



ATSE POSITION STATEMENT

Mining & mineral resources

Responsible partnership for sustainability

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Australian Academy of Technological Sciences & Engineering

As the global push for sustainability intensifies, and Australia seeks to meet its international commitments to sustainability on emissions reduction¹ and sustainable development², demand for sustainably sourced mineral and metal products has trebled in recent years and will continue to grow.

This presents an opportunity: a thriving mining and mineral resources industry will be essential to Australia's prosperity and well-being and can support the global community's demand for sustainably sourced mineral-rich technologies and products.

Mineral products and metals accounted for 75.1 per cent of total Australian export earnings in 2019,³ including critical minerals such as lithium with Australia producing 56 per cent of global lithium in 2019.⁴ The Australian minerals sector is tipped to grow, with a predicted 24,000 new jobs by 2030, as demand for these resources grows over the next decade.⁵

The mineral resources industry has a crucial role to play in supporting Australia's transition to a low-emissions economy and making Australia a renewables export powerhouse.

Australia is already a major exporter of copper, uranium and lithium and has the potential to become a renewables export powerhouse by supplying elements critical to a low-emissions future including cobalt, graphite, vanadium, and rare earths.^{6,7} As demand increases, a secure and sustainable supply chain – from extraction to processing – will be key to the sustainability of the sector.⁸

Despite the mining and minerals sector's central role in the Australian economy and importance in building global sustainability, public perceptions remain poor.

Practices that have damaged the environment and culturally significant sites have impacted on the mining and minerals sector's reputation and social licence to operate. This includes the destruction in 2020 of Juukan Gorge, a 46,000-year-old sacred site of global, cultural, and archaeological significance.⁹ This event led to significant state and national legislative reforms and placed a spotlight on the practices and sustainability of the mining and mineral resources sector in Australia. This event compounded mounting social pressure on the industry to deploy environmentally responsible technologies such as low-impact exploration and extraction. These pressures have illuminated the need for greater transparency, genuine engagement, co-management of Country and collaboration between operators, Traditional Owners and Traditional Custodians, current landowners, and local communities – and the need for the sector to take strong responsibility for its own sustainability practices.



Broken Hill, New South Wales. Source:iStock

Declining public sentiment is leading to declining enrolment in university mining-related courses and will result in a shrinking skilled workforce.¹¹

The sector has an opportunity to demonstrate leadership, achieve best practice in sustainability and cultural awareness, attract a skilled workforce and support Australia's economic prosperity. It has a significant contribution to make in discovering, extracting, and processing resources sustainably while playing an important role in combatting climate change. New technologies such as those that support remote exploration and lower footprint extraction can help build trust and support from communities as well as protect land with cultural significance to Aboriginal and Torres Strait Islander peoples, both in Australia and internationally.

To address Australia's sustainability challenges, the Academy of Technological Sciences and Engineering (ATSE) presents three evidence-based positions on how the minerals and mining industry can support Australia's sustainability commitments and become global role models for responsible, sustainable, and culturally appropriate practices.

POSITION 1

Australian research, development and deployment of technology can lead a sustainable transformation for our mining and mineral resources industry.

To adapt to changing social and environmental conditions, the mining and mineral resources industry should place a higher priority on the research, development and industrial scale deployment of lower-impact mid-stream processing, advanced industry 4.0 technologies to improve operational and environmental efficiencies, and low-carbon processes to increase environmental sustainability.

The use of low-carbon technologies (such as solar energy in remote mining operations), and sustainable practices (such as resource recovery and recycling to extract metals from e-waste), boost the industry's sustainability and create new economies.¹²

Government can incentivise the prioritisation of research and development within industry via a supportive policy environment and investments to encourage collaboration, translation and application of sustainability-enhancing technologies. The continuation of the highly valuable role of State-based Geological Surveys, the CSIRO and Geoscience Australia are excellent examples of public sector support of this kind.



Gas mining rig in the south Australian desert powered by solar energy. Source: iStock

POSITION 2

The United Nations Sustainable Development Goals (SDGs) offer a framework for sustainable development of the mining and mineral resources industry.

The 2030 Agenda for Sustainable Development and its 17 SDGs provide a framework for Australia to transform the minerals industry into one that is sustainable, and environmentally and culturally responsible.

The Academy strongly encourages mineral exploration and mining companies, together with Mining Equipment, Technology & Services (METS) businesses, government organisations, and industry representative bodies across the sector, to use the SDGs as a framework to improve the sustainability and safety of operations, processes, and investments.

This framework is already being used by many companies to guide sustainable investment and to reshape business operations,¹³ including through sourcing renewable energy and investing in emerging technology to decarbonise processes through the use of carbon capture and storage or alternate fuels.¹⁴ ATSE encourages the sector to share knowledge and encourage peer participation in these practices, to support the widespread adoption of best-practice approaches.



The 17 United Nations Sustainable Development Goals (SDGs). Source: un.org/sustainabledevelopment

POSITION 3

Cooperation is critical to realising the benefits of sustainability in the mining and mineral resources industry and in Australia.

Physical and cultural safety, and sustainability, are perpetual challenges facing the mining and mineral resources industry. The environmental impact and safety of operations, the well-being employees, local communities and current landowners, a culturally engaged and responsive approach to working with Traditional Custodians, and sustainability in industry operations are now widely recognised across the industry. Consistent leadership in safety performance is now a requirement for staying in business. Cultural safety should similarly be a requirement for ongoing operation. While large operations have more financial leverage to respond to these needs, smaller businesses are more agile in developing innovative and collaborative solutions that can be scaled up. Collaboration between operators and communities, and large operators and smaller businesses within the sector, could facilitate more effective knowledge sharing ensure new approaches are more likely to succeed.

Challenges relating to the security and sustainability of resources are multi-sector and come with significant risks that are prohibitive for the minerals and mining industry to address alone. The development of sustainable supply in critical mineral resources depends on financial instruments and incentives created by government to provide certainty and scale in sovereign capability. Cooperation between the industry and governments is essential to address these challenges and derive mutual benefit.

Fostering collaborative partnerships across key sector, research, Aboriginal and Torres Strait Islander, and other key bodies (such as funders, government, industry, and business) can support innovation, enhance the appeal of careers in minerals and mining, and enable environmentally sustainable, culturally appropriate, and economically rewarding solutions. While Australia has significant existing strengths in research and development, a lack of avenues for communication and collaboration has resulted in a disconnect across the innovation ecosystem.¹⁵

Leveraging existing or potential partnerships for successful commercialisation of industry-led technologies and products, sector-wide mapping of different relationships, investments, and eco-systems (such as the METS and the exploration and mining ecosystems), could allow for a more targeted approach to developing innovative solutions across the sector. Incentivising these collaborations should be a priority.



Road sign, Eyre Highway, South Australia. Source: iStock

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COVER IMAGE

Drysdale River, The Kimberley, Western Australia. Source: Satellite Images of Australia. 1982. Landsat image taken 9 November 1972, 1109-01085. Edited by KG McCracken (Chief, Division of Mineral Physics, CSIRO) and CE Astley-Boden (Information Officer, Institute of Energy and Earth Resources, CSIRO). Harcourt Brace Jovanovich