MINERALS COUNCIL OF AUSTRALIA

SUBMISSION TO SKILLS FOR VICTORIA'S GROWING ECONOMY

JULY 2020

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EXECUTIVE SUMMARY

The Minerals Council of Australia (MCA) Victoria Division welcomes the opportunity to make a submission to the review into Victoria's post-secondary education and training system.

Education and skills are a key policy priority for the resources sector. The Victorian mining industry supports over 88,000 jobs[1]. This figure continues to grow and includes mining equipment, technology and services reliant on mining.

Mining is a sophisticated and technologically advanced industry that requires a highly skilled and adaptable workforce. A flexible, high quality and responsive training and workforce development system is required to build the minerals workforce of the future.

The future minerals workforce will be more diverse and digitally connected. New capabilities are required to meet workplace changes and it is increasingly necessary to enhance the skills of the existing workforce. Accredited training needs to be responsive to industry needs and the broader education and training landscape should be flexible, varied and sustainable.

The new capabilities and skills require adjustments to the VET landscape. This includes acquisition of broad ranging skills and competencies using both accredited and non-accredited training.

Like many regional industries, mining faces labour pool shortages for trades roles and other skilled workers. There is a lack of vocational education and training (VET) options in parts of regional Victoria where demand for mining jobs is expected to grow. Regional delivery options from trades to mining courses are required to ensure that people living in regional Victoria have the opportunity to gain the skills needed for local industry.

A significant number of reviews, strategies and reports are underway or have been completed in recent years across the education and training policy landscape. Understanding and responding to the challenges identified through these reviews and implementing the associated program and policy recommendations will have economic and social benefits in both the state and national context.

As part of the Australian Government's Delivering Skills for Today and Tomorrow, the MCA is coordinating the Mining Skills Organisation Pilot (MSOP) on behalf of employers and in conjunction with broader industry. The MCA will be working with key players in the national VET governance structures to advise on and obtain agreement to changes that improve the quality and the extent of training for the sector.

Through MSOP, the mining industry will have the flexibility to develop and test innovative forecasting methods, training offerings and options across the skills pipeline to achieve the responsive pathways and skills acquisition required in the immediate and post COVID-19 employment landscape.

[1] Deloitte Access Economics, Mining and METS: engines of economic growth and prosperity for Australians, 2017

1. VICTORIA'S MINERALS INDUSTRY

The Victorian minerals industry has been an integral part of Victoria's social and economic fabric for over 150 years. Mining is not just about Victoria's past, it is critical to Victoria's future.

Victoria's mining sector produces gold, antinomy and brown coal. Significant operations include gold mining in Fosterville, Ballarat and Stawell, antimony and gold in Costerfield and brown coal in the Latrobe Valley. There are a number of mineral sands projects in the pipeline at various stages of development in the Wimmera and East Gippsland.

Exploration projects across the state in gold and base metals including copper have the potential to develop into new future mine projects. Developing Victoria's mineral sands and base metal deposits as inputs to renewable energy will help embed Victoria in renewable energy markets.

Almost 16,000 Victorians are directly employed in the resources sector.[2] Including the Mining Equipment, Technology and Services (METS) sector, around 88,000 jobs are supported by the industry in Victoria.[3] These include a range of jobs including equipment manufacturing and computer systems design.

The minerals and METS sectors' combined economic contribution to the Victorian economy was estimated to be worth $13.6 billion in 2015-16.[4]

Innovative technologies are supported by modern mining. Victoria is a natural hub for the METS sector with manufacturing and service businesses supplying mining operations across Australia and globally from regional centres and metropolitan Melbourne. METS is a $15 billion a year national export industry.

Victoria's potential for further development in mining and as a hub for the METS sector provides opportunities across the state in a range of occupations including the science, technology, engineering and mathematics (STEM) fields for young Victorians as mining continues to adopt new technologies in the pursuit of more productive, safer and environmentally sustainable operations.

Mining and regional development

As a regional industry, minerals projects play an important role in regional development in Victoria.

Turning Victoria's mineral endowment into new investment and jobs will create economic opportunities in regional Victoria. Around 95 per cent of jobs in mining are full time[5] and average fulltime wages are higher than the national average.[6]

The 2015 Regional Economic Development and Services Review, chaired by The Hon John Brumby, identified potential for further development of Victoria's earth resources to 'drive inclusive growth, and create regional jobs.'

The Government's *State of Discovery: Mineral Resources Strategy 2018-2023* was welcomed by industry. The strategy reaffirms that the minerals industry is a significant contributor to the Victorian economy and provides a framework to grow industry and create more jobs in regional Victoria through greater investment attractiveness, more engaged communities and modern regulatory regimes. The Strategy includes the aim to improve skills development for the mining and METS sector and skills attraction to regional Victoria.

[2] ABS Labour force Series cat no. 6291.0.55.003.
[3] Deloitte Access Economics, Mining and METS: engines of economic growth and prosperity for Australians, 2017
[4] Ibid.
[5] ABS cat no. 6291.0.55.003, *Labour Force, Australia, Detailed*.
[6] Australian Bureau of Statistics, *Average Weekly Earnings, Australia, Nov 2017*, ABS cat. no. 6302.0, released on 22 February 2018.

Victorian mining education initiatives

MCA Victoria is partnering with government and education programs to encourage education pathways to jobs in mining.

As a growing and high tech industry, access to a skilled labour pool for mining in Victoria is a critical concern. These range from trades roles in regional areas such as diesel mechanics, to more mining specific roles such as geo-technicians.

Two thirds of the mining workforce has a Certificate III or higher, with 26 per cent of the mining workforce holding a university degree. Mining is changing with the rates of technology adoption reshaping the skills required in the current and future workforce.

New VET courses tailored to future Victorian mining job demand should be developed and delivered in regional areas such as the Wimmera to address skills shortages and skill local workers to take advantage of job opportunities in regional Victoria. For example, the MCA is working with the Victorian Skills Commissioner to create a pathway for regional Victorians to enter the industry, especially in Victorian mining operations including underground gold and mineral sands mines.

Skilling local workers to fill the expected future demand will help reduce impacts on other industries in mining regions. Such a tailored course would broadly need to cover safety, environmental and cultural training, and various practical trades such as basic metallurgy and pipe welding.

The mining industry has developed and supported a number of initiatives to increase the awareness of careers in mining and support programs encouraging young people to pursue careers in STEM:

- The industry supports online resources for teachers and professional development through the Teacher Earth Science Education Program (TESEP) and Oresome Resources online portal providing free educational resources on minerals and energy
- MCA Victoria sponsors Victoria's Science Talent Search encouraging primary and early high school students pursuing science studies
- The MCA's mining careers guide has been provided to secondary schools in Victoria and is available digitally to support science teachers and careers advisers as part of the State Government's initiative to ensure all high schools have access to careers advice.

Supporting prosperity and regional development

The minerals industry considers education and training through the lens of broader regional development and prosperity. This recognises the minerals industry's acknowledgment of its role and responsibility to contribute to the sustainable development of host communities and regions.

This role includes supporting the development of skills and capabilities within its own workforce that are valuable in the broader economy as well as contributions to regional education and training outcomes as part of a company's social investment program.

The minerals industry contributes significantly to the education and training of its workforce and by extension the Australian population more broadly when skills attained in our industry are transferred to other jobs in the broader economy. For example, skills and capabilities gained in the minerals industry are compatible with and transferrable to a range of other sectors including in trades, warehousing and logistics, environmental science and other disciplines which are highly-sought after by the agriculture, tourism and manufacturing sectors.

Company social investment programs may often include support for programs encouraging primary and secondary school students and young people to pursue careers in STEM and trades. Partnerships with local training providers and universities are also common.

For example, Kirkland Lake Gold's Fosterville mine near Bendigo provides mine site exposure for first- and third-year undergraduate Bachelor of Science (Earth Sciences) Monash students through

field trips to the operating mine. This helps support the broader skills and capability development within a community and region. Another example is Stawell Gold Mines' apprenticeship program with Stawell Secondary College, which gives four local VCAL (Victorian Certificate of Applied Learning) students the opportunity to receive on-the-job practical training from mining professionals.

Mining Skills Organisation Pilot

The MCA has been appointed to establish the Mining Skills Organisation Pilot (MSOP), an industry led vehicle focused on building a responsive and flexible VET system which can deliver the skills and training needs of both the industry and the future minerals workforce.

The MCA has secured education partners that will develop new learning pathways to the modern mining sector including two curricula pilots (one in Mining Engineering Bachelor Degree and one in Associate Degree of Engineering) and a micro-credentials package.

These reflect the need to reinvigorate and strengthen learning outcomes across a spectrum of career stages. As a model to build on into the future, the pilots are focused on accelerating the development of innovative learning solutions, and importantly, bringing industry and educators closer together.

The MSOP will include retraining and reskilling in regional and remote Australia. As an initial priority, the minerals industry will accelerate 1,000 new apprenticeships through the pilot, in partnership with the Australian Government and in cooperation with the states and the Northern Territory.

New and innovative skill sets and qualifications linked to technology adoption in the modern mining sector, such as automation and data analytics, will be fast-tracked through the Mining SO Pilot and designed to be transferable to the METS and allied sectors.

2. CHANGING NATURE OF WORK AND SKILLS

The policy context

The MCA endorses reforms advanced by the Resources 2030 Taskforce and the Productivity Commission to generate a high-quality education system that promotes skills formation and prepares students for technology adoption, use and diffusion, including:

- Developing a more coordinated national tertiary curriculum for earth sciences and resources sector qualifications
- Introducing a more graduated system of student assessment to signal to employers the level of proficiency in VET
- Re-positioning VET as a valid pathway to securing the right skills for the changing landscape of work
- Delivering a campaign to increase awareness and understanding of the offerings and establishing a stronger narrative on post-secondary education options for new workers.

The MCA supports the findings and recommendations of the Expert Review of Australia's Vocational Education and Training System (Joyce Review) that seek to deliver a stronger skills sector for Australia and commend:

- Australian Government investment in and commitment to implementing the *Delivering Skills for Today and Tomorrow package*, which aims to ensure the VET sector delivers the skills critical to the economy now and into the future
- Work of the Council of Australian Governments (COAG) Skills Council to develop a VET Reform Roadmap structured around the pandemic crisis response, economic recovery, and long-term reforms.

The MCA is also interested in and following the complementary reviews and reforms responding to challenges that compromise achieving the robust architecture required to support excellence across the tertiary education and training landscape, in particular the:

- Australian Qualifications Framework Review (Noonan Review)
- Australian Skills Quality Authority Rapid Review (ASQA Review)
- Review of the National Agreement for Skills and Workforce Development (NASWD Review).

Current state of play in minerals tertiary education and training

Specialist minerals disciplines have suffered significant declines in recent years. In mining engineering, the future domestic pipeline of graduates is going to be significantly impacted with less than 50 expected to graduate in 2020. This is less than a third that graduated five years ago. While enrolments in mining engineering traditionally follow commodity prices, since 2016 they have not increased when commodity prices have.

PwC found that

> As mining companies continue to invest and focus on innovation and digitisation, the demand for digitally skilled candidates will increase. And while traditional engineering roles will continue to remain relevant, the need for people who are competent in AI, robotics, data analytics and mechatronics will be key for future fit mining organisations. The mining businesses of the future will see a convergence of perspectives between mining engineers and newer-age digitally focused roles.[7]

Whilst the traditional occupations and associated skills will remain relevant and essential to the future minerals workforce, they will be enhanced and complemented by a suite of broader skills and capabilities as employers are looking for workers with a mixture of skills, values and behaviours.

[7] PwC. *Aussie Mine 2018, November* 2018.

The broader skills and capabilities important to the future minerals workforce include core technical skills coupled with cognitive or 'soft skills' and interpersonal skills, as well as technological literacy and specialist skills in complementary disciplines.[8]

The VET sector should facilitate the diversity of options needed to deliver these skills, for example developing a matrix of these skills through short courses, skill sets or micro-credentials and contextualising them to core content of specific qualifications. This would require coordination across government, academia and industry to ensure that these options are funded, assessed and assured whilst also aligning with the relevant regulations, standards and frameworks.[9]

These issues have been identified by the Resources 2030 Taskforce as part of attracting and supporting the skilled minerals industry workforce, including developing a more coordinated national tertiary curriculum for earth sciences and resources sector qualifications at the higher education and VET levels.[10]

The MCA has estimated blue collar job demand through an independent pilot study. It is the most comprehensive analysis ever undertaken of mining-related jobs and skills advertising that include Australian licence requirements. Top practical skills identified include Forklift Truck Operation, Work Safely at Heights, Construction Induction Card, Enter and Work in a Confined Space and Boom-type Elevating Work Platform. Both basic and advanced rigging tickets and construction induction cards were also frequently included in job descriptions by employers.

The industry supports the recommendations of the taskforce and the Productivity Commission for reform across the entire Australian education landscape to meet the future workforce requirements for the industry and Australia.[11]

Innovation and technology adoption

Technological innovation will continue to change the nature of work in mining and will change skills requirements. The minerals industry is proactively assessing the composition of the future minerals workforce and the skills requirements.

The MCA commissioned Ernst & Young's The Future of Work: the changing skills landscape for miners and the economic implications of technology and digital mining – a comprehensive examination of future skills and training and technology trends in the Australian minerals industry to help inform the development of a roadmap to build workforce capabilities.

The Productivity Commission identifies skills formation as a priority because technology adoption, use and diffusion (the long-run drivers of productivity) require people with the right skills.[12] There is additional value in improving skills formation across the broad spectrum from foundational to advanced, because it provides better job security, income and job satisfaction. The Productivity Commission rightly points out that

> …the current skills system has fractures that put at risk its capacity to deal with the future labour market changes. There are deteriorating results among school students. The VET system is in a mess, and is struggling to deliver relevant competency-based qualifications sought by industry. Leading segments of the university sector are more focused on producing research than improving student outcomes through higher-quality teaching.

Delivering a flexible, functional and fluid tertiary education system at the post-secondary VET and higher education level is critical to meeting the skills needs, especially as specialist skills associated with innovation and technology adoption increase.

[8] Minerals Council of Australia, *2018 Minerals Industry Education Summit*, Melbourne, 17 May 2018.
[9] Australian Qualifications Framework Review Panel, Review of the Australian Qualifications Framework Discussion Paper, December 2018, Australian Government, p. 19.
[10] Department of Industry, Innovation and Science, *Resources 2030 Taskforce Australian resources – providing prosperity for future generations,* Canberra, September 2018
[11] Productivity Commission, *Shifting the Dial: 5 Year Productivity Review*, Report No. 84, Canberra, 3 August 2017, p. 82.
[12] Productivity Commission, *Shifting the Dial: 5 Year Productivity Review*, Report No. 84, Canberra, 3 August 2017, pp. 83-84.

Over the past ten years, there has been a dramatic change in the fundamental skills and capabilities, processes, roles, and organisational models that are needed to run an operational mine. Whilst moves to improve safety and increase productivity contribute to this change, much of it is driven or enabled by technology.[13]

Innovation and associated technology adoption will alter the current and future workforce, including the way traditional skilled trades and professionals interface with these new technologies. There will be an increasing role of automation, robotics and artificial intelligence that will see Australian mining continue to be at the forefront of innovation in the creation of new jobs.

The changing nature of work and skills includes soft skills

The changes in the way work is done will affect the type and mix of skills and knowledge that graduates need and the ways that providers deliver education, which in turn need to be reflected in the framework that supports funding, assurance and alignment.[14]

Access to technology and soft skills are central to the skill profile of Australia's future workforce.[15] It is anticipated that young people will hold more than ten jobs across five industries throughout their career, the skills and capabilities that employers are seeking continue to evolve, with a pronounced shift to seeking 'soft skills' and weighting them equally with 'test scores.'[16]

Science, Technology, Engineering and Mathematics

STEM skills are increasingly important with an estimated 70 per cent of all future jobs projected to be stem-related.[17] The World Economic Forum counts STEM literacy as a measure of the future readiness of countries, enabling students to thrive in the 'known unknown' of future careers.[18]

Encouraging critical STEM skills and connecting emerging talent in schools, universities and TAFE with what a career in the Australian mining sector is important to the future minerals workforce.[19]

The minerals industry is concerned about the marked decline in participation in STEM subjects in schools over the past decade. Participation in the future minerals workforce will require the development of new capabilities and skills from secondary through to higher education.

Anecdotal evidence suggests that there is a lack of understanding about the connection between studying STEM related subject and career pathways, particularly across learners in VET.

The industry has developed and supported a number of initiatives to increase awareness of an interest in careers in the industry. The industry supports established programs including peer-to-peer outreach programs, online resources for teachers and teacher professional development. Companies also make individual investments in STEM, as captured in their reporting and highlighted on their websites

The MCA, through its *Gender Diversity White Paper* strategy, has also developed numerous initiatives to increase the number of women in the workforce to deliver both skills and diversity benefits.[20]

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[13] G Yeates, 'The changing nature of work in mining', address at the Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne, 17 May 2018.

[14] Productivity Commission, Shifting the Dial: 5 year Productivity Review, 2017, p. 87; and Department of Jobs and Small Business, Australian Jobs 2018, Australian Government, 2018, p. 29; as seen in Australian Qualifications Framework Review Panel, Review of the Australian Qualifications Framework Discussion Paper, December 2018, Australian Government, p. 12.

[15] Senator, the Hon Zed Seselja, *Australia's Future Workforce, the opportunities and challenges*, Address at the Navigating Technology and Jobs of the Future Summit, 2018, Australian Information Industry Association, Canberra.

[16] J Owens, *Artificial Intelligence, machines and the GIG economy,* targeted stream at the *Navigating Technology and Jobs of the Future Summit*, 2018, Australian Information Industry Association, Canberra.

[17] Pricewaterhouse Coopers, *A smart move: future-proofing Australia's workforce by growing skills in science, technology, engineering and maths (STEM)*, p. 14 viewed 1 July 2020.

[18] M Timms, K Moyle, P Weldon & Pru Mitchell, *Challenges in STEM learning in Australian Schools*, Australian Council for Educational Research, 2018, p3, as seen in Cardno, *Sustainability in Action: Australian Mining and the United Nations Sustainable Development Goals*, October 2018, p. 24.

[19] Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne, 17 May 2018.

[20] Workplace Gender Equality Agency, Gender workplace statistics at a glance, Australian Government, August 2018, viewed 1 July 2020.

3. SKILLING THE FUTURE MINERALS WORKFORCE

Australia's education and training ecosystem needs to cater to a diverse range of learners and learning styles across a range of industries and shifting priority sectors. It is essential that the system is flexible and responsive to changes both across the labour market and within industries.

The VET and broader education and skill system needs to refocus skills curricula to meet future technology needs.

Pathways

Providing appropriate, timely and affordable skills, training and development options and pathways for both existing and pipeline workforce whilst connecting the tertiary education landscape at the post-secondary level is important.[21]

Pathways that span TAFE, university and include intensive micro-credentialing (mini-qualifications that demonstrate skills, knowledge, or experience in a given capability) will likely become commonplace for the industry, making it easier to learn the skills key for our industry.[22]

The minerals industry will require a VET system for accredited and non-accredited training that is industry-led, demand-driven and responsive to satisfy existing need and cater for the emerging skills of the future. The minerals industry maintains that funding of training should be extended beyond qualifications to include skill sets and units of competence.

Qualifications aligned to automated technology like operations control, process monitoring, interpreting data and problem solving are applicable across a range of current and emerging roles across industry but they are also the same qualifications needed for other control centre roles – like managing shipping movements at ports, or key activities across logistics businesses, and diverse sectors like health care.[23]

Perceptions

The skills, knowledge and learning gained through quality education are building blocks for healthy and prosperous lives. Quality education also equips people with the tools necessary for innovative solutions to the challenging and complex problems facing the world today.[24]

VET offers an alternative pathway for industry to gain workers with the right skills, by encouraging students and current employees to upskill, re-skill and develop expertise in a particular area by completing just a few units of competency, rather than a full qualification.[25] Yet broad public perceptions of VET as a pathway can perpetuate misinformed views that diminish its perceived value.

While there is clear awareness of VET a lack of targeted communication to the broader community in regard to VET opportunities has created a disconnect between perception and opportunity – directly impacting on the uptake of VET pathways and limiting the profile of learners that access the system. This is further exacerbated by a public history of fluctuating quality assurance across training providers as well as assessment and evaluation outcomes.

Re-positioning VET as an equally valid pathway for securing the right skills to be prepared for and thrive in the evolving landscape of work is a critical component of any action in response to this review. Complementary campaigns to increase awareness and understanding of the offerings and establishing a stronger narrative on the broader post-secondary education eco-system, coupled with implementing actions from this review that address weaknesses of the current system and introduce new learning pathways and options would contribute to a more sustainable VET system.

[21] Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne, 17 May 2018.
[22] Deakin University, https://www.deakinco.com/media-centre/news/Benefits-of-micro-credentials-for-business-and-employees, 24 October 2017.
[23] Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne, 17 May 2018.
[24] Cardno, *Sustainability in Action: Australian Mining and the United Nations Sustainable Development Goals*, October 2018, p. 24.
[25] Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne, 17 May 2018.

To adjust these perceptions, attention needs to be given to improving knowledge, awareness and understanding about career pathways and opportunities created through VET; with a particular focus on learners and their key influencers. For example, whilst young people obtain 58 per cent of the industry knowledge through television or online, 35 per cent through school classes and 29 per cent via family, family and friends or extended family remain the key influencers of career decisions and perceptions of different industries. This influence is based on trust in the information received and relevance of a parent knowing the student best.[26]

Pilot programs

The education experience needs to mirror real life working modes that still complement the technical side of learning. Today we work within and across networks and systems, and are expected to function through agile, borderless, teams or communities of practice that are outcomes focused and may be formed in response to a specific problem, execute their response and disband.[27]

The minerals industry supports and encourages the use of pilot programs. These programs test interventions and models across the education ecosystem to determine best-practice, identify the interventions and pathways, and establish a sustainable VET system.

Potential pilot programs include:

- Adapting the funding system to facilitate more flexibility and relevance around skills acquisition, including funding units of competence and skill sets[28]
- Shorter modules linked to qualifications and connected to real work content and experience, with flexible and technology enabled delivery modes across the higher and vocational sectors
- Alternative assessment and credentialing options[29]
- Combined, online curriculum that offers academic and skills development with materials, courses and offerings from multiple locations and providers to enable students to pick up different parcels of skills and knowledge relevant to their needs at the right time
- New models of teaching and engaging students, such as threaded degrees, flipped classrooms, interactive and immersive technologies and on-the-job learning
- Programs that offer just-in-time education and training, link training needs to labour market demands and are suitable for upskilling workers based on changing market needs[30]
- Cadet style programs for individuals transitioning mid-career or for long term unemployed
- Threaded pathways that span TAFE, university and short burst, micro credentialing to form learning bridges[31]
- Adapting existing models to develop a skills mapping system that can track an individual's abilities and knowledge, and map these against current and future skills.[32]

As noted, the MCA led Mining SO Pilot is currently developing projects, including some of those captured above, which may include Victorian training providers.

[26] Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne, 17 May 2018.
[27] Ibid.
[28] Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne, 17 May 2018; Australian Information Industry Association Navigating Technology and Jobs of the Future Summit, 2018, Canberra; and, Australian Government, *Review of the Australian Qualifications Framework Discussion Paper*, December 2018, viewed 1 July 2020.
[29] University of Melbourne micro-credentialing, web page, viewed 1 July 2020.
[30] Government of Canada, *Aboriginal Skills and Employment Training Strategy,* program web page, December 2018; and Obvious Choice, *Micro-learning* viewed 23 January 2019; and Productivity Commission, *Shifting the Dial: 5 Year Productivity Review*, 2017, p. 97 as seen in Department of Education and Training, *Changing work requires new skills and learning methods*, Department document, Australian Government, December 2018, p. 3.
[31] Minerals Council of Australia 2018 Minerals Industry Education Summit, Melbourne.
[32] J Clarke, *Technology, Government and the Customer Experience – Telstra,* Address at the Navigating Technology and Jobs of the Future Summit, Australian Information Industry Association, 2018, Canberra.