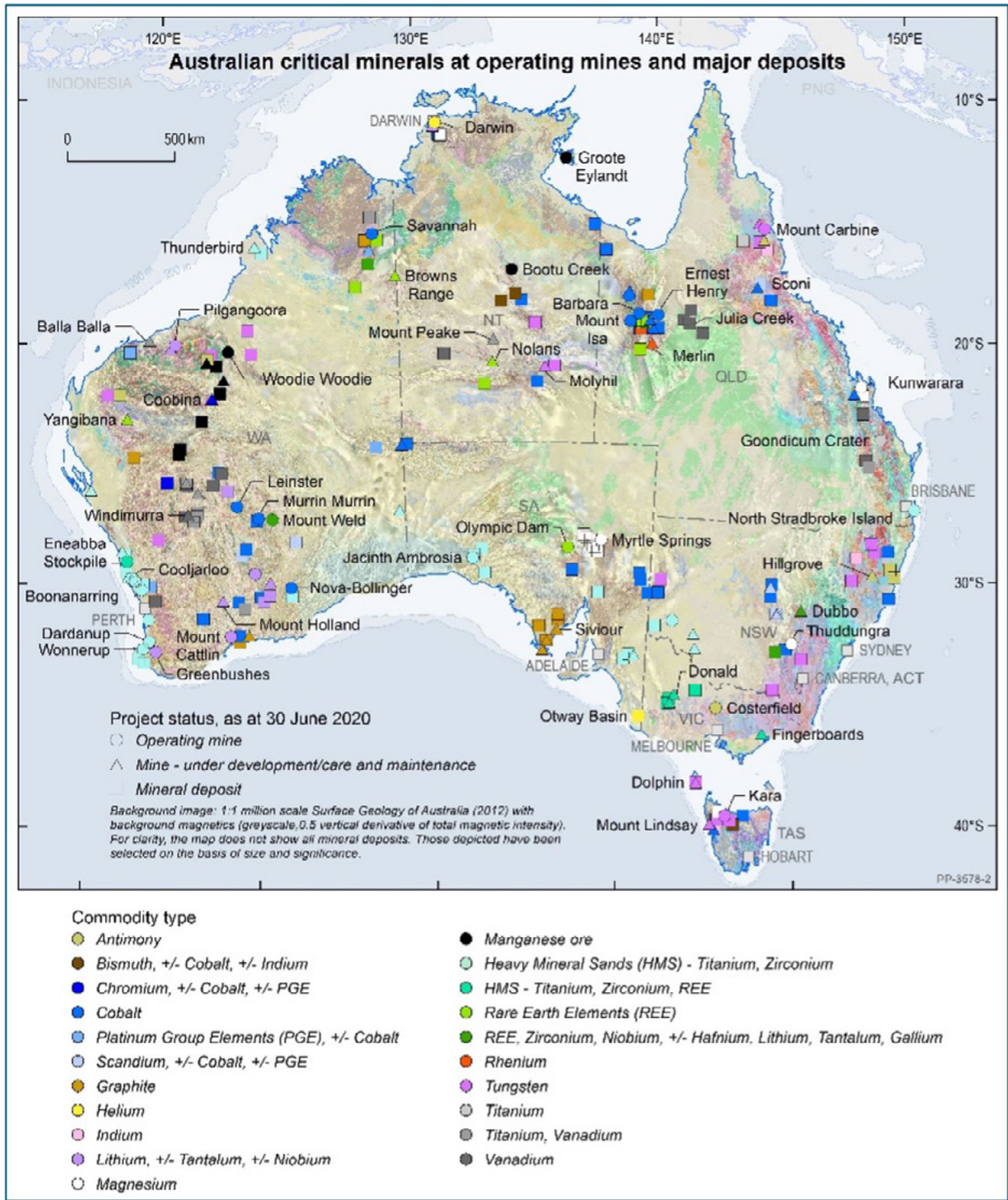
### Critical Minerals

Australia has rich stocks of a large number of known mineral resources, including critical minerals, essential to the production of low emission energy technologies such as electric vehicles, wind turbines, and batteries. For example, Australia has large reserves of rare earths, lithium, graphite, cobalt, manganese, and vanadium. Australia also holds significant endowment of other mineral resources that are used in conjunction of critical minerals in these emerging technologies, such as nickel, copper and bauxite (aluminium).



The government's Critical Minerals Strategy outlines a vision for Australia as a world leader in the exploration, extraction, production and processing of critical minerals.<sup>31</sup> The Australian Government established the Critical Minerals Facilitation Office (CMFO) in January 2020 to help diversify and strengthen global critical minerals supply chains and position Australia as global supplier of choice for trusted and sustainably produced critical minerals.

**Map 3:** Map of Australia's critical minerals operations.



Source: Geoscience Australia, 2020

31 Department of Industry, Science, Energy and Resources with the Australian Trade and Investment Commission (2019), *Australia's Critical Minerals Strategy*. Australian Government, Canberra.  
<https://www.industry.gov.au/sites/default/files/2019-03/australias-critical-minerals-strategy-2019.pdf>



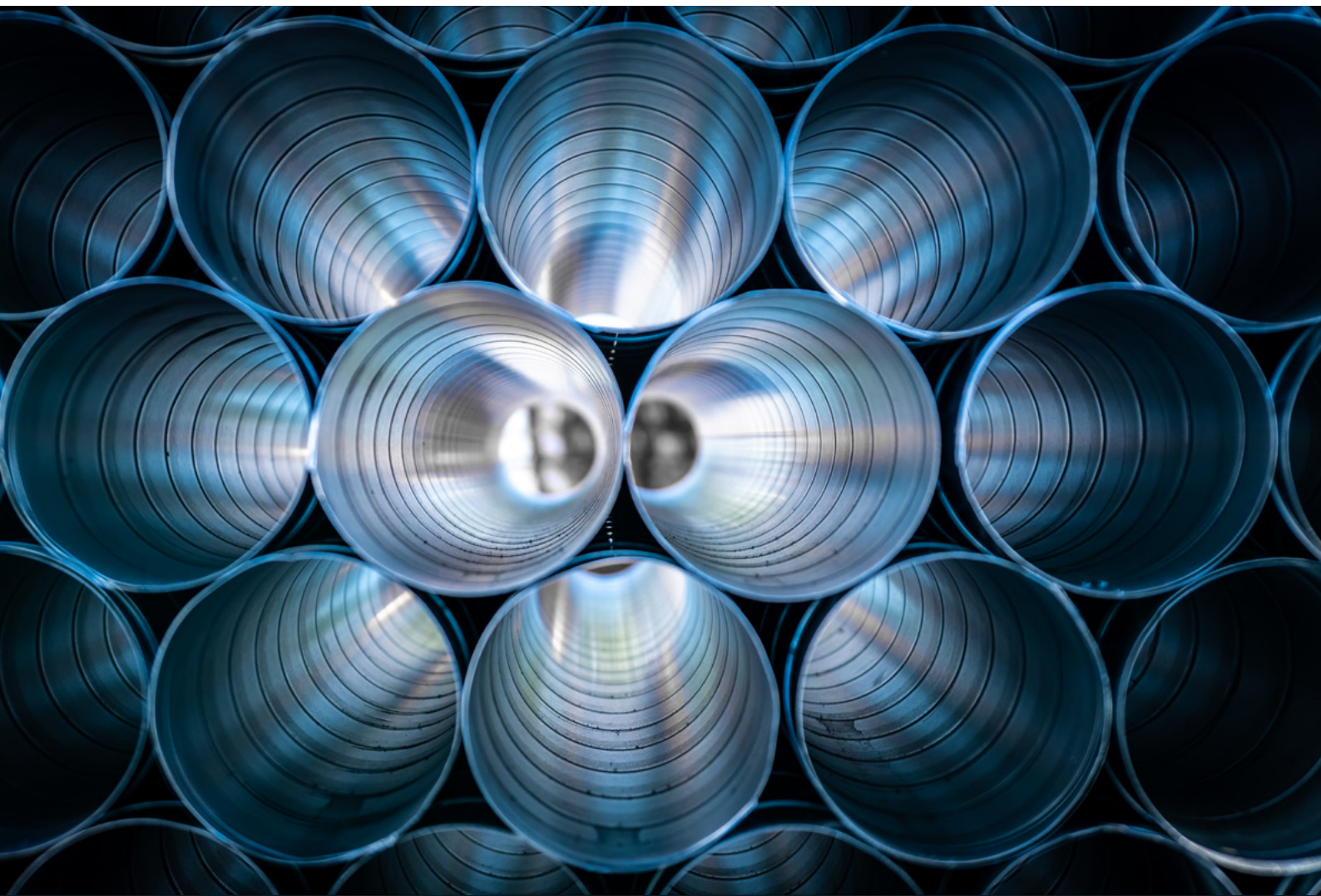
The CMFO is driving a coordinated and comprehensive approach to developing Australia's supply potential, including by supporting Australia to move further up the value chain to processing, separation and metallisation of the key minerals essential to renewable and defence technologies and Australia's advanced manufacturing capabilities. This work is supported by a A\$4.5 million Advancing R&D for Critical Minerals research program (administered by the CMFO), which is boosting the work of Australia's three national science agencies, CSIRO, the Australian Nuclear Science and Technology Organisation (ANSTO) and Geoscience Australia. The CMFO works across all levels of government, industry, investors, academia and Australia's international strategic partners to attract investment and grow Australia's critical minerals sector.

The CMFO is leading the delivery of a National Critical Minerals Roadmap with state and territory governments. Two key priority work streams under the National Roadmap are the delivery of an ethical certification scheme that includes provenance and Blockchain pilots. These pilots aim to capitalise on Australia's credentials as a resources supplier that meets high ethical, work place safety environmental and sustainability standards and improve supply chain transparency; and the establishment of critical minerals processing precincts to unlock government regulatory and infrastructure support.

The CMFO works in close partnership with proponents to navigate regulatory approvals, secure new investment and offtake agreements, and to connect projects to government financing vehicles like Export Finance Australia, the Northern Australia Infrastructure Facility and the Clean Energy Finance Corporation. The CMFO, supported by the Department of Foreign Affairs and Trade, Austrade and other agencies, is also progressing a significant program of international engagement with key trading partners.

To further support the development of a critical minerals downstream processing sector, the government has identified the resources technology and critical minerals industries as one of six priority sectors under the Modern Manufacturing Strategy, enabling the sector to benefit from the A\$1.3 billion Modern Manufacturing Initiative.





## Cooperation on hydrogen

Australia's leadership in developing a viable global hydrogen industry has started with significant investments to develop and domestic production. The government has made a joint investment in the world's first end to end liquefied hydrogen supply chain. Partnering with Japan and the Victorian Government, we are delivering the Japan-Australia Hydrogen Energy Supply Chain (HESC) pilot project in Victoria's Latrobe Valley. Production has commenced at the site, with the first trial shipment to Kobe in Japan expected to take place later this year.

A commercial-scale HESC could produce an estimated 225,000 tonnes of low emissions hydrogen each year. If this was used in power generation and other applications, it would reduce greenhouse gas emissions by 1.8 million tonnes a year. The project highlights the government's commitment to low emissions technology development, and its ambitions for Australia to become a global leader in low emissions hydrogen production and export.



## Future ready iron ore

Australia's resources sector is exploring opportunities to service a growing global export market for feedstock to low-emissions steel manufacturing. As major steel producing countries and operators consider how to lower their emissions, raw material producers along the value chain are also considering ways to reduce onsite and upstream emissions. This includes through improving the quality of iron ore, increased beneficiation, before it is shipped or as an input to produce hot briquetted iron on shore for use and export. The Australian Renewable Energy Agency (ARENA) and CSIRO are working with industry and state governments to enable Australia's large iron ore export sector to be ready to reap the benefits of being the primary supplier into low-emissions iron and steel markets. Further work on this is being explored as part of the second *Low Emissions Technology Statement*.



## Uncovering opportunities

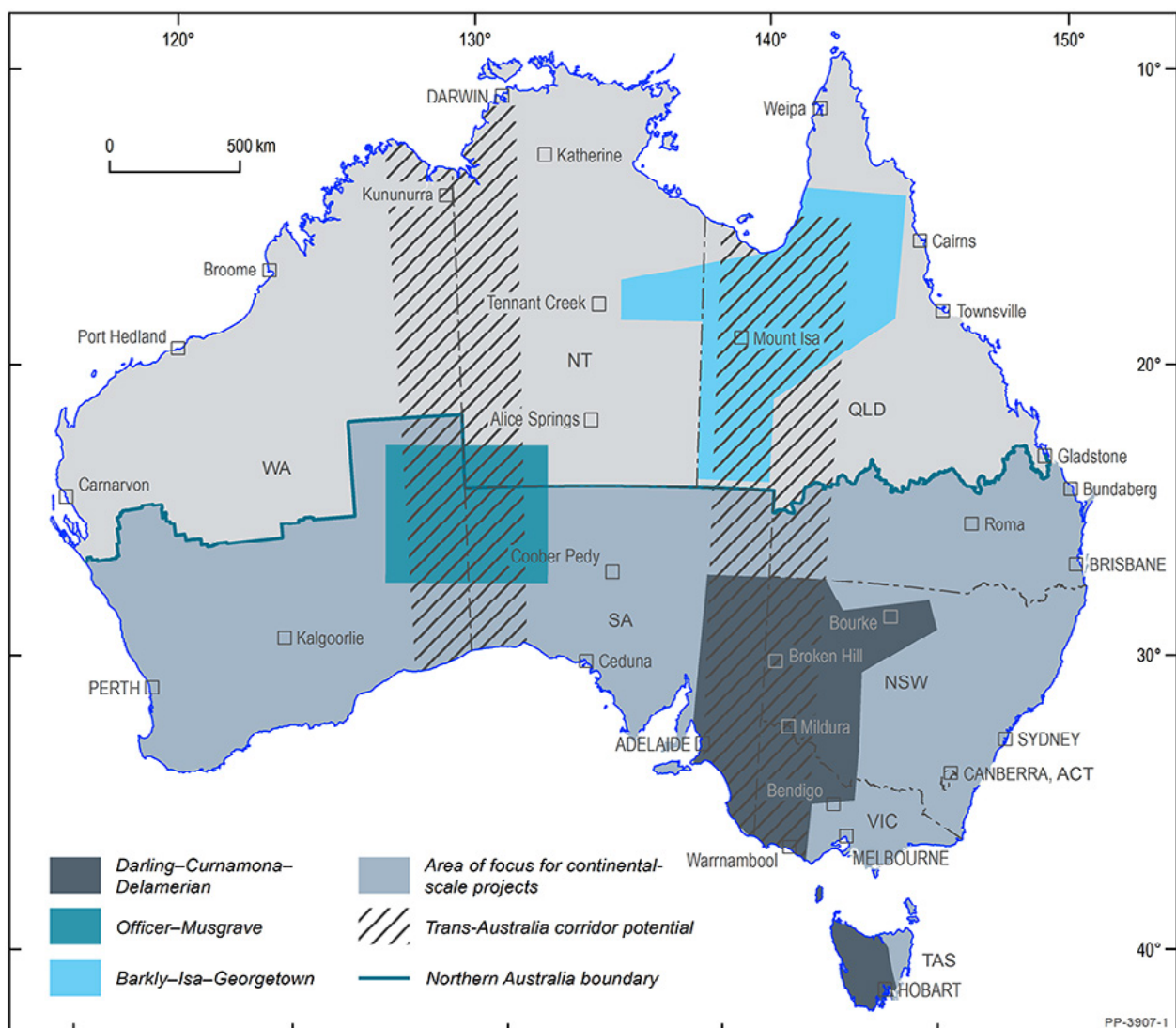
Geoscience Australia's A\$225 million Exploring for the Future Program provides industry and land and water managers with pre-competitive data about potential mineral, energy and groundwater resources to drive investment in the resources and agricultural sectors.<sup>32</sup> The program uses a series of cutting-edge geoscientific techniques to map Australia's geological structures at unprecedented scale and detail.

This freely available information creates a better understanding of our mineral, energy and groundwater systems and allows us to realise Australia's economic potential.

More than 250 datasets are already available online from the program's first phase of work in Northern Australia. The data has resulted in more than twenty companies taking up new investments in over 120,000 square kilometres of exploration acreage across Queensland and the Northern Territory.

The data is available through Geoscience Australia's innovative online portal.<sup>33</sup> The portal gives explorers, investors, and planners the information and tools they need to encourage exploration investment, inform resource management, and, ultimately, make a real difference to Australian communities.

**Map 4:** Exploring for the Future Phase 2 project activities map.



Source: Geoscience Australia, 2020

32 Exploring for the Future. <https://www.ga.gov.au/efft>

33 Exploring for the Future online portal. <https://portal.ga.gov.au/persona/efft>

## Supporting new energy opportunities through technology

Economies across the globe are undergoing substantial changes to meet growing demand for energy, while reducing emissions. This is creating increased demand for fuels such as LNG and hydrogen, while increasing the development and production of new low-emission technologies. These technologies create higher demand for raw materials required for their manufacture, as well as for other goods and services along associated supply chains.

Energy storage technologies, including batteries, are also coming online and rapidly scaling up. Consequently, global lithium consumption is projected to rise from 426,000 tonnes lithium carbonate equivalent (LCE) in 2021 to around one million tonnes by 2026, largely due to the uptake of battery electric vehicles.<sup>34</sup>

To seize these opportunities, the government has developed a number of strategies and roadmaps to best position Australia for these opportunities. The Australian Government's Low Emissions Technology Investment Roadmap and Statement supports the shift to secure, more affordable energy and achieving lower emissions through technology investment.<sup>35</sup>

The government's Cooperative Research Centres (CRC) Program provides grant funding to support industry-led collaborative research partnerships, solving industry-identified problems, including ensuring the industry stands well prepared to face future resource needs.

Current CRCs supporting the resources and METS industries include:

- **Future Battery Industries Cooperative Research Centre (CRC)**, is supporting research into innovative pathways to mine, extract, refine and recycle battery minerals, metals and materials to produce battery products. Additionally, Australia is taking action to support the circular economy through resource recycling, with CSIRO working with industry on lithium battery recycling.<sup>36</sup>
- **CRC for Optimising Resource Extraction (CRC ORE)** aims to transform the methods used by Australia's mining and minerals industry by developing energy-saving and resource-expanding technologies.
- **MinEx CRC** will create new opportunities for mineral discovery by delivering more productive, safer and environmentally friendly drilling methods; new technologies for collecting data while drilling and; exploration data on never before sampled rocks that are hidden but prospective for minerals.
- **Future Energy Exports CRC** aims to improve efficiency in all parts of the LNG value chain and enable Australia to become the leading global hydrogen exporter.
- **CRC for Transformations in Mining Economies** will drive transformational change to enable regions and communities to transition to a prosperous and sustainable post-mine future.
- **Future Fuels CRC** aims to transition energy infrastructure to a low-carbon economy using fuels such as hydrogen and biogas.

*The resources and METS sectors are also well supported in the CRC Projects (CRC-Ps) stream. CRC-Ps provide grants for shorter term, industry-led collaborations for up to three years with grants capped at A\$3 million. In recent rounds of the CRC-P stream, priority funding was allocated to support 11 projects with a specific focus on the critical minerals sector.*

34 Department of Industry, Science, Energy and Resources (2021) *Resources and Energy Quarterly – March 2021*. Australian Government, Canberra.

35 Department of Industry, Science, Energy and Resources (2020), *Technology Investment Roadmap; First Low Emissions Technology Statement*. Australian Government, Canberra.  
<https://www.industry.gov.au/sites/default/files/September%202020/document/first-low-emissions-technology-statement-2020.pdf>

36 CSIRO (2020), *Lithium-ion battery recycling*, Canberra  
<https://www.csiro.au/en/research/technology-space/energy/Energy-storage/Battery-recycling>



## Australia's existing expertise and new infrastructure investment

Australia's resources sector is thriving – despite dealing with natural hazards such as remote locations and unpredictable weather. The Government is investing A\$110 billion over 10 years from 2020–21 in transport infrastructure across Australia through its rolling infrastructure plan, of which a substantial component is under the Infrastructure Investment Program. The program will involve every Australian jurisdiction building much-needed infrastructure across a number of individual funding programs. This significant investment will not only better connect our regions, improve safety on our roads and meet our national freight challenges, but will also support the development and delivery of our resources exports to maintain the most efficient supply chain possible.



## Conclusion

*Australia has a long history as a reliable, resources exporter—supporting growth, construction and energy supplies throughout Asia.*

Australia's resources sector is a world leader in the reliable supply of iron ore, liquefied natural gas, coal, bauxite, nickel and manganese. Further, Australia has vast supplies of bulk commodities, precious metals, new energy resources and critical minerals of a high quality.

The Australian regulatory landscape is stable and predictable, with strong and coordinated efforts to ensure it remains relevant and fit for purpose. The government is ensuring that national environmental legislation does not unnecessarily duplicate state and territory processes while maintaining a high standard of protection.

Australia's proximity to Asia has seen it become the choice supplier in ever-expanding global supply chains. Australia has developed world-leading geoscience and learned institutions, technological research facilities, and a METS sector to support the exploration and development of our resources.

The Australian Government is investing in practical and project-based international collaboration and engagement opportunities to advance our priority low emissions technologies.

Building on our strengths, Australia is well positioned to supply new markets with bulk commodities, critical minerals, hydrogen and the world's best practice knowledge and governance.

This statement introduces Australia's Global Resources Strategy to the world and invites investors and trading partners to engage with the Australian Government and Australian expertise to meet changing energy and resources needs.





*We are Reliable, Responsible and Ready of the Future.*



