![Mining and Automotive Skills Alliance logo]

Workforce Plan
The Future is Now

Mining and Automotive Industries

November 2023

Contents

List of Figures

List of Tables

Acknowledgement of Country

In delivering our Initial Workforce Plan 2023, we pay our respects to First Nations people, those who cared for Country before our time, and those who continue to care for Country today.

We acknowledge them as the Traditional Custodians of the lands on which we live and work, and their connections to land, sea, and community.

We honour and respect their Elders, past, present, and emerging, and extend that respect to all First Nations people.

CEO Foreword

I am proud to present our Initial Workforce Plan, *The Future is Now*. This Plan will inform the initial strategies and actions of the Mining and Automotive Skills Alliance (AUSMASA) as the Jobs and Skills Council (JSC) representing the nation's mining and automotive industries. It provides a preliminary analysis and forecast of the industry sectors and workforce needs within AUMSASA's JSC remit.

The Australian Government has committed to delivering a collaborative, tripartite vocational education and training (VET) sector that brings employers, unions, and governments together to find solutions to skills and workforce challenges. Working together with Jobs and Skills Australia (JSA), that is what we will do.

The mining and automotive industries are critical to the Australian economy, energy transition, and net zero aspirations, and rely on highly skilled workforces. Today, training in mining is dominated by surface extraction operations, and in automotive it is dominated by light motor mechanical technology. While these important occupations speak to the status quo, both industries are on the brink of change and will make a significant contribution to achieving Australia's net -zero ambitions through critical minerals extraction and production and the ongoing adoption of electric vehicles (EVs) which will require a new generation of workforce skills.

AUSMASA is in an establishment phase focusing on building relationships and establishing trust with new stakeholders. Together, we will build support for the overall jobs and skills system to create an environment for success and change with the insights from the Initial Workforce Plan a key foundational element.

Much of our work over the first 18 months will be focused on establishment and workforce planning, however this will not stand in the way of delivering outcomes in the short term for stakeholders in this new environment, including in the important area of training product review, revision and development.

As a new organisation, AUSMASA looks forward to taking the lead in delivering innovative and sustainable outcomes as part of a once in a generation opportunity to transform education and training across Australia.

This Plan is based on existing data, information and industry insights collected since early 2023 during our establishment as a JSC. It will undergo continual development through workforce planning and industry stewardship activities. It provides evidence to support the delivery of outcomes to address immediate priorities and current industry needs, while further research will be undertaken to support our broader work over time.

The AUSMASA team and I look forward to working closely with all stakeholders, including industry and employers, industry peak bodies, unions, registered training organisations (RTOs), and State Training Authorities (STAs), to expand on this Initial Workforce Plan, and we welcome your contribution to this process.

Dr Gavin Lind
Chief Executive Officer

Section 1 – Introduction

1.1 About the Mining and Automotive Skills Alliance

Our key role as the Mining and Automotive Skills Alliance (AUSMASA), the Jobs and Skills Council (JSC) for the Australian mining and automotive industries, is to identify current and future workforce requirements, and consider those of allied sectors. This understanding forms the foundation of how we support both industries in ensuring the vocational education and training (VET) system is, and individual training packages are, responsive and tailored to their workforce skilling needs.

AUSMASA aims to empower both industries to develop essential workforce capabilities that are not only relevant for the present, but adaptable to the future. Recognising the rapidly evolving nature of both sectors, AUSMASA acknowledges the need for a responsive VET system as a key contributor to this aim. Additionally, AUSMASA notes that while it is the custodian of several vital VET training packages related to the mining and automotive industries, solutions to current and emerging industry needs will also require holistic input and support from the broader education sector, including non-accredited, school-based and university-based programs, as well as other stakeholders including industry peak bodies, unions, registered training organisations (RTOs), and State Training Authorities (STAs). By working closely with industry leaders, educational institutions, and key stakeholders, AUSMASA will help pave the way for a skilled and resilient workforce capable of meeting the challenges of today and tomorrow.

Another vital function of AUSMASA is industry stewardship. By gathering valuable insights on workforce issues, and advising on policies for the national training system, AUSMASA acts as a key voice for the mining and automotive industries that informs both the design and development of training packages and future policy development by the Australian Government. Our stewardship role emphasises the importance of promoting cooperation between training providers and industry in shaping a VET sector that effectively meets the needs of learners and employers alike.

Furthermore, AUSMASA stands as a critical enabler in supporting learners to attain the appropriate skills necessary for employment in the mining and automotive industries and their allied sectors across Australia. Through its vision, mission, goals, and industry stewardship, AUSMASA empowers both industries to champion proactive workforce planning and development.

1.2 Objectives of the Initial Workforce Plan

Workforce planning is essential to industry development. It represents a strategic approach that involves identifying, analysing and addressing the workforce needs of an industry. The goal of workforce planning is to ensure that an industry has the right individuals, with the right skills, in the right positions, at the right time.

The scope of workforce planning extends beyond individual organisations. It encompasses entire industries, and considers the collective workforces' needs, including the demand for specific skills, and the supply of available talent.

Our industry-wide approach ensures coordination and collaboration among all stakeholders, including employers, unions, government agencies and educational institutions.

Workforce planning plays a crucial role in driving industry development. By identifying and addressing skill gaps and talent shortages, and developing strategies to address these, it ensures industries have skilled and competent workforces that can meet their evolving needs.

Despite its numerous benefits, implementing workforce planning in an industry-wide context poses several challenges. Accurate data and reliable forecasting methods are crucial to effectively identify current trends and predict future workforce requirements. While having rich quantitative data is a critical element in any industry analysis, the benefit of industry-sourced qualitative data is invaluable for context and 'on-the-ground' insight.

The primary goal of this Initial Workforce Plan is to present an evidence-based scan of Australia's mining and automotive industries. This plan intends to analyse current labour market trends, the characteristics of labour sources and a variety of elements that influence the supply and demand for skilled labour. Per the requirements of the Workforce Planning: Best Practice Guidance Resource for JSCs document,[1] the Plan includes the following:

- **Initial Sector Scan:** This is an initial scan of the mining and automotive industries that identifies workforce challenges. This has been informed by desktop analysis and industry-

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[1] Department of Employment and Workforce Relations. 2022. *Workforce Planning: Best Practice Guidance Resource for Jobs and Skills Councils*. Canberra: Department of Employment and Workforce Relations.

sourced insights, as well as targeted interviews with key stakeholders specifically for the purpose of developing this initial Plan.

- **Evidence Gaps Identification:** This is an initial identification of gaps in evidence to guide potential future research and data collection efforts.
- **Mapping Existing Strategies:** The Plan features an initial mapping of the existing workforce strategies and measures within the industries.
- **Consultation Efforts:** This is an outline of planned and ongoing consultations specific to the Plan, including engagements with state and territory governments, their industry engagement mechanisms, State Training Authorities (STAs) and JSA.

1.3 Industry Coverage

AUSMASA's coverage across the mining and automotive industries includes various sectors and segments in the Australian and New Zealand Standard Industry Classification (ANZSIC) system. While the mining industry is recognised in an entire division of ANZSIC (Division B), the automotive industry is recognised as a consolidation of industry classes across the following four different divisions: manufacturing, retail trade, wholesale trade, and other services.

This ANZSIC industry coverage is shown diagrammatically in Figures 1 and 2. Figure 2 shows the relative size of each ANZSIC segment against the combined Australian mining and automotive workforce of roughly 620,800 workers, comprising of 265,600 for mining and 355,200 for automotive.

As part of its role as a JSC, AUSMASA is the custodian of the following VET training packages:

- **AUR:** Automotive Retail, Service and Repair (service and repair)
- **AUR:** Automotive Retail, Service and Repair (retail qualifications only)
- **AUM:** Automotive Manufacturing
- **RII:** Resources and Infrastructure (mining), excluding civil construction.

In addition, AUSMASA has driverless automotive technologies as an emerging industry within its remit.

Figure 1 ANZSIC code flowchart for the mining and automotive sectors

Figure 2 Relative proportion of the workforce in each of the ANZSIC codes
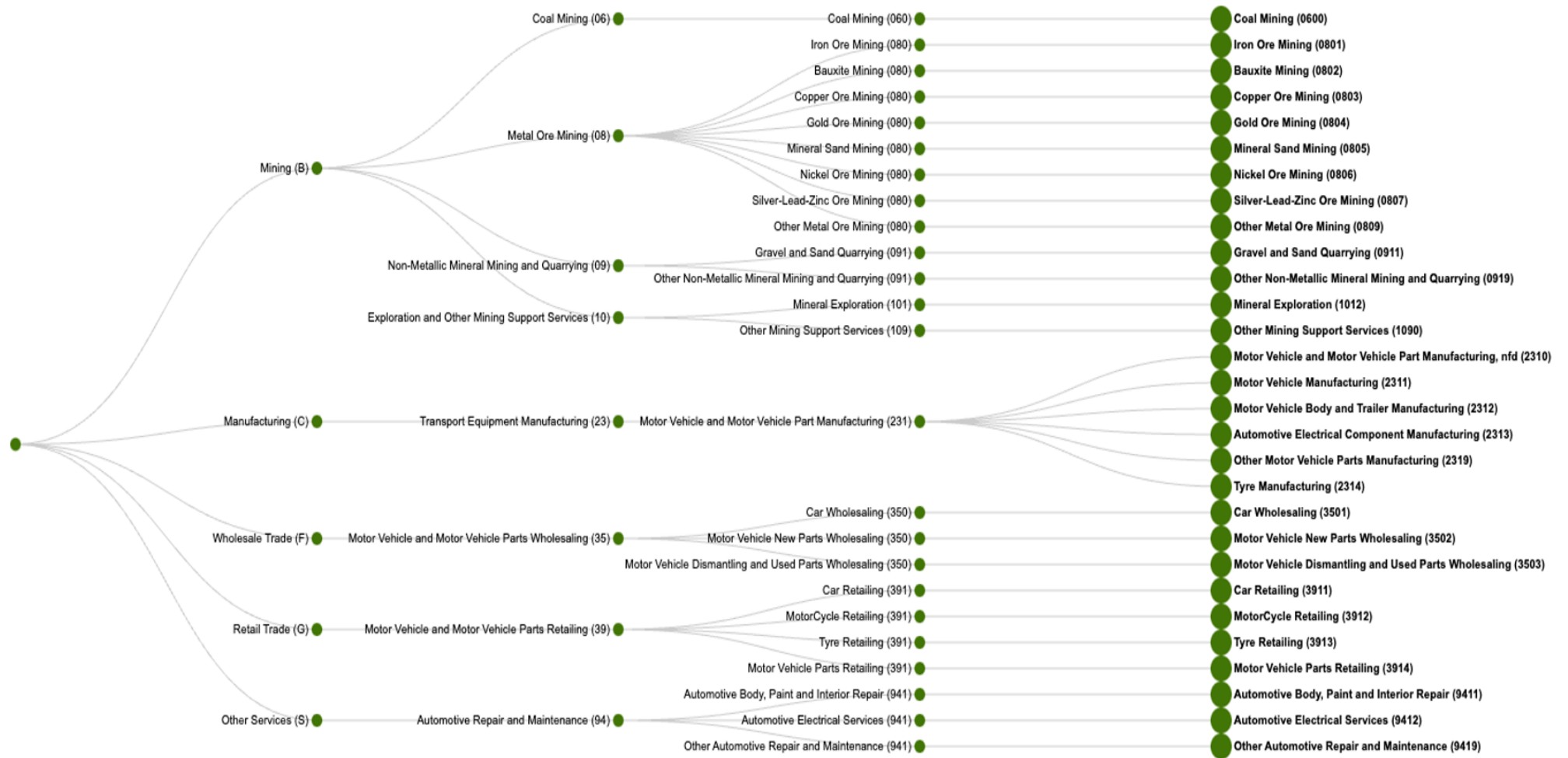
1.4 History of the Mining and Automotive Industries in Australia

The mining and automotive industries are woven into the fabric of Australia's national identity. They represent symbols of the nation's ingenuity, resilience and economic strength.

Mining is more than just an industry in Australia; its practise is deeply embedded in the national psyche, representing both the ruggedness of the Australian landscape and the resilience of its people. This connection dates back to the Gold Rush of the 1850s, a pivotal event that had a profound influence on Australia's national identity. It not only led to a wealth generation but also spurred significant infrastructure development, economic diversification, and migration. It catalysed population growth, introduced multiculturalism, and fostered a sense of Australian 'mateship', characterised by competition, equality, loyalty, and friendship.

From those early days of gold rushes to today's high-tech operations extracting minerals such as iron ore and lithium, mining has been a cornerstone in shaping the Australian economy and its global economic standing. It continues to represent a strong source of jobs and a driver of regional development, and its influence will continue to expand as the world shifts towards a decarbonised global economy.

The automotive industry embodies Australia's spirit of innovation and engineering prowess. Brands such as Holden have been etched into the national consciousness. Even though automotive manufacturing has declined, the focus has shifted to high-tech engineering, design, and components, keeping Australia on the world automotive map. The sector is now at the forefront of adopting new technologies, from electric vehicles (EVs) to autonomous driving systems, reflecting Australia's ability to adapt and innovate.

Both the mining and automotive industries face similar challenges – workforce shortages, the need to develop sustainable practices, and the impact of rapid technological change. They also share opportunities, such as the potential for leveraging Australia's mineral wealth for batteries, and the use of advanced data analytics in both sectors.

Beyond the economic and environmental impact, these industries touch on deeper cultural narratives. They are indelibly connected to the Australian ideals of hard work, ingenuity and the 'fair

go' ethos. They represent the basis of national discussions about sustainability, the future of work and Australia's place in a changing global landscape.

1.5 Australian Economic Backdrop: 2023

The current national economic backdrop is one of ongoing growth, challenges, and barriers.

Australia has a population of 26.3 million people,[2] which is growing by an average of 1.9% per year, putting it on track to reach 30 million by 2030. Australia's gross domestic product growth has settled back to pre-COVID-19 levels of 2.1% in June 2023 after a spike in June 2021 of 10.3%.[3] Demand for Australia's mineral riches and resurgent sales of new vehicles have ensured the mining and automotive industries are also experiencing strong economic growth. Securing sufficient human capital to service this growth is proving difficult. Australia's post-COVID-19 employment landscape continues to exhibit record-low levels of unemployment, hovering below 4% nationally. The strength of the labour market is showing all the tell-tale signs of an economy that is at full employment.[4]

Figure 3 Australian unemployment rate from Jan 2010 to May 2023
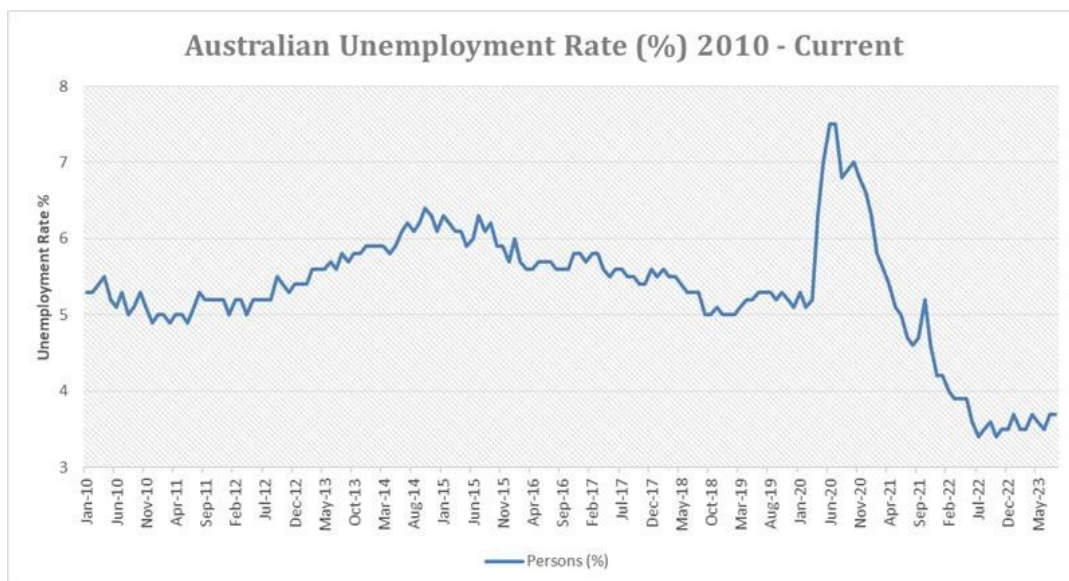
Source: Australian Bureau of Statistics. 2023. 'Labour Force, Australia, Detailed EQ07a - August 2023'. Canberra: ABS.

https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/latest-release

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[2] Reserve Bank of Australia. 2023a. 'Composition of the Australian Economy Snapshot'. *RBA.gov.* https://www.rba.gov.au/snapshots/economy-composition-snapshot/.
[3] Reserve Bank of Australia. 2023b. 'Snapshot Comparison'. *RBA.gov*. https://www.rba.gov.au/education/resources/digital-interactives/snapshot-comparison/
[4] Michelle Bullock. 2023. 'Achieving Full Employment'. *RBA.gov*. https://www.rba.gov.au/speeches/2023/sp-dg-2023-06-20.html.

In July 2023, 77.5% of working-age Australians (aged 15–64) were employed. Australia's employment rate has been generally increasing since the 1970s, which is associated with the rise in female labour force participation.[5]

Job vacancies in Australia were running at 431,600[6] across the country in May 2023 with 11,700 (2.7%) in the mining industry, its highest vacancy rate on record. While JSA reports that most Organisation for Economic Co-operation and Development (OECD) countries are facing skills shortages, Australia has a significantly higher rate of job vacancies when compared to the United States, the United Kingdom, and New Zealand, underscoring the combined effect of a growing economy, job creation and a tight labour market struggling to fill necessary vacancies.[7]

At the same time, inflation, which is measured by the consumer price index, continues to exceed the Reserve Bank of Australia's target range of 2%–3%. Inflation peaked at 7.8% at the turn of the year, having since receded slightly to 6% by June 2023. This prolonged period of inflation continues to have a significant impact on the cost of living and cost of operation for industry.

Steeply increasing property prices have made home ownership, especially for first-home buyers, difficult. Exasperating the issue is the fact that the nation's rental vacancy rates in August 2023 remained critically low at 1.2% and were more pronounced in regional areas. The vacancy rate in Perth, where the majority of the country's mining workforce resides, was even lower at 0.8%.[8] The availability of housing, or lack thereof, has been identified by AUSMASA stakeholders as impacting the industries' ability to secure workers from both interstate and overseas. Equally, the impact of housing shortages on the labour market has been acknowledged in the Australian Government's Employment White Paper, where increasing the supply of secure and affordable housing was identified as a key pillar for productivity growth.[9]

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[5] Australian Institute of Health and Welfare. 2023b. 'Employment and Unemployment'. *AIHW.gov.* https://www.aihw.gov.au/reports/australias-welfare/employment-unemployment.
[6] Australian Bureau of Statistics. 2023. 'Labour Force, Australia, Detailed EQ07a - August 2023'. *ABS.gov.* https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia-detailed/latest-release.
[7] Jobs and Skills Australia. 2023a. *International Labour Market Update - September 2023*. Canberra: Commonwealth of Australia.
[8] SQM Research. 2023. 'August Vacancy Rate Drops to 1.2%'. *SQM Research*. https://sqmresearch.com.au/uploads/12_09_23_National_Vacancy_Rate_August_2023_Final.pdf.
[9] Commonwealth of Australia. 2023. *Working Future: The Australian Government's White Paper on Jobs and Opportunities*. Canberra: Commonwealth of Australia.

While high levels of job opportunities, coupled with initiatives from the Government to encourage more skilled migration would normally offer a strong incentive for overseas skilled migrants to relocate to Australia, the high cost of living and the inability to secure housing has been identified by numerous key AUSMASA stakeholders as reasons why this potential solution to workforce shortages has thus far had minimal impact. It is against this backdrop of national economic growth, workforce constraints and inflation that the mining and automotive industries must work to secure their workforce of today and tomorrow, ensuring that the economic, environmental, and strategic benefits they have to offer will be fully realised.

1.6 Workforce Education

The tertiary education sector (VET and university) will play an even more critical role in ensuring the mining and automotive industries continue to attract and retain skilled talent, and this role continues to be multifaceted in its response to industry needs.

It is not the tertiary education sector's role to simply train and skill those entering the occupations of their choosing; it must also be involved in areas such as secondary education programs, which inform future workers of the sectors, the upskilling and reskilling of existing industry workers in response to advances in technology, and assisting mature workers with the transition to positions that allow them to use their years of expertise, sometimes in education itself.

Furthermore, AUSMASA's role as a JSC goes beyond its remit to alter, create, and delete training package products, extending to the provision of industry stewardship, including for the education providers servicing the mining and automotive industries.

Given the emerging trends, opportunities and challenges identified in this Initial Workforce Plan, it is likely the education aspects of these industries will undergo significant changes in the coming years.

AUSMASA is confident that the creation of new inclusion programs, targeted employment-based training, and other new education pathways for entry and advancement within both industries, will develop an engaged and more diverse automotive and mining workforces.

Technology will continue to reshape workforce needs, and it is critical educational pathways exist to help displaced workers retrain and join those industries whose growth and economic opportunities allow them to welcome new entrants.

1.6.1 Education Profile of the Industries

Data drawn from JSA indicates the current combined mining and automotive workforce is approximately 620,800, with 265,600 for mining and 355,200 for automotive.[10] The average age of the combined workforce is 41 years old, and 19.2% are female.

The VET system is a critical support for this large, combined workforce. Figure 4 shows the comparative highest qualifications achieved by workers in both industries. It shows that for the bulk of both industry's workforces, a VET-level qualification forms the backbone of their education. Mining has a higher reliance on tertiary-educated roles than the automotive industry, which is indicative of the industry's needs for specialised roles, such as mining engineers, metallurgists, geologists, and process engineers, in addition to the other more general professional roles required by both industries.

The automotive industry is also shown as being more accommodating of workers with only secondary school-level education outcomes.

Figure 4 Highest levels of education achieved among current workforce
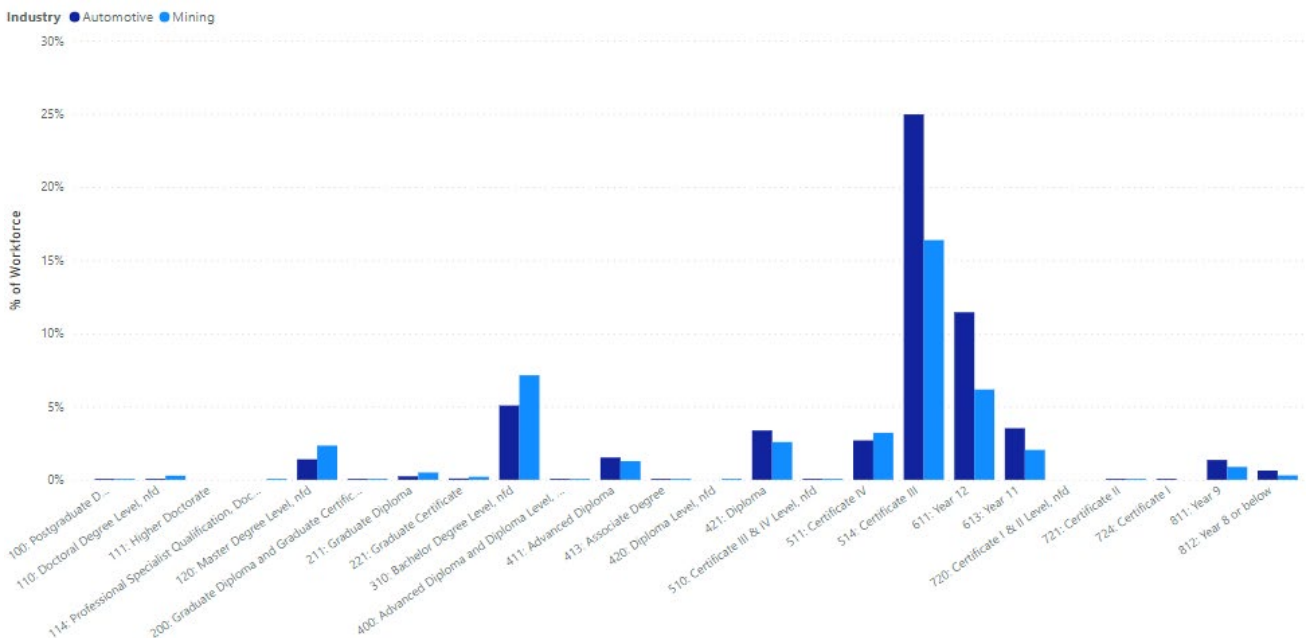
Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia: Kienco

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[10] Labour Market Insights. 2023. 'Discover trends in the Australian Jobs Market'. Data from Australian Government. *Labour Market Insights*. https://labourmarketinsights.gov.au/.

Furthermore, 2022 data from the National Centre for Vocational Education Research (NCVER) shows that for the three VET training packages associated with the mining and automotive industries, 120,895 students were enrolled across 121 programs of study.[11] A summary of enrolments is shown in Table 1.

Table 1 Student enrolments by training package

Training Package	# of Programs	Total Enrolled	% Male	% Indigenous	% With a disability
Automotive Industry Manufacturing (AUM)	2	475	96.8%	3.2%	4.2%
Automotive Industry Retail, Service and Repair (AUR)	66	89475	93.0%	4.7%	4.5%
Resources and Infrastructure (BCC, DRT, MNC, MNM, MNQ, RII)	53	30945	82.9%	7.6%	2.3%
	121	120895	90.4%	5.4%	4.0%

Source: National Centre for Vocational Education Research. 2022. 'Total VET Students and Courses 2022: Program Enrolments DataBuilder'. NCVER. https://www.ncver.edu.au/research-and-statistics/data/databuilderdatabuilder

The NCVER data highlights the specialised nature of the remaining Australian automotive manufacturing industry, with only 475 students enrolled across the country.

The automotive retail, service and repair training package also stands out as having the largest enrolments by a quantum of almost 3:1 compared to the resources and infrastructure enrolment statistics. The fact that the AUR package, and automotive industry more broadly, is strongly linked to multiple trade qualifications, and supports over 22 million vehicles around the country, may well explain this variance.

Table 1 shows the distribution of the 120,895 students across states and territories. Queensland (Qld) is a standout in its strong support of RII training, while Western Australia (WA) narrowly outperforms Qld in relation to AUR qualifications.[12] Given that WA only has about 11% of the nation's population, the strong performance of AUR qualifications in that state is likely the result of the mining industry's need for a range of AUR-qualified trades people, including heavy diesel mechanics, light vehicle mechanics and auto electricians.

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[11] National Centre for Vocational Education Research (NCVER). 2022. 'Total VET Students and Courses 2022: Program Enrolments DataBuilder'. *NCVER*. https://www.ncver.edu.au/research-and-statistics/data/databuilder.
[12] NCVER, 'Total VET Students and Courses 2022'.

Figure 5 Student enrolments by state
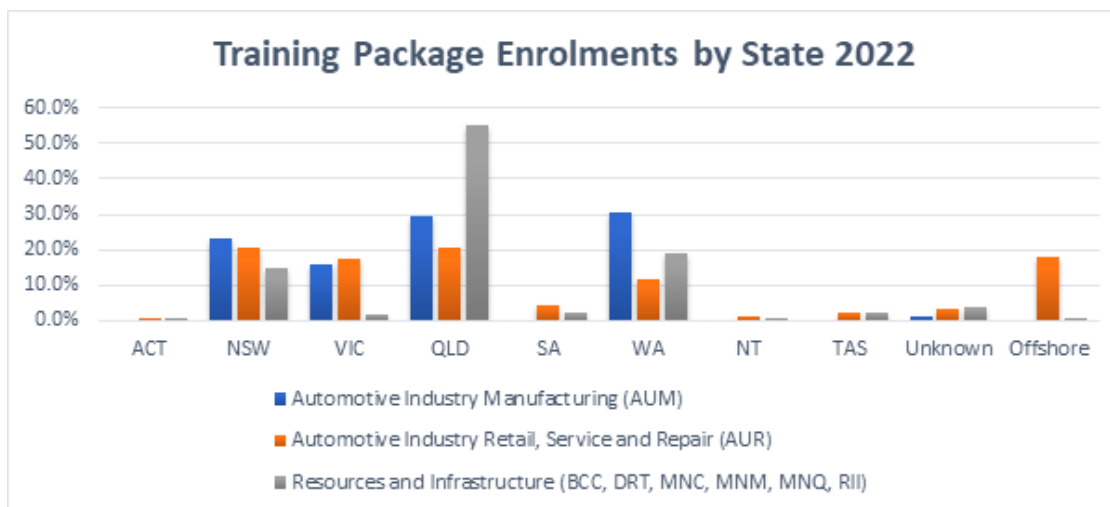
Training Package Enrolments by State 2022

Source: National Centre for Vocational Education Research (NCVER). 2022. 'Total VET Students and Courses 2022: Program Enrolments DataBuilder'. NCVER. https://www.ncver.edu.au/research-and-statistics/data/databuilder

Data from NCVER's DataBuilder shows that for the mining and automotive industries, 41.5% of training was being undertaken through an apprenticeship program, with 53.8% of the training for the sectors being provided by private RTOs.[13]

The NCVER data also shows that 90.4% of students were satisfied with their training overall. The same dataset also states that 58.0% of those who were not working before their studies, were working after completing their studies, which is higher than for other qualifications at Certificate II level or higher.

While high student satisfaction with training is a commendable result for training providers, industry stakeholders related to AUSMASA have frequently raised the concern that many training providers are operating with outdated equipment and learning environments, which they fear will become an even greater issue due to the speed of technological advancement. The ability for training providers, both public and private, to maintain modern training facilities with access to current technology will be critical for the graduation and supply of job-ready candidates and the ongoing confidence of the training sector in the eyes of industry.

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[13] NCVER, 'Total VET Students and Courses 2022'.

Appendix A provides a detailed breakdown of total enrolments, commencements, and completions for the AUR, AUM and RII training packages for 2022. Tables 2, 3 and 4 highlight the top five qualifications for each package.

Table 2 AUR Training package enrolment data from 2022

TRAINING PACKAGE ENROLMENT DATA, 2022					
Automotive Industry Retail, Service and Repair (AUR)	**Total Enrolled**	**% Male**	**% Female & Other**	**2022 Commencements**	**2022 Completions**
AUR30620 - Cert III in Light Vehicle Mechanical Technology	15,620	95.4%	4.6%	5280	510
AUR30616 - Cert III in Light Vehicle Mechanical Technology	11,125	95.6%	4.4%	385	2305
AUR20720 - Cert II in Automotive Vocational Preparation	9,780	86.8%	13.2%	0	0
AUR31116 - Cert III in Heavy Commercial Vehicle Mechanical Technology	4,555	95.8%	4.2%	210	1090
AUR40216 - Cert IV in Automotive Mechanical Diagnosis	4,375	97.8%	2.2%	155	0

Table 3 RII Training package enrolment data from 2022

TRAINING PACKAGE ENROLMENT DATA, 2022					
Resources and Infrastructure (RII mining qualifications only)	**Total Enrolled**	**% Male**	**% Female & Other**	**2022 Commencements**	**2022 Completions**
RII30120 - Cert III in Surface Extraction Operations	7,040	76.6%	23.4%	2260	480
RII20120 - Cert II in Resources and Infrastructure Work Preparation	4,375	79.7%	20.3%	45	35
RII20220 - Cert II in Surface Extraction Operations	2,755	74.8%	25.2%	225	100
RII30719 - Cert III in Emergency Response and Rescue	2,600	82.9%	17.1%	0	0
RII31820 - Cert III in Drilling Operations	1,765	98.3%	1.7%	395	140

Table 4 AUM Training package enrolment data from 2022

TRAINING PACKAGE ENROLMENT DATA, 2022					
Automotive Industry Manufacturing (AUM)	**Total Enrolled**	**% Male**	**% Female & Other**	**2022 Commencements**	**2022 Completions**
AUM30218 - Cert III in Automotive Manufacturing Technical Operations - Bus, Truck and Trailer	475	94.7%	5.3%	235	85

Source: National Centre for Vocational Education Research (NCVER). 2022. 'Total VET Students and Courses 2022: Program Enrolments DataBuilder'. NCVER. https://www.ncver.edu.au/research-and-statistics/data/databuilderdatabuilder

The data, even at this high level, shows that progress needs to be made by both the mining and the automotive industries to attract a more diverse workforce, an opportunity that is discussed in more detail throughout this workforce plan. This notwithstanding, based on the female participation data for the mining industry, apart from drilling and exploration, inroads are being made. Several initiatives currently underway within the mining industry show further opportunities to improve, which are explored in Section 2 of this plan.

1.6.2 Apprenticeships and Traineeships

The mining and automotive industries have a strong connection to the apprenticeship and traineeship environment. NCVER data shows that for the year ended 30th March 2022, 49,835

students were completing an apprenticeship or traineeship in the AUR, AUM and RII training packages.[14] Of these, the majority (36,265) were engaged in the AUR training package.

Enrolments in apprenticeships and traineeships have seen steady growth over previous years, up 30.7% since 2019, when total enrolments across the AUR, AUM and RII packages was 38,135. [15]

An area of concern across the whole apprenticeship and traineeship sector, with mining and automotive industries no exception, is the persistently high drop-off rates.

NCVER completions data for apprenticeships and traineeships that commenced in 2018 reflect a national average across all occupations of 55.8%. The automotive industry fares slightly better, with 58.1%, compared also to an average of only 53.4% for all trade apprenticeships. Mining traineeships in areas such as mobile and fixed plant operations recorded completions rates of 57.5% and 60.8% respectively.[16]

The reasons for low completion rates can be linked to a wide range of factors. An apprenticeship survey by the Australian Automotive Aftermarket Association showed that the top three challenges experienced throughout their apprenticeship were annoyance at menial and repetitive tasks, limited opportunity to work on vehicles and difficulty in keeping up with formal training / coursework.[17]

Feedback from one automotive Group Training Organisation strongly backed the concern that a lack of apprentice progression with formal coursework placed significant pressure on apprentices, increased frustration and heightened the likelihood of the apprentice discontinuing their apprenticeship.

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[14] NCVER. 2023. *Apprentices and trainees (DataBuilder).* Adelaide, November.

[15] NCVER. 2023. *Apprentices and trainees (DataBuilder).* Adelaide, November.

[16] NCVER. 2023. *Completion and attrition rates for apprentices and trainees 2022: data tables.* Adelaide, November.

[17] Australian Automotive Aftermarket Association. 2022. "Apprenticeships in the Automotive Industry." *Australian Automotive Aftermarket Association.* December. Accessed November 16, 2023. https://www.aaaa.com.au/wp-content/uploads/2022/12/AAAA-Submission-to-Apprenticeship-Discussion-Paper.pdf.

Factors identified by Group Training Organisations as positively supporting a higher retention and completion rate included regular mentoring and the completion of pre-vocational or school-based programs prior to the commencement of the formal apprenticeship.[18]

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[18] O'Dwyer, L & Korbel, P. 2019. "Completion rates for group training organisations and direct employers: how do they compare?" *NCVER.* Accessed November 16, 2023. https://www.ncver.edu.au/__data/assets/pdf_file/0026/7456220/Completion-rates-for-group-training-organisations.pdf.

Section 2 – Mining

2.1 Australian Mining Industry Overview

Australia's mining industry is a pillar of the Australian economy, being the largest exporter of minerals and metals in the world and accounting for 10% of Australia's GDP and 69% of the nation's export value.[19]

Australia is the world's largest exporter of iron ore, exporting more than double that of the next largest exporting nation, Brazil.[20] Australia is also one of the world's largest exporters of coal, bauxite, alumina, and many other resources. The latest figures show the Australian resources industry (which includes oil and gas) is worth over $527 billion, with the three largest sectors accounting for 85% of this revenue (oil and gas $164.00 billion, 31.1%; coal $157.11 billion, 29.8%; and iron ore $124.44 billion, 23.6%).[21] More than 25% of the mining industry's revenue is generated by three companies: BHP ($60.66 billion, 11.5%); Rio Tinto ($44.22 billion, 8.4%); and Glencore ($29.44 billion, 5.6%).

Table 5 Australia's selected resource and energy exports and selected commodities

Resource	Units	Unit Price 2022-23	Unit Price 2023-24	Unit Price 2024-25	Export Volume Unit	Export Volume 2022-23	Export Volume 2023-24	Export Volume 2024-25	Export Value, A$b, 2022-2023	Export Value, A$b, 2023-2024	Export Value, A$b, 2024-2025
Iron ore	US$/t	96	89	78	Mt	892	918	933	123	110	93
LNG	A$/GJ	21.4	15.9	14.4	Mt	82	81	79	92	68	60
Thermal coal	US$/t	303	158	133	Mt	178	201	202	64	38	30
Metallurgical coal	US$/t	279	241	213	Mt	157	174	175	60	50	42
Gold	US$/oz	1,827	1,871	1,806	t	247	326	334	23	22	21
Lithium	US$/t	5,173	3,378	2,360	kt	3,252	3,420	4,021	19	18	15
Crude oil	US$/bbl	87	87	81	kb/d	272	280	269	13	14	12
Copper	US$/t	8,264	8,522	8,503	kt	836	865	906	12	13	13
Alumina	US$/t	343	338	348	kt	16751	17494	17788	8.4	8.4	8.3
Aluminium	US$/t	2,341	2,449	2,601	kt	1,422	1,418	1,419	5.2	4.9	5
Nickel	US$/t	23,972	21,313	20,188	kt	154	174	188	4.5	4.4	4.2
Zinc	US$/t	2,986	2,754	2,842	kt	1,269	1,456	1,487	4.3	4.3	4.3
Uranium	US$/lb	51	59	61	t	5560	5855	6060	0.8	0.9	0.9

Source: Department of Industry, Science and Resources. 2023c. 'Resource and Energy Quarterly June 2023'. Industry.gov. https://www.industry.gov.au/sites/default/files/2023-07/resources-and-energy-quarterly-june-2023.pdf

Table 5 provides an overview of Australia's resources, focusing on the projected unit prices, export volumes and export values for various minerals and resources from 2022 to 2025. The iron ore

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[19] Minerals Council of Australia. 2023a. 'Employment Goals Undermined by Damaging IR Changes'. *Minerals.org*. https://minerals.org.au/resources/employment-goals-undermined-by-damaging-ir-changes/.
[20] Statista. 2023. 'Major Countries in Iron Ore Mine Production Worldwide in 2022'. *Statista.com*. https://www.statista.com/statistics/267380/iron-ore-mine-production-by-country/.
[21] James Thomson. 2023. 'Coal Mining in Australia'. *Melbourne: IBISWorld*. https://www.ibisworld.com/au/industry/coal-mining/14770/.

sector is expected to see a gradual decrease in unit prices from US$96/t in 2022—23 to US$78/t in 2024—25, with export volumes increasing from 892 Mt to 933 Mt over the same period.

Gold prices are forecasted to fluctuate, with a peak at US$1,871/oz in 2023—24 before dropping to US$1,806/oz in 2024—25. The export value for gold remains relatively stable. The lithium sector is expected to see a significant drop in unit prices from US$5,173/t to US$2,360/t, which is likely to be a result of additional global supply becoming available.

Australia is one of the world's leading producers of bauxite (aluminium ore), iron ore, lithium, gold, lead, diamond, rare earth elements, uranium and zinc. The growing global demand for critical minerals represents an opportunity for Australian miners and is likely to grow for a range of commodities used in renewable energy infrastructure, EVs, technology applications and advanced manufacturing processes. Australia has significant deposits of lithium, cobalt, vanadium and other rare earth elements, and the Australian Government's Critical Minerals Strategy, published in June 2023, sets out the Government's vision for growing the sector.

Australia produces 19 useful minerals in significant amounts, from which metals can be extracted, from operating mines across the country. The nation also has large mineral sand deposits of ilmenite, zircon, and rutile, and produces large quantities of black coal, manganese, antimony, nickel, silver, cobalt, copper and tin.

As of December 2022, there were 333 operating mine sites across the country, with 89% spread across WA (158), Qld (80) and New South Wales (57), making them the three major mining states. The quarrying industry operates approximately 2,200 quarries throughout the nation.

Australia's three most important mineral commodities are coal (95 operating mines, 94% of those on the east coast), precious metals, including gold, silver, and platinum group elements (93 operating mines, 81% in WA), and iron ore (41 operating mines, 90% in WA). In addition, there are 52 developing mine sites, which are deposits where the project has a positive feasibility study, development has commenced or all approvals have been received, and 87 mines under care and maintenance, which have known resource estimations and may be mined or developed in the future. [22]

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[22] Geoscience Australia. 2022. 'Mineral Exploration'. *GA.gov*. https://www.ga.gov.au/digital-publication/aimr2022/mineral-exploration.

The bulk of developing mine sites are focused on critical minerals and rare earth elements, with 23 in WA, seven in Qld, six in New South Wales (NSW), six in South Australia (SA), four in the Northern Territory (NT), four in Victoria (Vic) and two in Tasmania (Tas).[23]

The World Gold Council ranks Australia as the third largest producer of gold in the world, accounting for 9.2% of the world's annual production with 314 tonnes. China was the largest producer in the world in 2022 and accounted for 11% of the total global production, with Russia just edging out Australia with 9.5%. These three nations account for almost 30% of the world's gold production.[24]

The global demand for minerals and metals is not abating. It is estimated the world will consume more minerals and metals in the coming 30 years than it has for the last 70,000.[25] This represents a strong and enduring demand driver for the workforce required to operate in this growing industry.

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[23] Geoscience Australia. 'Mineral Exploration'.
[24] World Gold Council. 2023. 'Global Mine Production'. *GoldHub*. https://www.gold.org/goldhub/data/gold-production-by-country.
[25] Minerals Council of Australia. 'Employment Goals'.

2.2 Workforce Breakdown

The mining workforce in Australia comprises approximately 265,000 operational workers, which are covered by Division B of the ANZSIC system. Table 6 shows the distribution of the operational workforce across the major mining industry subdivisions.

Table 6 ANZSIC workforce data for the mining workforce

Category	No. People Employed
Metal Ore Mining	134,700
Other Mining Support Services	55,300
Coal Mining	46,300
Exploration	22,500
Other Non-Metallic Mineral Mining and Quarrying	6,800
	265,600

The following ANZSIC codes have been selected as representative of the mining industry for the purposes of determining key operational occupations required by the industry:

- Division: **Mining (B)**
  - a. Subdivision: **Coal Mining (06)**
    - i. Group: Coal Mining (060)
      1. Class: Coal Mining (0600)
  - b. Subdivision: **Metal Ore Mining (08)**
    - i. Group: Iron Ore Mining (080)
      1. Class: Iron Ore Mining (0801)
    - ii. Group: Bauxite Mining (080)
      1. Class: Bauxite Mining (0802)
    - iii. Group: Copper Ore Mining (080)
      1. Class: Copper Ore Mining (0803)
    - iv. Group: Gold Ore Mining (080)
      1. Class: Gold Ore Mining (0804)
    - v. Group: Mineral Sand Mining (080)
      1. Class: Mineral Sand Mining (0805)
    - vi. Group: Nickel Ore Mining (080)
      1. Class: Nickel Ore Mining (0806)
    - vii. Group: Silver-Lead-Zinc Ore Mining (080)
      1. Class: Silver-Lead-Zinc Ore Mining (0807)

viii.Group: Other Metal Ore Mining (080)

    1.   Class: Other Metal Ore Mining (0809)

c.   Subdivision: **Non-Metallic Mineral Mining and Quarrying (09)**

i.Group: Gravel and Sand Quarrying (091)

    1.   Class: Gravel and Sand Quarrying (0911)

ii.Group: Other Non-Metallic Mineral Mining and Quarrying (091)

    1.   Class: Other Non-Metallic Mineral Mining and Quarrying (0919)

d.   Subdivision: **Exploration and Other Mining Support Services (10)**

i.Group: Mineral Exploration (101)

    1.   Class: Mineral Exploration (1012)

ii.Group: Other Mining Support Services (109)

    1.   Class: Other Mining Support Services (1090)

Table 7 identifies the top 20 operational roles within the mining industry as identified by Australian and New Zealand Standard Classification of Occupations (ANZSCO) classification codes, which account for the bulk of the industry's identified operational workforce. While the mining industry, including its subdivisions, shares similar challenges in relation to national workforce shortages – an ageing population and the need to attract a more diverse workforce – individual subdivisions exhibit more nuanced supply-and-demand scenarios, which are introduced below.

Table 7 Top 20 operational occupations within the mining industry

Code	Occupation
712212	Miner
323211	Fitter (General)
133513	Production Manager (Mining)
312913	Mine Deputy
712211	Driller
234411	Geologist
233611	Mining Engineer (Excluding Petroleum)
322311	Metal Fabricator
312911	Maintenance Planner
712999	Stationary Plant Operators Nec
712213	Shot Firer
233512	Mechanical Engineer
251312	Occupational Health and Safety Adviser
700000	Machinery Operators and Drivers (nfd)
821912	Driller's Assistant
321211	Motor Mechanic (General)
312912	Metallurgical Or Materials Technician
321111	Automotive Electrician
224999	Information and Organisation Professionals (nec)
232212	Surveyor

Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

2.2.1 Coal Mining

Australia lays claim to 14% of the world's coal reserves, ranking third behind the United States (23%) and Russia (15%). Most of the coal mined in Australia is exported (approx. 91%), making Australia the world's largest exporter of metallurgical coal and the second largest exporter of thermal coal. [26]

Not surprisingly, the coal mining industry provides significant employment, capital investment and domestic and export income to the national economy.

The vast majority of coal mining activity occurs in Qld and NSW. Australia's principal black coal-producing basins are the Bowen Basin (Qld) and Sydney Basin (NSW). Locally important black coal mining operations also include Collie in WA and Fingal and Kimbolton in Tas. Figure 6 provides a graphical representation of coal mines and deposits.

Figure 6 Australian coal mines and deposits
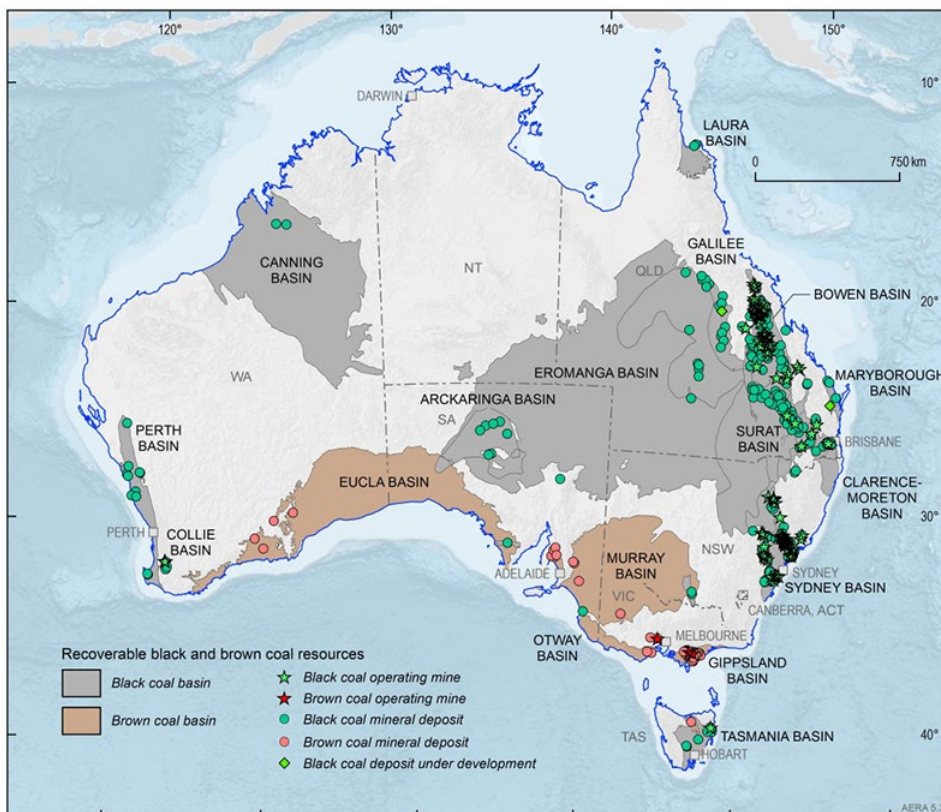
Source: Geoscience Australia. 2023b. 'Coal'. GA.gov. https://www.ga.gov.au/digital-publication/aecr2023/coal

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[26] Geoscience Australia. 2023a. 'Coal'. *GA.gov*. https://www.ga.gov.au/digital-publication/aecr2023/coal.

In Australia, nearly 80% of coal is produced from open-cut mines, which is possible due to the volume of coal seams located close to the surface. Open-cut mining is cheaper than underground mining and enables up to 90% of the resource to be recovered.[27]

The workforce for coal mining is large and diverse, with Australian Bureau of Statistics (ABS) Labour Force data showing that the workforce is concentrated close to where the reserves are located, which creates a large regional workforce.[28] The biggest regional concentrations of coal mining employment in 2021 (using census data) were in Mackay–Isaac–Whitsunday at 13,335 (up 3,380/34.0% from 2016), Hunter Valley at 10,056 (up 1,232/14.0%) and Central Queensland at 7,349 (up 679/10.2%) (Gilfillan 2023).

In such cases, coal mining becomes an important part of the social and economic fabric of local communities, with many families boasting multiple generations of coal workers.

Demand pressure on the coal workforce is not related to dwindling reserves but rather a steady shift away from coal due to the nation's vision of a decarbonised future. This will create specific workforce transformation challenges for the industry, which are further explored in the section titled Focus: Workforce Transformation (Coal).

2.2.2 Metal Ore Mining

Metal ore mining occurs at 134 mines throughout Australia and involves mining, processing, and exporting metals such as iron ore, gold, silver, copper, nickel, and bauxite. WA dominates the sector, as the state is home to 90% of the nation's iron ore mines and 81% of other metal ore mines.[29]

Metal ore mining is a significant employer within the mining industry, accounting for almost half of the identified operational mining workforce. Within WA, the sector has become synonymous with fly-in/fly-out (FIFO) operations, drawing most of its workforce from the greater Perth metropolitan area and also from the eastern seaboard.

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[27] Geoscience Australia. 2023c. *Dataset to Accompany Australian Operating Mines Map 2022 (23rd edition) March 2023*. Canberra, Australian Capital Territory, Australia.
[28] Australian Bureau of Statistics. 'Labour Force'.
[29] Geoscience Australia. 'Mineral Exploration'.

Kalgoorlie remains a key regional employment hub for metal ore mining, especially gold, with other notable hubs including Boddington (WA) and Orange (NSW), where Australia's largest and second largest gold mines are located, respectively.

Demand factors for this sector's workforce are linked to the demand for the mined, which remains strong and unabating. Supply challenges for the workforce are aligned with those identified within this plan's macroeconomic setting and the broader demographic ones identified for the mining industry as a whole.

Not unlike other sectors of mining, a key challenge for metal ore mining is improving its image and perception among the community and younger generations. These issues are explored in greater detail in the Workforce Attraction and Retention section.

2.2.3 Non-Metallic Mineral Mining and Quarrying

With approximately 2,200 quarries in Australia, the quarrying industry is an important part of Australia's resources landscape, supplying key raw materials such as stone, sand, gravel, limestone, and gypsum in support of the building and construction industry. These materials are used in the construction of roads, houses, and commercial infrastructure.[30]

The processing of quarried raw material is generally limited to crushing and screening activities.

While the quarrying industry has similar job roles to those found in coal and metalliferous mining, such as mobile plant operators, production managers and maintenance staff, there are some unique aspects to the industry that represent both opportunities and challenges.

Employing almost 8,000 operational staff, quarries tend to be located much closer to urban areas than large-scale coal and metalliferous mining operations. Quarried materials are heavily consumed by the building and construction industry, making proximity to these activities important.

As a result, quarries are broadly distributed throughout Australia, near both major urban centres and regional locations. This geographic relationship to population centres offers employment access to

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[30] Cement Concrete & Aggregates Australia. 2023. 'About CCAA'. *CCAA.com*. https://www.ccaa.com.au/CCAA/CCAA/Public_Content/ABOUT_US/Who_We_Are.aspx?hkey=12d5fe8b-a8ba-44d8-9988-c87f25b020ad.

the extractive resources industry without necessarily requiring either a commitment to a FIFO lifestyle or relocation to a population hub associated with major mining operations.

Demand for roles in the quarrying industry are directly related to the demand for the products. Given that most quarried material supports the building and construction sector, it is the demand of those industries that offers an insight into this industry's future growth potential. To that end, it is worth noting that the building and construction industry in Australia is coming off a volatile period that was impacted by rising interest rates, supply chain disruption and the erosion of profit; however, a period of recovery and growth has been forecasted for 2024—28.[31]

One of the quarrying industry's workforce retention challenges is the potential loss of workers to either the coal and/or metalliferous mining sector or the construction industry (especially civil). While the industry cannot necessarily compete with the wages paid by larger mining operations, it can offer a unique opportunity to work in the extractive industry closer to home and generally without shift work.

2.2.4 Exploration and Other Mining Support Services

Exploration drilling is the barometer of the mining industry. Utilising specialised equipment, such as exploration drill rigs, crews explore tenements in search of the next viable ore body for mining.

As highlighted by Figure 7, WA accounts for the largest proportion of exploration expenditure, with the primary mineral explored being gold, followed by iron ore and copper.[32]

Core drilling for mineral exploration, both above and below ground, allows geologists to analyse samples and determine the composition, structure, and quality of the deposits, ultimately guiding decision-making for potential mining projects.

Exploration drilling can be a physically demanding, albeit well-paid, job that requires working in some of Australia's most remote regions.[33]

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[31] A. Kelly. 2023. 'Construction in Australia'. *IBISWorld*. https://my.ibisworld.com/au/en/industry/e/performance.
[32] Geoscience Australia. 'Mineral Exploration'.
[33] Australian Drilling Industry Association. 2023. 'Looking for a Career in Drilling?' *ADIA.com*. https://adia.com.au/careers/.

There are approximately 2,500 drillers and 1,500 geologists employed within this sub-sector of mining. The drilling industry has historically been heavily male dominated, which the industry is actively trying to change. However, NCVER enrolment data for the *RII31820 Certificate III in Drilling Operations* shows that 98.3% of students are male, making it one of the least diverse qualifications within the RII training package.

Occupations within the exploration drilling sector offer a unique opportunity for workers seeking variety, high pay, and manual labour.

Much like other sectors within the mining industry, technological innovations are rapidly changing the way some tasks are performed. The use of drones, more advanced unmanned aerial vehicles, automatic spectroscopic scanning of drill cores and automatic data processing are examples of technologies that are emerging in the exploration sector.[34]

While such innovations could attract new entrants to the industry, it could also create the challenge of having to upskill the existing workforce with higher digital skills.

As per other sectors within the mining industry, exploration drilling is impacted by worker shortages, leading to recruitment initiatives such as WA's fully funded Driller's Offsider Job Ready Program, which can lead to employment and traineeship opportunities.[35]

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[34] Kazuya Okada. 2022. 'Breakthrough Technologies for Mineral Exploration'. *Mineral Economics* 35.
[35] Department of Training and Workforce Development. 2023. 'Training Pathways to Employment'. *Jobs and Skills WA*. https://www.jobsandskills.wa.gov.au/pathways#i-drillers-offsider-job-ready-program.

Figure 7 Exploration expenditure by state (2012—2021)

Legend:
- New South Wales
- Queensland
- Tasmania
- Western Australia
- Northern Territory
- South Australia
- Victoria

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Source: Geoscience Australia. 2022. 'Mineral Exploration'. GA.gov. https://www.ga.gov.au/digital-publication/aimr2022/mineral-explorationexploration
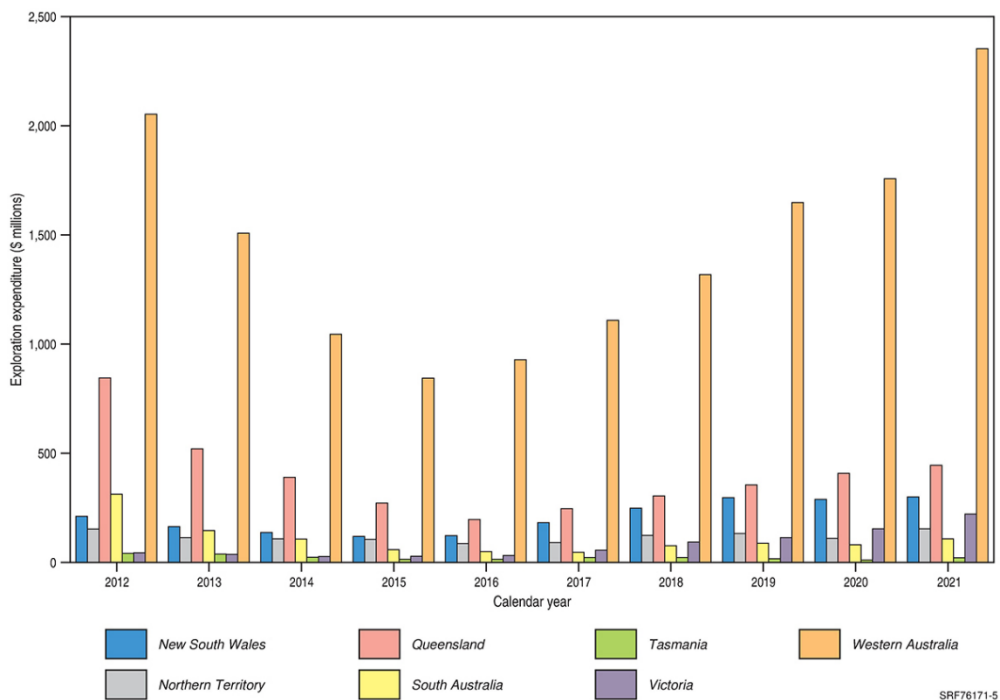
2.3 Workforce Demographics

2.3.1 Geographic Distribution

Figure 8 illustrates the geographical distribution of the mining industry in Australia based on where the workforce resides. The mining industry primarily resides in WA and in regional and remote labour markets.

Seven out of the top 10 labour markets are in WA. The three exceptions are regional or remote areas, such as Mackay–Isaac–Whitsunday in Qld (housing 6.4% of the industry's workforce), Hunter Valley, excluding Newcastle in NSW (with 6.1% of the industry's workforce), and Central Qld (home to 4.6% of the industry's labour market). [36]

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[36] Kienco. 2023. *Workforce Data Insights Produced on Behalf of AUSMASA*. Melbourne, Victoria, Australia: Kienco.

Figure 8 Heat map of where mining industry employees live
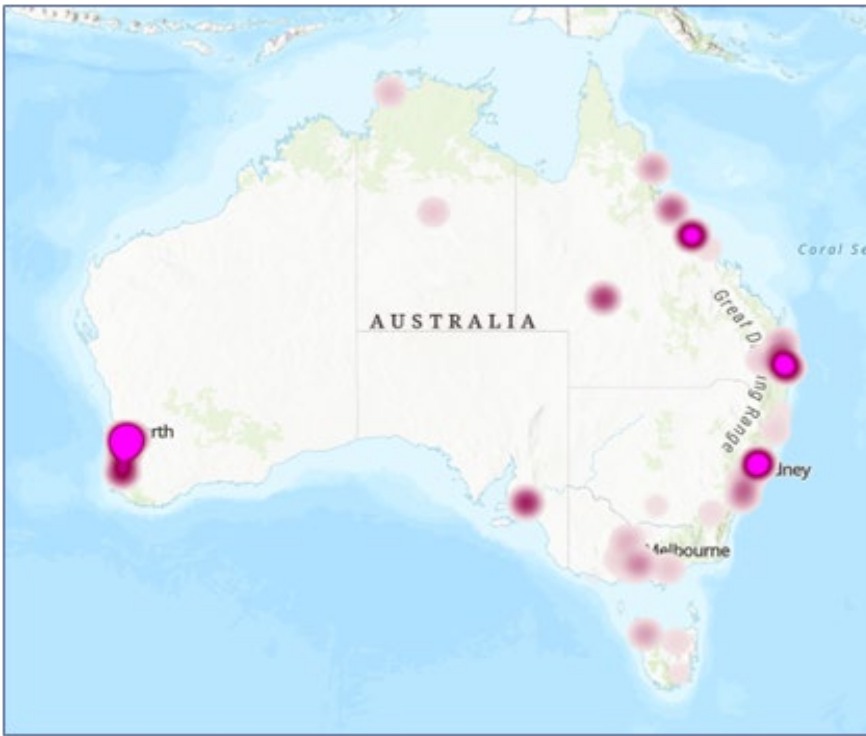
Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

2.3.2 Workforce Age

Figure 9 Age distribution of the mining workforce
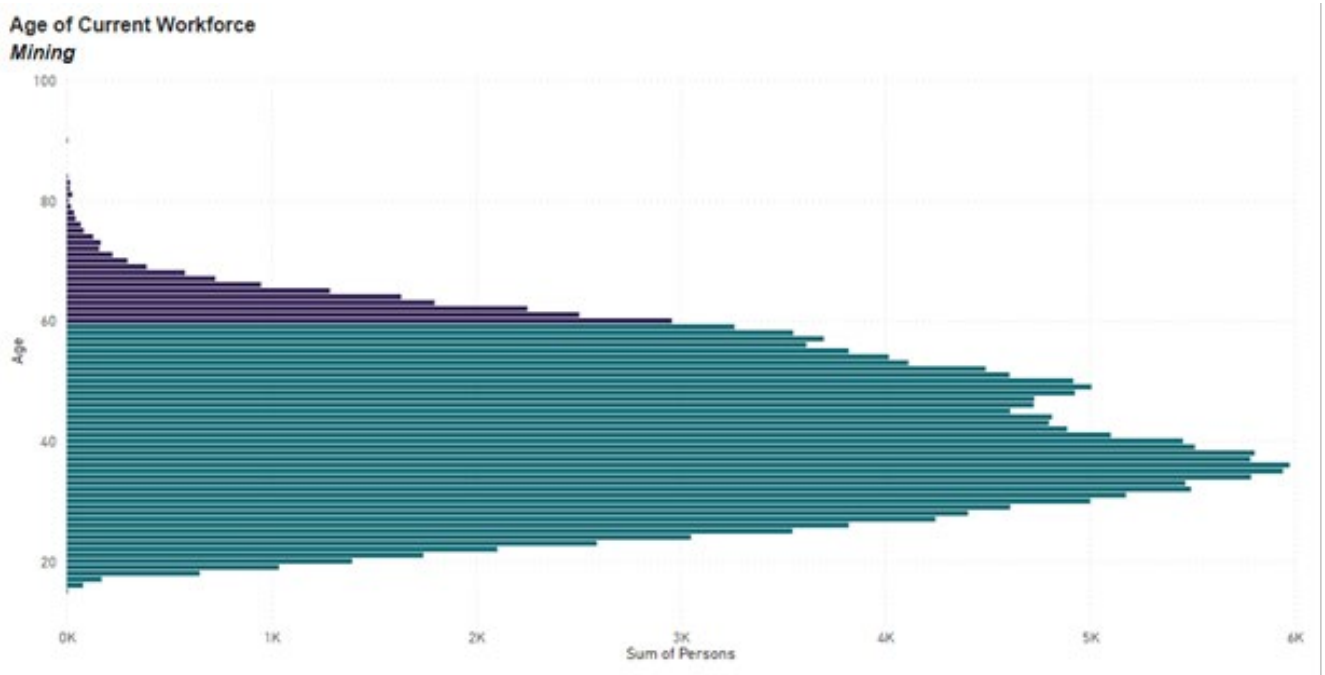
Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

The mining industry's age profile shows that the proportion of the workforce aged 60+ (and presumably approaching retirement) is not currently matched by a similar quantum of younger new entrants. This presents a particularly important consideration for the mining industry, especially given that the industry's perception among younger Australians is not as positive as desired. The need for cultural reform and improved perception is covered as part of the Workforce Attraction and Retention section of this report.

However, recent labour market reporting did indicate a tendency for older workers to remain engaged with the workforce for longer.[37] This may be in response to increased cost of living pressures or as a result of initiatives by the industry. Such a trend could offer the mining industry valuable time to improve the attraction of the industry to younger workers and facilitate the transfer of industry knowledge.

2.3.3 Gender Diversity

Figure 10 Gender and age distribution of the mining workforce
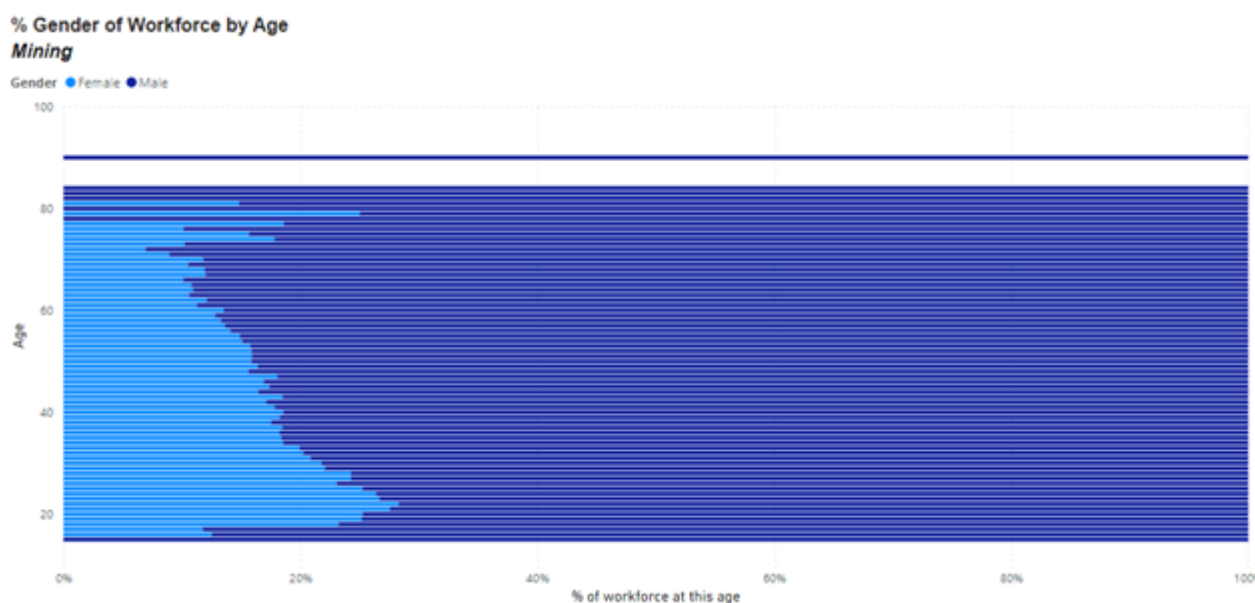
Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

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[37] Australian Institute of Health and Welfare. 2023a. 'Older Australians'. *AIHW.gov*. https://www.aihw.gov.au/reports/older-people/older-australians/contents/employment-and-work

According to the Workforce Gender Equality Agency (WGEA), at the end of the 2022 fiscal year, the mining workforce remained the least diverse sector in Australia, with only 20% female participation. [38]

When viewed by age, female participation in the mining industry peaks at just under 30%, with this number representing women aged in their mid-20s. Furthermore, WGEA data shows that women comprise 47.9% of all employed persons in Australia, which shows that there is a gap that offers significant opportunity for the mining industry to invest in the employment of women.

The female participation rate in Australia is 51%, which illustrates the size of the gap between female participation in the mining industry and that of the national average. Moreover, WGEA data covers 4,795 organisations for the reporting period 2021—22, providing information about 4,483,123 employees. There is a range of known issues associated with gender diversity in the mining sectors, which are further explored in the Gender Diversity and Workplace Cultural Reform section of this report.

The fact that peak female participation within the mining industry is among women aged in their mid-20s should serve as an encouragement given the effort mining companies have made recently to create greater gender diversity within their workforce. This could be a sign that current recruitment efforts and initiatives are having an impact and attracting new female entrants into the industry.

However, when considering the number of female students currently engaged in the VET system, NCVER data shows that females only make up 7.1% of current enrolments in the RII training package (Appendix A).

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[38] Workforce Gender Equality Agency. 2022. 'WGEA Gender Equality Scorecard 2022'. *WGEA.gov.* https://www.wgea.gov.au/sites/default/files/documents/WGEA-Gender-Equality-Scorecard-2022.pdf.

2.4 Workforce Attraction and Retention

2.4.1 Workforce Shortages

Of the top 20 operational occupations in the mining industry, 12 are listed as experiencing skills shortages on the Skills Priority List published by the National Skills Commission (see Table 8 below).

Tellingly, six out of the top 10 occupations are facing a skills shortage. Table 8 lists the 12 occupations that are identified as experiencing a skills shortage, with a state-by-state breakdown and indication of likely ongoing future demand.

The presence of several trades within the automotive sector on this list further highlights the important contribution that automotive trades make to the mining industry in Australia.

Almost all the occupations experiencing a shortage require either a degree or trade qualification, underpinning the importance of maintaining a strong pipeline of students undertaking relevant tertiary education.

While skilled migration has been identified by many of AUSMASA's key stakeholders as a logical supporting strategy in filling these roles, broader economic challenges, such as an extremely tight housing and rental market, along with global competition for skilled migrants, has limited the effectiveness of this approach. At 0.78% of the minerals workforce, skilled migrants represent a small but crucial talent pipeline to address skills in critical shortage and 'hard to fill' roles and offer an opportunity to have a larger impact if barriers within the skilled migration system were addressed. [39]

Beyond the roles identified below, numerous stakeholders have identified nuanced roles such as belt splicers as also being difficult to recruit for.

Finally, while not specifically listed below, the mining industry is in competition for many professional roles that are in demand across most industries, many of which are also in shortage. Examples of such include cybersecurity experts, construction managers and marketing specialists.

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[39] Minerals Council of Australia. 'Employment Goals'.

Table 8 Mining industry operational roles in terms of shortage (2022 data – 2023 data not released at time of publication)

ANZSCO Code	Occupation	National	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Future Demand
712212	Miner	S	S	S	S	S	S	S	S	S	STRONG
323211	Fitter (General)	S	S	S	S	S	S	S	S	S	MODERATE
712211	Driller	S	S	S	S	S	S	S	S	S	STRONG
234411	Geologist	S	S	S	S	S	S	S	S	S	SOFT
233611	Mining Engineer (excluding Petroleum)	S	S	S	S	S	S	S	S	S	STRONG
322311	Metal Fabricator	S	S	S	S	S	S	S	S	S	SOFT
233512	Mechanical Engineer	S	S	S	S	S	S	S	S	S	SOFT
721999	Mobile Plant Operators nec	S	S	S	S	S	NS	S	S	S	MODERATE
321211	Motor Mechanic (General)	S	S	S	S	S	S	S	S	S	MODERATE
312912	Metallurgical or Materials Technician	S	NS	NS	S	NS	S	NS	NS	NS	MODERATE
321111	Automotive Electrician	S	S	S	S	S	S	S	S	S	MODERATE
232212	Surveyor	S	S	S	S	S	S	S	S	S	SOFT

Source: National Skills Commission, Skills Priority List, 2022

| S | = Shortage |
| NS | = No Shortage |

Engagement with key mining stakeholders has highlighted the effort that is made in worker retention, with varied success across the industry. A cross-sectoral research project to establish the reasons for workers choosing to either move to another employer within the mining industry or leave the industry altogether would offer a more strategic insight from which targeted responses could be derived. Such a project may form part of AUSMASA's future endeavours to support the industry.

2.4.2 Public Perceptions of the Mining Industry

The public perception of the mining sector is impacted by changing societal expectations in relation to workplace culture, an increased focus on the environmental and social impacts of extractive industries on communities, human health, and cultural heritage.

2.4.3 The Next Generation of Workers

The number of younger people who are choosing to work within the mining industry is being outstripped by those who are approaching retirement. It is critical for the mining industry to address and reverse this trend.

Generation Z, which refers to those born between the late 1990s and early 2010s, is predicted to represent 25% of the global workforce by 2025. This generation is more connected to digital platforms than any generation before it and values social justice and environmental protection highly. Unlike previous generations of workers, Generation Z is the first generation to not rank

remuneration as one of the top two reasons for choosing a career path or industry, instead ranking workplace flexibility and purpose higher.[40]

This creates a problem, as while the mining industry is responsible for producing the minerals and resources that are vital for modern living, including the very technologies that will help ensure a cleaner and more environmentally friendly future, this is not how the industry is perceived by the younger population.

Research conducted by Year13 on our behalf provides a disconcerting insight into what Generation Z thinks of mining in Australia. More than 1,000 young people responded to the commissioned survey. Responses showed that nearly three-quarters of respondents felt that the mining industry did more harm than good, 56% would prefer to see the industry decrease in size and, while 87% knew Australia mined coal, only 27% knew that the industry also mined lithium, a key and necessary mineral for a decarbonised future.[41]

Figure 11 What Generation Z think of mining

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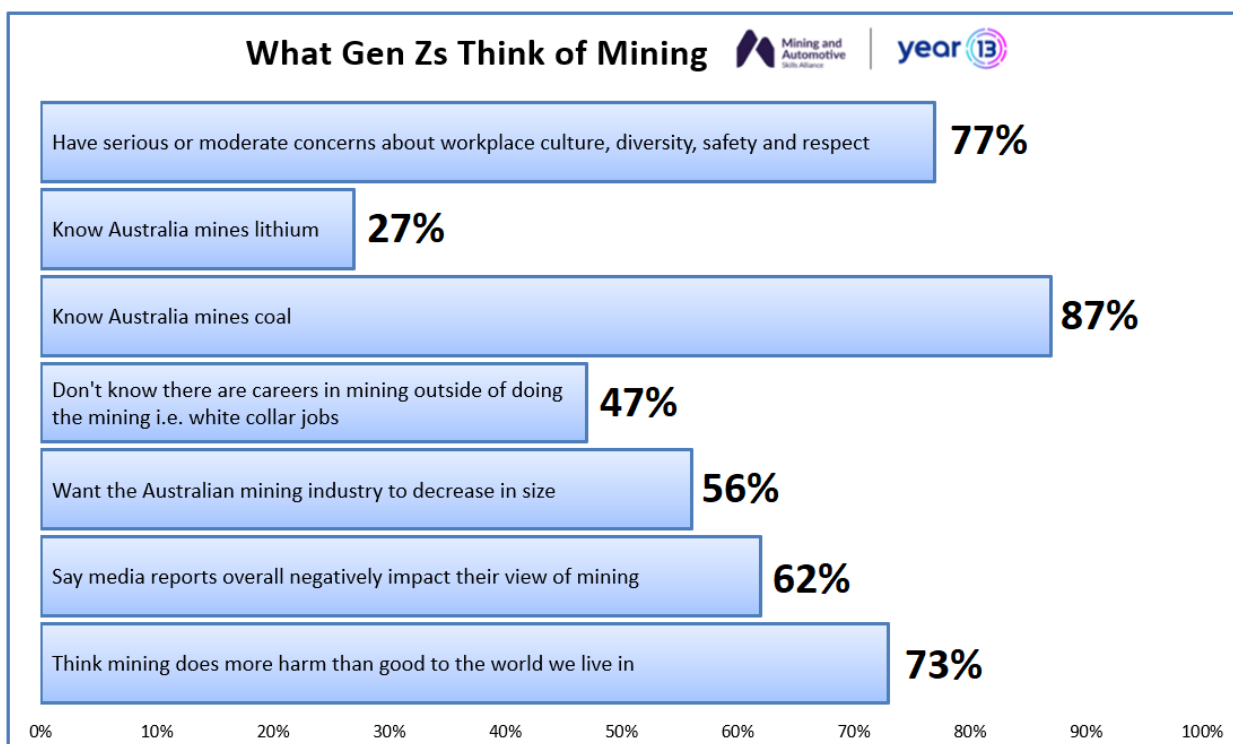
[40] McKinsey & Company. 2023. 'The Gen Z Equation'. *McKinsey Quarterly*.
https://www.mckinsey.com/quarterly/the-five-fifty/five-fifty-the-gen-z-equation.
[41] Year 13. 2023. *What Gen Zs Think of Mining*. Melbourne: AUSMESA.

2.4.4 Inadequate Awareness of Career Opportunities

The Year13 research also highlighted that career advice in relation to the mining industry is lacking, with the mining states of WA and Qld faring better. However, overall knowledge of potential career opportunities, be they trade-based or professional, remained low. This is an area of immediate concern for the industry and is exacerbated by the fact that all industries are scrambling and competing for human capital.

2.4.5 Environmental and Cultural Impacts of Mining

Degradation and the unintended destruction of sites deemed sacred to Indigenous people have come at a high reputational cost to the mining sector and certain mining organisations.

Media coverage of such incidents is likely to have lowered the public's perception of mining as a sector, thereby reducing the appeal of the sector and impacting efforts to attract and retain talented workers.

Following the Juukan Gorge incident, which resulted in the destruction of two ancient and sacred rock shelters in the Pilbara region of Western Australia dating over 46,000 years, a parliamentary senate enquiry was established to enquire into and report on the events that led to the incident. The enquiry made several recommendations including that the Australian Government legislate a new framework for cultural heritage protection at the national level, which is currently under development through a partnership between The First Nations Heritage Protection Alliance and a Parliamentary joint working group.

2.4.6 Greater Awareness of Risks to Health, Safety and Wellbeing

Unsurprisingly, the media coverage around workplace culture within the industry, especially in relation to bullying, sexual harassment and assault, has resulted in further harm to the industry's standing in the public view. While the industry has embarked on a significant campaign to improve workplace culture, physical and psycho-social wellbeing, and better understanding of its role in supporting a net-zero economy, the safety message must be conveyed to the community appropriately and supported by clear career opportunities to ensure an ongoing pipeline of new entrants into mining.

Legislative changes have occurred at the Australian Government level and across some states and territories, establishing a positive duty on employers to eliminate workplace sexual harassment and

discrimination. Such changes are generating awareness and creating greater organisational imperatives to proactively train and educate workers on what are acceptable and unacceptable workplace behaviours. Commencing in December 2023, the Australian Human Rights Commission will have new regulatory powers to investigate and enforce compliance with the positive duty.

2.4.7 Workplace Cultural Reform

Efforts to attract and retain workers into the mining and resources sector must be underpinned by genuine progress across a range of cultural reform imperatives.

Within the mining sector specifically, one leading Australian and global mining organisation conducted its own expert review into its workplace culture. While Rio Tinto was not the only mining organisation to examine the culture in which its workers operate, it was the only mining organisation to allow the review findings to be publicly available prior to February 2022 (others have since followed suit). Entitled ''Everyday Respect', the findings revealed a range of workplace cultural challenges and systemic issues and called for significant and planned cultural reform.[42]

A sharp and unrelenting focus was shone on the WA mining sector in 2021, with regular media coverage of poor and, at times, alleged criminal behaviour among workers in the industry. In response, the WA Government established a parliamentary enquiry into sexual harassment within the state's mining and resource industries workplaces. The Community Development and Justice Standing Committee's report entitled 'Enough is Enough'. (EiE) [43] looked at a range of factors, including:

- The prevalence, nature and reporting of sexual harassment against women in mining
- The factors that protect against sexual harassment occurring in the workplace
- The adequacy of the legislative framework
- The actions of the industry and government to improve the current situation.

The EiE report delivered 24 recommendations to the Western Australia parliament. The following recommendations specifically highlight the role that education and training could play in remedying the workplace cultures that have enabled such poor behaviours to occur:

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[42] Elizabeth Broderick & Co. 2022. *Report into Workplace Culture at Rio Tinto*. London: Rio Tinto.
[43] (Community Development and Justice Standing Committee 2022).

Recommendation 9: The industry should ensure that sexual harassment and assault training is accredited, fit-for-purpose and delivered by suitable practitioners. Training should be mandatory and ongoing for all employees. There should be additional specialist training for people who formally respond to incidents.

Recommendation 15: The Minister for Mines instructs the WA Department of Mines, Industry Regulation and Safety (DMIRS) to work with mining peak bodies to develop appropriate education and training across the industry for bystanders on when and how to report incidents of sexual harassment and make this a key component of cultural change in the industry.

Following the EiE report, several initiatives have emerged across governments and the mining sector to address issues regarding workplace culture. These initiatives focus not only on eliminating the sexual harassment of women in FIFO roles but also more broadly on readdressing the prevalence of a range of poor behaviours seen across the sector, such as bullying, racism and the attendant intersectionality of these behaviours.

An initiative by AUSMASA and the industry is detailed below, and while the industry and government have certainly made significant progress in addressing the existing workplace culture, there is still more that needs to be achieved.

DMIRS received 402 sexual harassment claims between 2022-23, marking an almost 50 times increase on those received just two years prior.[44] Such an increase in reporting is likely attributed to the greater focus the industry has received and the fact that the industry is strongly encouraging its workforce to report any unacceptable behaviour.

2.4.7.1 Building Safe & Respectful Workplaces

In 2022, AUSMASA (then known as the Australian Mining and Energy Skills Alliance, or AUSMESA) was contracted by three of Australia's largest mining organisations to develop an innovative and evidenced-based learning program targeted at raising awareness and improving the handling of bullying, sexual harassment, and racism in the workplace.

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[44] Caitlyn Rintoul. 2023. 'WA's Department of Mines, Industry, Regulation, and Safety Receives Work Sexual Harassment Claim Daily'. *The West Australian*. https://thewest.com.au/news/wa/was-department-of-mines-industry-regulation-and-safety-receives-work-sexual-harassment-claim-daily-c-11968752.

The Building Safe & Respectful Workplaces program (BS&RW) was informed by some of Australia's leading subject matter experts on the topics of bullying, sexual harassment, and racism. Specific considerations were made in the curriculum design for the impacts of these behaviours on First Nation peoples in the workplace. The design of the learning materials was undertaken by experts from Griffith University's MATE (Motivating Action By Employment) Bystander team, who also facilitated a series of metropolitan and regional-based pilot deliveries of the program.

Aimed at new entrants to the mining industry who are entering the industry through their studies in the VET sector, the potential impact of the two-day classroom-based program is strong. Across all pilots delivered in 2022 and 2023, the participants reported they felt 60% more confident at the end of their training to act as a bystander in the workplace.

Furthermore, AUSMASA is currently preparing to deliver a series of train the trainer programs to help suitably qualified and experienced practitioners to become approved facilitators of BS&RW. At the time of writing, AUSMASA is preparing for a national launch, which will see a rollout of BS&RW across the mining sector.

2.4.7.2 Improving Gender Diversity

The Australian mining industry is at a pivotal point in its history, realising the need for a diverse workforce with significantly more female participation to address multiple priorities.

Against a backdrop of significant workforce shortages, attracting more women to the mining industry meets an immediate human capital requirement. Women make up less than 15% of the large-scale mining workforce worldwide and 20% in Australia.

Given that, according to the WGEA, women comprise 47.9% of all employed persons in Australia, this represents a significant opportunity for the mining industry to improve in this area and create a more diverse workforce while also tackling workforce shortages.

Reviewing the official statements and policies on the major mining houses' websites shows that industry realises this as a key priority. However, it is not simply due to accessing a new pool of workers but also because research has shown that a diverse workforce is happier and safer overall.

The industry has responded with a variety of strategies to attract more women. For example, BHP has put considerable effort into attracting and supporting a significantly higher volume of female workers within its operations, with one of these initiatives showcased below. Rio Tinto has run recruitment campaigns specifically for women, with no prior experience in mining required. Fortescue Metals Group has introduced extended paid parental leave and flexible work options as part of its approach.

Across the board, mining companies have invested heavily in making mine site accommodation villages more homely, safe, and couple friendly, with recent examples gaining significant media attention for their nigh-on resort-style finish. [45]

The WA Chamber of Minerals and Energy (CME) recently identified increased female leaders within the industry as playing an important part of attracting other women to join the mining workforce, noting that the mentorship and visibility provided by female leaders made a significant contribution to recruitment efforts. [46]

The impact of these priorities and initiatives will continue to be monitored closely by AUSMASA with some promising trends already appearing. Feedback received from Komatsu indicates it experienced a 74% increase in female attraction in non-traditional trade applications in 2023. Equally, BHP's Future Fit academy currently boast an 84% female student population in Perth, with students engaged across a variety of traditionally male-dominated maintenance disciplines.

2.4.7.3 Diversity in Action — A Case Study

A recent study [47] reported in the *Harvard Business Review* that one mine in WA had women occupying 40% of its 869-strong frontline workforce, with women comprising the majority of senior managers (four out of six).

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[45] Alice Angeloni. 2022. 'Resort-style FIFO Camp Plans for Onslow Divide Opinion as Mineral Resources Pushes Ahead'. *ABC News*. https://www.abc.net.au/news/2022-12-08/mineral-resources-onslow-fifo-resort-mine-workers/101728222.

[46] Jane Murphy. 2023. 'Resources Industry Becoming More Female-Friendly, Say Pilbara Women in Mining'. *ABC News*. https://www.abc.net.au/news/2023-09-30/pilbara-women-in-resources-industry-increasing/102913318.

[47] Erik Denison and Richard Pringle. 2023. 'How a Remote Australian Mine Became a Gender-Balanced Workplace'. *Harvard Business Review*. https://hbr.org/2023/07/how-a-remote-australian-mine-became-a-gender-balanced-workplace.

The report outlines the progress made by South Flank, a BHP mine, in achieving gender equality. It highlights the strong engagement from senior leaders who set strict gender equity targets, as well as the support from leaders at BHP's head office. This has enabled the mine to restructure departments to create entry-level roles, hire women with a variety of professional backgrounds and invest in modifications to machines and equipment that can be used by people with different body types and sizes.

This progress is important for the mining industry, as it provides a roadmap for achieving gender equality. It also demonstrates the importance of strong leadership and support from senior executives in driving change.

Moreover, BHP has developed a unique three-day onboarding and site familiarisation program to support new hires. This program is delivered by a team of specialists and senior leaders, including the mine's GM, and has been well received by new hires who feel welcomed, excited to begin work and a sense of belonging. The presence of the GM and inductions is seen as unique, allowing values to be communicated to new hires directly from the senior leadership team.

The company has also made major investments in recreational facilities and safety systems at South Flank, including two gyms, soccer fields, an outdoor pool, a library, a music room, an Indigenous education centre, walking and fitness circuits, basketball and squash courts, and an indoor golf simulator. In addition, strict limits on daily alcohol consumption have been introduced, as well as new lighting, CCTV, electronic door locks, and security. Currently, BHP is working with social scientists to identify data-driven methods to stop exclusionary and harmful behaviours, such as sexist and homophobic language.

South Flank is hoping to be the prototype for the mine of the future.

The case study serves as a blueprint for the mining industry, demonstrating that gender balance is not only achievable but also beneficial for workplace productivity and innovation.

2.4.8 First Nation Participation

Aboriginal and Torres Strait Islander traditional custodians and communities are fundamental partners in mining and integral to the social and economic contribution that mining makes to Australia.

Government initiatives play a pivotal role in increasing the percentage of First Nation employees and ensuring social and cultural accountability. Programs such as the Indigenous Procurement Policy and the Indigenous Skills and Employment Program, have incentivised businesses to recruit and retain Indigenous Australians, thereby increasing employment in these sectors.

The 2023 Intergenerational Report highlights the importance of genuine engagement and collaboration with First Nation communities to attract First Nation Aboriginal people into the mining industry. This engagement should promote benefit sharing and respect of the land and water rights and interests of First Nation people and communities.[48]

According to 2021 census data, Indigenous Australians accounted for 4.6% of the mining workforce, which was above the average of 2.1% for all industries.[49] The percentage of the mining workforce represented by Indigenous employees has grown strongly, having been 1.3% in 2011 and 3.8% in 2016. As at 31st March 2023, Indigenous Australians represented 12.3% of all mining apprentices and trainees, which was higher than the all-industries average of 6.1%.[50]

While the mining industry, as a proportion of its workforce, employs Indigenous people at the highest rate, it is important to note that many more Indigenous Australian's work in other sectors of the economy. Equally, given the fact that the mining industry operates directly on the land of many First Nation peoples, it should be expected that their ability to share in employment opportunities is prioritised.

[48] The Australian Government. 2023. *Intergenerational Report 2023*. Canberra: Commonwealth of Australia.
[49] Australian Bureau of Statistics. 2023. 2021 Census - DataBuilder - Indigenous Employment by Industry. Canberra, 23 November.
[50] NCVER. 2023. Apprentices and trainees 2023 - March quarter DataBuilder, Contract status, Employer industry 2-digit by Indigenous status, 12. Adelaide, 24 November.

Figure 12 Indigenous employment by industry

Indigenous Employment By Industry

Legend:
- Information Media and Telecommunications
- Rental, Hiring and Real Estate Services
- Electricity, Gas, Water and Waste Services
- Financial and Insurance Services
- Wholesale Trade
- Arts and Recreation Services
- Agriculture, Forestry and Fishing
- Professional, Scientific and Technical Services
- Administrative and Support Services
- Mining
- Transport, Postal and Warehousing
- Manufacturing
- Accommodation and Food Services
- Education and Training
- Retail Trade
- Construction
- Public Administration and Safety
- Health Care and Social Assistance

Source: Australian Bureau of Statistics – 2021 Census - DataBuilder

2.5 Industry Trends and Priorities

Australia's mining industry continues to grow on the back of global demand for minerals and metals. The use of new technologies and processes have long been a hallmark of modern mining in Australia, and the current landscape is no exception. The following trends and priorities are informing decisions and shaping the workforce needs of the future.

2.5.1 Automation

Automation and digitisation are continuing to change how mining work is undertaken globally, with Australia being no exception and, in many cases, leading this innovation.

In short, automation is the operation of a job task or function without the need for direct human involvement. Digitisation is the conversion of analogue information into digital information. Automated processes can involve remote controlled machinery, wherein a human operator controls aspects of the function from a distant location. It can also involve artificial intelligence (AI) supported machinery. There is often an overlap, with some functions completed by sophisticated systems autonomously, while a person maintains control of other functions.

Automated working operations have existed since the industrial revolution. However, when combined with our ability to digitise processes and have automated processes work directly from digitised materials, the processes can almost eliminate the human need to be involved in certain job tasks. When this is linked with new AI programs, which can troubleshoot problems as they arise, the human element is further removed from the equation.

For the mining sector, the opportunities for new ways of working have changed how jobs are undertaken in a variety of important ways. Self-driving haul trucks and other mobile plant equipment in surface operations are being used in many mine sites and will soon be commonplace. The automated vehicle drives in a pre-orchestrated manner, supported by sophisticated GPS tracking and mine site mapping, and is optimised to be gentler on the vehicle than the average human operator.

Autonomous technology has also seen the introduction of driverless trains, with Rio Tinto being the first to use the technology in July 2018 for the delivery of 28,000 tons of iron ore from its Tom Price

operation to a port at Cape Lambert.[51] In this instance, the operation was monitored by Rio Tinto's AutoHaul™ team at its Perth Operations Centre almost 1,500 km away.

While the ongoing introduction of autonomous technology within both mining and the transport industry more broadly will displace or alter certain job roles (such as haul truck drivers and train drivers), it is also creating new job opportunities.

Autonomous operations need to be designed, developed, installed, tested, and monitored. Technology is giving rise to higher paying jobs, with greater opportunity for remote and flexible work. The growth of remote operations centres is seeing an increase of workers being able to support mining operations from metropolitan rather than remote locations, expanding the demographic of people that the industry can attract to work within it.[52]

However, these jobs also require higher digital skills, and many need specialised degree qualifications. Job roles created by autonomous technology include autonomous operations controllers, with research by iMove also showing increased demand for roles in IT, cybersecurity, civil engineering, mechanical engineering, and transportation systems design.[53]

A key priority for the industry and government will be to help impacted workers retrain for other job roles that are in demand. Given the current workforce shortage, every engaged and willing worker is a welcome part of the mining industry. Ensuring that the appropriate training programs and support mechanisms are in place to harness each worker's existing skills and impart new skills will be an ongoing priority for AUSMASA in partnership with industry and employee representatives.

2.5.2 Electrification

Electrification within the mining industry generally refers to altering existing machines and creating new machines to run on electricity as the preferred power source. Primarily, these replace traditional diesel-fuelled internal combustion engine equipment.

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[51] Rio Tinto. 2019. 'How Did One of the World's Largest Robots End Up Here?' *Riotinto.com*. https://www.riotinto.com/en/news/stories/how-did-worlds-biggest-robot.

[52] Australian Resources and Energy Group. 2018. 'A New Horizon: Guiding Principles for the Future of Work'. Australian Resources and Energy Group. https://www.areea.com.au/wp-content/uploads/2018/12/20191203_AMMA_A_New_Horizon_Guiding_Principles_for_the_Future_of_Work.pdf.

[53] Hussein Dia, Hadi Ghaderi, Sohani Liyanage, Rusul Abduljabbar, and Ali Matin. 2023. *Creating our Future Transport and Mobility Workforce*. Melbourne: Swinburne University of Technology.

The ongoing transition of mobile plant and light vehicles away from diesel and on to battery-electric systems is driven by the mining industry's commitment to a decarbonised operational future and, in the case of BHP, is seen as more efficient than transitioning to hydrogen-powered solutions. [54]

While hydrogen may have a significant part to play in a decarbonised Australian future, it does require investment in refuelling infrastructure. Many mine sites already generate their own electrical power due to their off-grid locations and, assuming the output of such is sufficient to run existing operations and charge a battery-electric mobile plant, no additional refuelling infrastructure or supply-chain logistics would be required.

The mining sector has been an early adopter of this technology and has been quick to upskill its workforce accordingly. Mining organisations that have spoken with AUSMASA have indicated that the existing fleet of traditional internal combustion engine vehicles will not be abandoned (due to costs of buying new vehicles); however, when new vehicles are purchased or old ones are updated, buying, or upgrading to electric will be the preferred way to operate.

The transition to electrification has created a scenario whereby mine site mechanics will need to be upskilled to support both diesel and electric plant vehicles. Therefore, AUSMASA is currently working closely with the industry to ensure that the relevant skill sets for upskilling are readily available to this cohort.

2.5.3 Technological Advancement

Modern mining operations require hundreds of millions, if not billions, of dollars' worth of investment. It stands to reason that mining operators seek out promising technological solutions where such implementation offers to increase productivity, improve safety or both. As such, the mining sector, despite public perceptions, is increasingly home to technologically advanced processes, systems and innovations.

Technological advancement is creating new job roles within the mining sector. However, these new roles often require advanced technical skills and education. Some examples of how technology is

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[54] BHP. 2023. 'Operational Decarbonisation'. BHP.com. https://www.bhp.com/-/media/documents/media/reports-and-presentations/2023/230621_operationaldecarbonisationinvestorbriefing.pdf.

being used within the mining sector to improve productivity and safety include the use of advanced data analytics, continuous asset monitoring systems, real-time sensor data, use of robotics and increased augmentation of AI systems.[55]

One example of how a combination of such technologies is being trialled in the mining industry is through the use of autonomous, scanner-equipped robots to inspect underground mines for post-blast safety, with a combined benefit of reduced downtime and increased miner safety.[56]

In its report exploring the future of work in the mining industry, the Minerals Council of Australia (MCA) identified that skills of increasing importance would include change management, collaboration, complex stakeholder engagement, creativity, data analysis, data and digital literacy, design thinking, stakeholder analysis and strategic planning.[57]

Overall, MCA's report identified which roles within the mining sector would be enhanced, redesigned, or automated by technology.

It is not surprising to note that the report identified a future fall in demand for operational roles such as drillers, miners, shotfirers and mobile plant operators as a result of technological solutions, whereas numerous roles, including metal fitters, machinists, electricians, production managers and mining engineers, would see a demand increase.[58]

Given the ongoing shortage of workers within the sector, any roles that are displaced by technology creates an opportunity for retraining and redeployment, maximising the retention of loyal and experienced employees in the process.

The ability to identify the gaps between existing skills in affected roles and those required by newly created roles of the future will continue to be a focus for AUSMASA in its engagement with the industry. Equally, given that digital skills and digital literacy is a core aspect of this transition, AUSMASA will continue to work closely and collaboratively with the JSC responsible for digital skills

[55] Australian Resources and Energy Group. 'A New Horizon'.
[56] Olivia Thomson. 2023. 'Robots are Increasing Safety and Productivity by Revolutionising Post-Blast Mine Re-Entry'. *Australian Mining.com*. https://www.australianmining.com.au/how-autonomous-robots-are-increasing-safety/.
[57] EY. 2019. *The Future of Work: The Changing Skills Landscape for Miners*. Melbourne: Minerals Council of Australia.
[58] EY. *The Future of Work.*

– the Future Skills Organisation – while conducting its own work around skills mapping (see Section 4 of this plan).

2.5.4 Areas of Focus

2.5.4.1 Critical Minerals

The Australian Government's Climate Change Bill 2022 enshrined into law an emissions reduction target of 43% from 2005 levels by 2030 and achieving net-zero emissions by 2050, kick-starting a journey towards decarbonisation that the mining industry will play a critical role in achieving.

The Department of Industry, Resources and Science describes critical minerals as 'essential to our modern technologies, economies and national security, and whose supply chains are vulnerable to disruption'.[59] The department maintains a list of what it classifies as critical minerals, basing the decisions about what minerals to include on global technology needs, particularly for emission reduction, advanced manufacturing, and defence.

Australia's currently defined list of critical minerals is shown in Figure 13. It's worth noting that the Department is currently seeking feedback on how this list will be updated in the future. Of note is that the Government does not currently consider copper a critical mineral, which is at odds with the view of many industry stakeholders, other nations, and the International Energy Agency.[60]

Critical minerals will play a significant role in Australia achieving its environmental and strategic objectives in the future and represent an opportunity for increased onshore refining and processing.

2.5.4.2 Critical Minerals Strategy 2023—2030

The Australian Government's Critical Minerals Strategy 2023—2030 is a comprehensive framework that aims to position Australia as a global leader in the critical minerals sector.

The global shift towards low emissions and renewable energy will correspondingly reduce the demand for fossil fuel-intensive exports, such as thermal coal. This transition underscores the

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[59] Department of Industry, Science and Resources. 2023b. 'Critical Minerals Strategy 2023–2030'. *Industry.gov*. https://www.minister.industry.gov.au/ministers/king/media-releases/consultations-open-update-critical-minerals-list Canberra: Department of Industry, Science and Resources.
[60] International Energy Agency. 2023. 'Critical Minerals'. *IEA.org*. https://www.iea.org/topics/critical-minerals.

importance of critical minerals in Australia's future economic landscape as well as the need for appropriate training strategies to help affected workforces realise those opportunities.

The Critical Minerals Strategy is a multi-faceted approach that not only aims to make Australia a key player in the global critical minerals market but also addresses broader social and environmental goals, which will likely facilitate the adoption of critical minerals by both the public and industry. It has far-reaching implications for the Australian labour market and energy and VET sectors, promising sustainable growth and global competitiveness.

The adoption of critical minerals in Australia over the next decade is poised to be significantly influenced by the country's commitment to environmental sustainability and renewable energy.

The strategy aims to address skills shortages in key professions, such as mining engineers, hydrogeologists, metallurgists, and geologists, while supporting 10,000 apprentices to enter the clean energy sector through the Government's $105.1 million New Energy Apprenticeship and New Energy Skills Programs.[61]

The strategy also focuses on workplace safety, culture, and flexibility to attract a diverse workforce, as well as environmental, social and governance credentials, including sharing benefits with First Nation communities and promoting gender equality.

Reforms to the Environmental Protection and Biodiversity Conservation Act aim to support the responsible development of critical mineral projects.

The evolving national strategy and global energy landscape are setting the stage for a significant shift in Australia's mining industry. The focus on renewable energy, critical minerals and low-emission technologies will not only change what is mined but also how it is processed, transported, and exported.

Evolving technologies are changing the type of resources required from the mining industry. One example, the adoption of EVs has led to a surge in demand for lithium, a key component in Lithium-ion batteries. Increasing demand for EVs, and by extension the minerals that make them possible, is

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[61] Department of Industry, Science and Resources. 'Critical Minerals Strategy'.

a key focus of the National Electric Vehicle Strategy.[62] The growing demand for Lithium-ion battery technologies implies that technological advancements in lithium extraction and processing are imperative.

The global drive towards renewable technologies is creating a surge in demand for the minerals that make such a world possible. According to research by the MCA, more than 260 new lithium, cobalt, nickel, and copper mines will be required globally by 2030 if the world is to meet global demand for mineral intensive EVs and energy storage batteries.[63] This places critical minerals as a key demand driver for increased access to a skilled workforce, among other things, to realise this potential.

However, the Critical Mineral Strategy is clear; no advanced industrial capabilities are sustainable without commensurate investment in Australian workers' skills, knowledge and qualifications.

Critical mineral mining requires access to the full breadth of existing mining industry job roles. However, the strategy's call for greater onshore refining and processing capabilities represents a new demand driver for skilled roles that may not currently exist within the mining workforce.

The need to support the development of such a processing capability and its workforce, and to identify any existing skills gaps as a matter of priority are highlighted in both Qld and WA's own respective critical mineral strategies.[64]

A key priority for AUSMASA will be to work closely with industry and relevant government bodies in identifying any skills gaps within the current workforce and emerging skills required to assist in making these critical mineral strategies a reality. A particular focus will be on determining if current processing-related qualifications will be fit for purpose in relation to onshore refining and processing of critical minerals.

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[62] Department of Climate Change, Energy, the Environment and Water. 2022. *State of Hydrogen*. Canberra: Department of Climate Change, Energy, the Environment and Water.

[63] Minerals Council of Australia. 2023b. *Future Critical: Meeting the Minerals Investment Challenge*. Canberra: Minerals Council of Australia.

[64] Department of Jobs, Tourism, Science and Innovation. 2020. *Strategy Update: Western Australia's Future Battery and Critical Minerals Industries*. Perth: Government of Western Australia; Department of Resources. 2023. *Queensland Critical Minerals Strategy*. Brisbane: Government of Queensland.

Figure 13 Current Australian critical minerals list

Critical mineral	Australian geological potential	Australian economic demonstrated resources (2020)	Australian production (2020)	Global production (2020)
High purity alumina	Moderate	No data	No data	No data
Antimony	Moderate	125.2 kt	3.9 kt	155 kt
Beryllium	Moderate	No data	No data	240
Bismuth	Moderate	No data	No data	17 kt
Chromium	Moderate	0	0	40,000 kt
Cobalt	High	1,495 kt	5.6 kt	135 kt
Gallium	High	No data	No data	300 t
Germanium	High	No data	No data	130 t
Graphite	Moderate	7,970 kt	0	1,100 kt
Hafnium	High	14.5 kt	No data	No data
Helium	Moderate	No data	4 hm³	140 hm³
Indium	Moderate	No data	No data	900 t
Lithium	High	6,174 kt	40 kt	82 kt
Magnesium	High	Magnesite: 286,000 kt	Magnesite 799 kt	Magnesite: 26,000 kt
Manganese	High	Manganese ore: 276,000 kt	Manganese ore: 4,800 kt	17,200 kt
Niobium	High	216 kt	No data	78 kt
Platinum-group elements	Moderate	107 t	0.522 t	380 t
Rare-earth elements	High	4,200 kt	20 kt	240 kt
Rhenium	Moderate	No data	No data	53 t
Scandium	High	30.34 kt	No data	No data
Silicon	High	No data	No data	8 kt
Tantalum	High	99.4 kt	0.1 kt	1.8 kt
Titanium	High	Ilmenite: 274,000 kt Rutile: 35,300 kt	Ilmenite: 1,100 kt Rutile: 200 kt	Ilmenite: 12,000 kt Rutile: 1000 kt
Tungsten	High	577 kt	Less than 1 kt	84 kt
Vanadium	High	7,408 kt	0	86 kt
Zirconium	High	Zircon: 79,300 kt	Zircon: 400 kt	Zircon: 2,000 kt

Source: Department of Industry, Science and Resources. 2023a. 'Australia's Critical Minerals List'. Industry.gov https://www.industry.gov.au/publications/australias-critical-minerals-list

2.5.4.3 Workplace Transformation (Coal)

The use of coal as an energy source has long been linked to rising global temperatures, with nations globally pivoting to the use of viable alternatives. A 2021 study suggested that for the world to avoid exceeding an increase in global temperatures of 1.5 degrees Celsius, 95% of Australia's coal reserves would need to stay in the ground.[65]

Australia is a significant producer of two types of coal: thermal and metallurgical. Australian thermal coal is used as a feedstock in coal-fired power stations, whereas metallurgical coal is a key input in the production of steel and iron ore. In 2022-23, Australia mined 173 million tons of metallurgical coal, of which it exported 157 mt. During the same period, Australia mined 231 mt of thermal coal, exporting 178 mt.[66]

In the near term, the transition away from Australian coal-fired power stations in support of the move to a decarbonised future will have a direct impact on coal mines located close to such power stations, where the primary purpose is to supply coal for local consumption.

The Australian Government, and state and territory governments, are investing significant funds in helping communities affected by such transformation to transition to new jobs within the clean energy sector. However, such initiatives will still require a large-scale reskilling effort, with new jobs likely requiring significantly more complex and digital skills.

For those workers who are unwilling, or unable, to reskill and transition to new job roles, there are still plenty of similar traditional roles available within other mining operations. However, this would undoubtedly require workers to move to those jurisdictions or metropolitan hubs from which FIFO operations are staged. In many instances, such a move would be a significant barrier, with a close connection to the community and the cost of relocation and housing in alternate locations being key factors.

The pending closure of WA's Collie coal-fired power stations is a prime example of such a pending workforce transformation challenge. After the State Government announced that all coal-fired power stations would be shut down by 2029, several initiatives were set in motion. The Government, recognising that the move away from coal would impact upwards of 1,200 workers, announced $200

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[65] Dan Welsby, James Price, Steven Pye and Paul Ekins. 2021. 'Unextractable Fossil Fuels in a 1.5°C world'. *Nature* 597.
[66] Department of Industry, Science and Resources. 'Australia's Critical Minerals List'.

million for the Collie Industrial Transition Fund to attract new projects and industries and $47.8 million for training initiatives to assist with the local workforce's transition.[67]

Over the longer term, as key export markets such as China move towards non-coal energy generation, the thermal coal market would be impacted more severely.

This would create a much larger displacement of coal miners. With the surging demand for critical minerals, such as iron ore, there would likely be opportunities for such workforces to be retrained and re-engaged in areas of demand.

Given metallurgical coal's key role in the production of steel, the transition away from it will be more gradual. However, research into alternative steel-producing technologies and techniques that do not require the use of metallurgical coal is ongoing, with the impact of such not likely to take place until the 2030s.[68]

It will be critical for the VET sector to be ready and responsive to such emerging challenges, and it will be a priority for AUSMASA to work closely with the industry to ensure that innovative and engaging training programs are available. AUSMASA welcomes the release of JSA's Clean Energy Capacity Study and looks forward to providing key insights into this workforce transformation challenge. AUSMASA's own proposed priority work in this area is further discussed in of this plan.

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[67] Sam Bold, Georgia Loney and Anthony Pancia. 2022. 'Collie Residents React as Western Australia Gives Deadline for Coal-Fired Power Plants'. *ABC News*. https://www.abc.net.au/news/2022-06-15/western-australia-quits-coal-power-plants-as-collie-town-reacts-/101152034.

[68] John Quiggin. 2020. 'Getting Off Coal - Economic and Social Policies to Manage the Phase-out of Thermal Coal in Australia'. *Australian Institute.org*. https://australiainstitute.org.au/wp-content/uploads/2020/12/P881-Getting-Off-Coal-WEB.pdf.

Section 3 – Automotive

3.1 Australian Automotive Industry Overview

Australia's automotive industry has continued to change and adapt to an ever-evolving operating landscape. As large-scale automotive manufacturing declined, the focus shifted to specialised manufacturing, high-tech engineering, design, and components, keeping Australia on the automotive map. The industry is now adapting to a new wave of technologies, from EVs to autonomous driving systems, reflecting the industry's ability, and need, to adapt and innovate.

Australia's automotive industry encapsulates the sale, service, and repair of vehicles, including motorbikes, bicycles, and all-terrain vehicles, specialised heavy vehicle and bus manufacturing, customised body and trailer manufacturing, marine mechanical services, and the manufacture and sale of parts and accessories.

Australia has had an enduring love affair with the automobile, with new car sales consistently beating previous records. By current trends, Australians purchase on average over one million new vehicles a year in one of the most competitive markets in the world.[69] As of January 2023, Australia had 21,168,462 registered vehicles on the road, a number that has been growing by approximately 400,000 vehicles per year.[70]

According to the Federal Chamber of Automotive Industries (FCAI), there are 68 brands of motor vehicles in Australia (including both light and heavy vehicles) with 380 different models that are sold and serviced by over 3,500 dealers. Population growth, the volume of vehicles in circulation and the variety of models enjoyed by Australians are key demand drivers for automotive industry employment.[71]

According to IBISWorld, the automotive industry in Australia generated nearly $166 billion in revenue in 2022-23, with predictions that the industry will grow in the next five years to yield over

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[69] Federal Chamber of Automotive Industries. 2023a. 'Representing the Australian Automotive Industry'. *FCAI.com*. https://www.fcai.com.au/about.
[70] Bureau of Infrastructure and Transport Research Economics. 2023. *Road Vehicles, Australia January 2023*. Canberra: Department of Infrastructure, Transport, Regional Development, Communications and the Arts.
[71] Federal Chamber of Automotive Industries. 2023b. 'Record Breaking New Vehicle Sales in August'. FCAI.com. https://www.fcai.com.au/news/index/view/news/806.

$182 billion annually. The sale of imported motor vehicles is expected to account for over 65% of revenue ($111.99 billion), and the purchases split between households and private businesses is similar at 47% each, with the public sector making up the balance.[72]

The automotive industry is also expected to generate $21.66 billion from the provision of repair and maintenance services, $20.99 billion from the sales of parts and accessories and $11.44 billion from locally manufactured vehicles, parts, accessories, and other products.[73]

Revenue in the sales of passenger cars is projected to reach AU$25.22 billion in 2023, with the market's largest segment being sport utility vehicles (SUVs), which is projected to account for AU$10.22 billion. The passenger cars market unit sales are expected to exceed 750,000 vehicles by 2027.

This year, new vehicle sales achieved the highest August result on record, as Australian customers took delivery of 109,966 new vehicles, a 15.4% increase on the same period in 2022. August's result continues to build on a strong year for automotive sales, being up 9.9% so far this year.[74]

The passenger vehicle market was down by 3.3% in August over the same month last year, which could have been because of ongoing supply chain challenges and lengthy waits for new vehicle deliveries. The SUV market was up by 28.3%, followed by light commercials, whose sales grew by 6.9%. The heavy commercial vehicle market was up marginally by 1.7% compared with August 2022.[75]

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[72] IBISWorld. 2023. 'Automotive Industry in Australia'. *IBISWorld*.
https://my.ibisworld.com/au/en/industry/x0014/at-a-glance.
[73] IBISWorld. 2023. 'Automotive Industry in Australia'.
[74] Federal Chamber of Automotive Industries. 'Record Breaking New Vehicle Sales'.
[75] Federal Chamber of Automotive Industries. 2023c. 'The Australian New Vehicle Industry'. *FCAI.com*.
https://www.fcai.com.au/new-vehicle-industry.

Figure 14 Vehicle sales by class, August 2023
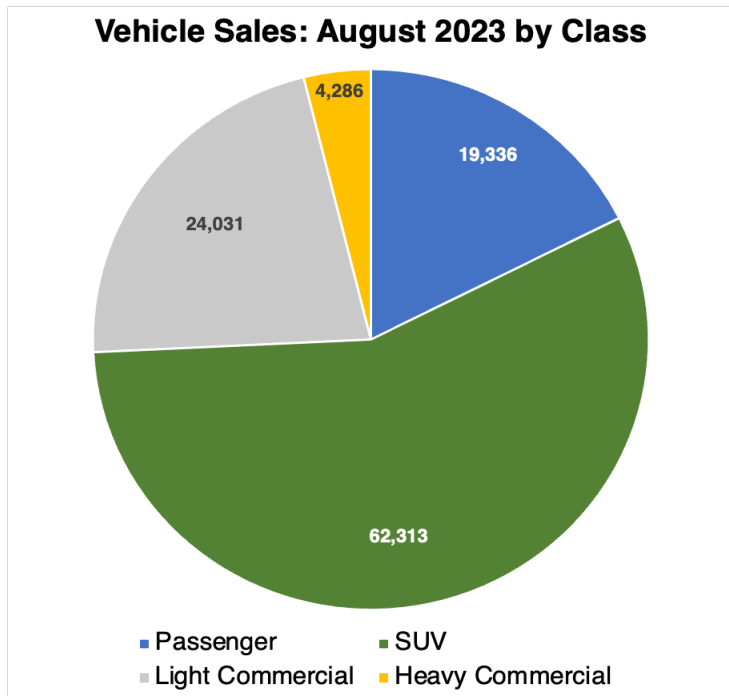
Vehicle Sales: August 2023 by Class

- Passenger
- SUV
- Light Commercial
- Heavy Commercial

19,336 / 62,313 / 24,031 / 4,286

Source: Federal Chamber of Automotive Industries. 2023b. 'Record Breaking New Vehicle Sales in August'. FCAI.com.
https://www.fcai.com.au/news/index/view/news/806

Figure 15 Vehicle sales, August 2022–August 2023
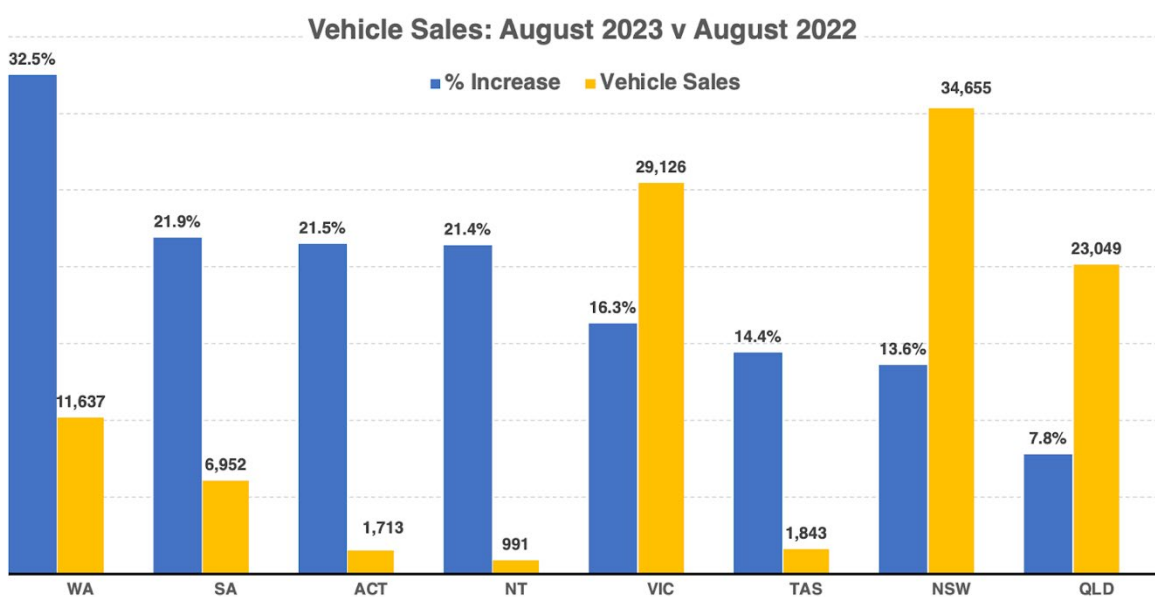
Vehicle Sales: August 2023 v August 2022

- % Increase
- Vehicle Sales

State	% Increase	Vehicle Sales
WA	32.5%	11,637
SA	21.9%	6,952
ACT	21.5%	1,713
NT	21.4%	991
VIC	16.3%	29,126
TAS	14.4%	1,843
NSW	13.6%	34,655
QLD	7.8%	23,049

Source: Federal Chamber of Automotive Industries. 2023b. 'Record Breaking New Vehicle Sales in August'. FCAI.com.
https://www.fcai.com.au/news/index/view/news/806

August's sales data also highlighted that consumers were continuing to embrace low emissions technologies, with EVs accounting for 6.4% of sales and hybrid vehicles accounting for 10.5% of sales.[76]

Although the manufacturing of cars has ceased in Australia, there is still a healthy market in the manufacturing of heavy vehicles, particularly trucks and buses. IBISWorld states that the industry generated $4.55 billion in revenue throughout 2021-22, employing almost 6,000 workers.[77]

Australian-manufactured trucks contain highly sought-after value-added features that are made specifically for the Australian environment, with the two major players being Volvo and PACCAR (Kenworth and DAF trucks), which are expected to continue their industry domination.[78]

The Bus Industry Confederation (BIC) lists 18 manufacturers in Australia in its report *Moving People* published in 2020, estimating that "in the manufacturing of the completed bus, $5 billion is contributed to the Australian economy each year and close to $1.5 billion in supplies and services to keep the bus operational and delivering services'.[79]

The Australian public's love of the great outdoors has driven a booming demand for new caravans in Australia and has boosted the productive output of recreational vehicle (RV) manufacturing. The caravans and camper trailer markets combined are worth $33 billion annually, with campervans and motorhomes netting a further $504.44 million in a very diverse industry that sees the market leader, Jayco, securing 11.4% of the market.[80]

Finally, IBISWorld values the manufacturing of motor vehicle parts and accessories in Australia at $4.11 billion annually, with powertrain and chassis parts making up over 65% of that with a contribution of $2.77 billion in 2022-23.[81]

[76] Federal Chamber of Automotive Industries. 'The Australian New Vehicle Industry'.
[77] L. Duane-Davis. 2023. 'Motor Vehicle Manufacturing in Australia'. *IBISWorld*.
https://my.ibisworld.com/au/en/industry/c2311/key-statistics.
[78] Duane-Davis. 'Motor Vehicle Manufacturing'.
[79] Bus Industry Confederation. 2020. 'Moving People: Australian Bus and Coach Industry: A Snapshot'.
Moving People. http://www.movingpeople.com.au/wp-content/uploads/doc/BIC0058.pdf.
[80] J. Fahey. 2023a. 'Motor Vehicle Body and Trailer Manufacturing in Australia'. *IBISWorld*.
https://my.ibisworld.com/au/en/industry/c2312/products-and-markets.
[81] DK Jeswanth. 2023. 'Motor Vehicle Parts and Accessories Manufacturing in Australia'. *IBISWorld*.
https://my.ibisworld.com/au/en/industry/c2319/at-a-glance.

Furthermore, as EVs and hybrid vehicles become more common, manufacturers of powertrain parts have employed greener technologies in their products, and some manufacturers have found niches supplying parts required for EVs, such as charge ports. This market is still in its infancy and showing strong growth potential.[82]

The automotive industry is heavily reliant on qualified tradespeople, and subsequently, the VET system, which is reflected in the significant enrolment statistics for the AUR training package.

3.2 Workforce Breakdown

The automotive industry in Australia comprises approximately 355,000 operational workers, distributed across a range of divisions in the ANZSIC system, namely manufacturing, retail trade, wholesale trade and other services. Table 9 shows the distribution of the operational workforce across the major automotive industry subdivisions.

Table 9 ANZSIC workforce data for the automotive workforce

Automotive Industry	No. People Employed
Automotive Repair and Maintenance	155,000
Transport Equipment Manufacturing	77,000
Motor Vehicle Retailing	67,000
Motor Vehicle Parts and Tyre Retailing	29,900
Motor Vehicle and Motor Vehicle Parts Wholesaling	26,300
	355,200

Source: Jobs and Skills Australia. 2023a. International Labour Market Update - September 2023. Canberra: Commonwealth of Australia.

The following ANZSIC codes have been selected as representative of the automotive industry for the purposes of determining key operational occupations required by the industry:

- Division: Manufacturing (C)
   a. Subdivision: Transport Equipment Manufacturing (23)
      i. Group: Motor Vehicle and Motor Vehicle Part Manufacturing (231)
         1. Class: Motor Vehicle and Motor Vehicle Part Manufacturing, nfd (2310)

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[82] Jeswanth. 'Motor Vehicle Parts'.

2. Class: Motor Vehicle Manufacturing (2311)

3. Class: Motor Vehicle Body and Trailer Manufacturing (2312)

4. Class: Automotive Electrical Component Manufacturing (2313)

5. Class: Other Motor Vehicle Parts Manufacturing (2319)

6. Class: Tyre Manufacturing (2314)

- Division: Wholesale Trade (F)

    a. Subdivision: Motor Vehicle and Motor Vehicle Parts Wholesaling (35)

        i.Group: Car Wholesaling (350)

            1. Class: Car Wholesaling (3501)

        ii.Group: Motor Vehicle New Parts Wholesaling (350)

            1. Class: Motor Vehicle New Parts Wholesaling (3502)

        iii.Group: Motor Vehicle Dismantling and Used Parts Wholesaling (350)

            1. Class: Motor Vehicle Dismantling and Used Parts Wholesaling (3503)

- Division: Retail Trade (G)

    a. Subdivision: Motor Vehicle and Motor Vehicle Parts Retailing (39)

        i.Group: Car Retailing (391)

            1. Class: Car Retailing (3911)

        ii.Group: Motorcycle Retailing (391)

            1. Class: Motorcycle Retailing (3912)

        iii.Group: Tyre Retailing (391)

            1. Class: Tyre Retailing (3913)

        iv.Group: Motor Vehicle Parts Retailing (391)

            1. Class: Motor Vehicle Parts Retailing (3914)

- Division: Other Services (S)

    a. Subdivision: Automotive Repair and Maintenance (94)

        i.Group: Automotive Body, Paint and Interior Repair (941)

            1. Class: Automotive Body, Paint and Interior Repair (9411)

        ii.Group: Automotive Electrical Services (941)

            1. Class: Automotive Electrical Services (9412)

        iii.Group: Other Automotive Repair and Maintenance (941)

            1. Class: Other Automotive Repair and Maintenance (9419)

Figure 16 identifies the top 20 operational occupations in the automotive industry based on ANZSCO classification, which account for the bulk of the workforce. While the subdivisions in the

automotive industry share similar challenges, such as national workforce shortages, an ageing population, and the need to attract a more diverse workforce, individual subdivisions exhibit more nuanced supply-and-demand scenarios, which are introduced below.

Figure 16 Top 20 operational occupations within the automotive industry

Code	Occupation
321211	Motor Mechanic (General)
621311	Motor Vehicle Or Caravan Salesperson
811111	Car Detailer
324111	Panelbeater
142111	Retail Manager (General)
324311	Vehicle Painter
899415	Tyre Fitter
321111	Automotive Electrician
323211	Fitter (General)
149212	Customer Service Manager
131112	Sales and Marketing Manager
832211	Product Assembler
324211	Vehicle Body Builder
321212	Diesel Motor Mechanic
611313	Sales Representative (Motor Vehicle Parts and Accessories)
322311	Metal Fabricator
321213	Motorcycle Mechanic
899411	Motor Vehicle Parts and Accessories Fitter (General)
233512	Mechanical Engineer
899412	Auto Glazier

Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

3.2.1 Automotive Repair and Maintenance

The automotive repair and maintenance sector keeps Australia's vehicles on the road. The sector is the largest employer within the automotive industry and consists of 27,620 service and repair workshops across the country, which is an increase of 11.5% since 2021[83] While an element of increased workshop numbers would be expected to be tied to growth in overall vehicle numbers, additional research could assist in identifying other factors and trends, especially since the growth in workshops is increasing at double the rate of growth in overall vehicle numbers in Australia.

Both the total quantity of vehicles in the market and number of workshops create a strong demand for qualified staff.

As of August 2023, the subdivision employed 146,871 qualified tradespeople across auto electrics, mechanical servicing and repair, panel beaters and vehicle painters, with motor mechanics

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[83] Australian Automotive Aftermarket Association. 2023a. 'Future Readiness Index - Summary Pack - August 2023'. *AAAA.com*. https://www.aaaa.com.au/wp-content/uploads/2023/09/AAAA-Future-Readiness-Index-Summary-Report-Non-Member.pdf.

accounting for 76.4% of these roles.[84] The data also shows that these occupations are geographically dispersed largely in line with Australia's population distribution, making a career in these occupations possible in most population centres of Australia while also ensuring high career mobility.

A notably sizable occupation within this sector that does not require any formal qualifications (Skill Level 5) is the car detailer. As of August 2023, there were 19,926 car detailers in Australia.[85] This represents a sizable pool of workers already engaged with the industry who could be supported to upskill into a trade. Therefore, AUSMASA will work closely with the industry in exploring how such a pathway could be promoted and supported.

This sector also encompasses bicycle mechanics, for whom specific training programs are available but not strictly required (Skill Level 4).

A comprehensive survey of the automotive industry in 2022 by Capricorn Society highlighted that most workshops were independently operated, servicing on average 27.3 vehicles per week in workshops with an average of 2.9 hoists.[86] The survey also gave insights into workshop size, with 22% of respondents operating with just one team member, 54% with two to five and 24% employing six or more.

The automotive repair and maintenance sector is at the very heart of the automotive industry with challenges such as candidate attraction, retention, and technological change, which are covered in greater detail in subsequent sections of this plan.

3.2.2 Automotive Sales (Retail and Wholesale), inc. Parts and Accessories

The automotive retail and wholesale sector consists of a significant workforce, recording a national salesforce of 35,274 in August 2023.[87] The sector is additionally supported by retail and branch

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[84] Jobs and Skills Australia. 2023a. *International Labour Market Update - September 2023*. Canberra: Commonwealth of Australia.

[85] Jobs and Skills Australia. *International Labour Market Update*.

[86] Capricorn Society. 2022. 'State of the Nation 2022'. *Issuu.com*. https://issuu.com/capricornsociety/docs/capricorn_state_of_the_nation_2022?fr=sYTEyZjU0MjczNzI

[87] Jobs and Skills Australia. *International Labour Market Update*.

managers, customer service managers, administrative staff, and technicians. The sector covers the sale of vehicles, trucks, buses, motorcycles, bicycles, and boats, as well as parts and accessories.

Data from industry peak bodies and IBISWorld highlight that there are upwards of 3,575 car dealerships,[88] 697 motorcycle dealerships[89] and 900 boating-related retail and wholesale businesses operating across the country.[90]

Workers directly involved in the sale of vehicles in Australia require an appropriate motor vehicle salesperson licence, the regulation of which is handled by individual states and territories. While training is required prior to attaining such a licence, this is normally in the form of a short course and is not, by requirement, a full qualification. The AUR package does however offer the non-compulsory *AUR31020 Certificate III in Automotive Sales* qualification, which can be completed as a traineeship, including prior to the final issue of a motor vehicle salesperson licence.

Industry insights suggest that this sector of the automotive industry is also the largest employer of women within the industry, a sentiment supported by enrolment data for the *AUR31020 Certificate III in Automotive Sales* showing 24.6% female participation.

3.2.3 Automotive Manufacturing

Although Australia's automotive manufacturing sector is no longer home to large-scale passenger vehicle manufacturing, it nonetheless generated $4.55 billion in revenue from 338 businesses in 2022/23.[91] ABS Labour Force data shows that there were 10,268 automotive vehicle body builders and trimmers across the nation, with the largest concentration being in Qld (34.5%).[92] This workforce is further supported by additional roles such as fitters, auto glaziers, metal fabricators, mechanical engineers and product assemblers.

The manufacturing sector predominantly specialises in the development of trucks (51.2% of output), buses (32.9%) and a growing demand for caravans, RVs, and trailers (15.9%), as well as emerging

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[88] Federal Chamber of Automotive Industries. 'The Australian New Vehicle Industry'.
[89] J. Fahey. 2023b. 'Motorcycle Dealers in Australia'. *IBISWorld*. https://my.ibisworld.com/au/en/industry/g3912/at-a-glance.
[90] Boating Industry Association. 2023. 'Industry Data'. *BIA.org*. https://bia.org.au/library/industry-data/
[91] Duane-Davis. 'Motor Vehicle Manufacturing'.
[92] Australian Bureau of Statistics. 2023. *Labour Force, Australia, Detailed - May 2023*. Canberra, Australian Capital Territory, Australia.

demand for EV conversions.[93] In 2021, the industry developed 23,931 RVs (towable and motorised), taking the number of total registered RVs to 772,598.[94]

Data from NCVER shows that the *AUM30218 Certificate III in Automotive Manufacturing Technical Operations – Bus, Truck and Trailer* is the only qualification within the AUM training package with current enrolments, recording 475 active students, of which 235 enrolled in 2022.

In relation to this qualification, it is worth noting that it is currently only offered by public Technical and Further Education (TAFEs) in Qld, NSW, Vic, and WA.[95] This represents a challenge for industry expansion in other jurisdictions.

[93] Duane-Davis. 'Motor Vehicle Manufacturing'.
[94] Caravan Industry Association of Australia. 2023. 'Who We Are'. *Caravan Industry Association of Australia*. https://www.caravanindustry.com.au/who-we-are/.
[95] Training.gov.au. 2023. 'AUM30218 - RTOs With Scope to Deliver'. training.gov.au. https://training.gov.au/Search?SearchType=Rto&searchTgaSubmit=Submit&scopeNationalCode=AUM30218&includeImplicitScope=true&registrationStatus=0%2C1%2C2%2C3.

3.3 Workforce Demographics

3.3.1 Geographic Distribution

Figure 17 Heat map of where automotive industry employees live
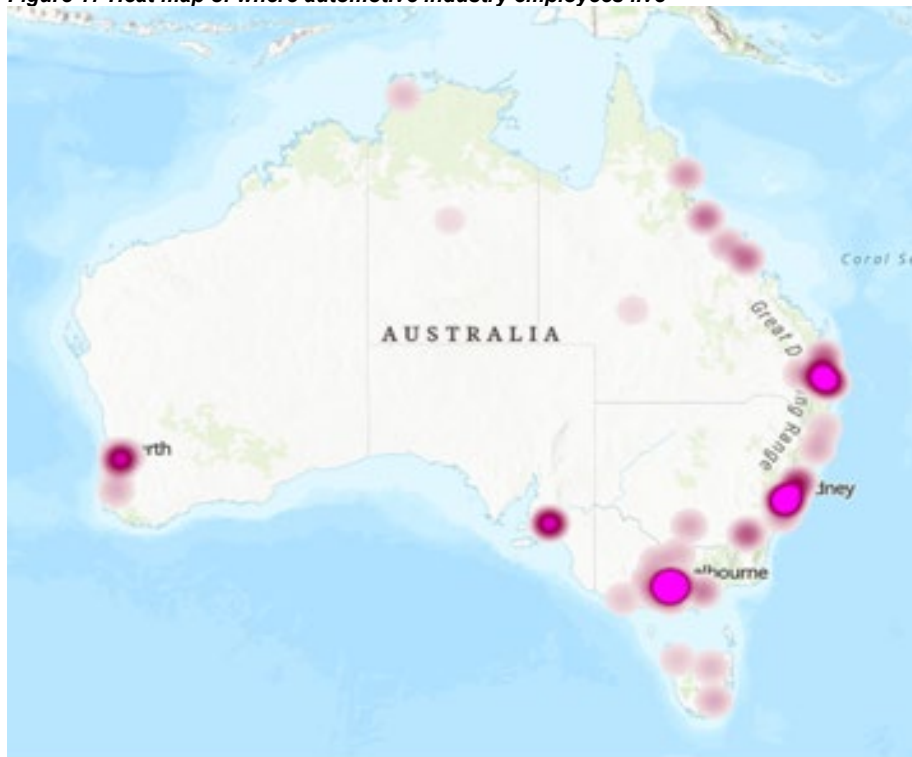
Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

Figure 17 illustrates the geographical distribution of where the automotive industry workforce resides in Australia. The automotive industry is dispersed across the country, with a significant concentration in the capital cities, predominantly along the eastern seaboard. The only two labour markets in the top 10 for this industry that are not part of a capital city are Logan and the Gold Coast in Qld. The top three labour markets for the automotive industry are all located in Melbourne (Southwest, West and Outer East, respectively).

For the automotive industry, the concentration in capital cities indicates the industry's close alignment to the major population centres that the industry serves, with Qld's regional concentration likely aligned to the automotive manufacturing industries in those locations.

3.3.2 Workforce Age

Figure 18 Age of current workforce for the automotive industry
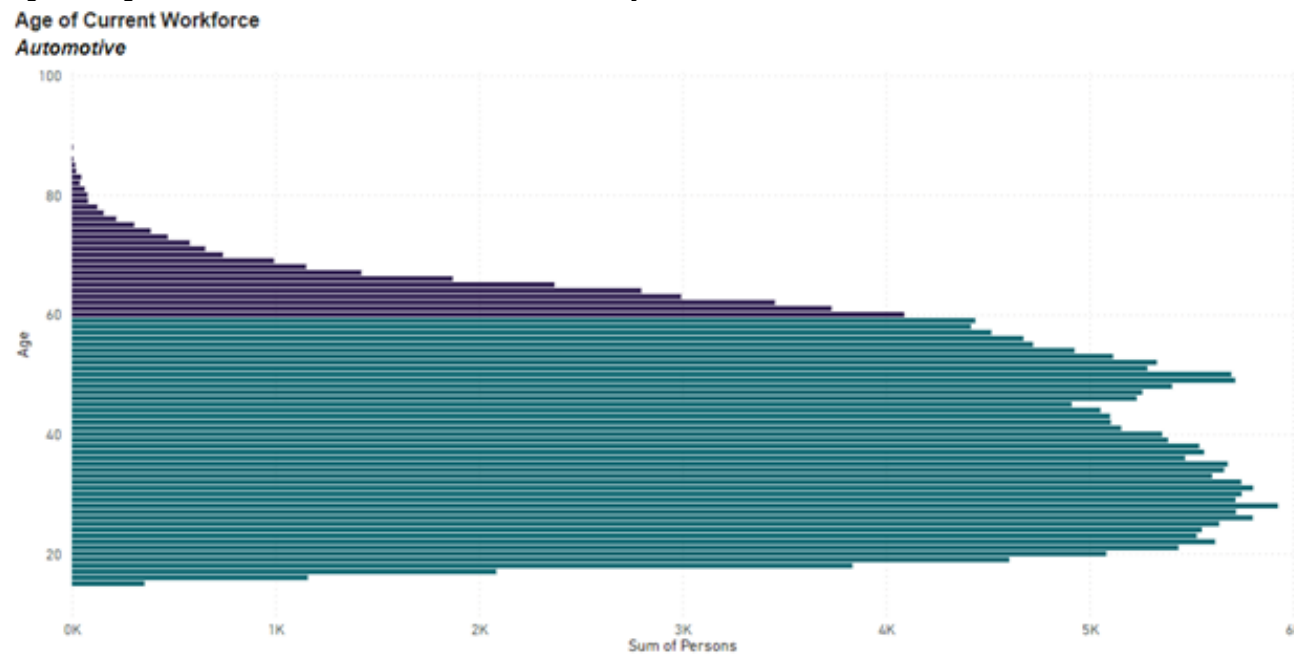
Age of Current Workforce
Automotive

Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

Much like the mining industry, the automotive industry is also faced with an ageing workforce, with many workers approaching retirement age. However, although the automotive industry is faring better than the mining industry regarding attracting younger workers to help maintain and grow the workforce, it has not prevented 36% of surveyed industry participants from identifying the need to attract more young people into the industry as a major challenge.[96]

The ability of the industry to use several VET qualifications as automotive career pathways, starting with students in secondary education, has been identified by multiple key stakeholders as an important mechanism for engaging with future industry entrants at an early stage of their career exploration phase.

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[96] Capricorn Society. 'State of the Nation'.

3.3.3 Gender Diversity

Figure 19 Gender diversity of current workforce for the automotive industry

% Gender of Workforce by Age
Automotive

Gender ● Female ● Male
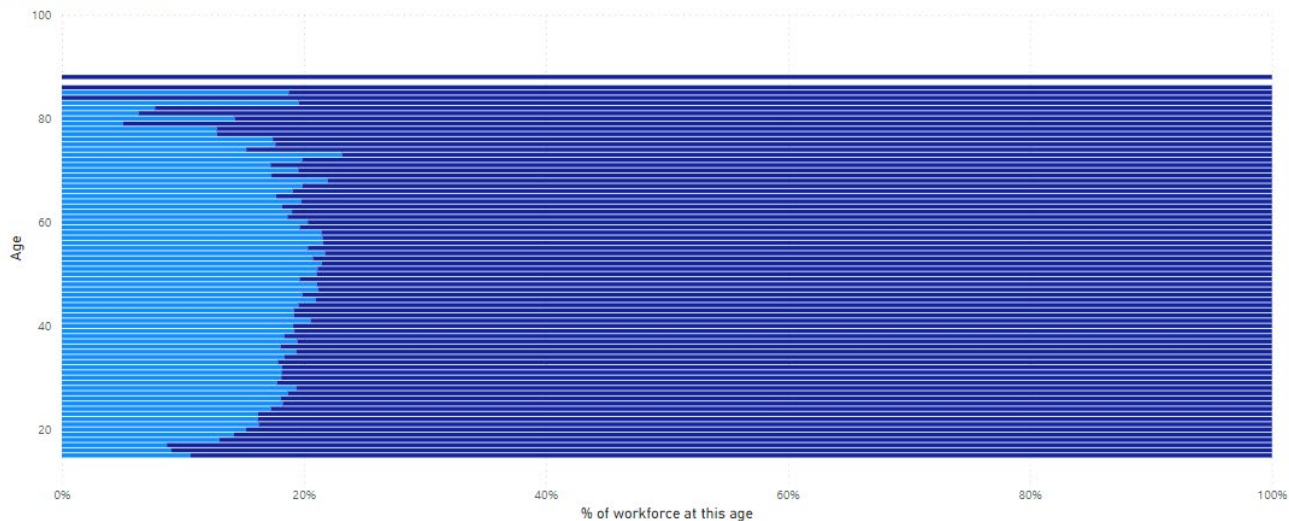
Source: Kienco. 2023. Workforce insights derived from 2021 Census. Melbourne, Victoria, Australia

The automotive industry has long been recognised as a male-dominated industry, a status that the industry is keen to address. However, current data shows that the longer-term trend of female participation within the automotive sector is yet to significantly change.

Female participation in the industry peaks at just above 20% and WGEA data shows that women comprise 47.9% of all employed persons in Australia, providing an insight into the size of the gap between other industries and that of the automotive industry. It also offers hope as a potential source of much needed additional human capital if efforts to attract more women to the industry are successful.

A survey of industry participants has provided an insight into the various roles within the automotive sector that are most likely to involve female participation, as shown in Figure 20.

Figure 20 Percentage of automotive businesses (by work type) with female participation
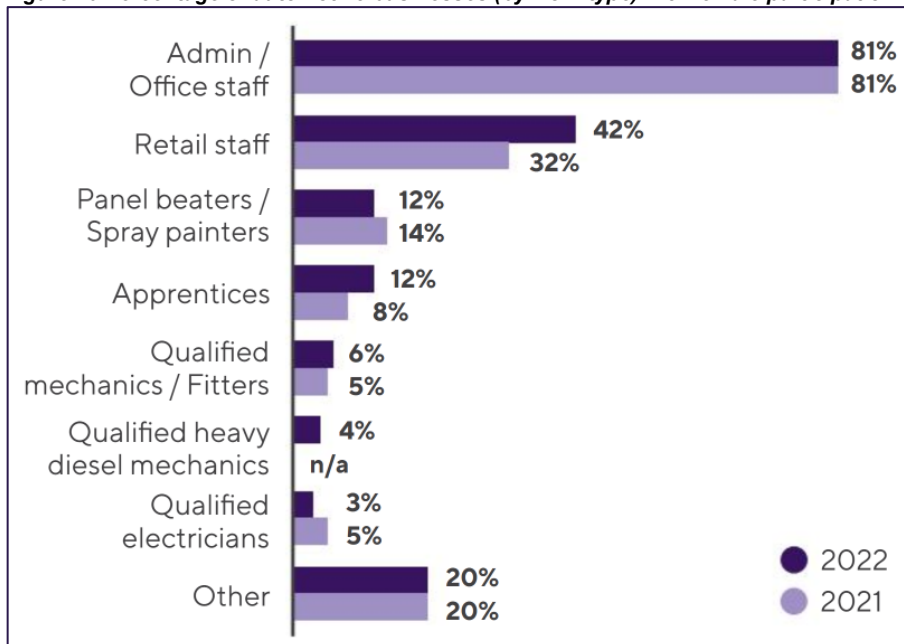
Source: Capricorn Society. 2022. 'State of the Nation 2022'. Issuu.com

https://issuu.com/capricornsociety/docs/capricorn_state_of_the_nation_2022?fr=sYTEyZjU0MjczNzI

The Capricorn Society data shows more work is required to attract women into trade qualification roles such as mechanics, fitters, and panel beaters.

An overview of some of the initiatives underway within the industry are further explored in the Gender Diversity section of this report.

3.4 Workforce Attraction and Retention

3.4.1 Workforce Shortages

Of the top 20 operational occupations in the automotive industry, that represent approximately 92% of all the operational workforce, 12 are listed as experiencing skill shortages on the Skills Priority List published by the National Skills Commission (see Table 10).

Tellingly, six out of the top 10 occupations are facing a skills shortage. The largest single impact is felt by the ongoing shortage of motor vehicle mechanics, which is the number one operational role in the industry, representing almost one-third of the operational workforce.

Recent research by the Australian Automotive Aftermarket Association (AAAA) found that the industry was short of almost 40,000 technicians: 27,000 qualified technicians and 13,500 apprentices.[97] This figure represents almost one technician per workshop in Australia and one apprentice for every second workshop. Further data from JSA's Internet Vacancy Index shows national job advertisements for motor mechanics, automotive electricians, panel beaters and spray painters totalling only 5,623.[98]

Numerous industry sources have suggested that most workshop owners are simply trying to navigate through the skills shortage by working longer hours themselves, taking less time off and not necessarily advertising for roles online. This suggestion is corroborated by data from the Capricorn Society's State of the Nation 2022 report, which showed that finding time to take a break and maintaining a healthy work—life balance topped the list of challenges associated with running a business.[99]

In total, the occupations impacted by skills shortage represent a significant proportion of the overall operational automotive workforce, underscoring the difficulty faced by the industry in attracting sufficient human capital to meet current and future operational requirements. Table 10 below lists the 12 occupations identified as being affected by skills shortage, with a state-by-state breakdown and indication of likely ongoing future demand.

Table 10 Automotive industry operational roles in shortage (2022 data – 2023 data not released at time of publication)

ANZSCO Code	Occupation	National	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Future Demand
321211	Motor Mechanic (General)	S	S	S	S	S	S	S	S	S	MODERATE
324111	Panelbeater	S	S	S	S	S	S	S	S	S	MODERATE
142111	Retail Manager (General)	S	S	S	S	S	S	S	S	S	MODERATE
324311	Vehicle Painter	S	S	S	S	S	S	S	S	S	MODERATE
321111	Automotive Electrician	S	S	S	S	S	S	S	S	S	MODERATE
323211	Fitter (General)	S	S	S	S	S	S	S	S	S	MODERATE
324211	Vehicle Body Builder	S	S	S	S	S	S	S	S	S	MODERATE
321212	Diesel Motor Mechanic	S	S	S	S	S	S	S	S	S	MODERATE
322311	Metal Fabricator	S	S	S	S	S	S	S	S	S	SOFT
321213	Motorcycle Mechanic	S	S	S	S	S	NS	S	S	S	MODERATE
899411	Motor Vehicle Parts and Accessories Fitter (General)	S	S	S	S	S	NS	S	S	NS	MODERATE
233512	Mechanical Engineer	S	S	S	S	S	S	S	S	S	SOFT

Source: National Skills Commission, Skills Priority List, 2022

S = Shortage

NS = No Shortage

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[97] Australian Automotive Aftermarket Association. 2023b. 'Half of all Automotive Workshops Looking for Staff'. *AAAA.com*. https://www.aaaa.com.au/industry-advocacy/half-of-all-automotive-workshops-looking-for-staff/.
[98] Jobs and Skills Australia. 2023b. *Internet Vacancy Index Report - August 2023*. Canberra, Australian Capital Territory, Australia.
[99] Capricorn Society. 'State of the Nation'.

Except for mechanical engineers and retail managers, all occupations experiencing a skills shortage require a trade qualification, underpinning the importance of maintaining a strong pipeline of students within these apprenticeship streams.

While low unemployment rates continue to put pressure on most employers when recruiting for additional staff, the analysis by JSA indicates that particularly in the case of automotive and engineering trades workers, employers are seeking specific skills and experience beyond the specified trade qualifications for the roles in question.[100]

This identified gap between qualified candidates and what employers deem to be suitable candidates will require further investigation by AUSMASA to ascertain whether the industry has concerns with the trade qualifications themselves or whether other life skills and experience are more sought after by the industry.

This identified gap is placing additional pressure on recruiting for roles that have already become endemically difficult to recruit for. Data for the March 2023 quarter showed that on average, automotive and engineering trade recruitment activity yielded 5.1 applicants per advertisement, of which only 1.7 were qualified for the role and only 0.8 deemed suitable by employers.[101]

Figure 21 highlights the industry's perspective on the biggest challenges facing the automotive industry, with a lack of qualified staff being the most common concern. Of note is the importance placed on attracting young people to the industry and the fact that one in five industry respondents viewed EVs as a challenge for the industry. These latter concerns are both covered in subsequent sections of this plan.

[100] Jobs and Skills Australia. 2023. Skills Shortage Quarterly - June 2023. Canberra: Jobs and Skills Australia.
[101] Jobs and Skills Australia. 2023c. *Labour Market Update - May 2023*. Canberra: Jobs and Skills Australia.

Figure 21 Biggest challenges facing the automotive industry
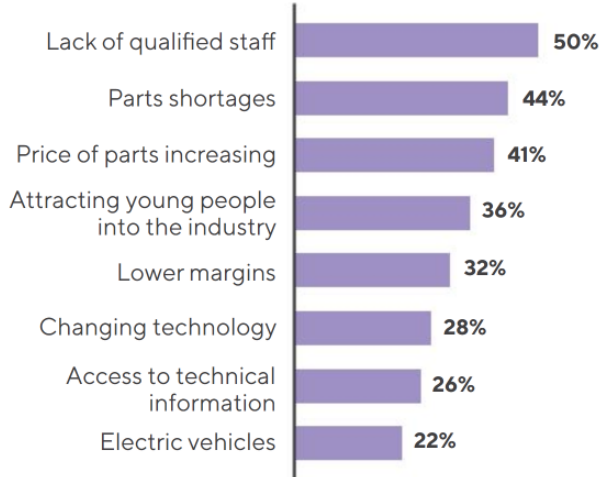
Challenge	%
Lack of qualified staff	50%
Parts shortages	44%
Price of parts increasing	41%
Attracting young people into the industry	36%
Lower margins	32%
Changing technology	28%
Access to technical information	26%
Electric vehicles	22%

Source: Capricorn Society. 2022. 'State of the Nation 2022'. Issuu.com
https://issuu.com/capricornsociety/docs/capricorn_state_of_the_nation_2022?fr=sYTEyZjU0MjczNzI

Despite the fact that, as of 2021, over 37% of motor mechanics operating across Australia were born outside of Australia and have since migrated here, skilled migration in 2021/22 only yielded 385 additional employer-sponsored motor mechanics, equating to only meeting 1.2% of the current demand.[102] Further, AAAA members cited the high cost of sponsoring potential overseas skilled mechanics as a key deterrent to the use of skilled migration as an additional recruitment option.[103]

While AAAA research identified that most technicians were being paid above-award rates (master technicians earn an average salary of $83,000, excluding superannuation) and had non-cash benefits such as access to further training, flexible hours, or the use of workshops outside of work hours, it was only being utilised by one in three workshops to boost retention.[104]

Feedback from key stakeholders has also highlighted the fact that automotive industry participants who are located in mining regions or areas where FIFO workforces are based (such as Perth) must also contend with the challenge of competing with the mining industry for similar roles, with mining companies able to offer higher salaries than individual workshops.

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[102] Australian Automotive Aftermarket Association. 'Half of all Automotive Workshops'.
[103] Australian Automotive Aftermarket Association. 'Half of all Automotive Workshops'.
[104] Australian Automotive Aftermarket Association. 'Half of all Automotive Workshops'.

While industry feedback has consistently credited the numerous school-based career preparation and pre-apprenticeship programs as a key strength for helping to attract new industry entrants, feedback from some parts of the industry fear that these programs do not do enough to promote the full breadth of career opportunities available, such as auto electrics and panel and paint. Instead, they are criticised for focusing too heavily on the motor mechanic stream. This is an area that AUSMASA can investigate further when reviewing the design of the qualifications in question.

3.4.2 Public Perception of the Automotive Industry

When questioned by AUSMASA as to how the industry is likely perceived by younger generations, many industry stakeholders feared that the perception was that working in automotive would be dirty, oily, and unsophisticated, which, given the advances of in technology and the industry more broadly, is not the case.

However, unlike the Year 13 data available for the mining industry, no substantial research has been identified that explores the attitudes towards automotive careers prior to that choice being made. Understanding the views, concerns and potential misconceptions about the automotive industry would be highly beneficial in developing specific strategies around attracting new entrants.

Moreover, AAAA has undertaken a significant review of automotive apprentices to measure their satisfaction and challenges across a range of factors. This survey provides valuable insight into perceptions after the choice to enter the industry has been made.

The key aspects of AAAA's research show that 96% of first year apprentices were either satisfied or very satisfied with their experience, with 41% of apprentices noting their interest in working on advanced vehicle technologies such as electric/hybrid vehicles and advanced driver-assistance systems.[105]

Such findings are encouraging but require entrants to have made the choice to commence an apprenticeship within the automotive industry in the first place. The same survey showed that,

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[105] Australian Automotive Aftermarket Association. 2022. 'Addressing Automotive Skills Shortages - Summary Report'. Australian Automotive Aftermarket Association. https://www.aaaa.com.au/wp-content/uploads/2022/06/Automotive-Skills-Research-Summary-Report-ACA_AAAA-AADA-MTAQ.pdf.

particularly for female participants, receiving negative responses from family, friends, and peers in relation to choosing an automotive apprenticeship was a key challenge.[106]

If such an influence on potential entrants is based on outdated perceptions of the industry, it would support the views held by the industry of the need for greater career education.

3.4.3 Workforce Diversity

While the automotive industry overall fares marginally better than the mining industry in attracting female workers, female participation is heavily skewed towards administration and sales-related roles.

Female participation in trades such as motor mechanics, auto electricians, panel beaters and spray painters remains extremely low. Further, ABS statistics for August 2023 show that only 2.6% of automotive and engineering trades workers were women.[107]

In addition, NCVER enrolment statistics show that this may improve in the future, with approximately 4.5% female participation in the *Certificate III in Light Vehicle Mechanical Technology* and, perhaps more encouraging, 13.2% female participation in the *AUR20720 Certificate II in Automotive Vocational Preparation* (see Appendix A).

The industry has recognised that improving female participation in the automotive industry is not only an important opportunity for addressing labour shortages but also an opportunity to create a more diverse and welcoming culture for all.[108]

Research by the University of Sydney showed that women were more likely to be given apprenticeship opportunities and succeed when commitment to gender diversity was taken seriously by leadership and support from women's trades networking groups was available.[109]

An example of an industry-led initiative to support women in automotive trades to network, mentor them, and encourage them to succeed, is the 'Women in Automotive' organisation launched by the

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[106] Australian Automotive Aftermarket Association. 'Addressing Automotive Skills Shortages'.
[107] Australian Bureau of Statistics. 'Labour Force'.
[108] Capricorn Society. 'State of the Nation'.
[109] Sarah Oxenbridge, Rae Cooper, and Marian Baird. 2019. *'One of the boys?' - The Work and Career Experiences of Australian Women Working in Automotive Trades Occupations*. Sydney: University of Sydney.

Victorian Automotive Chamber of Commerce (VACC) in 1999. Similar initiatives in other states include 'Auto Women' in Qld, which was established in 2022 by the Motor Trades Association of Qld (MTAQ).

Therefore, AUSMASA will continue to work closely with the industry to explore ongoing opportunities toto improve female participation in the automotive industry, especially in relation to how the VET system can assist.

3.5 Industry Trends and Priorities

The Australian automotive industry is experiencing significant technological change, which creates both opportunities and challenges. The key trends faced by the industry are explored further below.

3.5.1 Technological Advancement

The automotive industry worldwide continues to implement new high-technology solutions and systems into vehicles, making the task of workers that service, repair and fit such systems more complicated and digitally reliant.

Modern vehicles are being fitted with advanced driver-assistance systems, including radars, multiple cameras, sensors, and sophisticated operating systems, to not only manage the engine, transmission and exhaust but also most of the in-cabin functions and experiences.

To the degree that such a modern and digitally enabled industry could assist in enticing new entrants to join it, such advances are welcome, as they are beneficial for the consumer and road safety in general. However, the increased presence of sophisticated software and electronic systems also requires the existing workforce to keep pace.

Frequent feedback from the industry to AUSMASA has been that many training providers are failing to keep pace with technology and teaching students on outdated equipment. Equally, some industry participants have lamented the fact that original equipment manufacturers (OEMs) are reluctant to grant access to their proprietary systems for training providers, requiring all training to be conducted by them, which may not always be possible in all locations.

Technological advancement, including EVs (discussed separately below), requires increased digital literacy requirements. It is imperative that the VET sector can support existing workers to keep pace

with this change and that qualifications are kept current to remain relevant. AUSMASA will work closely with the industry and Future Skills Organisation (FSO), the JSC responsible for digital literacy,) in addressing these needs.

3.5.2 Electric Vehicles (EVs)

Australia's National Electric Vehicle Strategy identifies the rapid increase in the adoption of EVs as critical to Australia achieving its net -zero ambitions. Australia's transport sector makes up 19% of emissions, with passenger and light commercial vehicles accounting for 60%.[110]

In addition to existing policies to increase the demand for EVs, the proposed introduction of Australia's first Fuel Efficiency Standard is aimed at boosting the supply of EVs.[111]

There are currently upwards of 83,000 EVs on Australian roads, with EVs accounting for 3.8% of all new cars purchased in 2022. While this represents an impressive 86% increase from 2021, Australia still lags behind many other international markets, noting that in the European Union, 17% of new car sales are EVs.[112]

Nonetheless, the future composition of Australia's vehicle fleet will increasingly be electric, which means that especially the service and repair sector needs to be prepared.

There are varying indicators of industry preparedness when it comes to servicing EVs. Capricorn Society's survey found that 22% of respondents viewed EVs as a challenge for the industry, with only 18% considering themselves currently, or soon to be, ready to service them.[113] Meanwhile, AAAA's Future Readiness Index suggests that 10% of businesses are already 'Future Ready', with a further 40% making progress towards becoming 'Future Ready'.[114]

In addition to investing in physical infrastructure to support the servicing of EVs, appropriate training for technicians will be critical. There are currently two skill sets and one dedicated qualification

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[110] Department of Climate Change, Energy, the Environment and Water. 2023. 'National Electric Vehicle Strategy'. *DCCEEW.gov*. https://www.dcceew.gov.au/sites/default/files/documents/national-electric-vehicle-strategy.pdf.
[111] Department of Climate Change, Energy, the Environment and Water. 'National Electric Vehicle Strategy'.
[112] Department of Climate Change, Energy, the Environment and Water. 'National Electric Vehicle Strategy'.
[113] Capricorn Society. 'State of the Nation'.
[114] Australian Automotive Aftermarket Association. 'Half of all Automotive Workshops'.

within the AUR training package designed to help equip current and future technicians with the skills they need to safely service and repair EVs:

- *AUR32721 Certificate III in Automotive Electric Vehicle Technology*
- *AURSS00063 - Battery Electric Vehicle Diagnose and Repair Skill Set*
- *AURSS00064 - Battery Electric Vehicle Inspection and Servicing Skill Set*

The two skills sets are currently the primary method of upskilling existing technicians, with the *AUR32721 Certificate III in Automotive Electric Vehicle Technology* the logical qualification to eventually become the default choice for automotive mechanical apprentices. However, feedback from the industry suggests that in its current state, the qualification does not actively equip apprentices with the skills required to work on internal combustion engine (ICE) vehicles, something that will still be required for decades to come.

Therefore, AUSMASA is currently working closely with the industry to explore what changes may be necessary to this qualification to allow it to better serve the industry's current and future needs.

Another evolving development, the outcome of which could have significant impacts on the automotive industry, is the contemplation by the Queensland Government as to whether tradespeople working on EVs ought to also be fully qualified electricians. Should such a decision be made, the current skills shortages for mechanical trades would only be exasperated.

The ongoing adoption of EV technology within the market is also giving rise to new automotive manufacturing opportunities for the industry, with several businesses beginning to specialise in EV conversions.

Australian firm Zero Automotive is preparing to roll out 200 EV-converted Toyota LandCruisers to underground mines as early as 2024,[115] with fellow Australian firm SEA Electric having even bolder plans to convert 8,500 Toyota HiLux and LandCruiser utilities (utes), also in support of the mining industry.[116] In this instance, demand factors from the mining industry are helping to drive new manufacturing opportunities in the automotive industry.

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[115] Jordan Mulach. 2023a. 'Electric Toyota Landcruiser 70 Series Ute Revealed for Australia – But Not Showrooms'. *Drive.com*. https://www.drive.com.au/news/electric-toyota-landcruiser-ute-revealed-for-australia/.
[116] Jordan Mulach. 2023b. 'Australian Company to Build 8500 Electric Toyota Hilux, Landcruiser Utes for Mining Sites'. *Drive.com*. https://www.drive.com.au/news/sea-electric-8500-toyota-hilux-landcruiser-mining/.

Further, EV technology is making inroads in the maritime industries, with several suppliers now offering EV-powered boats.

Electric and hybrid vehicles also have unique safety requirements, especially for first responders such as fire fighters, police, and tow truck operators in the case of a collision. Currently, there is no accredited training available for first responders in the VET system, with some training providers offering unaccredited training. However, AUSMASA understands that Public Skills Australia (PSA), the JSC responsible for public safety, is investigating the development of an accredited program and will work collaboratively with PSA to ensure that any program considers the needs of the automotive industry, especially those involved in accident repair.

An important aspect of the maturing battery-electric landscape is the need to consider end-of-life recycling. Current EV batteries are neither easy nor economical to recycle.[117] However, to ensure that the many critical minerals that have gone into each battery are not wasted, nor the environmental gains that were achieved during the life of the battery, governments are working on introducing recycling requirements.[118] This emerging skill will need to be passed on to the workers who are involved in dealing with end-of-life vehicles, and AUSMASA will continue to work closely with the industry to ensure the VET system is ready to respond with appropriate training programs.

3.5.3 Hydrogen

Hydrogen presents as another promising fuel technology, which, depending on the energy source used to produce it, can be considered either low emission or zero emission in nature. Although Australia's hydrogen industry is still developing, heavy linehaul haulage is seen as the most likely way that hydrogen will enter the automotive industry.[119]

This will create additional opportunities for truck manufacturers in Australia and require new skills for the technicians who service and repair such vehicles. A key enabler that is required prior to the broader adoption of hydrogen as a transport fuel is the establishment of refuelling infrastructure.

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[117] Ian Morse. 2021. 'A Dead Battery Dilemma'. *Science*, 372, no. 6544.
DOI: 10.1126/science.372.6544.780 org.
[118] Morse. 'A Dead Battery Dilemma'.
[119] Department of Climate Change, Energy, the Environment and Water. *State of Hydrogen.*

There are currently no accredited training programs for the manufacture, service and repair or safe handling of hydrogen within the VET system, and AUSMASA will continue to work closely with the industry to ensure that appropriate training programs are developed in time to support this emerging technology.

Section 4 - Opportunities for Further Research and Engagement

The preparation of this Initial Workforce Plan has provided AUSMASA with renewed clarity as to how data sources can provide greater insights and support strategic decision-making. Australia maintains a readily available and transparent set of statistical data, which has made much of the analysis in this report possible. Even so, some analyses would have benefited from additional data sources or granularity, and these are explored below.

Research and industry engagement in support of this Workforce Plan has highlighted a range of projects that AUSMASA will explore in greater detail and prioritise according to industry feedback.

Close stakeholder engagement is key to supporting such projects and gathering ongoing insights into both the mining and automotive industries. Specific strategies for future engagement and collaboration opportunities are listed below.

4.1 Gaps in the Available Data

The following observations have been made in relation to the availability of data pertaining to workforce planning and greater insights for the mining and automotive industries:

- To arrive at granular data for specific industries or job roles, a variety of interrogative approaches are required with varying levels of success using ANZSIC, ANZSCO and ABS data. The ability to access such granular data (down to specific job roles), aligned to JSC industries and subdivisions, directly from JSA, would be highly valuable.

- NCVER conducts a biennial survey of employer use and satisfaction with the VET system. The results from this survey are high-level and show an overall employer satisfaction rating

of 86.5% for apprenticeship training in mining and 68.5% for apprenticeship training in manufacturing (under which automotive servicing falls).[120]

A range of industry feedback regarding concerns with the currency of some education providers' training environments, combined with the gap between qualified job applicants and those deemed suitable for employment, suggests that more granular insights into the views of the industry on training outcomes are warranted.

- Although NCVER enrolment data is useful in identifying trends, the ability for JSCs to also have access to statistical data on enrolments by education providers would be highly useful. Such data could be used to inform specific engagement activities.

- NCVER data on apprenticeship commencements and completions is highly useful, though additional insights such as student progression (in terms of time and unit progression) at time of apprenticeship discontinuation would aid in better identifying opportunities for intervention and redress.

- While skilled migration has been identified as a key contributor to meeting current and future skills shortages, skilled migration rates vary across occupations and industries. Additional data is required to understand specific trends and occupations that are in demand.

- Research for this workforce plan has highlighted that automotive workshops have been increasing in number at more than twice the rate of expansion in Australia's national vehicle fleet. Understanding the reasons for this rapid expansion would provide valuable insights into workforce dynamics and inform attraction and retention strategies accordingly.

- Having data insights into how the mining industry is perceived by Generation Z has shown to be highly useful for the development of specific attraction and pathway opportunities in the future. Such insights would be equally beneficial for the automotive industry.

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[120] NCVER. 2023. *Use and satisfaction of accredited training by type of training and employer characteristics, 2005-2023 (DataBuilder).* Canberra, November.

- The ability to review data from across both industries on the reasons why workers either move to another employer within their industry, or leave their industry altogether, would provide valuable insights into which attraction and retentions strategies are working, what motivates staff to remain in or depart from a job or industry, and what other strategies may be required by the industry to address any shortcomings. Such insights would invariably require the close cooperation of the industry itself in agreeing to conduct (if not already done) and share de-identified exit interview information.

- Detailed skills-mapping data, especially for key roles within the mining and automotive industries that are facing either transformation challenges (coal) or technological advancement (critical minerals processing, automation, EVs), would allow for a comparison between the current state of skills and those of the future state for key roles. In turn, such skills data would be a crucial component of developing relevant and responsive training programs to assist the workforce in upskilling. Such a skills-mapping exercise is flagged as a priority project for AUSMASA, noting also that such an approach would be directly supporting the Australian Government's Employment White Paper's strategy for a Skills Passport.

4.2 Future Priorities

The following activities are considered by AUSMASA as priorities in supporting both the mining and automotive industries to build and maintain the skilled workforce that is required for today and tomorrow. Additionally, AUSMASA will work closely with both industries to further test, adjust and prioritise this list of potential projects. AUSMASA's Strategic Workforce Advisory Committees (SWAPs) will play an important role in influencing, informing and endorsing these and future priorities.

Opportunity 1

Given the significant changes happening within the automotive industry with the ongoing growth of battery EVs (light, heavy and mobile plant), the emergence of hydrogen and feedback on the suitability of vocational preparation qualifications in sufficiently promoting all aspects of an automotive career path, AUSMASA proposes to conduct a targeted review of the AUR training package to ensure that key elements of it remains fit for purpose.

Elements of the review would focus on:
- Qualifications with historically low or no enrolments.
- The ability for training providers to train students on the required modern equipment/vehicles to produce credible training outcomes, creating a benchmark of what best practice looks like.
- The potential and desirability of mechanical trade qualifications to incorporate sufficient elements of both EV servicing technology and internal combustion engine (ICE) technology to prevent the need for dual-qualifications and/or skill sets to equip the workforce with the necessary skills to operate in an environment where both types of vehicles will be prevalent for decades to come.
- Potential changes to the package's vocational preparation qualifications to ensure they adequately prepare students for higher-level VET training within the automotive industry and suitably expose students to a broad range of skills and vocational opportunities.

NEXT STEPS: Project submission for Annual Activity Schedule

Opportunity 2

The RII and AUM training packages should also be reviewed for qualifications with historically low or no enrolments, determining their ongoing fit for purpose or other strategies to promote their uptake.

NEXT STEPS: Project brief development.

Opportunity 3

The Year 13 research undertaken by AUSMASA (then called AUSMESA) has been particularly insightful for establishing the views of Generation Z towards the mining industry. While it is the view of the automotive industry that a number of those findings would also hold true for their industry, there is no data to support those views.

An understanding of Generation Z perceptions of the automotive industry would assist in the development of specific vocational preparation courses and inform strategies to better promote the industry to potential new entrants.

As such, a research project to identify the public perception of the automotive industry is proposed.

NEXT STEPS: Project brief development.

Opportunity 4

AUSMASA proposes to work with key mining industry employers with the view of establishing a research project that collects de-identified exit interview data and explores reasons for workers choosing to change employers within the industry or leave the industry altogether.

Such data would provide valuable insights into what workforce attraction and retention strategies are working, why people choose to leave the industry completely and what role, if any; training

opportunities, or lack thereof; or challenges in adapting to new technologies or processes played a part in the worker's decision to leave.

NEXT STEPS: Concept brief development and discussion with key mining employers to ascertain willingness to participate in such a study.

Opportunity 5

Understanding the current skills landscape, especially for key roles in both the mining and automotive industries, coupled with a skills map of what will be required in the future for both existing and any new roles, is critical for the development of responsive training packages that meet current and forecasted skills gaps.

To that end, AUSMASA proposes to undertake a comprehensive skills mapping exercise for key roles in both industries, for both the current and future state. The key roles of focus will be based on the top roles identified for each industry in this Workforce Plan, and further refined through stakeholder feedback.

Aspects of such a project would include:
- Current skills identification of key roles in both industries
- Skills identification of future needs, be they for the same roles or, in the case of role augmentation or transformation, new roles (i.e., critical minerals processing, service and repair of hydrogen vehicles or end-of-life recycling of batteries)
- The development of both present state and future state 'personas'
- Comprehensive skills gap analysis
- Mapping of identified skills against current qualifications

NEXT STEPS: Project brief development following additional stakeholder engagement and feedback.

Opportunity 6

Utilising the insights gathered from the skills-mapping project, it is proposed that the RII training package elements that deal with mineral processing are reviewed to ensure they are fit for purpose in supporting increased critical minerals onshore refining and processing activities.

NEXT STEPS: Pending completion of the skills-mapping project.

Opportunity 7

As identified in this plan, car detailers represent a sizable component of the automotive industry workforce, with no requirement for a formal qualification (Skill Level 5). Given car detailer's existing engagement with the industry, AUSMASA proposes to explore what support, including potential Language, Literacy and Numeracy training, is necessary to encourage car detailers to consider a trade in the industry (Light Vehicle Mechanic, Auto Electrician etc).

NEXT STEPS: Project concept development with additional engagement with industry.

Opportunity 8

It has already been identified that skilled migration should be playing an important part in helping to address skills gaps in both the mining and automotive industries. However, evidence to date suggests that it is failing to have the full desired impact.

Therefore, AUSMASA proposes to engage closely with industry to ascertain key barriers to fully utilising the skilled migration pathway to assist in addressing skills shortages.

This project would also explore the role of Australian international education programs aligned with the mining and automotive industries, with a focus on their ability to provide graduates that may assist with skills shortages.

NEXT STEPS: Project brief development.

Opportunity 9

Complementing the skills-mapping project, AUSMASA proposes to undertake a thorough career progression-mapping exercise for both the mining and automotive industries, exploring current pathways for people to join the industries through entry into, through and beyond the VET environment.

Insights gained from this career pathway map could inform the development of new qualifications and skill sets, which could include:

- Specific qualifications and skill sets aimed at helping secondary students, career changers or workers impacted by workforce transformation to gain access to the mining and automotive industries.
- Revised and/or new qualifications and skill sets designed to assist in career progression aligned with the skills that the industry will need both now and in the future.
- Development of higher-education qualifications and/or programs to help workers prepare for and access university-grade disciplines in demand by the mining and automotive industries. Examples could include degree apprenticeships and associate degrees, noting that this supports the focus of the Employment White Paper on higher apprenticeships.

NEXT STEPS: Project brief development with additional scoping input and insights from industry.

Opportunity 10

AUSMASA proposes to monitor the impact of industry initiatives to improve workplace culture, especially as it relates to bullying and sexual harassment. The most useful source of data to inform such progress would be from mining industry employers themselves based on internal reporting and investigation of incidents.

Additional insights would be gained from any changes in trends recorded by the WGEA, state-based commissioners and/or regulators and the Australian Human Rights Commission.

NEXT STEPS: Further investigation of data sources is required.

Opportunity 11

AUSMASA will look to expand the Building Safe and Respectful Workplaces (BS&RW) program with a view of eventually creating a unit of competency for inclusion in one or more training packages.

The BS&RW program is currently non-accredited, with the project nearing a stage where the course will become a licensed product.

If further stakeholder feedback continues to show that this program is delivering tangible benefits, a logical next step would be to explore developing it as a unit of competency.

NEXT STEPS: Further monitoring of current course rollout and stakeholder feedback.

Opportunity 12

Valuable insights can be learned from investigating how other countries tackle similar skills challenges in their workforce. Therefore, AUSMASA plans to gain a greater understanding of overseas skills and training strategies with a view of using this to inform other activities identified in this section of the workforce plan.

NEXT STEPS: Project scoping involving insights from industry stakeholders.

4.3 Key Stakeholders and Engagement Strategy

AUSMASA recognises the important contribution that industry, peak bodies, unions, STAs, government departments (both state and federal), the education sector and other JSCs make in the successful execution of AUSMASA's workforce planning, industry stewardship, training product development and implementation, promotion, and monitoring functions.

Appendix B lists the key stakeholders currently being engaged by AUSMASA, noting that this list is constantly expanding and evolving. Appendix B identifies key stakeholders by industry (mining and automotive), by government department and by education provider type (public and private).

Furthermore, within the mining and automotive industry stakeholder lists, further classification for employers, unions, original equipment manufacturers (OEM) and industry associations/peak bodies is made.

Employers and unions are critical for receiving granular feedback on industry movements, challenges and opportunities at specific sites and amongst particular job roles. On the other hand, industry and peak bodies can provide valuable industry-wide insights on trends, challenges, opportunities and are often able to leverage their large membership base to gain in-depth survey data.

OEMs provide up-to-date intelligence on the technologies that will shape the future workforce of the mining and automotive industries and are often keenly involved in training initiatives for such new features.

STA's and government departments are key sources of policy priorities, including the funding of training, investment in TAFE infrastructure and strategies impacting work health and safety and localised workforce transformation challenges.

Public and private education providers are critical for ensuring the delivery considerations of training products are understood, with providers also offering industry insights from a training and education perspective.

Finally, AUSMASA recognises the critical importance of its relationship with the Australian Government Department of Employment and Workforce Relations (DEWR), JSA and the National Career Institute (NCI) as key partners in the success of the JSC model. Close working relationships with DEWR, JSA and NCI are maintained at the executive leadership level of AUSMASA.

It should be noted that AUSMASA is applying a diverse range of strategies to ensure that key stakeholders are consulted, and projects are driven by industry needs, considering the needs and perspectives of individual states and territories.

4.3.1 Existing Engagement Activities

Further, AUSMASA has implemented a range of strategies to engage with, and be informed by, key stakeholders. These activities are identified below.

4.3.1.1   Direct Stakeholder Engagement

AUSMASA is keenly interested in connecting widely with the mining and automotive industries, and while a number of formal engagement mechanisms are detailed below, the Industry Engagement team within AUSMASA stands ready and willing to connect with stakeholders at any time.

The AUSMASA team regularly attends and supports key industry events, conventions, and conferences around Australia in order to connect with a wide array of stakeholders. However, the Industry Engagement team is prepared to connect with interested stakeholders and discuss concerns, insights or explore opportunities for the mining and automotive industries as required. Such meetings can occur in person or online.

AUSMASA has staff based in WA, Qld, and Vic, and regularly visits other states and territories, in both metropolitan and regional locations.

AUSMASA aims to respond to industry enquiries within two business days.

4.3.1.2 Strategic Workforce Advisory Panels

To provide key insights into each panel's respective industry and help inform the priorities of AUSMASA's recommended projects, AUSMASA has established two Strategic Workforce Advisory Panels (SWAPs), one for mining and one for automotive.

Each panel consists of 15 members comprising employers, unions, education provider peak bodies (both TAFE and private RTOs), industry associations and OEMs. The selection of each panel's members was completed in September, with each panel planned to meet four times per year.

The composition of each SWAP panel was guided by a range of strategic objectives, including the desire to aim for gender balance, broad geographic representation, a diversity of organisation types and the appointment of members with detailed industry insights.

As SWAP panels are a formal advisory body within AUSMASA's engagement structure they provide a key advisory and project endorsement function.

4.3.1.3 Technical Advisory Groups (TAGs)

Technical Advisory Groups (TAGs) are established in support of specific projects and are designed to provide subject matter expert advice and guidance throughout the training product development process.

As such, the number of TAGs constituted at any given time will depend on the quantum of projects underway with AUSMASA. Moreover, TAGs consist of 12–15 members, with meetings generally occurring monthly for the duration of the project.

As per the guiding principles of SWAPs, TAG members will comprise employers, unions, relevant industry groups and associations as well as education providers.

4.3.1.4 Industry and Education Provider Roundtables

AUSMASA aims to hear from industry all throughout Australia, noting that different regions, rural and remote communities, and certain locations have unique opportunities and challenges that need to be understood.

Above and beyond the engagement strategies already identified, AUSMASA conducts a range of industry, and education provider, roundtables throughout 19 different locations in Australia. Roundtables are open to any interested stakeholder and are offered free of charge.

Roundtables allow participants to hear directly from AUSMASA as to the status of current and planned projects. Importantly, roundtables feature a facilitated session whereby participants can directly share their insights as to candidate attraction and retention issues, and opportunities, how well the VET system and current qualifications are serving their needs and any emerging trends that industry feels will have an impact in the near future.

The insights gained by these roundtables feeds directly into AUSMASA's stakeholder insights ecosystem and is used to inform future bodies of work to assist industry.

Roundtables are run separately for each industry.

Roundtables commenced in September 2023 and will run on an annual basis. The current locations identified for roundtables are as follows:

Queensland	**New South Wales**	**South Australia**	**Victoria**
- Brisbane	- Albury/Wodonga	- Adelaide	- Ballarat
- Cairns	- Newcastle		- Bendigo
- Mt Isa	- Orange	**Western Australia**	- Geelong
- Townsville	- Sydney	- Kalgoorlie	- Melbourne
	- Wollongong	- Perth	
Tasmania		- Porth Hedland	**Northern Territory**
- Burnie			- Darwin
- Hobart			

4.3.1.5   State Training Authorities and Government Departments

AUSMASA values the importance of maintaining collaborative engagement with all relevant State Training Authorities (STA) and applicable government departments, both state and federal.

Engagements with STAs and government departments are organised by members of AUSMASA's executive leadership team, via regular communication and meetings.

4.3.2 Planned Engagement Activities

Additional engagement activities are planned to be introduced in the near future to further enhance AUSMASA's ability to gain valuable industry insights.

4.3.2.1   Critical Minerals and Electric Vehicle Skills Forum 2023

Critical minerals and electric vehicles are changing the landscape of Australia's mining and automotive industries, unlocking a decarbonised future, and creating new opportunities for skills development, career growth and new entrants to both industries.

In support of the Critical Minerals Strategy and National Electric Vehicle Strategy, AUSMASA will be bringing together the leading critical thinkers from both industries to create a skills plan for the workforce that will help to make both strategies a reality.

The skills forum will be held in Canberra on Thursday 26 October 2023.

The Critical Minerals and Electric Vehicle Skills Forum is the first such event organised by AUSMASA, with similar annual events for other high priority occupations and/or sub-sectors likely to follow.

4.3.2.2   The AUSMASA Pulse of the Industry Survey

A new engagement strategy that AUSMASA will discuss with key stakeholders is the concept of a broad-ranging survey to gain insights into attraction and retention, emerging trends and satisfaction with specific qualifications and programs.

Noting that AUSMASA's stakeholders, especially key industry bodies, have access to large databases of industry participants, it is envisaged that any such survey would be conducted in partnership with these organisations.

Discussions around how such a survey would work are planned to commence before the end of the year, with a proposed first survey scheduled for February 2024, in time to add insights into the next annual workforce plan.

4.3.2.3 Direct Engagement for Feedback on Initial Workforce Plan

A key activity that will be undertaken by the AUSMASA team over the coming months is the broad socialisation of this Initial Workforce Plan amongst industry stakeholders. It is critical that AUSMASA's workforce planning activities are informed, and endorsed, by industry.

As an initial scan of the mining and automotive industries, feedback is needed to improve and broaden future iterations of this report.

Key feedback activities will occur between December 2023 to late February 2024 consisting of the plan's broad dissemination, online feedback opportunities, discussion at upcoming industry roundtables and focussed feedback from AUSMASA's Strategic Workforce Advisory Committees. AUSMASA's Industry Engagement team will also seek feedback directly from key industry stakeholders via targeted interviews.

4.3.2.4   Briefing Sessions for STAs and Industry Regulators

Following on from the dedicated introductory meetings held by AUSMASA with STAs, it is proposed to transition to regular web-enabled briefings to keep STAs and industry regulators abreast of projects being undertaken by AUSMASA and seek specific feedback on state and territory priorities.

Such briefings are likely to be bi-annual, in line with AUSMASA's Annual Activity Schedule, with ad-hoc briefings organised for any urgent development work being undertaken.

The first briefings are planned for late 2023, after AUSMASA's initial Annual Activity Schedule is finalised.

4.3.2.5   Creation of a Thought Leadership Network

The mining and automotive industries are at the forefront of technological innovation and exciting new trends and opportunities. Whilst many of AUSMASA's engagement strategies are focussed on understanding the current and emerging needs of industry, it is equally important to keep an eye on the future pipeline of technology, disruption, and opportunities.

To that end, AUSMASA will establish a Thought Leadership Network to bring together futurists, experts in the technologies that will shape the future of the mining and automotive industries and other key industry leaders.

The Thought Leadership Network is in its early stages of conceptual development.

4.3.2.6 Collaboration with Other Jobs and Skills Councils

AUSMASA is privileged to be working alongside nine other dedicated JSCs, who all share the common aim of assisting the industries that we represent to thrive.

Many of the challenges and opportunities faced by the mining and automotive industries are shared by others too. Innovative and impactful solutions often benefit from collaborative efforts.
The CEOs from all ten JSCs meet at least quarterly to share learnings and challenges with a view of identifying opportunities for collaborative solutions.

In addition to these quarterly CEO meetings, AUSMASA is proposing to discuss two additional JSC-wide collaboration opportunities with the other JSCs.

The first proposal will be to work on a large multi-industry career map, highlighting the career entry, progression, and mobility available in Australia's modern workforce. The ability to jointly explore inter-industry linkages, entry and exit points between industries and the shared skills required to make such journeys possible would offer deeper insights into common development opportunities within each JSC's respective training packages and serve as a visual tool for career exploration.

Secondly, AUSMASA proposes the joint hosting by all JSCs of a 'State of the Nation' forum, with a particular focus on technology and its impact on future workforces across multiple industries. The

ability to get key stakeholders from multiple industries to collaborate and explore potential solutions to a changing workforce landscape could give rise to an ongoing signature event for the JSC network.

AUSMASA also recognises the mining and automotive industries are naturally closely aligned to other industries such as oil and gas, transport and logistics, manufacturing, digital skills and building and construction. It makes sense to seek out close working relationships with the JSCs that support these industries.

This plan has already highlighted opportunities to work with Future Skills Organisation on improving digital literacy skills and Public Skills Australia on first responder training in relation to EV accidents.

Additionally, AUSMASA will work with BuildSkills Australia, with whom AUSMASA shares elements of the RII training package, to ensure that any work on the package considers the needs of both the mining and civil construction industries.

Engagement with Industry Skills Australia, who represent the transport industry, will likely revolve around the shared exploration of the impact of hydrogen and driverless technologies on heavy transport, as well as opportunities that arise as part of the broader critical mineral strategy as it relates to supply-chain implications from increased onshore refining and processing.

Finally, engaging with Powering Skills Organisation, who represent energy, oil and gas and renewables, will likely revolve around shared workforce challenges between mining and the oil and gas industry, noting numerous critical trades roles are shared across both industries.

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Appendix A – Enrolment Data Tables

The following NCVER data shows enrolment data for the three training packages under AUSMASA's remit (AUM, AUR and RII [[mining]).]).

TRAINING PACKAGE ENROLMENT DATA, 2022					
Automotive Industry Manufacturing (AUM)	**Total Enrolled**	**% Male**	**% Female & Other**	**2022 Commencements**	**2022 Completions**
AUM30218 - Cert III in Automotive Manufacturing Technical Operations - Bus, Truck and Trailer	475	94.7%	5.3%	235	85
				49.5% Commence	**17.9% Complete**

TRAINING PACKAGE ENROLMENT DATA, 2022					
Resources and Infrastructure (RII mining qualifications only)	**Total Enrolled**	**% Male**	**% Female & Other**	**2022 Commencements**	**2022 Completions**
RII30120 - Cert III in Surface Extraction Operations	7,040	76.6%	23.4%	2260	480
RII20120 - Cert II in Resources and Infrastructure Work Preparation	4,375	79.7%	20.3%	45	35
RII20220 - Cert II in Surface Extraction Operations	2,755	74.8%	25.2%	225	100
RII30719 - Cert III in Emergency Response and Rescue	2,600	82.9%	17.1%	0	0
RII31820 - Cert III in Drilling Operations	1,765	98.3%	1.7%	395	140
RII20920 - Cert II in Drilling Operations	1,670	95.2%	4.8%	800	280
RII30115 - Cert III in Surface Extraction Operations	1,505	83.4%	16.6%	10	145
RII30420 - Cert III in Resource Processing	1,440	75.0%	25.0%	195	45
RII40220 - Cert IV in Surface Coal Mining (Open Cut Examiner)	1,210	83.1%	16.9%	0	0
RII20320 - Cert II in Underground Coal Mining	1,110	87.4%	12.6%	190	15
RII20420 - Cert II in Underground Metalliferous Mining	665	78.9%	21.1%	1290	420
RII30220 - Cert III in Underground Coal Operations	600	96.7%	3.3%	35	40
RII20215 - Cert II in Surface Extraction Operations	530	89.6%	10.4%	0	10
RII40920 - Cert IV in Drilling Operations	505	98.0%	2.0%	85	40
RII20515 - Cert II in Resource Processing	415	94.0%	6.0%	0	15
RII50120 - Diploma of Surface Operations Management	380	88.2%	11.8%	15	0
RII40420 - Cert IV in Underground Coal Operations	305	96.7%	3.3%	0	0
RII32220 - Cert III in Well Servicing Operations	210	100.0%	0.0%	0	0
RII40120 - Cert IV in Surface Extraction Operations	205	95.1%	4.9%	85	0
RII20213 - Cert II in Surface Extraction Operations	190	86.8%	13.2%	0	0
RII30415 - Cert III in Resource Processing	160	87.5%	12.5%	0	20
RII20115 - Cert II in Resources and Infrastructure Work Preparation	145	69.0%	31.0%	10	0
RII30320 - Cert III in Underground Metalliferous Mining	120	87.5%	12.5%	160	50
RII30113 - Cert III in Surface Extraction Operations	95	84.2%	15.8%	0	0
RII50620 - Diploma of Drilling Operations	90	100.0%	0.0%	0	0
RII41220 - Cert IV in Well Servicing Operations	85	94.1%	5.9%	0	0
RII40320 - Cert IV in Underground Metalliferous Mining Operations	80	93.8%	6.3%	10	0
RII50920 - Diploma of Underground Coal Mining Management	80	81.3%	18.8%	0	0
RII51020 - Diploma of Well Servicing Operations	80	100.0%	0.0%	0	0
RII10115 - Cert I in Resources and Infrastructure Operations	70	57.1%	42.9%	0	0
RII31619 - Cert III in Trenchless Technology	70	100.0%	0.0%	55	15
RII50115 - Diploma of Surface Operations Management	50	90.0%	10.0%	0	0
RII40213 - Cert IV in Surface Coal Mining (Open Cut Examiner)	35	57.1%	42.9%	0	0
RII41319 - Cert IV in Emergency Response Coordination	30	83.3%	16.7%	0	0
RII20520 - Cert II in Resource Processing	25	80.0%	20.0%	40	10
RII30520 - Cert III in Mining Exploration	25	100.0%	0.0%	0	0
RII20415 - Cert II in Underground Metalliferous Mining	20	100.0%	0.0%	0	145
RII40315 - Cert IV in Metalliferous Mining Operations (Underground)	20	75.0%	25.0%	0	0
RII60320 - Advanced Diploma of Underground Coal Mining Management	20	100.0%	0.0%	0	0
RII30111 - Cert III in Surface Extraction Operations	15	100.0%	0.0%	0	0
RII30315 - Cert III in Underground Metalliferous Mining	15	100.0%	0.0%	0	10
RII31815 - Cert III in Drilling Operations	15	100.0%	0.0%	0	0
RII40115 - Cert IV in Surface Extraction Operations	15	66.7%	33.3%	0	0
RII40215 - Cert IV in Surface Coal Mining (Open Cut Examiner)	15	100.0%	0.0%	0	0
RII40415 - Cert IV in Underground Coal Operations	15	100.0%	0.0%	0	0
RII60415 - Advanced Diploma of Drilling Management	15	100.0%	0.0%	0	0
RII30715 - Cert III in Mine Emergency Response and Rescue	10	100.0%	0.0%	0	0
RII50915 - Diploma of Underground Coal Mining Management	10	100.0%	0.0%	0	0
RII60220 - Advanced Diploma of Extractive Industries Management	10	50.0%	50.0%	0	0
RII20915 - Cert II in Drilling Operations	5	100.0%	0.0%	0	0
RII32218 - Cert III in Well Servicing Operations	5	100.0%	0.0%	0	0
RII60115 - Advanced Diploma of Metalliferous Mining	5	0.0%	100.0%	0	0
RII60120 - Advanced Diploma of Metalliferous Mining	5	100.0%	0.0%	0	0
RII60215 - Advanced Diploma of Extractive Industries Management	5	100.0%	0.0%	0	0
	30,935	**82.9%**	**17.1%**	**5,905**	**2,015**
				19.1%	**6.5%**
				Commence	**Complete**

TRAINING PACKAGE ENROLMENT DATA, 2022					
Automotive Industry Retail, Service and Repair (AUR)	Total Enrolled	% Male	% Female & Other	2022 Commencements	2022 Completions
AUR30620 - Cert III in Light Vehicle Mechanical Technology	15,620	95.4%	4.6%	5280	510
AUR30616 - Cert III in Light Vehicle Mechanical Technology	11,125	95.6%	4.4%	385	2305
AUR20720 - Cert II in Automotive Vocational Preparation	9,780	86.8%	13.2%	0	0
AUR31116 - Cert III in Heavy Commercial Vehicle Mechanical Technology	4,555	95.8%	4.2%	210	1090
AUR40216 - Cert IV in Automotive Mechanical Diagnosis	4,375	97.8%	2.2%	155	0
AUR31120 - Cert III in Heavy Commercial Vehicle Mechanical Technology	4,275	95.9%	4.1%	2295	190
AUR20716 - Cert II in Automotive Vocational Preparation	3,820	89.4%	10.6%	0	0
AUR31216 - Cert III in Mobile Plant Technology	3,470	94.1%	5.9%	190	885
AUR31220 - Cert III in Mobile Plant Technology	3,060	91.3%	8.7%	1645	120
AUR30320 - Cert III in Automotive Electrical Technology	2,770	91.9%	8.1%	1305	75
AUR50216 - Diploma of Automotive Technology	2,660	98.1%	1.9%	0	0
AUR30316 - Cert III in Automotive Electrical Technology	2,485	92.4%	7.6%	150	560
AUR20520 - Cert II in Automotive Servicing Technology	1,640	87.2%	12.8%	195	35
AUR20516 - Cert II in Automotive Servicing Technology	1,635	87.2%	12.8%	20	55
AUR20220 - Cert II in Automotive Air Conditioning Technology	1,525	97.4%	2.6%	15	0
AUR31020 - Cert III in Automotive Sales	1,280	75.4%	24.6%	640	50
AUR10120 - Cert I in Automotive Vocational Preparation	1,220	80.3%	19.7%	60	55
AUR32416 - Cert III in Automotive Refinishing Technology	1,105	89.1%	10.9%	70	305
AUR32120 - Cert III in Automotive Body Repair Technology	1,005	97.0%	3.0%	615	30
AUR32116 - Cert III in Automotive Body Repair Technology	985	97.5%	2.5%	45	230
AUR32420 - Cert III in Automotive Refinishing Technology	980	89.8%	10.2%	640	45
AUR21920 - Cert II in Automotive Tyre Servicing Technology	960	95.8%	4.2%	275	115
AUR31016 - Cert III in Automotive Sales	955	83.2%	16.8%	70	175
AUR20218 - Cert II in Automotive Air Conditioning Technology	895	96.1%	3.9%	0	0
AUR30420 - Cert III in Agricultural Mechanical Technology	800	96.3%	3.8%	445	35
AUR30416 - Cert III in Agricultural Mechanical Technology	615	96.7%	3.3%	15	160
AUR50116 - Diploma of Automotive Management	610	95.9%	4.1%	0	0
AUR30816 - Cert III in Motorcycle Mechanical Technology	485	95.9%	4.1%	40	125
AUR30820 - Cert III in Motorcycle Mechanical Technology	485	93.8%	6.2%	240	15
AUR30516 - Cert III in Marine Mechanical Technology	460	98.9%	1.1%	35	85
AUR20416 - Cert II in Automotive Electrical Technology	445	91.0%	9.0%	5	0
AUR32220 - Cert III in Automotive Glazing Technology	345	91.3%	8.7%	235	10
AUR30716 - Cert III in Outdoor Power Equipment Technology	260	96.2%	3.8%	15	40
AUR32518 - Cert III in Automotive Underbody Technology	255	100.0%	0.0%	90	40
AUR30520 - Cert III in Marine Mechanical Technology	225	100.0%	0.0%	180	0
AUR20420 - Cert II in Automotive Electrical Technology	220	88.6%	11.4%	30	0
AUR20916 - Cert II in Automotive Body Repair Technology	185	86.5%	13.5%	25	30
AUR30720 - Cert III in Outdoor Power Equipment Technology	185	94.6%	5.4%	115	5
AUR20920 - Cert II in Automotive Body Repair Technology	180	91.7%	8.3%	55	40
AUR30220 - Cert III in Bicycle Workshop Operations	160	90.6%	9.4%	85	0
AUR31520 - Cert III in Automotive Diesel Engine Technology	140	100.0%	0.0%	15	0
AUR40820 - Cert IV in Automotive Mechanical Overhauling	120	95.8%	4.2%	0	0
AUR21220 - Cert II in Automotive Underbody Technology	100	95.0%	5.0%	50	25
AUR31316 - Cert III in Automotive Engine Reconditioning	90	94.4%	5.6%	20	20
AUR21820 - Cert II in Automotive Steering and Suspension System Technology	80	87.5%	12.5%	15	10
AUR21916 - Cert II in Automotive Tyre Servicing Technology	80	93.8%	6.3%	0	5
AUR32216 - Cert III in Automotive Glazing Technology	75	100.0%	0.0%	0	40
AUR20820 - Cert II in Outdoor Power Equipment Technology	70	92.9%	7.1%	0	0
AUR20320 - Cert II in Bicycle Mechanical Technology	65	84.6%	15.4%	0	0
AUR32320 - Cert III in Automotive and Marine Trimming Technology	60	83.3%	16.7%	45	0
AUR40416 - Cert IV in Automotive Performance Enhancement	60	91.7%	8.3%	0	0
AUR30116 - Cert III in Automotive Administration	55	27.3%	72.7%	30	20
AUR30920 - Cert III in Motor Sport Technology	50	90.0%	10.0%	0	0
AUR32316 - Cert III in Automotive and Marine Trimming Technology	50	90.0%	10.0%	0	15
AUR21520 - Cert II in Automotive Cylinder Head Reconditioning	45	100.0%	0.0%	0	0
AUR31820 - Cert III in Heavy Commercial Trailer Technology	45	100.0%	0.0%	20	5
AUR40620 - Cert IV in Automotive Electrical Technology	45	100.0%	0.0%	0	0
AUR30216 - Cert III in Bicycle Workshop Operations	40	87.5%	12.5%	5	20
AUR10116 - Cert I in Automotive Vocational Preparation	30	83.3%	16.7%	0	0
AUR31420 - Cert III in Automotive Diesel Fuel Technology	25	100.0%	0.0%	5	5
AUR40116 - Cert IV in Automotive Management	25	80.0%	20.0%	15	0
AUR40720 - Cert IV in Automotive Body Repair Technology	10	100.0%	0.0%	0	0
AUR40816 - Cert IV in Automotive Mechanical Overhauling	10	100.0%	0.0%	0	0
AUR21120 - Cert II in Automotive Sales	5	0.0%	100.0%	0	0
AUR21816 - Cert II in Automotive Steering and Suspension System Technology	5	100.0%	0.0%	0	0
AUR31816 - Cert III in Heavy Commercial Trailer Technology	5	100.0%	0.0%	0	0
AUR40320 - Cert IV in Motor Sport Technology	5	100.0%	0.0%	0	0
	89,485	93.0%	7.0%	16,090	7,580
				18.0% Commence	8.5% Complete

Appendix B – Key Stakeholders

Mining Industry Stakeholders

Employers	Industry Associations / Peak Bodies
Arafura Rare Earths	Association of Mining and Exploration Companies (AMEC)
BHP	Austmine
BHP Mitsubishi Alliance	Australasian Institute of Mining and Metallurgy (AusIMM)
Evolution Mining	Australian Drilling Industry Association (ADIA)
Fortescue	Chamber of Minerals and Energy WA (CME)
Glencore	Coal Services NSW
Idoba	Construction and Mining Equipment Industry Group (CMEIG)
IntoWork	Construction Material Processors Association (CMPA)
Locating Unlimited	Minerals Council of Australia (MCA)
Minerals Resources	Resource and Engineering Skills Alliance (RESA)
One Key Resources	Resource Industry Training Council (RITC)
Programmed Skilled Workforce	Tasmanian Minerals, Manufacturing and Energy Council (TMEC)
Rio Tinto	

Original Equipment Manufacturers	Unions
Barminco	Australian Workers Union (AWU)
Caterpillar	Mining and Energy Union (MEU)
Hastings Deering	
Hitachi	
Komatsu	
Liebherr	
Murray Engineering	
Normet	
Westrac	
William Adams	

Automotive Industry Stakeholders

Original Equipment Manufacturers/Employers	Industry Associations / Peak Bodies
Carloop	Australian Automotive Aftermarket Association (AAAA)
Cummins	Australian Refrigeration Council (ARC)
Foton mobility	Boating Industry Association (BIA)
Isuzu	Bus Industry Confederation (BIC)
Paccar	Capricorn Society
Pure Hydrogen	Federal Chamber of Automotive Industries (FCAI)
Revora	Future Battery Industries Cooperative Research Centre
Scania	Heavy Vehicle Industry Association (HVIA)
Tesla	Motor Trade Association of SA/NT (MTA SA/NT)
United Forklift and Access Solutions	Motor Trades Association NSW (MTA NSW)
Velocity Trucks	Motor Trades Association of Australia (MTAA)
Volkswagen Group	Motor Trades Association of Queensland (MTAQ)
	Motor Trades Association of Western Australia (MTA WA)
	Queensland Resources Council
	Tasmanian Automotive Chamber of Commerce (TACC)
	Truck Industry Council (TIC)
	Utilises Engineering Electrical Automotive Training Council (UEEA)
	Utilities, Engineering, Electrical, Automotive Training Council (UEEA)
	Victorian Automotive Chamber of Commerce (VACC)

Unions
Australian Manufacture Workers Union (AMWU)
Electrical Trades Union (ETU)

State Training Authorities & Government Departments

State Training Authorities	Government Departments
Automotive Training Board NSW	Department of Biodiversity, Conservation and Attractions (DBCA) (Australian Government)
NSW Department of Education, Skills & Pathways	Department of Education - Training Services NSW | Education and Skills Reform Division (NSW)
Training Services NSW	
Office of the State Training Board WA	Department of Education (NT)
Victorian Skills Authority	Department of Energy, Environment and Climate Action (DELWP) (Australian Government)
Skills Canberra	Department of Energy, Environment and Climate Action (VIC)
Skills SA	Department of Industry, Tourism and Trade (NT)
Skills Tasmania	Department of Training and Workforce Development (DTWD) (WA)
South Australian Skills Commission	Department of Youth Justice, Employment, Small Business and Training (QLD)
	Department of Infrastructure, Planning and Logistics (NT)
	Electrical Safety QLD
	Industry Skills Advisory Council NT (ISACNT) (NT)
	Office of Industrial Relations (QLD)

Education Providers

Public Education Providers	Private Education Providers
Box Hill Institute	Aveling
Canberra Institute of Technology (CIT)	I-CAR
Central Queensland University (CQU)	Independent Tertiary Education Council of Australia (ITECA)
Central Regional TAFE (WA)	Komatsu
Charles Darwin University	Monarch
Griffith University	MTA Institute
Bendigo Kangan TAFE	MTA NSW
North Metropolitan TAFE (WA)	MTA SA/NT
North Regional TAFE (WA)	MTA WA
South Metropolitan TAFE (WA)	MTAQ
South Regional TAFE (WA)	Trainwest
Central Regional TAFE	Volkswagen Group Australia
Sydney University	Westrac
TAFE Directors Australia (TDA)	WorkSafe Connect
TAFE NSW	
TAFE QLD	
TAFE SA	
TasTAFE	

~End~