



Australian Government  
Department of Industry,  
Science and Resources

# Australia's Critical Minerals Strategy: Discussion Paper

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Discussion Paper

December 2022

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# Minister's foreword



The Australian Government is committed to taking ambitious action on climate change and seizing the opportunities of the net zero transformation.

A key element of this commitment is growing Australia's critical minerals resources and industries to support new clean energy technologies and emissions reduction targets.

Critical minerals like lithium, vanadium, silicon and rare earths are building blocks of clean energy technologies, such as batteries, solar panels and electric vehicles. Critical minerals are also essential inputs to technologies we take for granted everyday - and that help to power our homes,

offices, factories, and mobile phones. As well as being central to our future energy needs, critical minerals play an important role in other ways. Rare earth magnets are a key component of the motors used in robotics, platinum is used in medical products such as pacemakers, and magnesium and scandium are used in fighter jets.

Without mining, the world cannot reach net zero by 2050. In fact, the minerals required to achieve our decarbonisation goals are of such magnitude that to reach net zero, we will need more mining, not less. This provides us with an unrivalled opportunity which Australia is well placed to capture. Our nation produces almost half of the world's lithium, is the second-largest producer of cobalt and the fourth-largest producer of rare earths. By leveraging our competitive advantages, the critical minerals that we mine and refine here, can help us to move up the value chain and into downstream manufacturing. But this will not happen by itself – significant effort is required to create an environment that supports challenging projects and brings them efficiently to market, while ensuring they uphold high environmental, social and governance (ESG) standards. We need to work together with our allies and partners overseas to help these projects link into emerging markets in countries like the United States, the United Kingdom, Japan, Korea, India and the European Union.

To ensure we have the right policy settings in place to advance the critical minerals sector, the Government is developing a new Critical Minerals Strategy. It will focus on creating economic opportunities, including for regional Australia, developing new sovereign capabilities and industries, and building reliable, competitive and diverse supply chains. The issues raised in this discussion paper reflect the importance of the critical minerals industry to the Government and our ambition of making Australia a clean energy superpower. It will also reflect the Government's broader priorities, such as tackling climate change, the Australia Made Battery Plan, growing industries in Northern Australia, implementing the Uluru Statement from the Heart, boosting women's economic equality, and strengthening international trade partnerships.

The Strategy will work to support clean energy technologies and will ensure that critical minerals are mined and processed in ways that make a positive contribution to the lives of local communities, First Nations Peoples and the quality of our natural environment. This is good for Australia and aligns with growing global requirements for products that accord with the highest ESG standards.

The Government will bring together stakeholders across a range of sectors to ensure we hear views on challenges and solutions that can inform Government policies. We are committed to ensuring First Nations Peoples have a seat at the table as a valued partner throughout these consultations. I encourage all those with an interest in the new Strategy to comment on this discussion paper.

# 1. Introduction

Australia has a narrow window of opportunity to capitalise on global critical minerals demand and unlock its potential as a clean energy superpower.

Critical minerals are essential inputs for a range of clean energy technologies, such as wind turbines, electric vehicles (EVs) and solar PV. For the world to achieve the goals under the Paris Agreement, renewable energy technologies will need to be adopted across all sectors of national economies. They also have important applications in other priority sectors such as defence, space, aviation, automotive, agritech, medicine and telecommunications.

Demand for these minerals is expected to grow significantly over the next three decades. It will be imperative to maintain a stable supply of critical minerals in the context of highly concentrated supply chains to meet this demand.

Australia has the potential to supply a substantial portion of this demand, supporting global clean energy supply chains and decarbonisation, creating high-paying jobs – including in our regions - and contributing to a strong future for the resources sector.

However, Australian critical minerals projects face complex challenges, including:

- technical risks associated with complex mineralogy and the need for bespoke processing technology solutions
- project risks given deposits are located in remote areas, processing plants require substantial capital and many proponents are junior companies
- market risks given highly concentrated supply chains due to opaque markets with limited pricing data.

Despite this, Australia remains well positioned to cement itself as a global supplier of choice for processed critical minerals to meet rapidly growing global markets.

The Government has committed to developing a new Critical Minerals Strategy (the Strategy) to capture this opportunity and help Australia move up the global value chain. The Strategy will help Australia add value to our resources, grow our domestic downstream processing and manufacturing industries and support decarbonisation.

The new Strategy will reflect:

- the important role Australia's critical minerals can play in helping Australia and international partners achieve their emissions reduction targets
- the imperative to bring Australian projects online quickly to support diversified critical mineral supply chains and markets
- the growth of Australia's domestic manufacturing and industrial sectors
- Australia's ongoing commitment to the highest environmental, social and governance (ESG) standards.

This discussion paper marks the launch of the Government's consultation on the new Strategy which will be developed with input from industry and community stakeholders, including First Nations Peoples. This paper discusses the role of critical minerals in supporting clean energy technologies and considers how Australia might capture global clean energy opportunities by expanding the critical minerals sector into downstream processing.

Stakeholders are encouraged to provide written submissions in response to questions in the discussion paper alongside general feedback related to the Strategy or the critical minerals sector. The department will also hold a series of stakeholder roundtables over the next several months. Stakeholders can also contact the Critical Minerals Office directly to express their views. Submissions, feedback and views on the new Strategy can be sent to [CMOconsultation@industry.gov.au](mailto:CMOconsultation@industry.gov.au).

The Strategy will complement other Government priorities, including the \$15 billion National Reconstruction Fund (NRF), Powering Australia (including the National Electric Vehicle Strategy and Australia's emissions reduction target), the Australia Made Battery Plan and A Future Made in Australia.

It will work in concert with other elements of the Government's broader agenda, including economic growth, regional development, supporting the growth of new industries in Northern Australia and improving representation of women in mining and resources.

First Nations landholders and communities are core partners in mining. The Strategy will be developed in line with the implementation of the Uluru Statement from the Heart, to ensure that the economic opportunities associated with a growing critical minerals sector are shared with First Nations Peoples.

## 2. Creating economic opportunity

As the world shifts towards renewable energy, demand for critical minerals is expected to dramatically increase to 2030 and beyond.<sup>1</sup> Australia has a unique opportunity to meet the world's growing demand for critical minerals over the next decade and beyond, particularly in supporting countries seeking to deploy clean energy technologies to meet their emissions targets.

Australia's critical minerals sector has an important global role to play in addition to providing economic benefits for Australia. We have existing projects and significant geological reserves of the minerals needed to develop clean energy technologies. The economic opportunity presented by these projects could be multiplied into a pipeline of secure, well-paying regional jobs if we can expand the sector's footprint in value chains by moving into downstream processing. This is also an opportunity to explore how the benefits of a growing critical minerals sector can be distributed more equally across communities, to maximise economic benefits and improve social equity.

**The Government wants to work with stakeholders to understand how it can best enable regions and First Nations communities to maximise and capture the benefits of this opportunity, including by building on lessons learned from the development of Australia's traditional resources which may be relevant to critical minerals.**

### Leveraging Australia's resource abundance

Australia has significant, economically viable deposits of many critical minerals, which are increasingly important for technologies in sectors like clean energy, medicine and defence, among many others.

For example, Australia produced almost half the world's lithium in 2020, produces nine of the ten minerals used in lithium-ion battery anodes and cathodes, and has projects seeking to develop refineries for the tenth (graphite). Australia is the largest producer of titanium and zirconium and is the fourth largest producer of rare earth elements. Australia is also well placed to supply cobalt, tantalum and tungsten, and many other critical minerals (see Table 1).

Australia has a significant pipeline of projects, highlighted in the *Australian Critical Minerals Prospectus* released by Austrade, and Geoscience Australia's online critical minerals portal. We are looking to better understand how we could capture more value in the global resources market by bringing our rich mineral reserves online. Australia could use these projects to build on its existing competitive advantage in resources and grow its downstream processing capabilities to create a wider pool of jobs.

**We are seeking your views on how Australia can leverage its existing resource endowments and capabilities to support higher value-add activities by bringing more downstream processing projects online.**

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<sup>1</sup> International Energy Agency (IEA) World Energy Outlook, pg. 26.

Table 1:

Critical Mineral	Geological potential	Economic reserves ranking	Production ranking
Lithium	High	2 <sup>nd</sup> in the world	World's largest producer
Rare earths	High	6 <sup>th</sup> in the world	4 <sup>th</sup> largest producer
Cobalt	High	2 <sup>nd</sup> in the world	3 <sup>rd</sup> largest producer
Graphite	Moderate	8 <sup>th</sup> in the world	-
Manganese	High	4 <sup>th</sup> in the world	3 largest producer
Bauxite (for High Purity Alumina)	Moderate (HPA)	2 <sup>nd</sup> in the world	World's largest producer
Silica	High	-	15 <sup>th</sup> largest <u>silicon</u> producer*
Vanadium	High	2 <sup>nd</sup> in the world	-

Source: Australia's Identified Minerals Resources 2021

Australia's list of critical minerals reflects our vast geological reserves and the opportunity to both meet the growing demands of our likeminded partners and strengthen international supply chains.

## Growing Australia's regions

As the International Energy Agency (IEA) notes, total energy sector employment is expected to increase globally from just over 65 million at present to up to 90 million by 2030.<sup>2</sup>

Critical minerals projects could support high-paying, skilled jobs for key regional areas and heavy industry hubs as the world shifts to net zero. The Australian Government sees potential for these projects to be a key driver of economic opportunity and empowerment for regional and First Nations communities through employment, training and benefit sharing arrangements.

These benefits may compound the further down the value chain Australian projects go. Increasing value-added processing onshore in Australia could attract further investment, create more jobs and deepen the economic opportunity for communities. For example, developing, Australia's battery industry and mineral value chains could support 34,700 jobs by 2030.<sup>3</sup>

Ongoing investment by industry in Australian mineral exploration, supported by Government investment in public precompetitive geoscience, could help drive the discovery of new, bigger and higher quality resources, including in new mineral frontiers. This is just one example of opportunities to drive a long-term pipeline of quality critical minerals projects for development.

These resources are widely dispersed across the country (see Diagram 1). This dispersion and the scale of the economic benefits of growing the sector means there is an opportunity to improve participation from, and outcomes for, under-represented talent (such as women, First Nations Peoples, people in regional areas, new career starters and those looking to retrain).

**We welcome submissions from stakeholders in the critical minerals sector, regional communities and First Nations communities on how to make the most of this opportunity.**

<sup>2</sup> IEA World Energy Outlook, pg. 122.

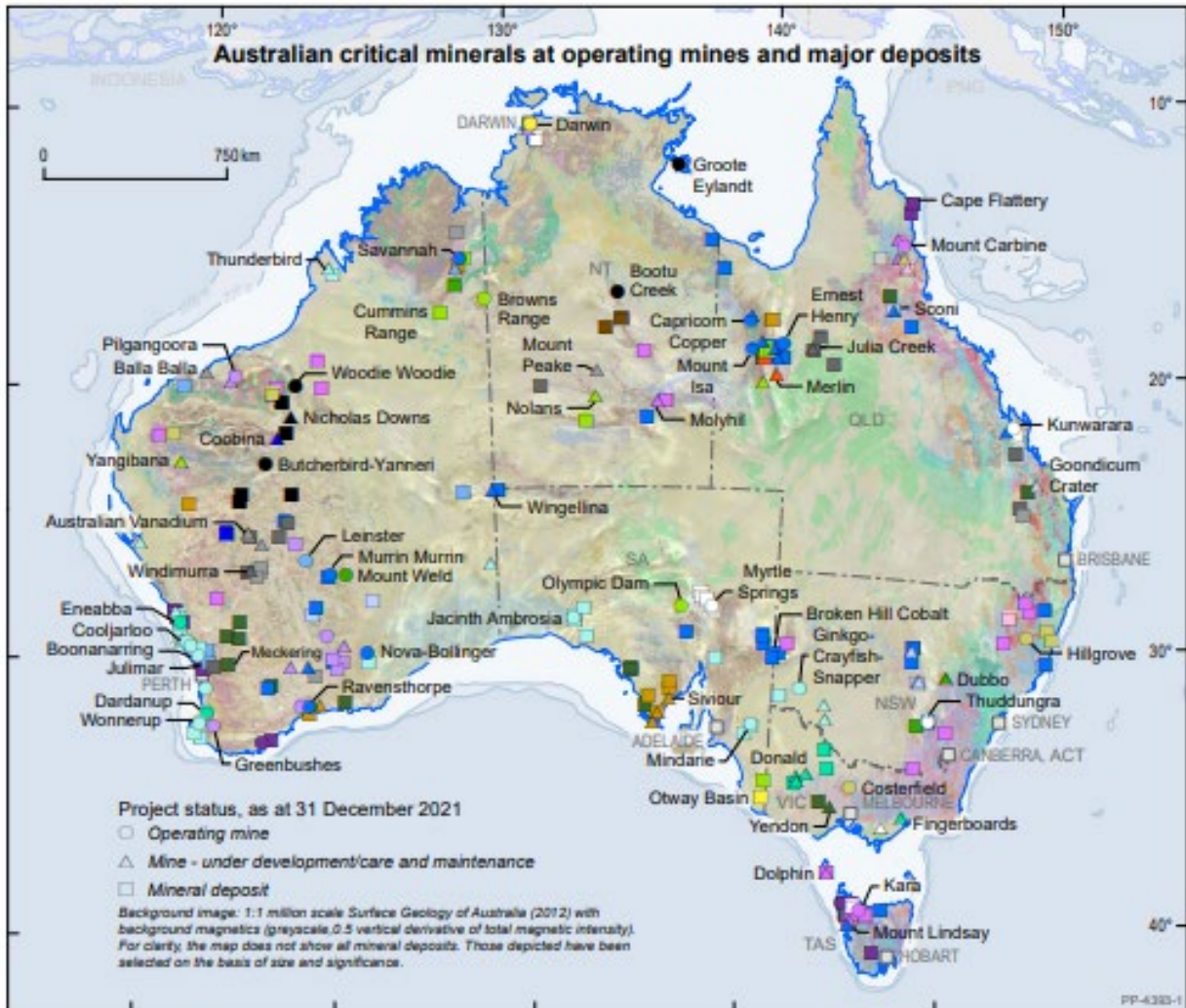
<sup>3</sup> Accenture, Future charge: Building Australia's Battery Industries, Future Battery Industries Cooperative Research Centre (FBICRC), 2021, p 3.



## Questions

1. How can Australia capitalise on its existing advantages to create economic opportunity for all Australians – particularly regional communities and First Nations Peoples?
2. What could be done to facilitate project development and ensure benefits flow to regional communities?
3. What might be done to ensure maximum reasonable opportunity for local employment and local business participation in projects?
4. What role can Government play to help ensure the sector maximises gender equality?

Diagram 1: Australian critical minerals at operating mines and major deposits



Commodity type	
● Aluminium (HPA)	● Manganese ore
● Antimony	● Heavy Mineral Sands (HMS) - Titanium, Zirconium
● Bismuth, +/- Cobalt, +/- Indium	● HMS - Titanium, Zirconium, REE
● Chromium, +/- Cobalt, +/- PGE	● Rare Earth Elements (REE)
● Cobalt	● REE, Zirconium, Niobium, +/- Hafnium, Lithium, Tantalum, Gallium
● Platinum Group Elements (PGE), +/- Cobalt	● Rhenium
● Scandium, +/- Cobalt, +/- PGE	● Silicon
● Graphite	● Tungsten
● Helium	● Titanium
● Indium	● Titanium, Vanadium
● Lithium, +/- Tantalum, +/- Niobium	● Vanadium
● Magnesium	

## 3. Developing new sovereign capabilities and industries

### Moving Australia's critical minerals capabilities downstream

The Government has committed to building a sovereign industrial base that creates new opportunities to value add to our raw materials and develop critical minerals downstream processing capabilities.

This could allow Australian projects to be involved in more of the downstream processing stages – for example to develop battery precursor materials, rare earth oxides and titanium powder used in additive manufacturing. This is an opportunity to capture additional value from our critical minerals by undertaking more advanced processing and manufacturing onshore. As an example, the Australia Made Battery Plan, currently under development, will guide governments and industry towards a shared vision of end-to-end battery manufacturing in Australia, including value adding to battery minerals.

Australia has advanced METS capabilities and a skilled workforce, coupled with a large project pipeline and emerging manufacturing capabilities. Our world-class research and development (R&D) capabilities could also build the intellectual property (IP) needed to grow the sector.

As partners increasingly look to Australia's mineral resources to secure supply in the context of increasing global demand, Australian projects could embed themselves into existing and emerging critical mineral supply chains.

Building these sovereign capabilities and industries could also strengthen Australia's supply chain resilience and minimise overreliance on other nations. It could also drive a deeper and more robust global market by ensuring multiple sources of mid-stream products, such as alloys and precursor chemicals – which may help overcome concentrated processing and manufacturing bottlenecks in supply chains.

**We are seeking your views on how the Government could help the Australian critical minerals sector move up the value chain to develop sovereign capabilities and industries.**

### Driving new investment in Australian projects

Building a pipeline of quality projects is key to delivering on these objectives. The Government is considering how to best target its efforts to help progress critical minerals projects at all stages of development towards a point where they are sufficiently advanced to seek final investment financing and become commercially viable.

Australia is known as a reliable trading partner and presents a strong market offering to encourage investment activity. Recognition must be given to the barriers faced by the critical minerals industry. Opaque markets and capital and technical complexity associated with these projects can be barriers to investment.

The Government can help de-risk projects by crowding in private investment. Already a range of initiatives are available or in development which are designed to encourage investment, incentivise adding value and moving into downstream manufacturing, and address known barriers to entry, such as:

- The NRF, including \$1 billion earmarked for Value Adding in Resources
- \$2 billion Critical Minerals Facility, administered by Export Finance Australia

- \$100 million Critical Minerals Development Program

Projects may also be eligible for equity or financing support through financing vehicles like the Northern Australia Infrastructure Facility (NAIF) or the Clean Energy Finance Corporation (CEFC).

Engagement with industry has highlighted the importance of supporting enabling infrastructure where this reduces the risk and cost of multiple projects. This could include upgrading or expanding road, rail, loading facilities, power, water or reagent capabilities. The Government's recent \$1.5 billion in planned equity to support the construction of common user marine infrastructure within the Middle Arm Sustainable Development Precinct and help emerging clean energy industries is an example of this type of investment.

**We would like to hear your views on what more is required to support strategically significant projects overcome barriers. This could include attracting new investment both domestically and internationally in Australia's critical minerals sector.**

### Leveraging Australia's R&D capabilities and IP

Developing domestic IP and sovereign capability, and attracting investment in IP, including from overseas, could help secure technological breakthroughs in critical minerals processing. This would allow Australia to build its expertise in critical minerals processing so the sector can capture a larger share of growing global markets for clean energy technologies.

Australia holds significant critical minerals processing expertise and R&D capability, with significant know-how and technical expertise across our national science agencies, industry and academia.

Notable examples include Geoscience Australia's national mineral systems data and Critical Minerals Mapping Initiative portal, CSIRO's in-house hydrometallurgy expertise and ANSTO's decades-long experience in developing novel rare earths processing and lithium extraction solutions for industry.

Better coordinating industry-government-academia R&D efforts have the potential to create a step change in advancing the critical minerals sector, particularly by stimulating industry investment in resource exploration, which could result in discovery and development, and targeting technical bottlenecks in supply chains. It could also help scale-up and commercialise critical minerals R&D at a faster rate than our competitors.

The Government has already committed to supporting critical minerals capability through the \$50 million Critical Minerals R&D Hub, which is designed to maximise the value of our R&D and IP by drawing on Australia's world-leading research capabilities by better aligning the critical minerals R&D activities of CSIRO, ANSTO and Geoscience Australia and progressing deeper international R&D collaboration.

**The Government is considering the role it could play to build links between national science agencies, industry and academia to advance key critical mineral processing capabilities and create new, world-leading IP.**

#### Questions

5. What are the specific opportunities Australia should seek to realise while developing downstream processing and manufacturing capabilities?
6. For key technologies and value chains, such as batteries, magnets, alloys and other clean energy technologies, what are the key obstacles to Australia moving up the value chain?

7. How can governments, industry, and researchers support Australia's critical minerals industry to move further downstream and develop new sovereign capabilities?
8. What can Australia do to better develop and retain IP and to attract IP investment from like minded partners?

## 4. Building reliable, competitive and diverse supply chains

### The case for supply chain diversification

Critical minerals supply chains are geographically concentrated, leaving them fragile and vulnerable to disruption. This is a global challenge requiring international cooperation. There is growing recognition of the importance of diverse global supply chains to ensure resilience, stability, and continuity of supply. Likeminded countries are increasingly concerned about the pressure growing demand can place on critical minerals supply chains, given many are vulnerable to supply chain disruption.

This was a key observation of the Sydney Energy Forum held in July 2022, with participants discussing the importance of both increasing production capacity as the world progresses the energy transformation, and improving the resilience of supply chains through diversification.

Concentration in critical minerals is particularly acute at the refining and processing end of critical minerals supply chains. The importance of bolstering the diversity and resilience of supply chains for these valuable materials will heighten as demand for these products continues to grow.

The United States (US) *Inflation Reduction Act* passed earlier this year is an example of how other countries are working to incentivise the diversification of critical minerals supply chains. It takes action on two fronts, providing support to grow the US' domestic processing capability while incentivising manufacturers sourcing their inputs outside established supply chains.

The Australian Government's objective in contributing to the diversification of supply chains is to make these markets stronger, more efficient, more resilient and more transparent. With world leading reserves of critical minerals, Australia could develop and expand its sector to support global diversification.

More diverse supply chains can mitigate supply chain risks such as production bottlenecks and price volatility, in part caused by the material-intensity of clean energy technologies compared to fuel-intensive energy, bringing new energy and trade dynamics into play.<sup>4</sup>

**We welcome comments on how Australia could contribute to supply chain diversification, moving projects downstream and supplying a more diverse range of critical mineral commodities from Australia into key markets.**

### Building strategic partnerships to attract investment

Building strategic international partnerships is fundamental for Australia's critical minerals projects to access global opportunities and contribute to diverse, competitive and resilient supply chains.

Foreign investment has always been – and remains – fundamental to Australia's prosperity. It helps drive economic growth, creates skilled jobs, improves access to overseas markets and enhances productivity.

Australia's domestic demand alone cannot sustain a large critical minerals sector. Attracting international investment and offtake can enable Australian projects to access key markets and create the scale needed to be commercially viable.

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<sup>4</sup> IEA, *The Role of Critical Minerals in Clean Energy Transitions* (2021), pg. 28-29.

Strengthened government-to-government collaboration could increase access to global markets and support emissions reduction efforts. There are many prospective Australian critical minerals projects that could directly support the economic needs of our key trading partners and their efforts to transition to net zero.

Australia could benefit from working closely with key like-minded economies such as the US, the United Kingdom (UK), the European Union, Japan, the Republic of Korea and India. Benefits could also be realised by partnering countries with an increasing interest in investing in clean energy technologies, such as key economies in the Indo-Pacific.

The increase in demand from our trading partners could create cost-advantages for these projects and allow Australia's critical minerals sector to mature, particularly as key markets move to increase their investment in clean energy technologies and bolster their manufacturing capabilities.

**We are seeking views on how Australia could leverage its international partnerships and collaborations to support Australia's critical minerals projects and contribute to a more diversified global market for clean energy technology.**

### Initiatives to support enhanced international collaboration

Strategic agreements with partner governments, government-to business and commercial arrangements may create opportunities that support investment or build critical minerals capability.

Austrade is the Australian Government's lead trade and investment facilitation agency. It supports the critical minerals sector by developing commercial partnerships that connect Australia with our trading partners, which includes facilitating offtake and foreign investment in prospective Australian projects. The Critical Minerals Office provides national policy and strategic advice and facilitates the development of the sector, including by deepening collaboration with key international partners.

Several existing bilateral collaborations include:

- The Australia-US *Joint Net Zero Technology Acceleration Partnership*
- The Australia-UK *Joint Working Group on Critical Minerals*
- India-Australia *Critical Minerals Investment Partnership* which aims to support Indian investment in Australian critical minerals projects and grow the sector.
- The Australia-Republic of Korea *Memorandum of Understanding on Cooperation in Critical Mineral Supply Chains*
- The Australia-Japan *Partnership between Australia's Department of Industry, Science and Resources and Department of Foreign Affairs and Trade and Japan's Ministry of Economy, Trade and Industry Concerning Critical Minerals*
- The Australia-France *Critical Minerals Dialogue*
- The Australia-Germany *Working Group on Raw Materials*
- Scientific partnerships such as the *Critical Minerals Mapping Initiative* between Geoscience Australia, the US Geological Survey and the Geological Survey of Canada.

Australia has an active presence in a range of multilateral fora, including:

- The *Minerals Strategic Partnership* which aims to bolster critical mineral supply chains essential for the energy transition



- The *IEA Critical Minerals Working Party* to enhance the quality and impact of the IEA's work on critical minerals with member countries, including Australia
- The *Conference on Critical Materials and Minerals* to exchange information on policies governing critical materials, R&D, and related efforts
- Chairing the *Strategic Advisory Group in the International Organization for Standardization (ISO)* which has analysed current and potential standardisation work in critical minerals
- The Quadrilateral Security Dialogue
- The G20.

Australia is also a founding partner of the Energy Resource Governance Initiative (ERGI), a US-led initiative which provides tools and technical assistance to countries with developing mineral resources to help establish best practice governance in mining.

**We are looking for feedback on what key activities the Australian Government could undertake in collaboration with its key international partners to secure tangible outcomes that help unlock Australia's critical minerals potential.**

#### Questions

9. How can government support the capability of critical minerals companies and other relevant entities to identify, engage and grow new target markets?
10. How should Australia engage with international partners to support the diversification of supply chains? What should this engagement focus on (including which countries)?
11. What actions can Australia take to ensure it leverages related investment by other countries, for example the US *Inflation Reduction Act*.
12. Is there more the Australian Government can do to facilitate business-to-business engagement and drive supply chains diversification?
13. How can Government and business work together to ensure private sector insights on the context and complexity of current supply chains and markets can inform policy design?

## 5. Supporting clean energy technologies

### The role of critical minerals in the clean energy transition

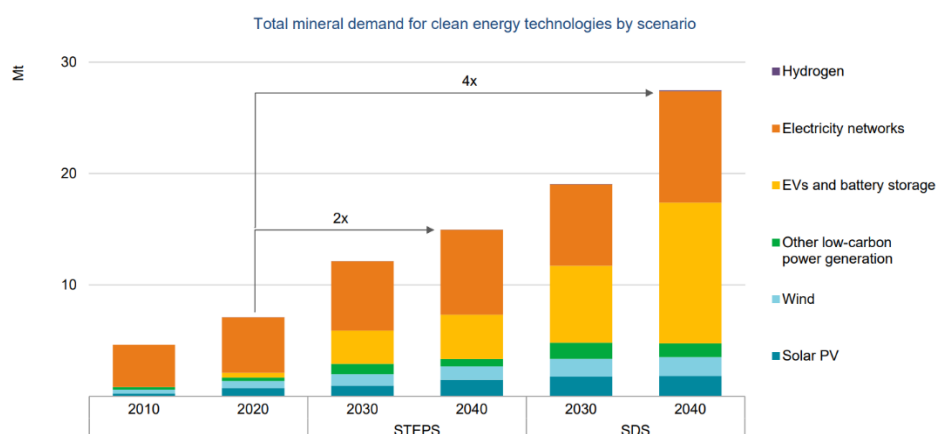
Critical minerals are vital to the decarbonisation efforts needed by countries to reach net zero emissions. They are the foundation for most, if not all, the technologies which underpin the renewable transition – including electric vehicles, batteries, solar, hydrogen electrolyzers and energy efficient technologies like LEDs.

Achieving the global Paris commitments requires a significant scale-up in production of the critical minerals underpinning these clean energy technologies, and other key metals to build the related infrastructure.

As noted by the IEA, low-emissions electricity systems differ significantly from traditional fossil fuel resources as they depend on a greater proportion of critical minerals. For example, compared to a natural gas-fired power plant:

- Solar PV requires six-times more critical minerals inputs
- An onshore wind installation requires nine-times more critical minerals inputs
- An offshore wind installation requires thirteen-times more critical minerals inputs.<sup>5</sup>

Forecasts indicate that total mineral demand from clean energy technologies could double or even quadruple by 2040. EVs alone are projected to increase by 30 per cent every year to 2050.<sup>6</sup>



International Energy Agency, *The Role of Critical Minerals in Clean Energy Transitions* (2021) \*

Demand for these minerals is expected to rise at an unprecedented rate, for example, by 2040 global demand for key battery minerals such as lithium will increase by 40 times its current rate while cobalt and graphite could rise by approximately 20 times their current rate. For rare earth elements, global demand could rise by seven times around 2040 compared to 2020 levels.<sup>7</sup>

As noted by the IEA, after the medium term, projected demand will surpass the expected supply from existing mines and projects under construction for most minerals, highlighting that significant additional sources of supply such as mines and processing facilities are needed.<sup>8</sup>

<sup>5</sup> IEA World Energy Outlook 2022, pg. 318.

<sup>6</sup> IEA World Energy Outlook 2022, pg. 46; Outlook for Selected Critical Minerals 2021, Department of Industry, Science and Resources (DISR), Australian Government, 2021, pg. 4.

<sup>7</sup> International Energy Agency, *The Role of Critical Minerals in Clean Energy Transitions* (2021), pg. 8 and 53.

\* *Sustainable Development Scenario (SDS); Stated Policies Scenario (STEPS)*

<sup>8</sup> IEA, *The Role of Critical Minerals in Clean Energy Transitions* (2021), pg. 120.



These trends highlight that the shift to meet emissions reduction targets will drive a rapid increase in critical minerals demand, signifying a significant increase in investment in key energy commodities.

## Australia as a clean energy superpower

Australia has enshrined in law its national emissions reduction targets of 43 per cent by 2030 and net zero by 2050. The Government is introducing initiatives that will help reduce emissions across our economy and position Australia to become a renewable energy superpower.

While the global transition to net zero emissions is a challenge, it represents an enormous opportunity as new policies in major markets could increase annual clean energy investment to over USD\$2 trillion by 2030 – a 50 per cent rise from today.<sup>9</sup>

Australia is an ideal destination for this investment and we can play a pivotal role in delivering the clean energy technologies the world needs.

For example, Australia can increase its refining capabilities to support battery grade chemicals, and cathode and anode active materials, and Australia already has three lithium hydroxide facilities in operation or under construction which could be leveraged to support battery supply chains.

Furthermore, the Government has committed investment of up to \$100 million for a battery manufacturing precinct as part of the Australia Made Battery Plan to boost onshore battery manufacturing.

Unlocking the full potential of our critical minerals endowments could therefore support global emissions reduction efforts and position Australia as a clean energy superpower.

Critical minerals mining and processing projects require significant amounts of energy to make the end products. In addition to electricity, natural gas is currently a key source of energy and industrial process feedstock for these projects – particularly where very high temperatures are required or reductants are needed for chemical reactions. In some situations, remote and isolated mine sites currently rely on standalone gas or diesel powered generators to provide reliable and cost effective power to their mining operations. Australia's ambitious plans and investments in boosting renewable electricity generation, driving down the cost of Carbon Capture and Storage, bringing online massive-scale green hydrogen and developing high-quality carbon offsets, offer these projects a realistic pathway to decarbonising. We are interested in how Australia can best leverage our energy potential to ensure flexible and dispatchable power generation, transmission, direct-use and storage to support the development of critical minerals projects.

**We are seeking views on how the Government could support the integration of the Australian critical minerals sector with domestic and international clean energy supply chains.**

### Questions

14. What are the opportunities for critical minerals projects to maximise their ability to support clean energy supply chains and technologies?
15. How could the Australian Government help industry address capability barriers to supporting clean energy supply chains for critical minerals projects?
16. How can the Australian Government support the sector's integration with key clean energy supply chains, both domestic and international?

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<sup>9</sup> IEA, World Energy Outlook 2022, pg. 20.

## 6. Supporting sustainable critical minerals development

Australia has a reputation as a reliable and responsible trading partner, with some of the world's most robust ESG credentials. This includes strong environmental protection frameworks at the national, state and local levels.

According to the World Bank's Worldwide Governance Indicators project, Australia has some of the strongest ESG performance across six dimensions of governance. These include political stability and absence of violence and terrorism, government effectiveness, regulatory quality, voice and accountability, rule of law and control of corruption.<sup>10</sup>

These findings are in line with those of other research, such as studies undertaken by the Fraser Institute, which ranked Western Australia – one of Australia's leading resources jurisdictions – as 1<sup>st</sup> in the 2021 Annual Survey of Mining Companies in the Best Practices Mineral Potential Index and Investment Attractiveness Index.<sup>11</sup>

While our credentials are strong, Australia must work to maintain this position by addressing challenges such as emissions reductions, workplace safety and inequality.

### Commitment to the highest ESG standards

ESG credentials are an important issue of concern for consumers, investors and markets as they are crucial to creating domestic social license. ESG encompasses issues such as environmental protection, native title, labour protections, workplace respect, gender equality and diversity, and anti-corruption.

ESG requirements are playing an increasing role in the critical minerals sector and companies are seeking to demonstrate their credentials as ethical and sustainable producers of critical minerals, in addition to state and commonwealth environmental regulations which aim to mitigate pollution or adverse impacts on biodiversity from mining.

The importance of sustainable production could also give rise to an increased focus on circular economy and recycling practices to ensure more sustainable growth and mitigate waste and harm to the environment, while reducing supply constraints. The rise of waste flowing from clean energy infrastructure reaching the end of its life is set to increase 30-fold by 2031.<sup>12</sup>

Australia has a reputation as a sustainable producer of minerals. Our environmental and planning approval processes are legislated at the federal and state levels, and ensure community consultation, environmental impact assessments, heritage protection and labour projections. Our credentials create a point of difference in global critical minerals markets which the Government seeks to better capitalise on for the benefit of our sector.

Jurisdictions such as the EU and the US are increasingly introducing new regulatory requirements to strengthen ESG standards. For example, the proposed EU *Critical Raw Materials Act* will place a

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<sup>10</sup> World Bank 2022 The Worldwide Governance Indicators, 2022 Update. Available at: <http://info.worldbank.org/governance/wgi/>.

<sup>11</sup> Fraser Institute, Annual Survey of Mining Companies (2021): Best Practices Mineral Potential Index and Investment Attractiveness Index. Available at: <https://www.fraserinstitute.org/studies/annual-survey-of-mining-companies-2021>.

<sup>12</sup> European Protection Agency, 2021 - *Emerging waste streams: Opportunities and challenges of the clean-energy transition from a circular economy perspective*. Available at: <https://www.eea.europa.eu/publications/emerging-waste-streams-opportunities-and>

strong emphasis on sustainable supplies with high ESG credentials. Provenance traceability is also a key aspect of this issue, both from the perspective of demonstrating high ESG standards and also complying with geographic restrictions, such as those set out in the US *Inflation Reduction Act*. Australia's regulatory and incentive frameworks need to be flexible and responsive to ensure companies are well-placed to continue to demonstrate international best practice while remaining competitive.

Environmental approvals that are fast and reliable, but which provide excellent protection of biodiversity and our natural resources, are crucial to ensuring our projects are both competitive and globally recognised as responsible and sustainable.

**The Government is considering options to strengthen Australia's critical minerals ESG credentials, including through increased focus on circular economy and recycling practices, and uptake of traceability tools. Views are sought on whether these issues should form a part of the Critical Minerals Strategy.**

### Partnerships with First Nations Peoples

All Australian governments are working with First Nations Peoples, their communities, organisations and businesses to implement the new National Agreement on Closing the Gap at the national, state and territory, and local levels. This new approach acknowledges that First Nations Peoples must determine, drive and own the desired outcomes, alongside all governments.

The resources sector has a key role to play in building on the strong foundations First Nations Peoples have, through their deep connection to family, community, land and culture, to ensure better and more inclusive economic and social outcomes for all Australians.

Genuine partnerships with First Nations Peoples are essential for the success of the critical minerals sector. Nationally, the mining industry as a proportion of its workforce employs First Nations Peoples at a higher rate than any other industry.

The resources sector is already partnering with First Nations communities through a range of initiatives to create opportunities for First Nations Peoples and to support an inclusive workforce. This includes BHP's Indigenous Development Program which helps to create career pathways for First Nations employees to move into new roles, including leadership. South32 has partnered with the Australian Indigenous Education Foundation to support Indigenous students' access to schooling, and to complete Year 12 while developing skills to make a successful transition to employment. Deepening these partnerships can help to improve economic rights and enable the benefits of a growing critical minerals sector to be shared more equitably.

The resources sector also operates in many regional areas of Australia that are in close proximity with First Nations communities. Working in genuine partnership with these communities will benefit the sector and First Nations Peoples, and can be a powerful avenue for closing the gap.

**We are seeking views on how the Government can build genuine partnerships with First Nations Peoples and which align with objectives of Closing the Gap and implementation of the Uluru Statement from the Heart.**

### Supporting a skilled, inclusive and safe workplace

Like Australia's resources sector more broadly, the critical minerals sector has a highly skilled workforce who are supporting a pipeline of planned critical minerals projects vital to the new energy economy.

Growing the sector may require a larger and wider talent pool of workers. Initiatives by industry are looking to address these shortages to ensure that the needs of the sector can be met, including by

supporting a more diverse and inclusive workplace, increasing the participation of women and ensuring that workplaces are safe and respectful environments.

The mining sector remains a highly male-dominated industry. Improving the participation of women is contingent on a range of factors, but key aspects include addressing unacceptable behaviour in the workplace and improving gender equality. For example, the Workplace Gender Equality Agency notes the mining, construction and manufacturing sectors employ the lowest share of women, typically under 30 per cent of the sector workforce.<sup>13</sup> The Government has committed to supporting gender equality through the National Plan to Achieve Gender Equality.

**We welcome the views and perspectives of the community on how the Government can encourage cultural change to help engage more people in a safer and more inclusive workplace in the critical minerals sector, including by working with industry and across jurisdictions.**

#### Questions

17. What more can Australia do to ensure we are the international best practise jurisdiction for ESG?
18. What role can Government play in supporting the critical minerals sector ensure workplaces are safe and inclusive, and can attract and retain underrepresented cohorts, such as women?
19. How can Government and industry create meaningful engagement with First Nations Peoples and ensure critical minerals projects benefit their communities?
20. What are the opportunities to further strengthen the ESG credentials of the sector? For example, helping industry showcase their high ESG projects or support enabling capabilities such as the adoption of mineral traceability measures.
21. What are the opportunities for Australia in increasing recycling and circular economy practices in the critical minerals sector?

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<sup>13</sup> Australian Government, Workplace Gender Equality Agency – *Gender Equity Insights 2022: The State of Inequality in Australia* (2022). Available at: <https://www.wgea.gov.au/publications/gender-equity-insights-series>.

## 7. Discussion questions

1. How can Australia capitalise on its existing advantages to create economic opportunity for all Australians – particularly regional communities and First Nations Peoples?
2. What could be done to facilitate project development and ensure benefits flow to regional communities?
3. What might be done to ensure maximum reasonable opportunity for local employment and local business participation in projects?
4. What role can Government play to help ensure the sector maximises gender equality?
5. What are the specific opportunities Australia should seek to realise while developing downstream processing and manufacturing capabilities?
6. For key technologies and value chains, such as batteries, magnets, alloys and other clean energy technologies, what are the key obstacles to Australia moving up the value chain?
7. How can governments, industry, and researchers support Australia’s critical minerals industry to move further downstream and develop new sovereign capabilities?
8. What can Australia do to better develop and retain IP and to attract IP investment from like minded partners?
9. How can government support the capability of critical minerals companies and other relevant entities to identify, engage and grow new target markets?
10. How should Australia engage with international partners to support the diversification of supply chains? What should this engagement focus on (including which countries)?
11. What actions can Australia take to ensure it leverages related investment by other countries, for example the *US Inflation Reduction Act*.
12. Is there more the Australian Government can do to facilitate business-to-business engagement and drive supply chains diversification?
13. How can Government and business work together to ensure private sector insights on the context and complexity of current supply chains and markets can inform policy design?
14. What are the opportunities for critical minerals projects to maximise their ability to support clean energy supply chains and technologies?
15. How could the Australian Government help industry address capability barriers to supporting clean energy supply chains for critical minerals projects?
16. How can the Australian Government support the sector’s integration with key clean energy supply chains, both domestic and international?
17. What more can Australia do to ensure we are the international best practise jurisdiction for ESG?
18. What role can Government play in supporting the critical minerals sector ensure workplaces are safe and inclusive, and can attract and retain underrepresented cohorts, such as women?
19. How can Government and industry create meaningful engagement with First Nations Peoples and ensure critical minerals projects benefit their communities?

20. What are the opportunities to further strengthen the ESG credentials of the sector? For example, helping industry showcase their high ESG projects or support enabling capabilities such as the adoption of mineral traceability measures.
21. What are the opportunities for Australia in increasing recycling and circular economy practices in the critical minerals sector?
22. Are there any other factors or issues the Government should consider in developing the new Critical Minerals Strategy.