

12 May 2023

Clean Energy Capacity Study Team
Jobs and Skills Australia
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Dear Clean Energy Capacity Study Team

Clean Energy Capacity Study discussion paper

The Minerals Council of Australia (MCA) and its members have a strong commitment to climate action, supporting the Paris Agreement and an industry ambition of net zero by 2050. The industry is also taking rapid climate action and a proactive approach to research and develop the technologies to facilitate and support the transition.

The global shift towards renewable energy sources such as wind, solar, hydro as well as nuclear energy and fossil fuels with carbon capture usage and storage (CCUS) will require a new workforce skilled in the installation, maintenance, and operation of these technologies. The renewable energy sector is expected to create a significant number of jobs. Over 60,000 clean energy jobs could be created in Australia by 2025, most of them in regional areas.^{1 2}

However this opportunity may not be realised if Australia is unable to provide the necessary minerals required to build an unprecedented capacity of low-emissions energy generation on a global scale. Australian mining will form a key part of the global supply chain for the minerals needed in the transition to net-zero, and must be a critical input to a vastly expanded domestic and international processing and manufacturing sectors.

The shortage of skilled workers for a clean energy future is present and urgent. The government cannot afford to be complacent about training and skills for the mining sector and must immediately improve pathways for a workforce that will extract and process materials for net zero transition.

The current challenge

While the study seeks to 'analyse the potential supply (at the national, state and regional level) of clean energy workers over the next 10, 20 and 30 years', the minerals sector is 'starting from behind' regarding the workforce needed for the mining and production of materials to deliver global net zero ambitions. Simply extracting the raw materials required for global transition to low-emissions energy sources requires an urgent shift in government policy and investment for the skills and training sector.

The MCA recommends the workforce analysis and planning functions of Jobs and Skills Australia are accelerated to develop a comprehensive workforce plan that, with regard to the mining industry:

- Captures skills in immediate and growing demand, and where job opportunities lie (inclusive of existing and emerging sectors)

¹ Joint media release, [Energy sector survey to map jobs of the future](#), 30 Jan 2023

² *Renewable Energy Jobs: Future Growth in Australia* (climatecouncil.org.au), p. ii, viewed 1 May 2023

- Enables all career pathways platforms to connect into and/or be drawn upon, to promote national consistency.

This approach will align skills with industry needs and drive demand to the courses that improve post training job outcomes, and deliver the minerals needed for the global shift to clean energy technologies.

Existing skills shortages in the Australian mining sector

The Australian mining sector is experiencing skills and labour shortages across a broad range of skilled occupations.³ At the most basic level in 2023, an urgent lack of geologists is limiting the capacity for the Australian minerals sector to identify resources to simply meet current demand, let alone meet future dramatically increased demand projected. This is a barrier that exists well in advance of designing and developing mines, extracting and processing resources, and increasing potential export revenues through the creation of an entirely new advanced manufacturing sector - a value chain that takes decades to establish.

As noted by the Australian Geoscience Council (AGC), 'the dearth of geoscientists, which is replicated globally, threatens to crimp Australia's ability to find, define and mine key minerals needed in a decarbonised future.' The AGC also notes that this is a result of the 'lack of earth science teachers and other problems in the STEM disciplines', suggesting a challenge that originates upstream of the minerals sector.

However, it's not just a shortage of geologists that is creating issues across the mining sector. There is a current and growing shortage of specialised workers across the industry, including mining engineers, metallurgists, surveyors and geotechnical engineers.

Global demand for Australian resources

Australian mining already supplies many global markets with the materials necessary for modern manufacturing and construction. The transition to net zero will require a greatly expanded supply of 'critical minerals' to construct solar panels, wind turbines and electric vehicles.

As noted by the Department of Industry, Science and Resources, Australia has an abundance of critical minerals and an opportunity to become a global leader as an ethical and environmentally-responsible supplier.⁴ The challenge will be managing significant competition for the specialised workforce required to develop these assets.

A successful global transition to net zero will be built on an unprecedented provision of Australian Rare Earth Elements, copper, lithium, nickel and cobalt. The International Energy Agency (IEA) recognises the increasing gap between demand and production capacity out to 2030 (see Figure 1).

With the Australian minerals sector already facing key skills shortages, realising the opportunity to meet global demand for resources essential for the transition to net zero will become increasingly difficult. Figure 1 describes the potential gap between supply and demand for copper, cobalt and lithium out to 2030.

The challenge of meeting this increased demand is highlighted by the short timeframe – one that is significantly shorter than that of the proposed Clean Energy Capacity Study.

The government cannot afford to be complacent about mining sector investment and must improve conditions for capital investment in Australia. Investment in mining is a prerequisite to attracting the investment, technology, intellectual property, and specialist skills needed to develop downstream processing and advanced manufacturing that is crucial to Australia's clean energy future.

³ [Workforce, innovation and skills](#) - Minerals Council of Australia, viewed 1 May 2023

⁴ [Critical minerals](#), Department of Industry, Science and Resources (industry.gov.au), viewed 2 May 2023

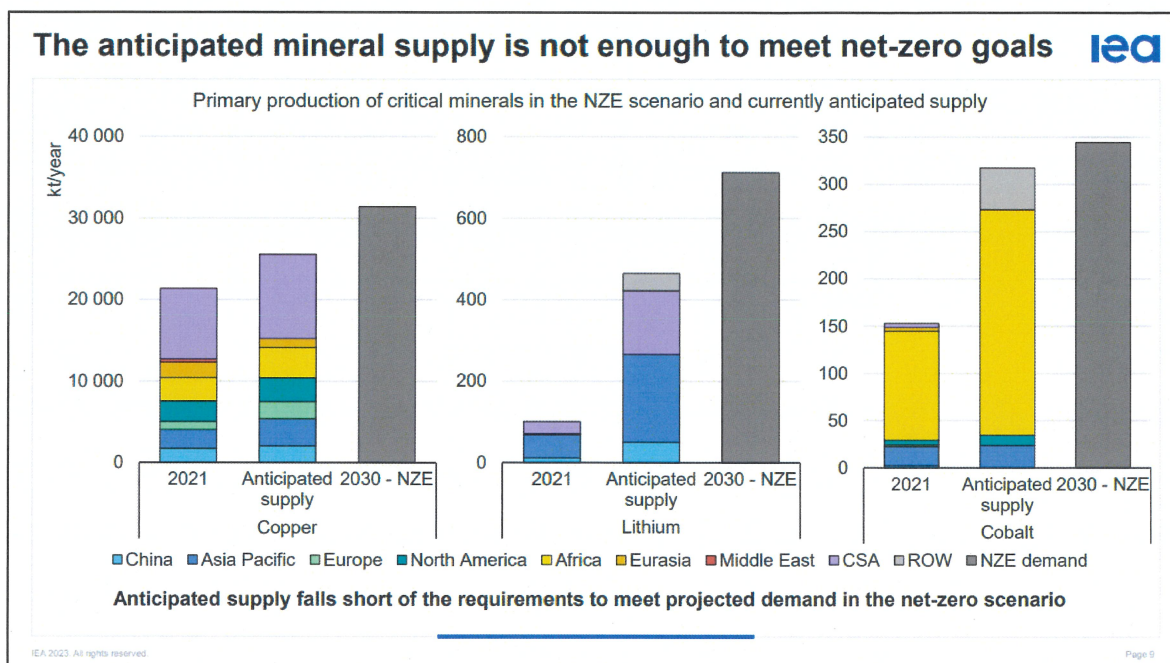


Figure 1: International Energy Agency, *Update on Critical Minerals*, Tae-Yoon Kim, March 2023

Growing Australia's METS sector

There will be other opportunities for Australia to export mining equipment, technology and services (METS) to assist other jurisdictions in extracting the resources required for net zero transition.

Australia is recognised globally as the market leader in METS across many different technology platforms and commodity segments. Currently contributing \$92 billion in gross value to the Australian economy and employing over 500,000 people, the METS sector is well positioned to grow even further by leveraging its market position to assist other jurisdictions to more efficiently extract and process minerals.⁵

However, this growth is highly-dependant on commitments that facilitate an inflow of significant investment in the development of METS career pathways while minimising leakage to other technology sectors. Government will need to examine special policy settings to manage this risk, with other high-paying sectors competing for talent in the global market.

Protecting this high-value export should be prioritised, and be actively promoted by government as a demonstration of expertise within the Australian mining sector and its capacity to support the global transition to net zero emissions.

The government's critical minerals strategy must focus on the broad policy settings required for Australia to maximise its share of this investment opportunity. This is particularly relevant to the emerging critical minerals workforce who – through co-location with other manufacturing and processing industries – can establish strong and vibrant communities built on specialised employment in regional Australia.

This sector should also be recognised within the Clean Energy Capacity Study.

⁵ [METS Sector Australia](https://metsigned.com) - Mining Equipment, Technology & Services (metsigned.com), viewed 1 May 2023

Hydrogen, ammonia and Carbon Capture, Utilisation and Storage (CCUS)

Australia has a natural competitive advantage in deploying CCUS technologies, with known high quality, stable geological storage basins, existing infrastructure, world-class technical expertise and regulatory regimes (environment protection, carbon accounting and reporting, financial services).

As noted by the Climate Change Authority, ‘the Intergovernmental Panel on Climate Change estimates that for a 50 per cent chance of limiting global warming to below 1.5°C, around 6 billion tonnes of CO₂ would have to be removed per year by 2050 globally, and about 14 billion tonnes per year by 2100.’⁶

Australia needs low-cost carbon abatement to maintain its position as a leading energy exporter and ensure international competitiveness in a lower-carbon future. With scale and experience, the cost of CCUS will decrease, creating the potential to deliver competitive, large-scale abatement for existing industries and new industries such as hydrogen and ammonia.

A successful clean hydrogen industry, for example, will require similar skills to those already required by industries like mining/minerals and oil and gas, meaning a significant re-skilling of the workforce will not be as necessary and many of those skilled regional jobs can remain.

In Australia, the Climate Change Authority has recently found CCUS technologies, if deployed using the best available science, could develop a new skilled clean energy workforce, particularly for Australia’s regions and First Nations peoples.⁷

The impact of a domestic nuclear industry for submarines

The clean energy workforce is not limited to energy generation for civilian use.

Following the bipartisan decision to acquire nuclear submarines the construction, operation and maintenance of a nuclear fleet will require another highly-skilled clean energy workforce.

Logic would suggest that the same technology could be used to reduce carbon emission via a civilian nuclear energy industry. To meet the challenge of building and operating such complex facilities (both civilian and military) the tertiary education sector will need to immediately implement pathways to careers involving nuclear technologies.

The scale of this demand could be significant. The Australian Nuclear Science and Technology Organisation (ANSTO) workforce remains one of the most specialised in Australia. As of 30 June 2022, ANSTO’s Nuclear Operations, Medicine, Science and Technology divisions employed 774 people.⁸ Across the organisation, around 300 employees hold a PhD, representing a quarter of its entire workforce.⁹

When placed alongside the scale of the nuclear submarine program, the size of the challenge becomes immediately clear. The Department of Defence estimates that, at its peak, 8,500 personnel will be needed for ‘building and sustaining nuclear-powered submarines in Australia.’¹⁰

This education program will need to immediately commence, and would benefit from the a civilian nuclear energy sector that offers this new workforce the option to utilise their specialised skills in another part of the industry.

Conclusion

The MCA commends the department for undertaking this important work, however the workforce required for Australia’s clean energy future is an immediate and urgent problem.

⁶ Media release, *Carbon sequestration critical for Australia: New Report*, Climate Change Authority, 17 April 2023

⁷ Climate Change Authority (2023), [Reduce, remove and store: The role of carbon sequestration in accelerating Australia’s decarbonisation](#), viewed 2 May 2023

⁸ [ANSTO 2021-22 Annual Report \(ansto.gov.au\)](#), viewed 2 May 2023

⁹ [ANSTO, Submission to the Greater Sydney Commission](#), 31 March 2017

¹⁰ [AUKUS submarine workforce and industry strategy | Defence Ministers](#), 14 March 2023

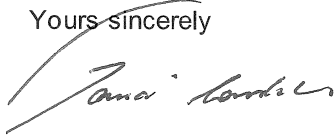
Demand for critical minerals, copper and hydrogen will be unprecedented out to 2030 and beyond. The timeline for this study must be brought forward to ensure that skills and training are available to quickly develop highly specialised workforces within the mining sector.

Beyond 2030, excluding a potential nuclear industry risks Australia falling behind in its net zero ambitions. If heavy industry proves difficult to decarbonise without an alternate low-emission technology delivering the required heat-producing energy, it may be too late to establish the necessary infrastructure and workforce.

This century, the demand for Australia's mineral resources will not abate – instead it will grow and increasingly focus on those needed to move the world to net zero. The skills and workforce shortages that mitigate Australia extracting maximum economic benefit from this global transition are needed in 2023.

The MCA is happy to provide further briefing regarding this matter at a time suitable to the department.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Tania Constable', written over a horizontal line.

TANIA CONSTABLE PSM
CHIEF EXECUTIVE OFFICER