OPPORTUNITIES FOR ADVANCING AUSTRALIA'S STRATEGIC INTERESTS THROUGH EXISTING REGIONAL ARCHITECTURE.

AusIMM Submission

Senate Standing Committee on Foreign affairs, Defence & Trade.

1st September 2021

About AusIMM

The Australasian Institute for Mining and Metallurgy (AusIMM) is the peak body for resources professionals, with over 13,000 members across more than 110 countries. Established in 1893 and operating under the Royal Charter, we represent professionals across all levels of the mining industry, working from exploration through to delivery and in disciplines ranging from mining engineering to geoscience, health and safety, finance, Government, and academia.

We lead the way for people in resources, supporting professionals to provide enduring benefits for the community. We are committed to upholding ethics, codes and standards in resources and delivering the highest quality of professional development to the sector.

As the trusted voice for resources professionals, we exercise shared leadership to benefit our sector and in the interest of all members of the global community. We advance our sector's continued technical and professional leadership on the world stage, champion community understanding and support for the industry, and work with governments to design, implement and maintain regulatory frameworks that facilitate the continued economic and social contributions delivered through mining.

Executive Summary

The Australian resources sector is the powerhouse of the Nation's economic growth and social prosperity, as the leading global provider of commodities essential for all aspects of modern life. In 2019-20, Australian mining accounted for 60% of the Nation's export revenue, generating more than $283 billion in export earnings. Australian mining export revenue is forecast to grow to a record $296 billion as the global economy continues to rebound from the impacts of the COVID-19 Pandemic.[1] The stability of Australian mining throughout the COVID-19 Pandemic, and a clear pathway of continued growth, highlight the sector's important role in providing:

- Employment opportunities that are long-term, well-paid, diverse and expanding
- Economic growth and resilience, underwriting the prosperity of rural and regional economies and the national economy.
- Innovation in technology, talent, standards and practices that strengthen Australia's global position and yield benefits extending across a range of industries and sectors

What is sometimes less well appreciated is the vital role the sector and the professionals who work in it advance Australia's geostrategic interests.

Mining industry professionals are at the centre of geopolitical focus, creating opportunities for Australia by unlocking strategic mineral reserves and intellectual capital, developing an innovative industrial sector, and enhancing political stability.

The vital mineral elements rising in global demand for renewable and efficient energy, technologies and industrial advancement forecasts, rely on Australian industry involvement.

Australian resources professionals play a fundamental role as technical, managerial, and strategic leaders for some of the region's most complex and challenging issues. Australia's leading technical expertise is often the pre-eminent requirement for most industrial operations and is pivotal to achieving green technologies and the global proliferation of technology in Industry4.0.

Despite a well-respected global reputation for excellence, Australia can have an insular view of the mining industry tied to its economic contribution. Australia's mining companies operate significant overseas

1 Australian Bureau of Statistics (ABS), January 2021, 'International Trade in Goods and Services, Australia', Cat. No 5368, Canberra: available at: https://www.abs.gov.au/statistics/economy/international-trade/international-trade-goods-and-services-australia/latest-release.

operations with substantial integration and movement of Australasian resources professionals throughout the Indo-Pacific.

Australia's proximity to Asia has always been a significant trade advantage for our resource exports. The dominance of the region accounts for two-thirds of the global economic growth forecasts to 2030. The shift in geopolitical dynamics is driving a rapidly changing landscape in the supply and demand of the international mineral market and its skills requirements. The control of reserves and secure access to the supply chain has significant potential to impact and realign geopolitical power in the global system.

Geopolitical volatility is a regional challenge as the Indo-Pacific develops its economic activity and increases its presence in international markets. The Australian resources sector is at the heart of an oscillating decline for fossil fuels, a rapidly developing competitive need for critical minerals and a regional architecture framework of security and alliance partners. As a vital supplier of minerals to the region, Australia is in a constant evolution of an essential trade construct centred on bilateral engagements. The maturing bilateral climate parallels the mining sector's increasing awareness of reputational importance and consumer, shareholder, government, and media focus on ESG and the sector's social licence to operate, which is at the heart of professional standards of individual practice.

In addressing the Committee's terms of reference, this submission focuses on opportunities for advancing Australia's strategic interests through cooperation across the Indo-Pacific in the mining industry. The submission addresses thematic focus areas of critical minerals, disaster relief and critical technology through the fundamental role of technical and professional leadership. The opportunity for deepening cooperation between regional security partners is addressed through the resource sector's economic and social contributions across the region, which we see as a critical mechanism of Australia's soft power across the Indo-Pacific region.

Recommendations

Standards Leadership

Deepen regional engagement through Australia's global leading professional standards and best practice frameworks.

Investment

Facilitate investment through major regional conferences and forums to support continued innovation and expand downstream opportunities.

Regional Partnerships

Support the uptake of Australian resources processing, technology, automation, and capabilities in partnership with AusIMM as the peak body for resources professionals within the Australasian region

Social Responsibility and Performance

Advance geostrategic leadership by championing the adoption of Australian Environmental, Social and Governance (ESG) frameworks, competencies, and training.

Future Workforce

Augment existing regional partnerships to support skills development, professional mobility, and workforce sustainability in the region.

Strategic Focus

Engage Australian professional expertise in developing a strategic White Paper series on priority areas, including critical minerals.

Disaster Management

Maintain an expert disaster management task force comprised of Australian resources sector professionals and experts, which is deployable to support regional disaster prevention and response efforts.

Mining in APEC

APEC is the peak regional body for economic cooperation in the Asia Pacific region. APEC member economies account for approximately 70 per cent of all mining output and consumption, including most of the world's bauxite, copper, iron, nickel, silver, tin and zinc.

The resources sector supports Australia's engagement with APEC partners on energy, science, technology, innovation and metrology, through its people and professional standards

The mining, mineral and metal industries are critical in the APEC region, occupying close to 75 per cent of all global mining trade and investment[2]. As direct opportunities and downstream operations expand into the region, particularly in developing economies, there will be increased risk and occurrences of serious incidents.

Having a consistent response framework and a network of experts to assist when mining operations have problems is a leadership role Australia could take up in the region. With the expert knowledge, resources, and professional development already standard best practice in the mining industry, developing this into a regionally capable response function would be a small investment to have the ability to provide a considerable regional engagement tool.

[2] https://www.apec.org/Groups/SOM-Steering-Committee-on-Economic-and-Technical-Cooperation/Mining

A Strategic National Endeavour

Australia's Mining Industry

Australia's leading role in mining globally is derived from the high regard and respect, stemming from its commitment to advancing and leadership in developing industry best practices. The mining industry is a significant part of Australia's thriving economy, accounting for eight per cent of the gross domestic product (GDP). The Australian mining industry amounts to 75% of the country's exports, contributes significantly to employing Australia's workforce, and increases Australia's living standard through higher incomes and flourishing economic conditions.

Australia has a robust mining equipment, technology, and services (METS) sector with leading developments in innovation servicing the industry. Mining contributes billions of dollars to federal and state governments each year in taxes and royalties. This funding assists all industries in Australia, making way for new schools, infrastructure, roads, hospitals and more. Major companies in the resources sector donate funding to support community programs and scholarships across our country. Through the METS sector and supply chains, the mining industry employs over 1.1million professionals in Australia. [3]

The scope of the Australian mining industry is a genuinely national endeavour with operations across the country. The mining industry occupies a vital role in employing, training and expanding opportunities for Australia. The sector's support for diversity, particularly in Indigenous communities and women, has supported skills development and professional opportunities. The options across Australia are viable and create a significant opportunity to develop case studies and facilitate regional engagement through sister city relationships and embedding bi-lateral arrangements within State mining industry operations.

Evaluating the depth of the sector by region provides a unique consideration of the scale of activities in Australia. The different regional focuses support parallel lines of dialogue and engagement to widen the discussion in deepening strategic regional relationships through needs-based access to minerals and Australia's highly skilled mining professionals who deliver the endeavour.

[3] https://metsignited.org/australian-mets-sector/

Mining in Western Australia

Western Australia (WA) is a large part of Australian mining and a significant player in the international mining industry. It hosts substantial high-grade resources and hosts some of the largest operational mines in the country and the world.
WA is the world's largest iron ore supplier, with multiple iron ore projects, especially in the Pilbara region in the north of the State.
New mineral exploration is constantly underway in WA, with a new spotlight on lithium and vanadium to meet the growing demand for green energy alternatives and new battery technologies.
WA is ranked by the Fraser Institute as the top region in the world for mining investment.

- **The State hosts 98 per cent of Australia's iron ore.**
- **Approximately 60 per cent of Australia's gold reserves can be found in WA.**
- **The sector directly employs more than 20,000 people.**

Mining in South Australia

South Australia (SA) exports many essential commodities to the world, including copper, uranium and zircon. The State is ranked as one of the most attractive regions globally for mining investment.
BHP's Olympic Dam is Australia's largest mine and the world's largest single deposit of uranium.

- **Iluka's Jacinth-Ambrosia in SA is the largest zircon mine in the world.**
- **SA hosts 25% of Australia's gold resources.**
- **The resources industry directly employs more than 10,000 people.**

Mining in Victoria

Victoria (VIC) has played a significant part in Australia's mining history and still provides the potential for mineral exploration today. VIC is known for producing gold, antimony, and brown coal.
VIC is home to large mining companies, including an innovative mining equipment and technology sector (METS).

- **Mining contributes more than $13 billion to the State's economy and creates 121,000 jobs.**
- **In 1851, gold was discovered in Ballarat, starting the gold rush that made Melbourne one of the wealthiest cities in the world.**
- **Melbourne-based firms accounted for 65% of the Australian Stock Exchange 100 (ASX100) mining stock in 2018.**

Mining in Queensland

Queensland (QLD) is a significant mining state, with many of Australia's coal mines located in the Bowen Basin. QLD is also the world's largest supplier of silver.

Growing demand in the State has led to new exploration and projects found in the northwest and east, focusing on creating jobs for the future. The QLD mining sector is well-poised to be an essential player in strategic and critical minerals, including those used in new technologies such as electric vehicles

- **The mining sector provides more than 50,000 jobs for QLD.**
- **In 2018-19, mining contributed nearly $75 billion to the state economy.**
- **Despite its vast contribution, the sector takes up only 0.1% of QLD's land surface area.**
- **QLD hosts some of the highest-grade graphite in the world, as well as the world's highest grade rhenium deposit.[4]**

Mining in New South Wales

New South Wales (NSW) is rich in coal, gold, copper, silver, lead and zinc, cobalt, and lithium. Significant coal deposits were found in the Sydney-Gunnedah Basin. The Cowal open-pit gold mine in the Central Western Plains region is the biggest in NSW.

NSW has many projects in the pipeline that, once underway, will significantly boost the State's economic and employment performance.

- **Mining in NSW offers 40,000 jobs across the State.**
- **Mining provides almost $2 billion worth of royalties to the state government.**
- **Newcastle exports 160 million tonnes of coking coal per year and is the world's largest coal export port.**

Mining in Tasmania

Tasmania (TAS) has been a significant mineral producer for over a century and boasts solid geological diversity. TAS hosts iron, copper, lead, zinc, tin, high-grade silica, and tungsten.

- **The primary three mining operations in TAS are Rosebery, Savage River and the Renison Joint Venture.**
- **In 2016-17, the resources sector produced $1.8 billion worth of value to the State.**
- **The Renison mine on the West Coast of TAS is Australia's largest tin deposit.**

[4] https://www.ausimm.com/bulletin/bulletin-articles/queenslands-new-economy-minerals-initiative/

Mining in the Northern Territory

The Northern Territory (NT) is rich in world-class minerals, including zinc, copper, lead, tungsten, lithium, vanadium, phosphate and potash, gold and uranium. There are currently seven high-quality mines operating.

Being located so close to Asia, the port at Darwin gives the NT a geographical advantage for mineral exports and strong relations with major markets in China, Korea, Japan and India.

- **NT's mining and manufacturing industry is valued at more than $4 billion.**
- **Groote Eylandt, in the Gulf of Carpentaria, hosts the world's largest manganese mine.**
- **One-third of Australia's known uranium reserves are in the NT.**

Sector Resilience & Covid-19

While Covid-19 has been a challenge that has impacted every industry, the resources sector's impact has varied across commodities, regions, and sections of the workforce. The sudden disruption to global trade created swift challenges in emergency measures, regional regulations/restrictions, and considerable supply chain disruption.

As the world emerges from the Pandemic, there is potential to leverage technology, science, innovation, and technical capability to deepen strategic regional partnerships

The immediate risk to workers health and safety saw the swift suspension of nonessential travel and transition to work from home (WFH) arrangements. Scaled-down production and changes to the operating policy were all implemented through pandemic management plans to protect employees from transmission risks. COVID-19, as a disruption event has been too large and too pervasive in its impact for the industry to be able to revert entirely back to a pre-pandemic 'normal'. COVID-19 has been the catalyst for entrenching new operating models, with WFH and virtual service models becoming standard practice.

COVID-19 has been a unique disruption for the resources industry. Lasting longer than most short-term shocks, such as major accidents, the Pandemic has moved faster and more abruptly than longer-term trends, such as trade wars or next-generational technology. The mining industries capacity to manage disruptions effectively is considerable compared with other industries due to the high risk/safety thresholds. With the advancement of the sector's remote operations and intelligent infrastructure, the human capital element is advanced in managing and mitigating disasters.

The deployment of better communications technology has enabled and justified remote working operations. However, the increased acceptance of flexible work arrangements is unlikely to be an immediate shift. The importance of corporate knowledge transfer and collective learning is going to sustain a hybrid model. The one lasting change from the Pandemic is going to be on the need for travel. Travel has been an accepted necessity of mining operations globally with geographically dispersed and often remote assets and operations. The Pandemic had eroded the implicit cultural acceptance of travel in situations where video conferencing is available. Whilst this will have an impact on some operations, there is still a significant demand for onsite workforces to retain considerable FIFO demand.

The Pandemic has proved to be a significant shock to the long and complex existing supply chains of the international mining industry. The disruption to the supply of minerals shipments has created increased pressure for the State to solidify their reliable access through bi-lateral and multi-lateral agreements. The increased demand has driven significant regional engagement for Australia, with key regional partners concentrated on developing, securing, and operating ongoing partnerships in critical minerals.[5]

[5] https://www.dfat.gov.au/news/news/Pages/transforming-australia-into-a-major-exporter-of-critical-minerals-products

Industry 4.0

The global shift to technology, data, and the cyber economy is disrupting how we live and the governance systems and structures in effect. Likewise, it creates demand for a host of critical minerals, thus increasing the geostrategic relevance and opportunity to advance Australian interests through the resources sector.

Tech disruption has fundamentally shifted how business operates. The race for technology superiority is a deeply geopolitical competition contingent on access to critical resources

The paradigm shift towards renewable energy and artificial intelligence (AI) implications dramatically impact political power and State interactions. The rise in state-sanctioned cyberattacks and the slow response to cyber control regulation have intensified conditions, resulting from the prolonged isolation of the Pandemic.

As the global demand for technology increases, States are moving to secure their critical mineral supply chains. This rapidly developing opportunity for Australia in the bilateral engagement of regional geopolitical architecture. The demand shift will require skills development to ensure future workforce requirements can sustain the industry's operations.

The rising intensity of the global technology race has, for example, created an acute supply strain for minerals and products used in computers, smartphones, tablets, cars, televisions, LED lights, household appliances like washing machines, microwaves, and a host of another consumer, commercial and defence technologies.

The 5G and AI deployment is another element of the technology race stimulating demand in the international minerals market. The geopolitics of a future low-emissions economy is of serious regional concern, with developing economies focused on access to low-emission energy technologies. The Pacific-Island Nations are particularly vocal on environmental impact and deepen ties with regional actors whose exports and support are vital in a carbon-constrained future.

The future success of the global renewable energy industry is highly dependent on the mining sector and the vital resources it supplies for technology. The key to securing a lower carbon future is through minerals and mining operations. Yet, the industry is starved of easy access to capital as public perception condemns mining to be part of the problem. The ability of professionals to bridge the gap with public trust can be through promotion of industry standards and best practice, reestablishing public confidence in the sustainability of the sector.

Critical Minerals

Critical Minerals are vital in driving global development, are essential ingredients for emerging energy, defence, communications, and transport technologies, and are crucial for regional security and supply chain resilience.

The resources sector in our region can build on a substantial minerals endowment and world-class research, training, engineering, and technical capabilities to move up the value chain into the advanced manufacturing of battery precursor chemicals and finished battery products. Australia is the world's largest producer of lithium concentrates also mining and processing other battery metals, including nickel, cobalt, aluminium, vanadium, graphite, manganese, uranium, and rare earth elements.[6]

Growing global demand for critical minerals is a unique opportunity for Australia's strategic regional engagement

The global battery and energy commodities market is forecasted to increase by 25% per annum through 2028.[7] Currently, Australia realises only 0.53% of the lithium value in the lithium-ion battery value chain by exporting metal concentrates.[8] In a rapidly developing, politically complex, global market, the opportunity to capture a significant proportion of this growth is not only substantial but time-sensitive.

There is a substantial opportunity to build on Australia's minerals endowment and industrial capacity to attract continued capital investment and create growth in the Australian export market. AusIMM believes Australia can expand domestic minerals processing and value-added manufacturing through the resources sector. We also recognise an opportunity to adapt innovations within Australian mining for use in other sectors, such as defence and space, in turn helping Australia capture more significant shares of the global market for these products.[9]

Leveraging Australia's leading technical and professional expertise to develop a strategic White Paper series addressing these and other opportunities in the region. The ability to export best practice operational management and training and skills development in the region creates increased opportunities for engagement and bilateral cooperation through the whole life cycle usage within the region. That driving demand for critical and rare earth minerals globally will force alliances around the supply, access, and control of these essential minerals.

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[6] Best, A and Vernon, C, 2020, 'State of Play: Australia's Battery Industries as at March 2020', CSIRO, Australia.

[7] Casson, B, Lewis, C and Martin, K, 2021, 'Outlook for Selected Critical Minerals: Australia 2021', Office of the Chief Economist, Australia; Department of Industry, Science, Energy and Resources, 2020, 'Responsible, Reliable, Ready for the Future: Australia's Global Resources Statement', Australian Government, Australia; Department of Industry, Science, Energy and Resources, 2021, Resources Technology and Critical Minerals Processing National Manufacturing Priority Road Map', Australian Government, Australia.

[8] The Lithium-Ion Battery Value Chain – New Economy Opportunities for Australia, AusTrade, December 2018, Figure 31.

[9] See for example Australian Government, 2021,'Resources Technology and Critical Minerals Processing National Manufacturing Priority Road Map', available at: https://www.industry.gov.au/sites/default/files/March%202021/document/resources-technology-and-critical-minerals-processing-national-anufacturing-priority-road-map.pdf.

ESG

Social responsibility and performance

Environmental, social, and governance (ESG) factors are fundamental to the sustainability and financial viability of the global mining industry, including in Australia.[10]

Social, environmental, and governance performance impacts community sentiment and trust in the credibility of mining operations

ESG has a profound impact on sources, availability, time frames and costs for project financing.[11] Mineral resource development opportunities are likely to be severely constrained unless projects and unavoidable legacies are agreed upon as acceptable by affected landholders/custodians in advance.[12] AusIMM is taking a global leadership position in ensuring resources professionals meet the highest social responsibility and performance standards.

The AusIMM is developing leadership in ESG through a comprehensive Social Responsibility Framework, consisting of a Social Responsibility Statement, our Royal Charter and Code of Ethics, a Chartered Professional Program for environmental and social performance professionals, and Professional Certificate in ESG and Social Responsibility to lift awareness, understanding and competency across the mining sector.

AusIMM submits to the Committee that measures such as these are fundamental to attracting continued investment into the Australian resources industry and supporting its ongoing role as the number one source of export revenue for the Australian community.

AUsIMM recommends the government partnership with AusIMM to advance geostrategic leadership through the regional uptake of the AusIMM Social Responsibility Framework. The AusIMM Chartered Professional Program and course offerings provide skills development throughout the region and is an opportunity to deepen discussions in strategic forums to engage regional partners in a dialogue about Australia's leadership on ESG and social responsibility in mining.

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[10] AusIMM Social Responsibility Statement, available at: https://www.ausimm.com/about-us/governance/social-responsibility-framework-and-statement/.
[11] AusIMM, 2019, 'Social Licence Policy Development Forum Summary Report', available at: https://www.ausimm.com/globalassets/advocacy/slto_forum_report_final.pdfd;
PwC, 2020, 'Aussie Mine 2020: Resources the Recovery'; Mackenzie, S, Everingham, J and Bourke, P, 2020, "The Social Dimension of Mineral Exploration", SEG Discovery No 121. April 2020, pp. 16-28;
[12] Lebre, E., Stringer, M., Svobodova, K., Owen, J., Kemp, D., Cote, C., Arratia-Solar, A., Valenta, R., 2020, 'The Social and Environmental Complexities of Extracting Energy Transition Metals', *Nature Communications,* available at: https://www.nature.com/articles/s41467-020-18661-9.pdf.

Industry Standards

The Organisation for Economic Co-operation and Development (OECD) has estimated that standards, which set out minimum specifications, procedures, and guidelines for developing products, services and systems, impact 80 per cent of all global trade.[13] The Commonwealth Department of Industry, Science, Energy and Resources facilitates Australia's export growth by supporting and leading international standards development. Multi-lateral engagements such as the APEC Sub-Committee on Standards and Conformance (APEC SCSC) are crucial drivers of exporting best practices and fostering shared learning and skill development. This leadership enhances Australia's global trade and provides consistency in management practices that enables ease of movement for professionals operating across jurisdictions in the mining sector.

Professional and technical excellence in mining strengthens Australia's global standing

Our resources professionals are amongst the most highly skilled globally, and our reputation technical and ethical leadership supports Australia's broader standing on the world stage.

AusIMM Under the Royal Charter, the AusIMM upholds standards and promotes professional best practices globally. The respect for Australian mining professionals, codes and standards, professional development and training sustains high demand for our skilled professionals. It strengthens opportunities for global dialogue and deepening strategic relationships through the resources sector.

Globally respected mining codes and standards

The demand for Australian mining experts reflects the global recognition of Australian mining standards, expertise and experience. This international recognition is core to the global position and competitive strength of Australian mining, and AusIMM exercises a leadership role in developing and promoting the highest ethical and professional standards through a range of codes, standards and professional frameworks, including:

- The AusIMM Code of Ethics, which ensures mining professionals uphold and enhance the global standing of mining professionals, has been translated into Mandarin and is supported by an established governance framework including By-Laws and Professional Conduct Regulations.
- The AusIMM Social Responsibility Framework, discussed above, also outlines professional standards to support the sector's environmental, social, and financial sustainability.

[13] OECD, 1999. Regulatory Reform and International Standardisation. Available at: https://www.oecd.org/tad/benefitlib/1955309.pdf

- JORC Code, the entire denomination of which is the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, which AusIMM co-parent with our partners at the Australian Institute of Geoscientists (AIG) and Minerals Council of Australia, and has been translated into Mandarin;
- VALMIN Code, or Australasian Code for the Public Reporting of Technical Assessments and Valuations of Mineral Assets, also co-parented with the AIG.

The global mining community has demonstrated engagement efforts to align with Australian standards of professionalism and technical excellence. This global leadership position plays an essential role in supporting Australia's broader international standing.

Australia's best practice frameworks

The global mining community seeks opportunities to discover best practice upskilling practices from the respected Australian mining sector. AusIMM plays a crucial role in increasing the worldwide recognition and uptake of mining best practices, offering a wide range of globally recognised courses and training services to meet this demand.

More than 40% of the AusIMM flagship Professional Certificate in JORC Code reporting enrolments are from outside Australia and New Zealand. A further example lies in our work with the Global Mining Association of China in 2020 to deliver a five-day training program on the JORC Code in China.

The deepening interest in Australian practices and innovations across crucial themes shaping the future of the global mining industry:

- **Technology and innovation: operational efficiency, waste reduction and environmental performance.**
- **Health and safety: Australia leading progress towards a zero-harm industry.**
- **Sustainability: social responsibility and performance of the sector.**
- **Provides a mechanism for Australia's development and leadership and role of the mining sector to attract investment opportunities, strengthening the economy and prospects for professionals.**

AusIMM invites the Government to collaborate on championing mining regulations, norms, codes and standards across the Indo-Pacific region. Facilitating these efforts through existing regional forums, including, for example, the APEC Subcommittee on Standards and Conformance and ASEAN Regional Mining Forums, provide a significant regional leadership opportunity for Australia.

Future Workforce

The pace and scale of change in the resources industry have never been more substantial. The Australian mining industry is becoming more sophisticated, automated, and technologically advanced as it develops more efficient operational methods. Mining professionals will require different skillsets to maintain Australia's global competitiveness as the sector evolves.

Ensuring the skills requirements of the future workforce are achieved requires coordination across the industry, Government, and universities.

The resources sector demands continued skills advancement as new practices become best practices. There is a trend developing around attracting and retaining talent, particularly as Australian miners find themselves in direct competition with employers across various industries. This trend poses a significant challenge in the technological advancement of operations.

The AusIMM has identified several key areas requiring action to ensure a sustainable and agile future resources workforce:

- **Forecasting,** to ascertain the future needs of the industry, map expected growth in the resources workforce and identified potential gaps and skills shortages
- **Education**, skills and training, with an expansion of education pathways to diversify progression and entry options across all mining-relevant fields
- **Attraction and retention**, to improve the perception of the resources sector and increase awareness of the breadth of established and emerging career opportunities, as well as the role of mining in providing future economic and social prosperity
- **Equality of opportunity** through the adoption of a broad understanding of the diversity in the community. By recognising the value of diversity and increasing inclusiveness of the industry; and
- **Collaboration** across industry, Government, and academia to align approach for best practice industry settings

The AusIMM Resources Education Collaboration Summit, co-hosted by AusIMM with the Victorian Government, is working to address these areas through several initiatives with industry, Government, and education partners.

The National Resources Workforce Strategy outlines various policies and programs to support a sustainable future resources workforce. This strategy is essential to ensuring the skills and talent needed to sustain the industry are met and provides a forum to address

The Government role in supporting the future of the resources workforce reflects the broader responsibility of the Government to drive growth in Australia's economy and support job creation through the Nation's major industries. The nature and scope of the resources sector will provide a unique opportunity to enhance the regional connectivity through professionals. As Industry 4.0 substantially drives job demand across sectors engaging in digital transformations and operations to meet demand, Australia will require increased skills migration. As the Columbo and New Columbo plan have demonstrated, people's movement in engaging in study and work provides a unique connection that builds enduring ties. The framework model has been used to significant effect in developing meaningful soft power diplomacy.

Approaching future planning and considerations of the sector industrial landscape and operational construction establishes the need for regional engagement on deepening strategic treaties and sovereign agreements to develop new and more accessible pathways of mobilising the skilled professionals in the region.

Working Group on the Resources Industry Future Workforce

The AusIMM *Working Group on the Resources Industry Future Workforce* is an evidence-based approach initiative collating data from universities and industry to model the supply and demand and map gaps in the Australian resources sector. The Working Group comprises key personnel representing industry and academia.

There is a substantial opportunity to strengthen and project Australian leadership in the region through programs focused on expanding access to careers in the resources sector. In particular, the APEC Women in STEM Principles and Actions is an opportunity to increase engagement through scholarships, forums and further research addressing the barriers and opportunities for women in the mining sector and creating a regional focus on developing the skills and qualifications of women. As women in the region have more exposure to expanding their professional opportunities, there will likely be a significant shift in economic activity.

Enhancing professional development opportunities for women in the region not only assists in ensuring the sector's future workforce but also contributes to increased standards of living and economic independence. Although growing women's workforce participation in Australia is a priority of the Government, it should also be considered a regional engagement opportunity.

The AusIMM has identified substantial opportunities to deliver initiatives through existing regional architecture and mining-focused programs. The Regional Collaborations Programme and intergovernmental Group on Earth Observations provide a framework for establishing a skills development and workforce structure in the Indo-Pacific region.

Emergency Management & Disaster Response

When faced with the challenges of managing disaster response, awareness and preparedness are central to mitigating the loss of life, infrastructure, and homes. The effectiveness of first responders' management of disaster response operations is affected by the immediate quality of communication and access to the skills and expertise needed to execute.

Australia's mining industry is at the forefront of global best practices in emergency mining management

An outstanding safety track record in the Australian sector's low occurrence of death, significant injury, and high potential incidents creates a deep level of respect for the skilled professional capacity. It is far less common in Australia to have significant disasters that lead to profound adverse incidents. Still, experience in other jurisdictions informs that emergency response often requires multiple emergency services and specialist support from the international community.

Poor safety, health and environmental management in the mining sector poses a substantial risk to the community well-being and the ongoing viability of mining operations within the affected region.

The number of catastrophic tailing dam failures and other mining disasters is increasing globally, with the 2019 Brumadhino disaster in Brazil serving as perhaps one of the most high-profile recent examples. This disaster killed 270 people and has had a profound and enduring impact on the surrounding environment.[14]

Such incidents confirm that the global industry can, and needs to protect lives and the mines' environment.

The Australian resources sector has an outstanding track record in safety, health, and environmental risk management, including disaster planning and response. Underwriting the sector leadership is the technical and professional excellence of people working in the sector and our industry's commitment to continuous improvement regarding all mining-related risks.

[14] Owen, Kemp, Lebre, Svodobova and Murillo, 2020, 'Catastrophic tailing dam failures and disaster risk disclosure', *International Journal of Disaster Risk Redection* 42(2); Colvin, P, 2020, 'Recent developments with Global Tailings Standards', AusIMM, available here.

The same disaster response capacity and preparedness do not necessarily exist elsewhere in the Indo-Pacific region. AusIMM sees an opportunity for Australia to advance its strategic interests by providing specialist technical support and training to meet this capability gap.

AusIMM members are highly qualified professionals who can contribute expertise on critical components of effective mine disaster responses, including:

- Design, construction, operation, and monitoring of tailings facilities
- Mine safety and health management
- Environmental management
- Operational governance
- Community engagement
- Emergency response and long-term recovery.[15]

AusIMM recommends developing a rapidly deployable mining disaster relief capability to quickly support the Australian aid and humanitarian responses in future mining disasters. This capability can also be engaged to deliver specialist management training across the Info-Pacific.

The AusIMM recommends facilitating a regional tailings standard that Australia can support regional skills development by enabling Professional Certificate in Tailings Management through regional cooperation frameworks and bilateral engagement. The substantial and enduring challenge for the mining sector in the wake of the Brumadhino disaster[16] is a significant cooperation imperative that could prevent future disasters for a regional partner.

[15] Ibid.
[16] Ibid.

Conclusion

This fundamental technical and professional leadership role is a critical driver of the resource sector's economic and social contributions in Australia and across the region. The status and credibility of the Australian industry is an opportunity for more excellent soft power diplomacy by Australia in the Indo-Pacific.

Australia's proximity to Asia continues to be a significant trade advantage for resource exports and advances Australia's geostrategic interests. As geopolitical dynamics shift around supply chain integrity, the rapidly rising demand for Australian minerals, standards, processes, and practices will increase as a significant Australian soft power projection component, particularly in our region.

The significant role mining professionals play in the Indo-Pacific region, in terms of the breadth and economic contributions of the Australian sector, provides unique agility to respond to substantial disruptions.