

Sustainability Industry Reference Committee

Draft Skills Forecast and Proposed
Schedule of Work 2019–2023



Administrative Information

Name of Industry Reference Committee (IRC):

Sustainability

Name of Skills Service Organisation (SSO):

Innovation and Business Skills Australia (IBSA Manufacturing)

About the Industry Reference Committee

The Sustainability Industry Reference Committee comprises 11 members and was constituted in November 2017.

The 2019 Industry Skills Forecast and Proposed Schedule of Work was reviewed and approved by the membership below:

Mr Peter Nemtsas (Chair)	Mr Andrew Petersen
Ms Karla Paeglis	Mr Michael Grogan
Mr Ian Curry	Mr Mark Goodsell
Mr Daniel Giles	Mr Luke McConchie
Ms Patricia Caswell	Ms Meriel Chamberlin
Mr Bradley Anderson	

About the Skills Forecast

The Industry Reference Committee (IRC) Skills Forecast and Proposed Schedule of Work identifies priorities for training package development work to meet the needs of industry. This document is based on research, analysis and consultations with IRC members and industry stakeholders and provides evidence of current and emerging industry skills needs.

Industry Reference Committee Signoff

This 2019 return of the Sustainability IRC Skills Forecast and Proposed Schedule of Work was agreed as the result of a properly constituted IRC decision and was approved by:

IRC Chair: Mr Peter Nemtsas

Date: **Month** 2019

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This IRC Skills Forecast and Proposed Schedule of Work has been prepared on behalf of the Sustainability Industry Reference Committee for submission to the Australian Industry and Skills Committee (AISC).

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Executive Summary

Sustainability is not a discrete industry. It is a discipline that underpins or comprises work across a very broad range of industries, making these skills very much cross sectoral in nature. There are three distinct streams within the MSS Sustainability Training Package which focus on separate functional areas: Sustainable Operations, Competitive Systems and Practices and Environmental Monitoring and Technology.

Workforce challenges and opportunities relating to energy costs and energy security, the rise of the circular economy, technology changes and new business models, are impacting the sectors that may utilise qualifications from the MSS Sustainability Training Package. This is resulting in new and emerging skill development priorities, including:

- skills to meet emerging technological changes in competitive systems and practices
- skills to address emerging job roles in environmental monitoring and technology, and
- generic skills, such as problem solving, design thinking, leadership, change management and innovation management.

The [Proposed Schedule of Work 2019–2020 to 2022–2023](#) was developed by the IRC, with support from IBSA Manufacturing, based on identified industry trends. The Schedule lists the priorities over the next four years, the rationale and the proposed timeframes for these activities.

The priority identified as important and proposed for 2019-2020 is to review the fitness for purpose of Competitive Systems and Practices qualifications in meeting workforce upskilling demands and emerging technological changes, as well as to consider the development of skill sets in Competitive Systems and Practices. The proposed changes aim to enable skilled workers to implement specific initiatives and practices including 5S and Kaizen, as well as the removal of duplicate units. Further details about the proposed Competitive Systems and Practices qualifications and skill sets can be found in the [Proposed Schedule of Work](#). A Case for Change for this priority will be submitted in 2019-2020.

Sector Overview

The MSS Sustainability Training Package has wide-reaching impacts across all industry and this is expected to continue to increase over the next decade. The Training Package defines the skills and qualifications that are essential to building an inclusive, sustainable and resilient future for our economy, society and our environment. These skills underpin work in a wide range of industries and job roles, which means the MSS Sustainability Training Package underpins a broad range of sectors.

The World Summit of Social Development defined three core elements – economic growth, social inclusion and environmental protection – as the foundation of the philosophy and social science of sustainability. These three ‘pillars’ now underpin global Sustainable Development Goals¹ and many national and international standards and certification schemes. They also form the basis of tackling core challenges that the world now faces, including: climate change; water scarcity; waste management; diversity and inclusion; human rights and modern slavery; and the future of work.

This definition of sustainability is also reflected in the increasing focus of businesses on their ‘triple bottom line’ by shifting the attention from solely considering financial/economic performance to also measuring and monitoring social, environmental and ecological performance as a means of improving the value generated by the organisation.

Currently there are three distinct streams within the MSS Sustainability Training Package which focus on separate functional areas. They are:

1. **Sustainable Operations**, which focuses on the integration of sustainability principles and practices into business operations and culture to enhance sustainable and competitive advantages and meet legislative requirements. This includes the skills to:
 - establish and monitor an organisation’s own sustainability performance
 - develop and implement sustainability improvement strategies and practices in their organisation and all or part of the value chain, and
 - engage with stakeholders, including shareholders, employees, governments, other value chain members and the local and general community.
2. **Competitive Systems and Practices**, which focuses on the application of ‘lean’² and continuous improvement principles across all parts of an organisation’s supply and value chain. This includes the skills to:
 - reduce waste and inefficiencies (such as wasted time and energy, unnecessary processing and product features, stockpiles of materials and inventory, poor use of human resources and errors/rework)
 - identify and analyse problems
 - measure and improve performance
 - create consistent and integrated systems and processes, and
 - continuously improve productivity and sustainability.

¹ Sustainable Development Goals, <https://sustainabledevelopment.un.org/index.php?menu=1300>, accessed 28/11/2018.

² Lean principles and methods are focused on maximising customer value while minimising waste (adapted from <https://www.lean.org/WhatsLean/>).

3. Environmental Monitoring and Technology, which focuses on the measurement, monitoring and development of solutions to address impacts on air, water and other environmental elements. This includes skills for technicians and paraprofessionals who:

- collect, analyse and report environmental data
- contribute to the assessment of environmental risks and impacts
- develop and implement policies, management plans and strategies, and work practices associated with sustainable development, environmental management, waste management, pollution control, rehabilitation and restoration
- install, operate, and maintain new 'sustainable' technologies
- monitor and report on environmental and sustainability performance and compliance, and
- improve the knowledge and skills of workers and community members about environmental management and sustainability.

Industry Snapshot

Due to the broad impact of the MSS Sustainability Training Package, it is not possible to define the industries that it serves or to capture any data that is indicative of the full range of industries that may use these qualifications. The data and commentary below are merely indicative of the types of industry sectors for which the qualifications are relevant.³

Sustainable Operations

Sustainable operations can be a focus for virtually any organisation in any industry sector that is seeking to:

- identify and implement sustainability-related initiatives,
- audit and report on their performance in aspects of sustainability, or
- meet legislative requirements in relation to sustainability issues.

In addition, there are a range of businesses providing specific consultancy services to assist organisations in meeting these varied sustainability needs. These fall into the Australian and New Zealand Standard Industrial Classification (ANZSIC) sector of Management Advice and Related Consulting Services (6962).

According to IBISWorld reports,⁴ sustainability consulting was projected to account for 8.5% of all revenue generated by the Management Advice and Related Consulting Services sector in 2017–2018. There were 68,127 businesses operating in this sector in Australia in 2017, which is a 10% increase in

³ Selected data from the Australian Bureau of Statistics (ABS) included in this report is based on two hierarchical classification systems – the Australian and New Zealand Standard Industrial Classification [1] (ANZSIC) and the Australian and New Zealand Standard Classification of Occupations [2] (ANZSCO). A list of ANZSIC and ANZSCO codes that have been identified by key industry stakeholders as relevant to the MSM Training Package are provided at [Appendix A](#) and [Appendix B](#).

Census data, the most recent being 2016, can generally be broken down to the four-digit levels of these classifications. However, annual data is only available at the three-digit levels. Some of the industries or occupations that are included at the available level of aggregation may not be specifically relevant to this Training Package.

Furthermore, the ANZSIC and ANZSCO classification systems were introduced in 2006, with minor revisions incorporated into the ANZSCO structure in 2009 and 2013. The IRC has noted that some ANZSIC and ANZSCO codes are now outdated and do not represent some emerging industries or occupations. In addition, the classification systems may not be sensitive to localised specialisations. Despite these limitations, the data can be useful in highlighting recent trends and, when supplemented with qualitative advice from industry, can help to develop a useful picture of current and prospective industry conditions.

⁴ IBISWorld (2017) IBISWorld Industry Report M6962a: Management Consulting in Australia, August 2017.

the number operating in 2015. 99% of businesses operating in this sector are small or non-employing. The remaining 1% are medium or large employers .⁵

Competitive Systems and Practices

Competitive systems and practices can be implemented across any organisation in any industry sector and these skills are commonly used in industries as diverse as manufacturing, financial services, information and communications technology and healthcare services.

The manufacturing, financial and insurance services and healthcare and social assistance industry sectors alone accounted for almost 20% of all business in Australia in June 2017 (a total of 414,442 businesses),⁶ which is indicative of the large scope of potential relevance of the Competitive Systems and Practices qualifications.

Environmental Monitoring and Technology

Within the environmental monitoring and technology area, there are organisations that are focused primarily on the provision of monitoring services (such as air, water or soil testing or other monitoring such as noise) to assist other organisations in meeting legislative requirements and improving their products and services. However, once again, these types of roles are also found in organisations within a range of industries, including manufacturing and mining and all levels of government.

There are two ANZSIC industry classifications that are indicative of the types of industries that may use these qualifications – Regulatory Services (7720) and Scientific Testing and Analysis Services (6925).

In June 2017, there were 3,206 businesses operating in the Scientific Testing and Analysis Services sector and 357 in the Regulatory Service sector.

Key Industry Stakeholders

There are a number of peak bodies representing sustainability, environmental monitoring and/or competitive systems and practices interests within Australian industry, including:

- Association for Manufacturing Excellence
- Association for Sustainability in Business
- Australian Land and Groundwater Association
- Australian Sustainable Built Environment Council
- Australian Sustainable Business Group
- Business Council for Sustainable Development Australia Water Stewardship Australia
- Centre for Sustainability Leadership
- Facility Management Association
- Energy Efficiency Council
- LEAN Enterprise Australia.

Each state and territory government has environmental protection legislation and standards against which it regulates industry. The Commonwealth Department of Environment also administers regulation, as do local governments.

⁵ Source: ABS 8165.0 Counts of Australian Businesses, including Entries and Exits, Jun 2013 to Jun 2017.

⁶ Source: ABS 8165.0 Counts of Australian Businesses, including Entries and Exits, Jun 2013 to Jun 2017.

There are also numerous non-government organisations (NGOs) at national, state and local levels that advocate for sustainability and environmental issues.

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Training Snapshot

Learner Training Profile

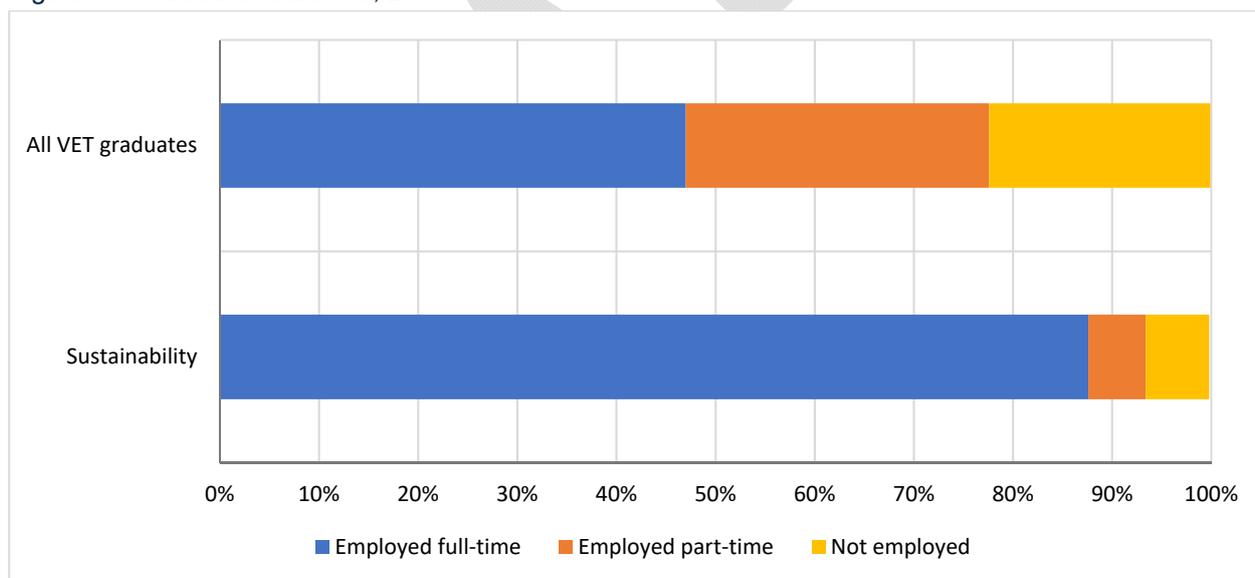
In 2017, a learner enrolled in a qualification from the MSS Sustainability Training Package was most likely to be:

- enrolled in a Certificate IV in Competitive Systems and Practices
- studying in Victoria
- 40–49-year-old age bracket
- male
- not in an apprenticeship or traineeship
- enrolled with a private training provider.

Source: NCVER VOCSTATS (Program enrolments 2017 by various breakdowns).

Of the graduates of MSS Sustainability Training Package qualifications in 2017, 93.6% were employed after training, with the majority of these (87.6%) employed full-time. As illustrated in Figure 1 below, this level of post-qualification employment is significantly higher than that of Vocational Education and Training (VET) qualifications overall.

Figure 1 – Graduate outcomes, 2017



Source: NCVER VET student outcomes 2017, Data visualisation – VET graduate outcomes, all VET graduates.

Several qualifications from the MSS Sustainability Training Package are funded as traineeships:

- Certificate II in Competitive Systems and Practices (funded in Victoria)
- Certificate III in Competitive Systems and Practices (funded in Victoria, Western Australia, Tasmania and the Australian Capital Territory)
- Certificate IV in Competitive Systems and Practices (funded in Victoria, Western Australia, Tasmania and the Australian Capital Territory)
- Diploma of Competitive Systems and Practices (funded in Victoria and Western Australia)
- Advanced Diploma of Competitive Systems and Practices (funded in Victoria)

- Certificate IV in Environmental Monitoring and Technology (funded in the Australian Capital Territory)
- Diploma of Environmental Monitoring and Technology (funded in the Australian Capital Territory).⁷

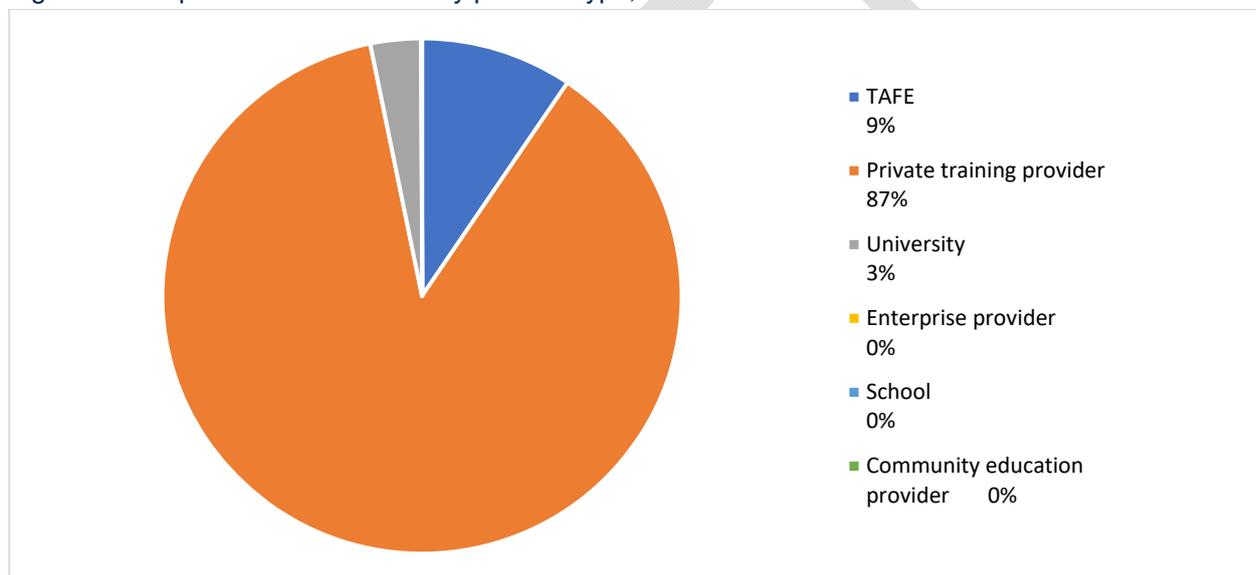
Enrolments undertaken as part of a traineeship accounted for just over a quarter of all MSS Sustainability Training Package enrolments, with the largest proportion of traineeship commencements occurring in the Certificate III in Competitive Systems and Practices. This proportion has declined by 5% since 2014.⁸

None of the qualifications in the MSS Sustainability Training Package are delivered through VET in Schools.

Training Delivery

As illustrated in Figure 2, delivery by private Registered Training Organisations (RTOs) accounts for most enrolments, although there has been a decline from 95% in 2015 to 87% in 2017.

Figure 2 – Proportion of enrolments by provider type, 2017



Source: NCVET VOCSTATS, extracted on 15/08/2018.

Table 1 indicates the proportion of RTOs with MSS Sustainability qualifications on scope. This data is current at 28 August 2018, per the listing on the National Register of Vocational Education and Training (VET) available at www.training.gov.au. There is a total of 73 RTOs in Australia with Sustainability qualifications on scope.

Aside from the Certificate IV in Environmental Monitoring and Technology, which is only on the scope of RTOs in New South Wales, Western Australia and South Australia, there is quite an even spread of RTOs with each of the remaining MSS Sustainability qualifications on scope across all states and territories.

⁷ This data is sourced from State and Territory Training Authorities and is provided for information only and must be confirmed with these authorities.

⁸ Source: NCVET VOCSTATS, extracted on 15/08/2018.

Table 1 – Number of RTOs by nationally recognised qualifications on scope

Qualification name	No. of RTOs on scope
Certificate II in Competitive Systems and Practices	12
Certificate III in Competitive Systems and Practices	51
Certificate IV in Sustainable Operations	3
Certificate IV in Environmental Monitoring and Technology	6
Certificate IV in Competitive Systems and Practices	55
Diploma of Sustainable Operations	2
Diploma of Environmental Monitoring and Technology	11
Diploma of Competitive Systems and Practices	16
Advanced Diploma of Competitive Systems and Practices	5
Graduate Certificate in Competitive Systems and Practices	2
Graduate Certificate in Sustainable Operations	0
Graduate Certificate in Environmental Management	0
Graduate Diploma of Competitive Systems and Practices	0

Source: Training.gov.au. RTOs approved to deliver this qualification. Accessed 28/08/2018.

Qualifications Available

The following qualifications and skill sets are contained in the MSS Sustainability Training Package:

Sustainable Operations

- Certificate IV in Sustainable Operations
- Diploma of Sustainable Operations
- Graduate Certificate in Sustainable Operations

Competitive Systems and Practices

- Certificate II in Competitive Systems and Practices
- Certificate III in Competitive Systems and Practices
- Certificate IV in Competitive Systems and Practices
- Diploma of Competitive Systems and Practices
- Advanced Diploma of Competitive Systems and Practices
- Graduate Certificate in Competitive Systems and Practices
- Graduate Diploma of Competitive Systems and Practices.

Environmental Monitoring and Technology

- Certificate IV in Environmental Monitoring and Technology
- Diploma of Environmental Monitoring and Technology
- Graduate Certificate in Environmental Management.

Skill Sets

- Audit energy usage for a work area

- Determine energy usage
- Improve energy usage for a process or organisation
- Improve energy usage for a work area
- Recommend energy improvements
- Reduce sustainability risk
- Lead energy and greenhouse gas improvements.

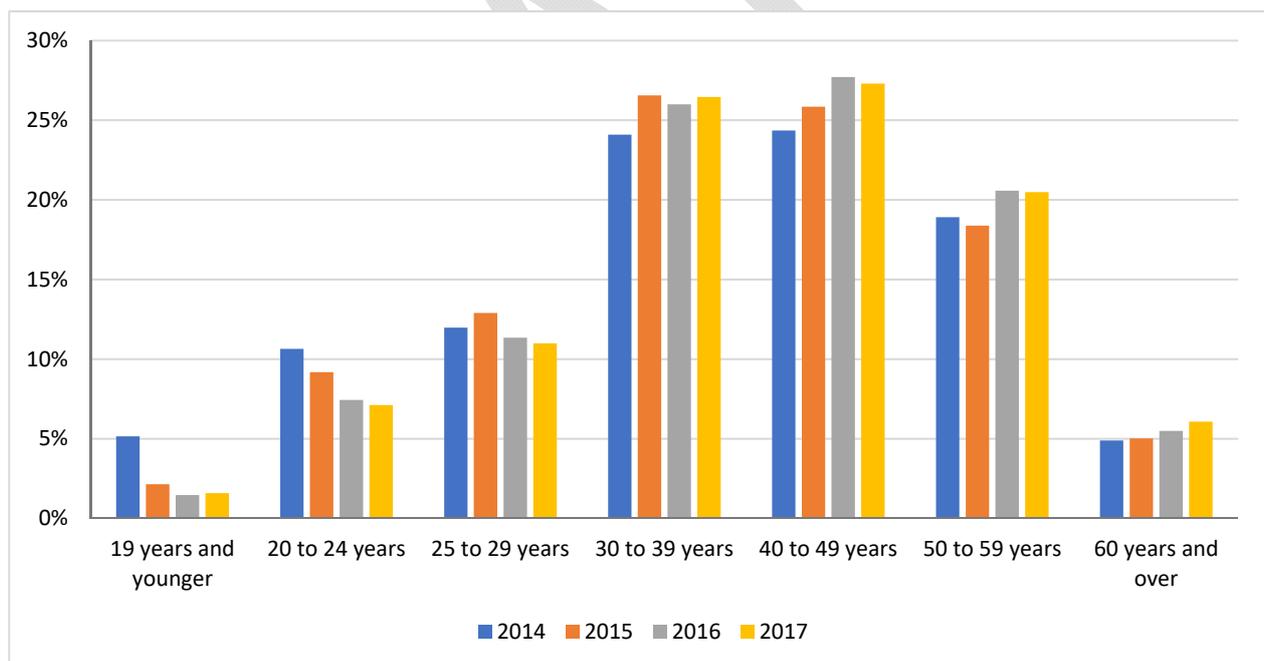
Qualification Uptake

There was a total of 12,388 enrolments in MSS Sustainability qualifications in 2017. This is a decline of 5% since 2016 and of 27% since 2015. Of the 2017 enrolments:

- the large majority (87%) were delivered by private training providers
- most were in Victoria (51%), followed by Western Australia (26%)
- 56% were government funded
- 97% were in competitive systems and practices qualifications
- three-quarters were male (a proportion that has remained consistent since 2014).

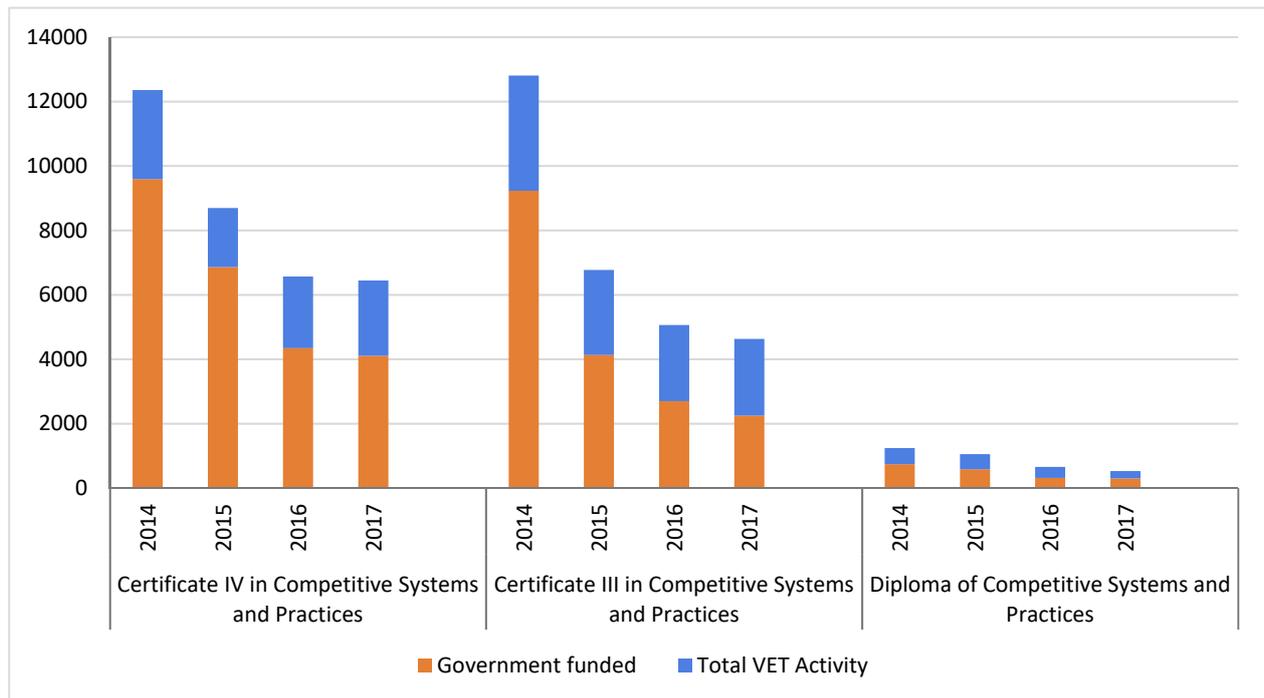
As illustrated in Figure 3, the age profile of enrolments reflects the ageing of the workforce (i.e. fewer enrolments in younger age groups and increasing enrolments amongst older age groups).

Figure 3 – Enrolments by age group, 2014–2017



Enrolments in the MSS Sustainability Training Package are dominated by the Certificate III and Certificate IV in Competitive Systems and Practices (see Figure 4 below). However, enrolments in the Diploma of Environmental Monitoring and Technology almost doubled between 2016 and 2017 (from 96 to 180). Enrolments in the Certificate IV in Environmental Monitoring and Technology have also been increasingly steadily from 43 enrolments in 2015 to 81 in 2017. Likewise, enrolments in the Diploma of Sustainable Operations has increased from 5 enrolments in 2015 to 50 in 2017.

Figure 4 – Top three qualification enrolments, Total VET Activity, 2014–2017



Challenges and Opportunities

For Industry and Employers

A number of developments across Australia are increasing the focus on sustainability and creating new sustainability-related jobs. This is likely to increase the demand for sustainability-related skills and provide opportunities for greater uptake of MSS Sustainability qualifications and skill sets.

Circular Economy

The concepts and principles of 'circular economy' are starting to be applied across Australia's waste industries.

*'...a circular economy is one in which products and materials keep circulating within the economy at their highest value for as long as possible, through reuse, recycling, remanufacturing, delivering products as services and sharing.'*⁹

In early 2018, China adopted strict contamination limits for the recyclable materials it imports. Under its National Sword Policy, materials such as plastics waste, unsorted waste paper and waste textile materials will only be accepted if they have a contamination rate of 0.5% or less, which is much lower than the current global standard in the recycling industry for contamination, which is 1.5%.¹⁰

⁹ Transforming Queensland's Recycling and Waste Industry, Directions Paper, Queensland Government 2018.

¹⁰ China's New Waste Recycling Policy, https://www.greenindustries.sa.gov.au/chinas-new-policy-on-waste-and-recycling_29/11/2018.

This has created significant challenges for Australia's recycling sector, which previously exported more than 1.25 million tonnes of recyclable materials to China and has prompted efforts across the country to develop new markets and mechanisms for dealing with recyclable waste.¹¹

As part of these efforts, the New South Wales Government has developed a circular economy policy based on the following principles:

- Minimise consumption of finite resources
- Decouple economic growth from resource consumption
- Design out waste and pollution
- Keep products and materials in use
- Innovate in resource efficiency, give preference to higher-order reuse and repair opportunities
- Create new circular economy jobs.¹²

The Queensland Government is also in the process of developing a new recycling and waste strategy, under which it 'will progressively move toward a circular economy to realise resource recovery opportunities and grow recycling sector investment and jobs'.¹³

The Australian Government has also committed to updating the National Waste Policy to include circular economy principles by the end of 2018.¹⁴

Advanced and Sustainable Manufacturing

Research suggests that to remain competitive, manufacturers need to take advantage of opportunities in the adoption of the following practices:

- Customised high-margin solutions – this includes design services, and the manufacture of superior components and innovative products.
- Sustainable manufacturing – both business models and processes to support sustainable manufacturing and the manufacture of sustainable products.
- New business models that include selling services – this includes maintenance and repair services, workflow management services and health and biosecurity services.
- Adoption of advanced technologies – including sensors and data analytics; advanced materials; smart robotics and automation; 3D printing; and augmented, mixed and virtual reality, which in turn has implications for underpinning digital literacy and STEM skills across the workforce.
- Global value chains – which have been shown to provide businesses with exposure to new technologies, processes and skills.¹⁵

The Queensland Government has developed a 10-Year Roadmap and Action Plan for Advanced Manufacturing, with the aim of the state becoming an international market leader in the delivery of advanced manufacturing technologies, systems, products and services that are innovative, sustainable, and embedded in local and global supply chains by 2026.¹⁶

¹¹ NSW Circular Economy Policy Statement: Too Good To Waste, October 2018.

¹² NSW Circular Economy Policy Statement: Too Good To Waste, October 2018, p5.

¹³ Transforming Queensland's Recycling and Waste Industry, Directions Paper, Queensland Government 2018.

¹⁴ NSW Circular Economy Policy Statement: Too Good To Waste, October 2018, p4.

¹⁵ CSIRO (2016) Advanced Manufacturing; A Roadmap for unlocking future growth opportunities for Australia.

¹⁶ <https://www.statedevelopment.qld.gov.au/industry-development/advanced-manufacturing.html>.

Sustainability is one of the areas of focus of the roadmap and action plan, which includes sustainable manufacturing practices initiatives to address energy and other input costs, to reduce waste and to meet customer demands for products that are both affordable and have a light environmental footprint.¹⁷

There is also a separate roadmap and action plan for the development of a Biofutures sector which will focus on the manufacture of products from sustainable organic and waste resources into a range of bioproducts (e.g. sustainable chemicals, fuels, synthetic rubber, cosmetics, detergents and textiles) and plans to develop a similar roadmap for the development of a hydrogen industry in the state.¹⁸

The advanced manufacturing roadmap and action plan acknowledges that becoming a leader in advanced manufacturing will require support for manufacturing firms to become more aware of advanced manufacturing technologies and to build the skills and expertise to use these technologies, including improving information communications and technology (ICT) literacy and building leadership and operational enterprise management skills.

The Skills, Training and Workforce Development Strategy for the Manufacturing Industry in Queensland, which supports the roadmap and action plan, details several actions that are particularly relevant to competitive systems and practices qualifications:

- Explore opportunities to incorporate principles related to the business environment and advanced manufacturing in school, VET and university programs related to the manufacturing industry.
- Facilitate the take-up of training programs in competitive manufacturing principles and processes across the industry, including by those who may already possess prior qualifications.
- Through the current formal mechanisms, seek the development of units of competency and resources on enterprise management and innovation skills that can be added to training programs serving the industry.
- Promote access to and explore funding options for upskilling and reskilling avenues to support changing skill requirements within the industry, including through modularised training offerings and skill sets.
- Support the development of the range of foundation and 'soft skills' required to support the transition to advanced manufacturing, including adaptability, resilience, digital literacy and STEM.¹⁹

Renewable Energy and Energy Efficiency

The New South Wales and Victorian Governments have adopted long-term objectives of achieving net-zero emissions by 2050 as a means of improving energy productivity. They identify improved energy efficiency within the domestic housing market as key to achieving this target. A variety of key influencers have been identified, who could influence decisions about energy efficiency within the market. It has been acknowledged that the motivations for influencing decisions are not yet well established and that there are a number of knowledge and skill gaps that would need to be addressed.²⁰

¹⁷ Advance Queensland (2018) Advanced Manufacturing 10-Year Roadmap and Action Plan, December 2018, Queensland Government, p30.

¹⁸ Advance Queensland (2018) Advanced Manufacturing 10-Year Roadmap and Action Plan, December 2018, Queensland Government, p19.

¹⁹ Jobs Queensland (2018) Advanced Manufacturing: A Skills, Training and Workforce Development Strategy for the Manufacturing Industry in Queensland, p72.

²⁰ ACIL Allen Consulting, 2017, Residential Housing Industry Capabilities Analysis of Capability to Support NSW and Victorian Government Energy Efficiency Policies and Programs.

The Queensland Government has also adopted a target of achieving zero net emissions by 2050. Aspects of the strategy to achieve this target include a target to generate 50% of Queensland's energy from renewable sources by 2030, as well as a plan to work with Queensland industries and communities to develop a Workforce Development and Skills Plan for low- and zero-emissions jobs.²¹ A number of large-scale projects are planned or underway as part of investment in renewable energy, including hydro, geothermal and wind power projects and a large-scale solar program.²²

South Australia is also very active in the renewable energy space, with a similar target of investing \$10 billion in low-carbon energy and achieving 50% of electricity production by renewable energy by 2025 through large-scale wind, solar and energy storage projects.²³ More recent projections by the Australian Energy Market Operator suggest that the state will reach 100% of electricity production by renewable energy by 2025.²⁴

Technology

Changes in technology, particularly in terms of the use of new technology for monitoring and automation, will increasingly impact on many of the job roles in which MSS Sustainability qualifications are used. This is largely influenced by global trends around 'Industry 4.0' and the increasing use of automation.

These changes are shifting the focus from the skills needed for collection of information and diagnosis of problems to those needed for interpretation and communication of information and the development of new solutions to problems. Consequently, organisations that are being affected by these changes in technology are increasingly looking for employees with problem-solving, communication and STEM skills.

A recent Australian Industry Group (AIG) survey of its members found that employers are experiencing difficulties recruiting employees with STEM skills, particularly technicians and trades workers and professionals. They also identified that the most significant capability improvements required by managers are in the areas of technology/digitalisation, with employers prioritising managers for digital technology training.²⁵

In the environmental monitoring sector, consultations identified that environmental sampling is now often conducted in the field using electronic devices and uploaded to a central database or server. Drones are also being used more frequently to capture surveying and sampling data, such as measuring landfill rates, ongoing volume measurements for civil earth works, collecting samples from remote areas and taking water samples along waterways.

At the same time, the way that captured data is managed and processed by the sector is changing. Data is now being displayed visually (e.g. by using a Geographic Information System (GIS) (e.g. ArcGIS)) to better communicate results and findings, rather than just a report with text and tables.

The increasing use of drone technology is also a contributing factor to an increase in the use of thermographic cameras. The thermography industry uses thermal imaging cameras (also known as infrared cameras) to detect the energy that is produced by an object or animal and turn this into an

²¹ Pathways to a clean growth economy: Queensland Climate Transition Strategy, Queensland Government Department of Environment and Heritage Protection, 2017.

²² Queensland Government Department of Energy and Water Supply (2017), Powering Queensland: Our renewable energy achievements.

²³ Government of South Australia (2015) A low carbon investment plan for South Australia.

²⁴ <https://reneweconomy.com.au/south-australia-will-be-at-100-renewables-by-2025-market-operator-52312/>.

²⁵ Australian Industry Group (2018) Skilling: A National Imperative.

image, which can be used for analysis, evaluation accuracy and report writing. This technology is used regularly in environmental management (to monitor heat loss and gain), as well as many other industries. However, there are currently no accredited competency standards for the sector. Consultations have identified that as the technology has developed and become more widely and cheaply available, a lack of skill and understanding of how to interpret the information and images is creating significant safety and economic risks for the industries that use thermographic imaging services. At the same time, some thermal imaging cameras are being imported and transported around Australia within the necessary licensing and notifications for Weapons of Mass Destruction, which is required for thermal cameras above 33hz.

Supply-side Challenges and Opportunities

Consultations suggested that a lack of funding for qualifications in sustainable operations, and a resulting lack of training providers, is proving to be an impediment to skilling learners in improvements in sustainability, such as energy efficiency, with learners finding it difficult to access appropriate training.

It was also suggested that the sustainable operations qualifications may not adequately align with current job roles in the sector, which may also be impacting on demand for and supply of these qualifications.

Current training package development work related to the sustainable operations qualifications (Corporate Social Responsibility, Carbon Auditing and Energy Management) are likely to improve the relevance and level of interest in these qualifications and provide a strong foundation for industry to respond to any future legislative changes in relation to environmental and sustainability reporting.

The developments in renewable energy projects in Queensland and South Australia and the increasing focus on the principles of a circular economy may also provide an opportunity for increased interest in sustainable operations qualifications.

The supply of skills needed to utilise changing technology is also posing challenges for the manufacturing industry. Recent research conducted by NCVER identified a shortage of local training providers with the capacity to deliver training in the skills needed to utilise new technologies as impacting on the sector's ability to adopt Industry 4.0 process and practices.²⁶ Further work is scheduled on competitive systems and practices qualifications in 2019–2020 to ensure they maintain alignment with evolving job role and workplace requirements.

For Learners and Training Package Development

Competitive Systems and Practices

Consultations have indicated that most people who enrol in competitive systems and practices qualifications are looking to upskill beyond their primary qualification by completing specific units of competency rather than gain a whole qualification. In recognition of this need, there have been suggestions that skill sets may be a more effective pathway to upskilling workers in competitive and lean practices, rather than needing to undertake a full qualification.

The top eight units of competency from the MSS Sustainability Training Package in terms of unit enrolments are all competitive systems and practices units (see Table 2 below). The numbers of enrolments in these units in some cases exceed the number of enrolments in competitive systems and

²⁶ Seet, P., Jones, J., Spoer, J. and Hordacre, A. (2018) The Fourth Industrial Revolution: the implications of technological disruption for Australian VET, NCVER, Adelaide. p36.

practices qualifications (e.g. there were 4,633 enrolments in the Certificate III in Competitive Systems and Practices in 2017, but there were 8,779 enrolments in the unit 'Apply quality standards', which forms part of the Certificate III). This particular unit appears in two qualifications in the Sustainability Training Package and 47 other qualifications outside of MSS Sustainability), highlighting the importance of these skills beyond the competitive systems and practices qualifications. This may be a further indicator of the value of creating skill sets in particular aspects of competitive/lean practices.

Table 2 – Top eight MSS Sustainability unit enrolments, 2017

Unit name	No. of enrolments in 2017
Apply quality standards	8,779
Undertake root cause analysis	7,718
Apply 5S procedures	7,425
Ensure process improvements are sustained	6,397
Facilitate change in an organisation implementing competitive systems and practices	4,500
Map an operational process	4,281
Review competitive systems and practices	4,263
Facilitate and improve implementation of 5S	3,872

Source: NCVET VOCSTATS, extracted on 29/08/2018.

Environmental Monitoring and Management

Consultations identified several issues that may need to be addressed through training package development work over the coming years. These include:

- a need for technicians to have skills in operating new sampling and data capture technology in the field (e.g. drones, electronic devices) as well the skills to store and process data
- emerging job roles for environmental technicians in the receipt and interpretation of data, including scrutiny of data and validation of laboratory reports
- laboratory technicians are increasingly being used to collect samples, which assists with minimising costs, but also with the chain of custody of samples
- many of the relevant environmental standards are now out of date and will soon be updated.

Micro-credentials and Modular Learning

Micro-credentials (i.e. small chunks of learning) have been identified as a potential way for the VET system to be more responsive to rapidly changing training and skill development needs in the face of changing technology.²⁷

The idea of modular learning and greater choice over the content of training was raised in recent research by the Advanced Manufacturing Growth Centre,²⁸ while modularised training offerings and skill

²⁷ Seet, P., Jones, J., Spoer, J. and Hordacre, A. (2018) The Fourth Industrial Revolution: the implications of technological disruption for Australian VET, NCVET, Adelaide. p46.

²⁸ Advanced Manufacturing Growth Centre (2018), Industry 4.0: An Opportunity for Every Australian Manufacturer; Submission to the Department of Industry, Innovation and Science.

sets were identified in the Skills, Training and Workforce Development Strategy for the Manufacturing Industry in Queensland as an important part of building advanced manufacturing capability.²⁹

Given that the current enrolment patterns within MSS Sustainability Training Package qualifications indicate much greater levels of uptake within older age groups, considerations of how to support upskilling needs are particularly important.

Generic Skills

Generic skills are also becoming increasingly valued by employers, with research suggesting that learners who have mastered these skills will be more prepared for potentially multiple career changes over a lifetime.³⁰

A recent report by NCVET, which analysed the potential impact on technological disruption and the Fourth Industrial Revolution on workplaces and the implications for the VET system, suggested that:

- training needs to equip the workforce with the knowledge and skills to use new technologies as well as prepare them for an expanded scope of tasks within job roles
- generic/soft skills will play an essential role in preparing workers to be flexible and cope with the rate and scope of change
- in some firms (especially in advanced manufacturing firms), specialist technology skills will be needed
- there is a need for collaboration between employers and the VET sector to support lifelong learning within the workforce.³¹

²⁹ Jobs Queensland (2018) Advanced Manufacturing: A Skills, Training and Workforce Development Strategy for the Manufacturing Industry in Queensland, p72.

³⁰ NCVET, 2017, Focus on Skilling our future workers, available online at <http://www.voced.edu.au/focus-skilling-our-future-workers>.

³¹ Seet, P., Jones, J., Spoer, J. and Hordacre, A. (2018) The Fourth Industrial Revolution: the implications of technological disruption for Australian VET, NCVET, Adelaide. p9-10.

Employment and Skills Outlook

The difficulty in defining the sustainability sector also creates challenges in identifying the range of occupations in which MSS Sustainability Training Package qualifications are relevant. This is particularly challenging in the sustainable operations and competitive systems and practices areas, which are relevant to such a wide range of industries and occupations.

There are some job roles which are more likely to include responsibility for aspects of sustainability, such as Sustainability Manager, Sustainability Consultant, Sustainability Advisor, Environmental Advisor/Consultant, Environment and Sustainability Team Leader/Manager, Manager Corporate Responsibility, Quality Manager, Production Team Leader/Manager, Facilities Manager and Procurement Manager.

A number of Australian and New Zealand Standard Classification of Occupations (ANZSCO) occupations have been identified that are at least partially relevant to these specialised job roles:

- Production Managers (1335)
- Other Specialist Managers (1399)
- Management and Organisation Analysts (2247)
- Science Technicians (3114)
- Miscellaneous Technicians and Trade Workers (3990)
- Engineering Production Workers (7123).

Employment Outlook

Within this small range of identified ANZSCO-related occupations, employment numbers have remained relatively stable over the period 2016–2018 (see Table 3 below). The exception is employment for Science Technicians, which almost doubled between 2017 and 2018.

Table 3 – Related ANZSCO occupation unit groups and their estimated number of employees, 2016–2018

ANZSCO Occupation Unit Group		Estimated Number of Employees (rounded to nearest 100)		
		2016	2017	2018
1335	Production Managers	54,300	61,800	53,300
1399	Other Specialist Managers	47,600	50,200	50,600
2247	Management and Organisation Analysts	64,500	61,500	64,200
3114	Science Technicians	14,600	12,800	23,000
3990	Miscellaneous Technicians and Trades Workers nfd	0	100	100
7123	Engineering Production Workers	17,700	17,800	18,200

Source: Department of Jobs and Small Business, Labour Market Information Portal.

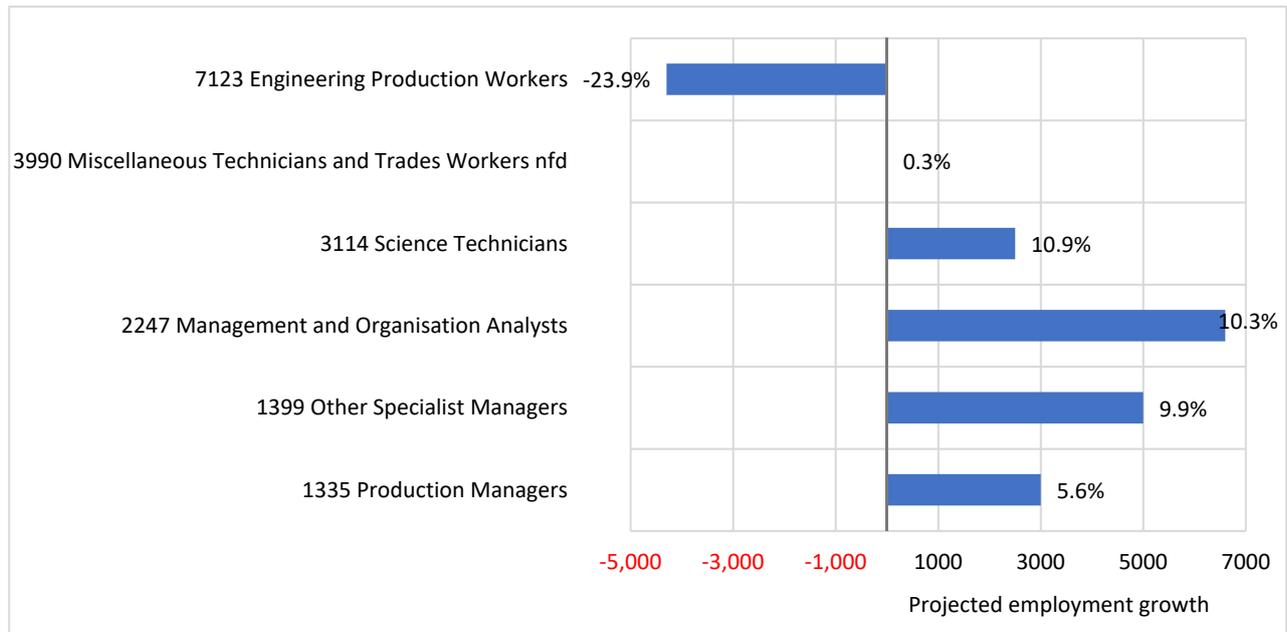
Occupation time series data (May 2014 to May 2017) has been sourced from the ABS 6291.0.55.003 Labour Force, Australia, Detailed, Quarterly, May 2018. Figures are average of preceding 4 quarters.

In terms of employment projections, employment for lower-skilled workers is expected to decline, while employment in occupations requiring higher skill levels is expected to grow. As illustrated in Figure 5 below, demand for Engineering Production Workers (which relates to the Certificate II in Competitive

Systems and Practices) is projected to drop by 24%, while demand for Science Technicians, Management and Organisation Analysts and other Specialist Managers (which relate to MSS qualifications at Certificate IV and above) is expected to grow by around 10%.

This reflects overall industry trends in which lower skilled roles are declining as routine tasks become increasingly automated, and roles that require more complex skills are increasing.

Figure 5 – Projected 5-year employment growth to 2023 by ANZSCO 4-digit occupation unit group (figures rounded to nearest hundred)



Workforce Supply Challenges and Opportunities

There are two emerging job roles that have been identified through consultations:

- Increases in the availability of data as a result of environmental or sustainability monitoring is leading to a need for skills in the interpretation and presentation of data. This emerging job role would centre around 'data visualisation', which involves interpreting the available data and presenting and communicating it in a way that is understandable to a specific audience and able to be acted upon within an organisation.
- The growing demands for more efficient and sustainable use of resources is extending to the field of asset maintenance. This is a growing demand for people who can perform the role of 'maintenance planning' in industrial environments, which involves the planning and scheduling of maintenance activities in a way that maximises productivity and sustains the life of assets.

The 2018 AIG survey report identified three major issues impacting on the supply of skills across the manufacturing industry.³² These were:

1. Skills shortages, which were reported by 75% of survey respondents and represented a 49% increase from the previous year's survey. Skills shortages were most significant in technician and trades worker roles and recruitment difficulties most often experienced in relation to STEM skills, automation, big data and artificial intelligence solutions.
2. Insufficient levels of literacy and numeracy, which was reported as a challenge by 99% of respondents. This was a slight increase from 92% in the previous year.
3. Lack of leadership and management skills, with 62% of respondents believing that a lack of leadership and management skills is having a high impact on the business. This was an increase from 56% in the previous year.

Skills Outlook

The outcomes of the Future Skills Workshop undertaken by the Sustainability IRC in 2018 raised a number of issues that have implications for sustainability skills and the ways in which the training system supports their development.

- Australian businesses and the manufacturing industry need to be ready to respond to government regulation – particularly in relation to international sustainability action. Larger organisations often react to international competitors, but opportunities exist for Australian business to take the lead on sustainability issues.
- Organisations need to be able to undertake a self-evaluation in relation to sustainability. Training should be available to assist industries, organisations and people better understand what being sustainable means and how it affects the triple bottom line of reputation, financial resources, and the environment.
- Organisations may be reluctant to train employees due to financial constraints, despite evidence of the value of training to an organisation when it is structured and managed carefully.
- The communication of data and sustainable products is an emerging trend. Training needs to include how to influence and inform the consumer.
- The 'just in time' approach that has become a predominant way of doing business, along with increasing casualisation and sub-contracting of the workforce, contraction of business sizes and financial constraints for businesses are all contributing to a demand for smaller chunks of learning and training for workers (as seen in the trend for 'micro-credentials').

Key Generic Skills

The Sustainability IRC noted that the categorisation of generic skills, in particular the grouping together of skills that differ significantly (e.g. management vs leadership), rendered the ranking of the generic skills listed below quite unhelpful in terms of training product development. In addition, many of these skills are interlinked. For example, systems thinking, leadership and problem-solving skills are all a part of sustainability skills, while environment skills are closely aligned with STEM skills, and information literacy is essential for data analysis.

³² Australian Industry Group (2018) Skilling: A National Imperative.

They suggested that a much more useful approach would be to identify the generic skills that were important within and across the different manufacturing sectors and to determine what these would look like at different skill and job role levels, (using AQF descriptors as a guide).

The 2018 Industry Skills Forecast and Proposed Schedule of Work identified growing demand for certain generic skills across the industries using MSS Sustainability qualifications. These included:

- problem solving
- design thinking
- leadership
- change management
- innovation management.

The ranking of key generic skills in Table 4 by the Sustainability IRC remains unchanged from 2018. Where there are only certain aspects of the generic skill area that were seen as important, these have been highlighted within the text in the table.

Table 4 – Key generic workforce skills³³

Combined Manufacturing IRCs		Sustainability IRC	
1	Design mindset/Thinking critically/Systems thinking/Solving problems skills	1	Design mindset/Thinking critically/ Systems thinking/Solving problems skills
2	Technology use and application skills	2	Communication/Collaboration including virtual collaboration/Social intelligence skills
3	Learning agility/Information literacy/Intellectual autonomy and self-management skills	3	Data analysis skills
4	Communication/Collaboration including virtual collaboration/Social intelligence skills	4	Managerial/ Leadership skills
5	STEM skills	5	STEM skills
6	Language, Literacy and Numeracy (LLN) skills	6	Environmental and Sustainability skills
7	Data analysis skills	7	Financial skills
8	Managerial/Leadership skills	8	Technology use and application skills
9	Customer service/Marketing skills	9	Learning agility /Information literacy/Intellectual autonomy and self-management skills
10	Environmental and Sustainability skills	10	Language, Literacy and Numeracy (LLN) skills
11	Entrepreneurial skills	11	Customer service/Marketing skills
12	Financial skills	12	Entrepreneurial skills

Demand for generic skills may vary considerably between industry sectors, regions and individual businesses. Employers may prioritise some generic skills over others depending on their particular context, workforce and business imperative. All of the identified generic skills are important throughout the workforce. This ranking represents the importance of generic skills across an industry but should not be expected to reflect the specific experience of every business and employer within that industry.

³³ Demand for Generic Skills may vary considerably between industry sectors, regions and individual businesses. Employers may prioritise some Generic Skills over others depending on their particular context, workforce and business imperatives. All of the identified Generic Skills are important throughout the workforce. This ranking represents the importance of Generic Skills across an industry but should not be expected to reflect the specific experience of every business and employer within that industry.

Through the research and consultation processes for the development of this Industry Skills Forecast, the Sustainability IRC has identified the priority areas for training package development listed in Table 5 below.

Table 5 – Priority areas for training package development

Rank	Skill	How identified
1	Energy management, use and procurement	Consultations and literature review
2	Competitive Systems and Practices skill sets	Consultations and data analysis
3	Environmental monitoring and technology	Consultations
4	Sustainable Operations	Consultations and data analysis
5	Generic skills related to manufacturing and sustainability	Consultations

Key Drivers for Change and Proposed Responses

For sustainability, the challenges and opportunities and the employment and skills outlook described in this report indicate the need for skill development solutions in a number of priority areas. These are outlined in Table 6 below.

Table 6 – Priority skills and proposed responses

Priority Skills	Key Driver for Change	Proposed Response
Regulatory/Legislative		
Skills required to implement the circular economy	Rising focus on circular economy principles and practices as a result of new state and commonwealth government strategies for waste management	Monitor the implementation plans being developed out of new waste management strategies to identify any skill needs that may be relevant to the MSS Sustainability Training Package
Industry-specific		
Competitive Systems and Practices	Increasing focus on advanced manufacturing and sustainable manufacturing processes Increasing demands for skill sets and 'micro-credentials'	To be addressed through the proposed Competitive Systems and Practices project
Environmental Monitoring and Technology	Changing use of technology Emerging job roles in thermography, occupational hygiene, and other areas of environmental monitoring Increasing demands for skill sets and 'micro-credentials'	To be addressed through the proposed Environmental Monitoring and Technology project
Sustainable Operations	Low uptake of qualifications	To be addressed through the proposed Sustainable Operations project
Energy use		
Energy use management and energy procurement	Significant business concerns about energy security and energy management	To be addressed by the Energy Management project
Provision of advice on practices and options for maximising energy efficiency	State government targets for improving energy productivity	Monitor action around this policy area for potential levers for increased demand for skills in this area in the future. Relevant occupations will include all those related to the domestic housing market (e.g. building trades, design, drafting, real estate).
Renewables technology	Increased focus on renewable energy	Monitor activities in this area for any emerging skill needs that may be relevant to the MSS Sustainability Training Package

Priority Skills	Key Driver for Change	Proposed Response
Emerging job roles		
Maintenance planning	Need for more efficient and effective management of maintenance processes in industrial environments	<p>Scope the role of maintenance planners and identify any gaps that might be addressed within the MSS Sustainability Training Package.</p> <p>Will be relevant to occupations related to maintenance management as covered by the new ISO 55000 Asset Management Standards.</p> <p>Is likely to have impacts on qualifications in other areas such as local government, resources, utilities, aviation and defence.</p>
Data visualisation	Increasing need for reporting and communication of data to support process and sustainability improvements	Monitor the outcomes of cross sector work to determine whether the skill demands for this emerging role will be addressed.
Generic skills		
Problem solving, design thinking, leadership, management, STEM and customer engagement	Changing business models and practices	Conduct an audit of generic skills needed across each of the training packages within the Manufacturing sector to identify commonalities at different skill/job role levels (and perhaps using AQF descriptors as a guide).

Training Product Review

Current Activities

Corporate Social Responsibility

In February 2018, IBSA Manufacturing was commissioned to undertake training package development work on the MSS Sustainability Training Package. The Training Package review and development work focuses on extending skills for sustainability job roles to reflect the increasing importance of organisations' need to meet 'Corporate Social Responsibility' expectations. These include adherence to national and international standards related to carbon, energy, and greenhouse gas reduction. The project will revise a number of units along with the existing skill set 'MSSSS00006 Reduce Sustainability Risk' and develop one new unit 'Interpreting and applying standards relating to corporate social responsibility'.

The training package development work is due to be completed and submitted for Australian Industry and Skills Committee (AISC) consideration in April 2019.

Energy Management

In January 2019, IBSA Manufacturing submitted a Case for Change to undertake training package development work on the MSS Sustainability Training Package on behalf of the Sustainability IRC. The training package work focuses on the development of an Energy Management skill set.

The development of a cross sector Energy Management skill set, based on 'ISO 50001 Energy Management', provides a common approach for Energy Management across all training packages. The new skill set provides a vocational education pathway for the acquisition of the skills required to establish and maintain an organisation's energy management.

The Case for Change is currently being considered by the AISC.



AISC Cross Sector Projects

In 2017, the AISC established nine cross sector projects in the common skill areas of: automation, big data, digital skills, consumer engagement through social media, cybersecurity, environmental sustainability, inclusion of people with disability in VET, supply chain, and team work and participation. This signalled a new approach to training package development that aims to simplify vocational education and training (VET) and improve mobility through recognition of qualifications between occupations.

To ensure cross sector units are relevant to multiple occupations and industry sectors, each project includes representation across multiple industries. Cross sector units of competency will be housed in the most relevant training package and marked with a cross sector identifier. Once available on training.gov.au, the units can be adopted across all industry training packages as qualifications and skills are reviewed or developed.

The following cross sector projects have been identified as potentially impacting the MSS Sustainability Training Package:

- The **Big Data** cross sector project will focus on the development of a new basic unit to introduce learners to Big Data and data-driven decision-making, a new skill set to boost skills in data analysis, three new common units to reduce duplication and identification of Big Data-related units of competency that already exist and could be imported into other training packages as electives to improve portability.
- The **Cyber Security** cross sector project aims to review current and emerging developments in cyber security skills, particularly in relation to data confidentiality, protection and privacy, and identified related skills needs shared by multiple industry sectors.
- The **Supply Chain Skills** cross sector project aims to support industries to increase efficiencies and meet consumer demands through the development of ten new skill sets related to the establishment and maintenance of high-performing supply chains.
- The **Teamwork and Communication** cross sector project aims to develop common team work and communication units that can be used across multiple industries. The project includes the development of five new units to be included in the BSB Business Services Training Package.

There are a further three cross sector projects that may also impact the MSS Sustainability Training Package: Automation Skills, Digital Skills and Environmental Sustainability. The next phase of work on these projects is being determined and the Sustainability IRC will continue monitoring their progress for consideration in future training package development work.

The Sustainability IRC will consider recommendations to integrate the new units developed under the above cross sector projects into qualifications in the MSS Sustainability Training Package once components are available.

Upcoming Activities

Priorities 2019–2023

Following consideration and analysis of the industry challenges and opportunities, current and emerging skills needs and the key drivers for change, the Sustainability IRC have identified a number of areas for training product development. These training priorities are outlined in the IRC's [Proposed Schedule of Work 2019–2020 to 2022–2023](#) table which lists the priorities for the next four years. This table also provides a rationale for the priorities, proposed scope and timeframes for these activities.

Important Priorities for 2019–2020

The IRC identified the following training priority as important and propose their inclusion as a priority for the 2019–2020 schedule of work.

- **Competitive Systems and Practices:** Review the current qualifications in light of current workforce demands for upskilling and the demands of technological changes, including consideration of the development of skill sets.

A separate Case for Change will be prepared and submitted to the AISC for consideration.

Priorities Over the Next Three Years

The IRC identified the following training priorities to be considered over the next three years.

- **Environmental Monitoring and Technology:** Updating and development of new units, skill sets and qualifications to support emerging job roles, new technologies and training gaps.
- **Sustainable Operations:** Review of sustainability qualifications and units to align with current job roles and to reflect current terminology and practices in sustainability.

Future Priorities

In their analysis of the industry challenges and opportunities, current and emerging skills needs and the key drivers for change, the Sustainability IRC identified the following areas for future training product development.

- Generic skills that are relevant to manufacturing and sustainability.
- Emerging job role in maintenance planning and scheduling.
- Emerging job role in data visualisations and communication for process and sustainability improvements.

Consultation Undertaken

Key individual and group stakeholders, identified by the Sustainability IRC, were consulted during the development of the Industry Skills Forecast. See [Appendix E](#) for the consultation list.

Feedback was gathered via the following methods:

- forums, meetings and focus groups – attended in person and via webinar
- interviews and one-on-one consultation – via phone/teleconference and/or face-to-face
- nationwide and organisation-specific surveys or questionnaires.

Issues and Sensitivities Raised

Industry consultation identified a number of issues and sensitivities, relating to particular areas within the industry, which have been outlined in the table below. The [Proposed Schedule of Work](#) provides further information on the action to be taken to address these issues/sensitivities.

Table 7 – Issues and sensitivities raised by stakeholders during consultation

Area	Issue and/or sensitivity	Action to be taken
Competitive Systems and Practices	<ul style="list-style-type: none"> • In 2017, 97% of enrolments in the MSS Sustainability Training Package were in competitive systems and practices qualifications. • Job roles and workplace requirements are evolving. New forms of human–machine and machine–machine interaction are emerging, leading to more sustainable and competitive business operations. • Most learners enrol in competitive systems and practices qualifications to upskill beyond their primary qualification by completing specific units of competency, rather than gain a whole qualification. • Skills learnt in competitive systems and practices qualifications have importance and relevance outside the qualifications; as evidenced by the number of enrolments in the top eight competitive systems and practices units, which exceed the number of enrolments in competitive systems and practices qualifications. • There are currently no skill sets that enable skilled workers to implement specific initiatives and practices including 5S and Kaizen. • A full qualification is not always relevant. Manufacturing businesses are increasingly seeking employees that possess trade or other vocational skills, who also have knowledge and understandings of competitive systems and practices; these competencies are often second to the employee's primary role or function. • There are untapped opportunities for businesses to upskill their entire workforce by implementing organisation-wide competitive systems and practices initiatives. • There are increasing demands for skill sets and 'micro-credentials'. • There is an increasing focus on advanced manufacturing and sustainable manufacturing processes. • Several competitive systems and practices units have duplicate content. 	2019–2020 Case for Change

Area	Issue and/or sensitivity	Action to be taken
Environmental Monitoring and Technology	<ul style="list-style-type: none"> • There are a number of emerging job roles in the areas of thermography and occupational hygiene. • Technicians lack a range of skills in relation to new technologies: <ul style="list-style-type: none"> ○ the use of applications that store and process data ○ operating new sampling and data capture technology in the field (e.g. drones, electronic devices) ○ interpreting information and images in industries that use thermographic imaging services. • There is a need for skills in the interpretation and presentation of data, including scrutinising and validating laboratory reports and 'data visualisation', which involves interpreting the available data and presenting and communicating it in a way that is understandable to a specific audience and able to be acted upon within an organisation. • Many of the relevant environmental standards are now out of date and will soon be updated, which will need to be reflected in the relevant qualifications. • Increasing demands for skill sets and 'micro-credentials'. 	Proposed activity 2020-2021
Sustainable Operations	<ul style="list-style-type: none"> • Sustainable operations is an industry in development. • There is a lack of funding for qualifications in sustainable operations, and a resulting lack of training providers. Learners, therefore, are finding it difficult to access appropriate training. • Qualifications may not align with current job roles in the sector, leading to a lack of demand/supply. • There have been significant funding and policy changes, which need to be reflected within the qualifications. • There is a need to: <ul style="list-style-type: none"> ○ review units of competency to ensure they reflect current terminology and practices in sustainability. ○ integrate the generic skills identified as being important across manufacturing sectors. 	Proposed activity 2021-2022
Emerging job roles	<ul style="list-style-type: none"> • Consultation identified emerging job roles in maintenance planning and scheduling, as well as in data visualisations and communication for process and sustainability improvements. 	Identified for future training product development.

Proposed Schedule of Work 2019–2020 to 2022–2023

Sustainability IRC

MSS Sustainability Training Package

Contact details: Peter Nemtsas

Date submitted to Department of Education and Training: MONTH, 2019

Year	Items to be Included in the <u>National Schedule</u>
2019–2020	<p>Competitive systems and practices qualifications and skill sets</p> <p>Review and update Competitive Systems and Practices qualifications to meet workforce upskilling demands and the demands of emerging technological changes. Consider the development of skill sets in Competitive Systems and Practices to enable skilled workers to implement specific initiatives and practices including 5S and Kaizen, as well as the removal of duplicate units.</p> <p>Rationale</p> <p><i>What has changed?</i></p> <p>To improve efficiencies and remain competitive industry are seeking to upskill existing employees working a broad range of job roles across manufacturing, financial services, information and communications technology and health care sectors in lean manufacturing and continuous improvement principles. The qualifications in the Competitive Systems and Practices stream are used however, as these competencies are an addition to the employee's core function the development of skill sets in the Competitive Systems and Practices stream will support the upskilling in specific key skills within that (such as 5S or Kaizen) without requiring a whole qualification. The availability of skill sets in specific practices may also enable businesses to upskill their entire workforce by implementing organisation-wide competitive systems and practices initiatives.</p> <p>At the same time, new forms of human–machine and machine–machine interaction are emerging as part of the next wave of innovation and process improvements leading to more sustainable and competitive business operations. This trend is likely to have implications for Competitive Systems and Practices qualifications and units.</p> <p><i>Employer/Industry Drivers</i></p> <p>There is an increasing focus on advanced manufacturing and sustainable manufacturing processes and increasing demands for skill sets and 'micro-credentials'. Further information on the employer and industry drivers will be included in the Case for Change.</p> <p><i>Employment Data/Occupational Outcomes</i></p> <p>Demand for lower level manufacturing production workers is expected to decline, however an increased demand for workers with higher level skills, Science Technicians, Management and Organisation Analysts and other Specialist Managers, is expected to increase, see Employment Outlook section. The employment data and occupational outcomes will be expanded upon in the Case for Change.</p>

Qualification Usage and History

In 2017, 97% of the total enrolments in MSS Sustainability qualifications (12,087) were in the competitive systems and practices qualifications. Consultations have also identified several Competitive Systems and Practices units that are duplicating content, these units need to be reviewed and duplicates removed. In addition, feedback has identified a need to review and update training package components within the competitive systems and processes stream including rationalisation of duplicated content and redevelopment of qualification packaging rules to better align with job roles.

The below table shows enrolment figures for the qualifications identified for consideration in the project. The data shows strong enrolment in Competitive Systems and Practices qualifications, particularly at the Certificate III – Diploma levels. However, there has been a decline in enrolments for some of these qualifications, which may indicate that the qualifications are no longer fit for purpose.

The Graduate Diploma, which has been identified as low enrolment will be reviewed in the Case for Change. Further evidence on state/territory funding arrangements will be provided in the Case for Change.

Qualification Code	2014	2015	2016	2017	Total
Certificate II in Competitive Systems and Practices	93	210	542	381	1,226
Certificate III in Competitive Systems and Practices	12,804	6,770	5064	4,633	29,271
Certificate IV in Competitive Systems and Practices	12,357	8,691	6,569	6,444	34,061
Diploma of Competitive Systems and Practices	1,240	1,053	6,56	528	3,529
Advanced Diploma of Competitive Systems and Practices	103	81	44	77	305
Graduate Certificate in Competitive Systems and Practices	85	60	17	24	186
Graduate Diploma of Competitive Systems and Practices*	0	0	0	0	0

***Low enrolments**

The seven qualifications in the competitive systems and practices stream were updated with release two in October 2018 however this was due to minor editorial changes required to update unit titles. The native units of competency were transitioned in June 2016, however, were not reviewed as part of this process.

Ministers' Priorities Addressed:

At its inaugural meeting, the Council of Australian Governments (COAG) Industry and Skills Council (CISC) agreed on six key objectives for reform of the VET system. The below table outlines the priorities that would be addressed by this project:

Ministers' Priority	How Addressed
Removing obsolete and superfluous qualifications from the training system	The use of Skill Sets to meet industry need for a targeted range of skills may provide an opportunity to rationalise qualifications.
Making more information available about industry's expectations of training product delivery	The Implementation Guide will include information to the Skill Set
Ensuring the training system better supports individuals to move easily from one related occupation to another	The skill set supports upskilling of workers in competitive systems and practices which are transferable to a broad range of sectors.
Improving the efficiency of the training system by creating units that can be owned and used by multiple industry sectors and housing these units in a 'work and participation bank	Where relevant the updated training package components will use existing and cross sector units.
Fostering greater recognition of skill sets	The development of a Skills Set provides alternative pathways and supports upskilling of existing workers.

Consultation Plan:

The IBSA Manufacturing training development process uses a five-phase methodology which follows the Training Development and Endorsement Process Policy that includes the establishment of a Technical Advisory Group (TAC), identification of key stakeholders, the creation of a project web page and coordination of project and work with the IRC.

A more detailed consultation plan will be included in the Case for Change.

Scope of Project:

Estimated Project Duration: 12 months

If approved, the project would be undertaken in stages.

Anticipated Start Date: April 2020

- Anticipated Completion Date: Case for Endorsement to be submitted June 2021

Training products potentially impacted:

- Certificate II in Competitive Systems and Practices
- Certificate III in Competitive Systems and Practices
- Certificate IV in Competitive Systems and Practices
- Diploma of Competitive Systems and Practices
- Advanced Diploma of Competitive Systems and Practices
- Graduate Certificate in Competitive Systems and Practices
- Graduate Diploma of Competitive Systems and Practices

Further consultation to be undertaken to determine industry need for skill sets in specific practices.

Environmental Monitoring and Technology

Update and develop new units, skill sets, and qualifications as needed to support emerging roles, new technologies and training gaps in the areas of occupational hygiene, environmental measurement and thermal imaging. Industry has identified the following priorities in this area:

- Consideration of the addition of an occupational hygiene stream to the Diploma of Environmental Monitoring and Technology and the development of new units of competency to support this
- Development of new thermal imaging units of competencies and skills sets
- Consideration of the development of skill sets around measurement in environmental monitoring and technology (e.g. water testing, methane measurement, soil absorption). This would include reviewing existing units.
- Further analysis of environmental monitoring and technology roles and content review to determine the scope of work.
- Integrate the generic skills identified as being important across manufacturing sectors.

Rationale

Many of the technical roles in occupational hygiene (such as dust, vapour and fume exposure monitoring, asbestos inspection and air monitoring, and hazardous substances risk assessments) are currently being filled by environmental technicians who need to learn new technologies, equipment and roles on the job, or are undertaken by consultants. While many environmental technicians' skills are transferrable, there are still knowledge and skills gaps that exist. The current qualifications predominantly deal with EPA licensing and legislative requirements regarding environmental monitoring. However, an opportunity exists to develop training package components that focus on the occupational sampling of workplaces to ensure compliance with OHS/WHS legislation. Establishment of an occupational hygiene stream would help facilitate industry's workforce development needs by standardising training outcomes for this emerging workforce for basic sampling tasks currently being conducted by consultants, or by retrained graduates of a Bachelor of Environmental Science qualification. This would also create pathways into higher education for these entry-level workers undertaking sampling tasks and activities.

There are currently no standards for appropriate and accurate conduct, interpretation and reporting of thermographic testing, which is increasingly being used in sectors such as Environmental Management, Recycling and Waste, Plumbing, Electrical, Pest Control, and Building industries to create a thermal profile to identify heat loss and heat gain. There is support from the Australian Thermography Association, Standards Australia, Australian Chamber of Commerce and Industry, Office of Defence Expert Controls and Civil Aviation Standards of Australia for the development of standards for the use of thermal imaging cameras and the interpretation and reporting of resulting data.

Training products potentially impacted:

Further analysis is required to identify qualifications within the Environmental Monitoring and Technology stream.

Sustainable Operations

Recent training package development work has highlighted the need to consider a full functional analysis of sustainability roles and content review.

Rationale

Sustainability qualifications are relatively low-use qualifications compared with others. This is because the sector has experienced significant funding and policy changes and it is an industry still in development. Recent projects have highlighted the need for a full analysis of the qualifications and units to align them with industry requirements.

It would also:

- review relevant units of competency to ensure they reflect current terminology and practices in sustainability
- integrate the generic skills identified as being important across manufacturing sectors.

Training products impacted:

Further analysis is required to identify qualifications within the sustainable operations stream.

2021–2022

Appendix A: Occupation Classifications

For the purposes of analysing employment trends, the following ANZSCO codes have been used.

4-digit classification	6-digit classification	Related MSS Sustainability Training Package qualifications
1399 Other Specialist Managers		Sustainable Operations Competitive Systems and Practices Environmental Monitoring and Management (qualification matches not specified in training.gov.au)
2247 Management and Organisation Analysts	224712 Organisation and Methods Analyst	Graduate Certificate in Sustainable Operations Diploma of Competitive Systems and Practices Advanced Diploma of Competitive Systems and Practices Graduate Certificate in Competitive Systems and Practices Graduate Diploma in Competitive Systems and Practices
3114 Science Technicians	311413 Life Science Technician	Certificate IV in Sustainable Operations Diploma of Sustainable Operations Certificate IV in Environmental Monitoring and Technology Diploma in Environmental Monitoring and Technology
3990 Miscellaneous Technicians and Trades Workers	399000 Miscellaneous Technicians and Trades Workers	Certificate III in Competitive Systems and Practices Certificate IV in Competitive Systems and Practices
7123 Engineering Production Workers	712300 Engineering Production Worker	Certificate II in Competitive Systems and Practices
1335 Production Managers		Sustainable Operations Competitive Systems and Practices (qualification matches not specified in training.gov.au)

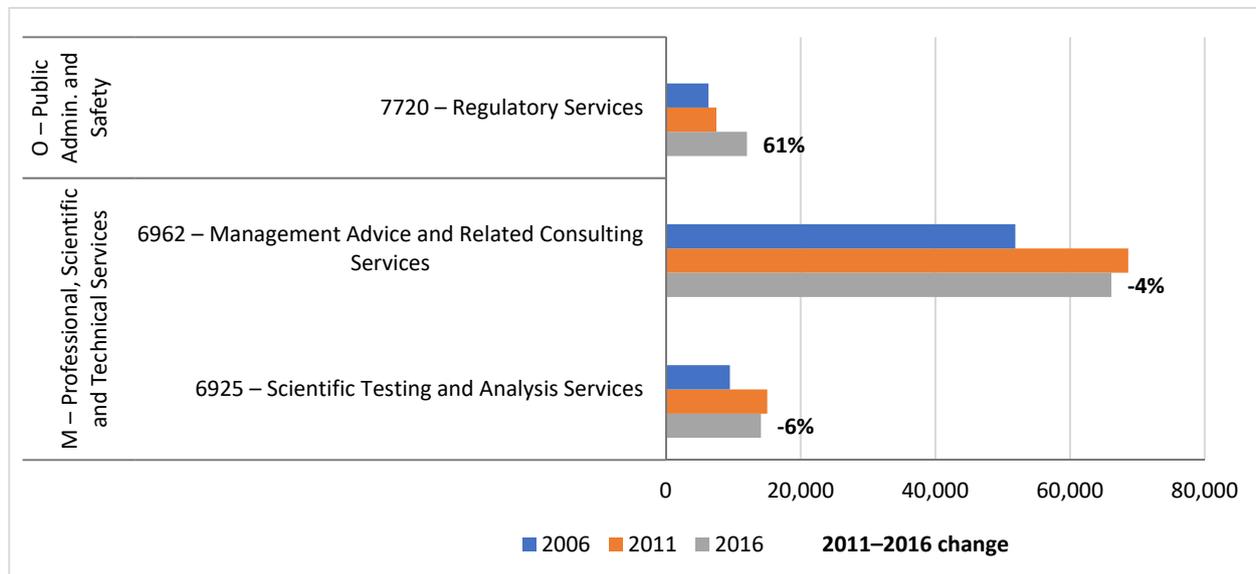
Appendix B: Industry Classifications

For the purposes of analysing the business landscape, the following Australian and New Zealand Standard Industry Classifications (ANZSIC) codes have been used.

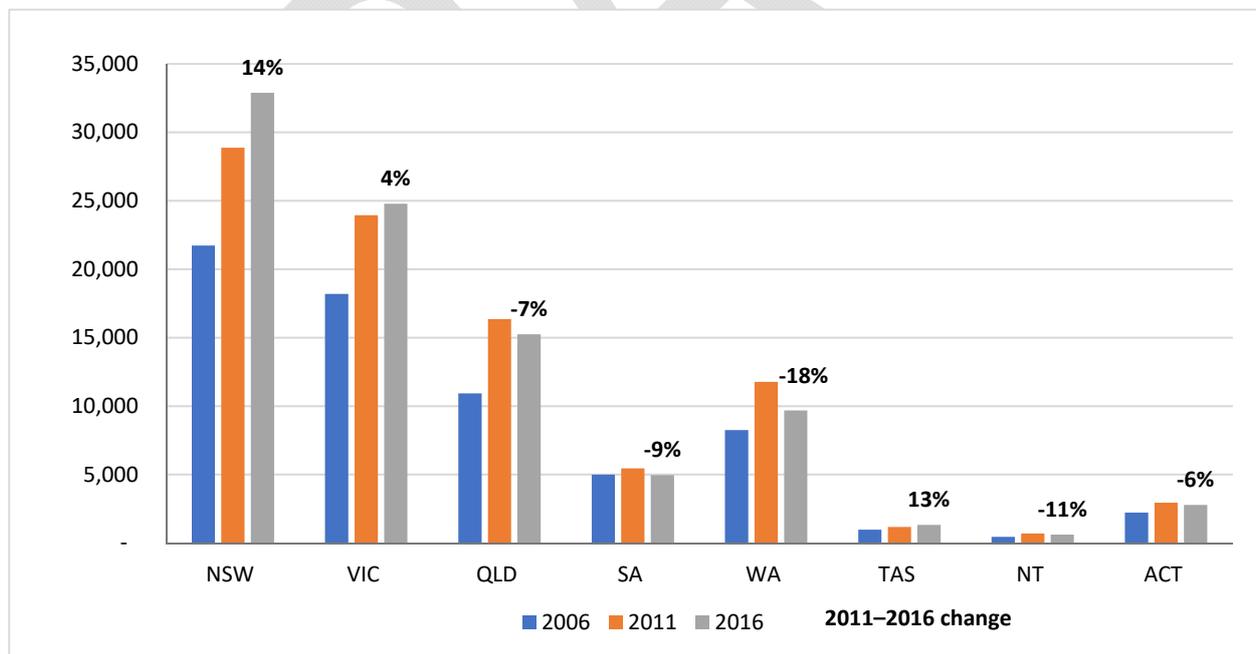
3-digit classification		4-digit classification		Related MSS Sustainability Training Package qualifications
696	Management and Related Consulting Services	6962	Management Advice and Related Consulting Services	Sustainable Operations Environmental Monitoring and Technology
772	Regulatory Services	7720	Regulatory Services	Environmental Monitoring and Technology
692	Architectural, Engineering and Technical Services	6925	Scientific Testing and Analysis Services	Environmental Monitoring and Technology

Appendix C: Census Snapshot

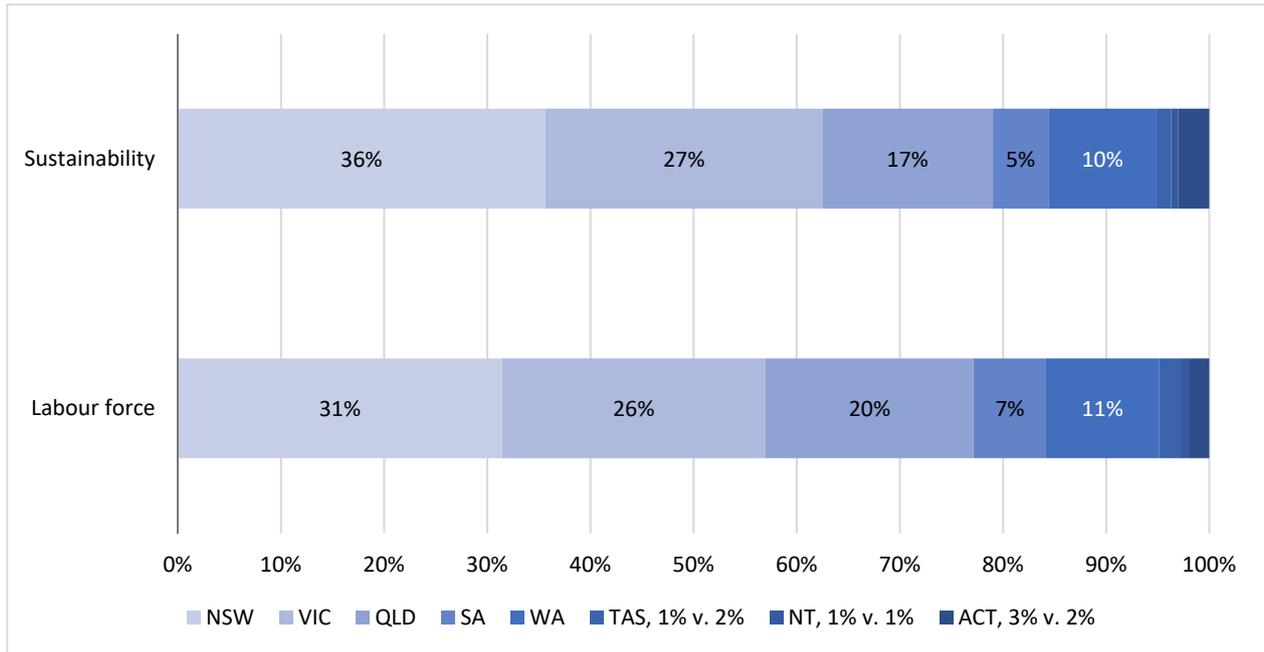
Number of employees in selected industry classes, Census 2006–2016, and five-year change from 2011 to 2016



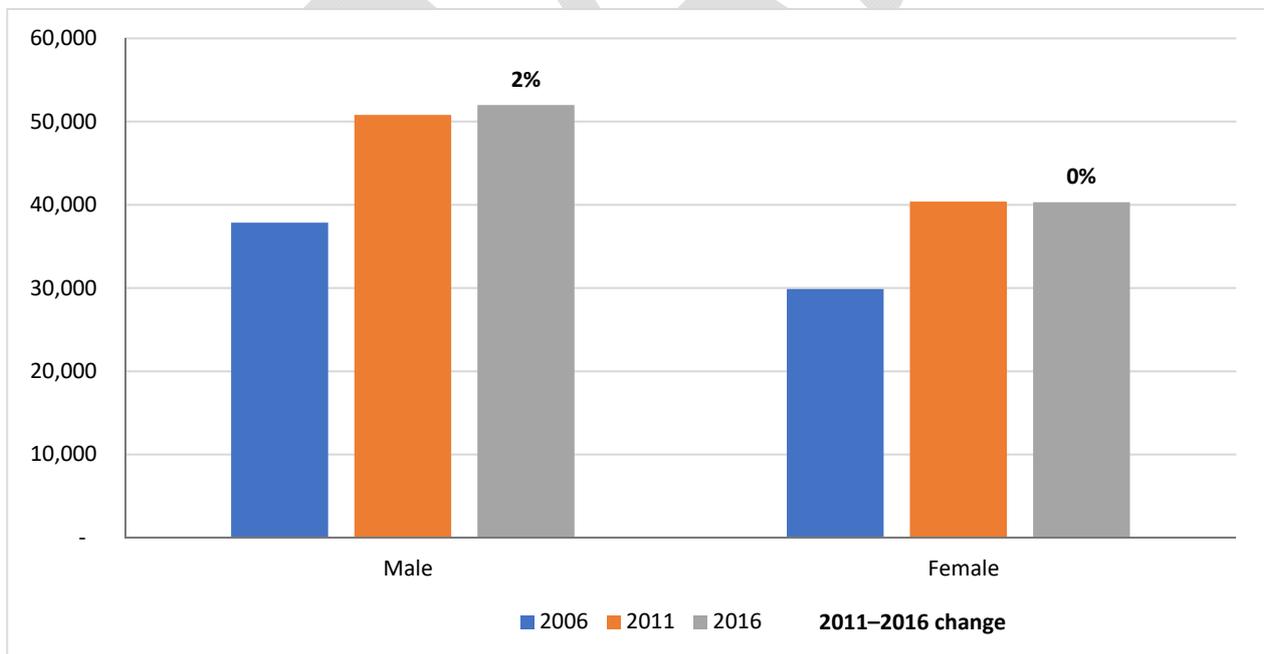
Total number of employees in selected industry classes by state of usual residence, Census 2006–2016



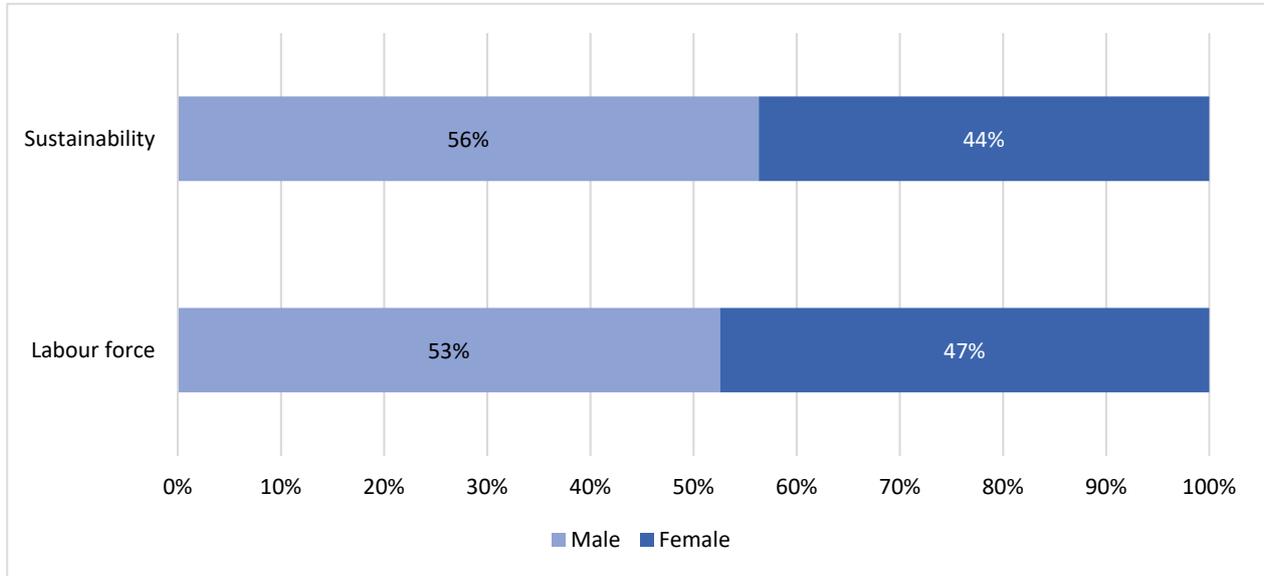
State of usual residence of employees in selected industry classes versus the general labour force, Census 2016



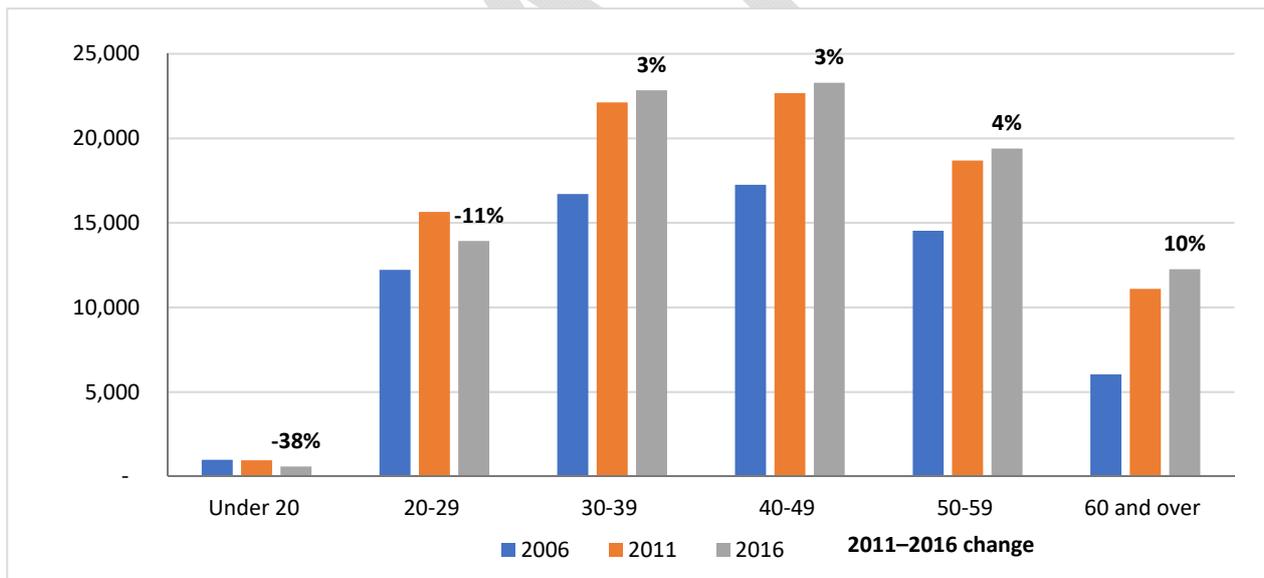
Total number of employees in selected industry classes by gender, Census 2006–2016



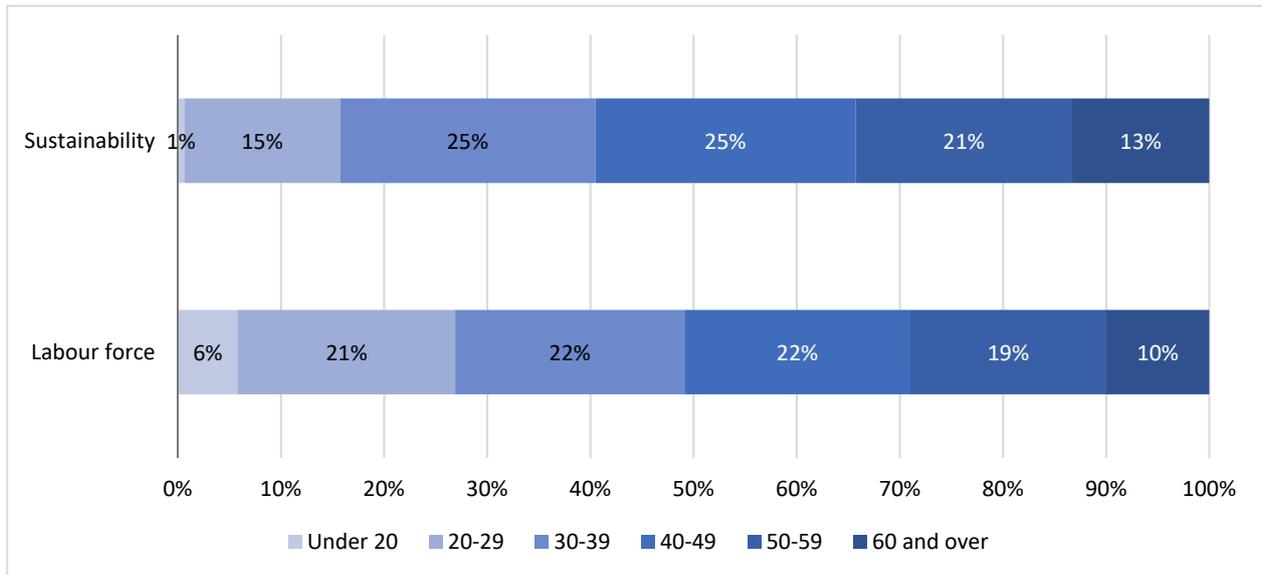
Gender of employees in selected industry classes versus the general labour force, Census 2016



Total number of employees in selected industry classes by age, Census 2006–2016

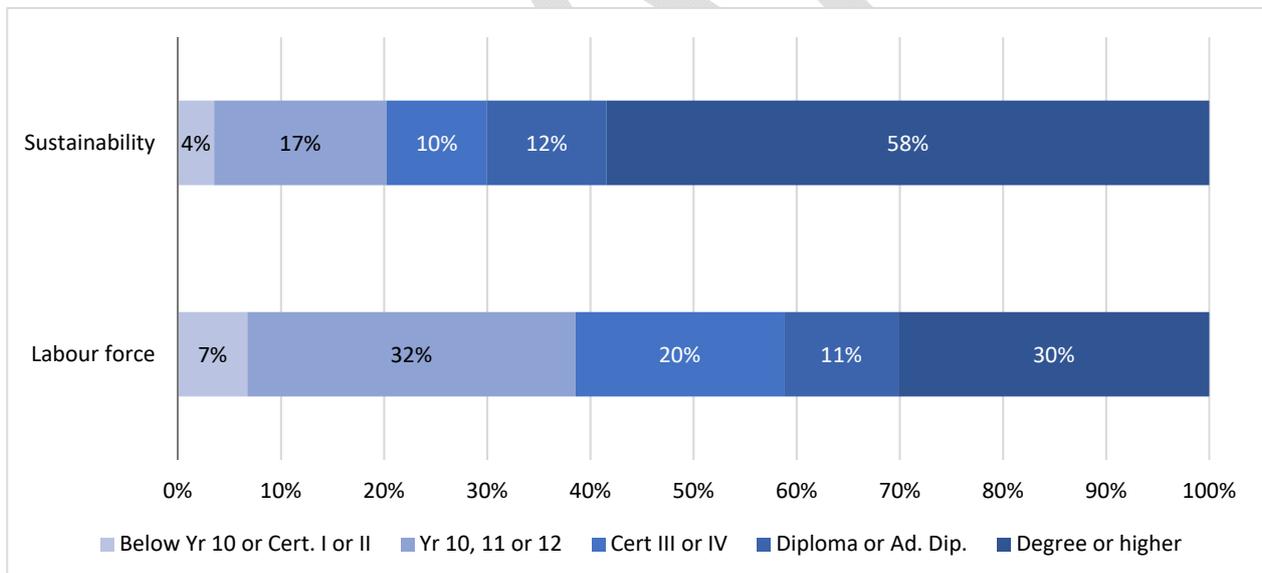


Age of employees in selected industry classes versus the general labour force, Census 2016



Highest educational attainment of employees in selected industry classes versus the general labour force, Census 2016

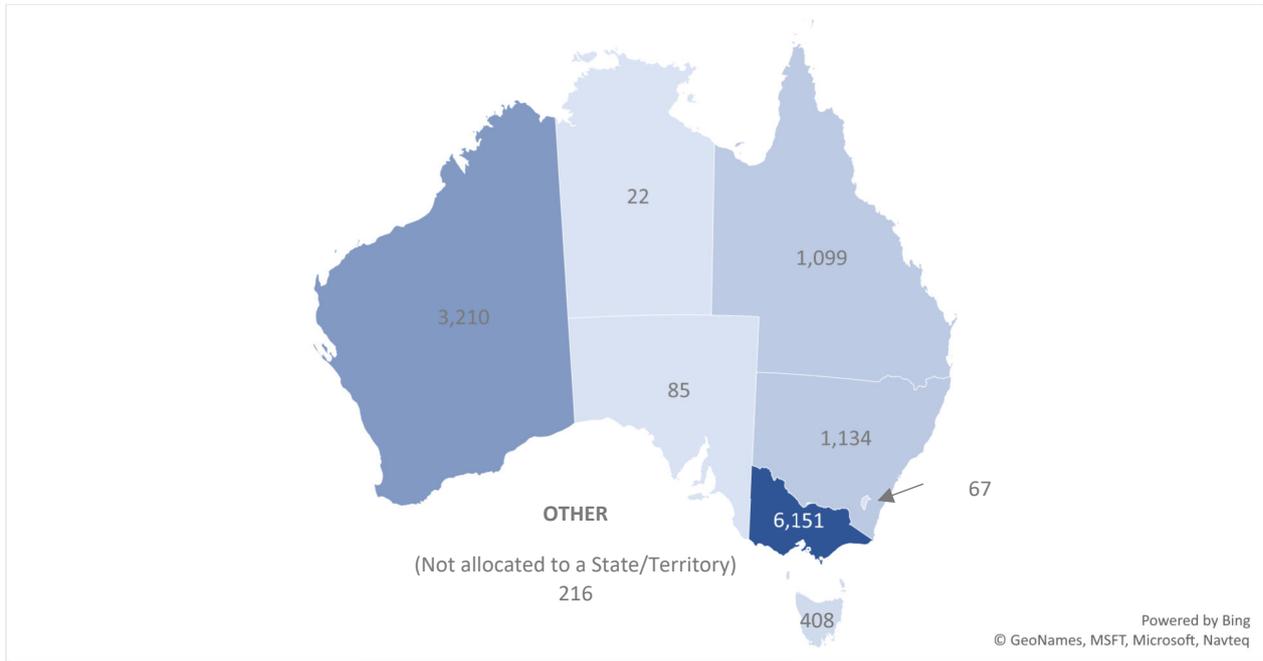
Excludes those whose educational attainment was not stated or not applicable



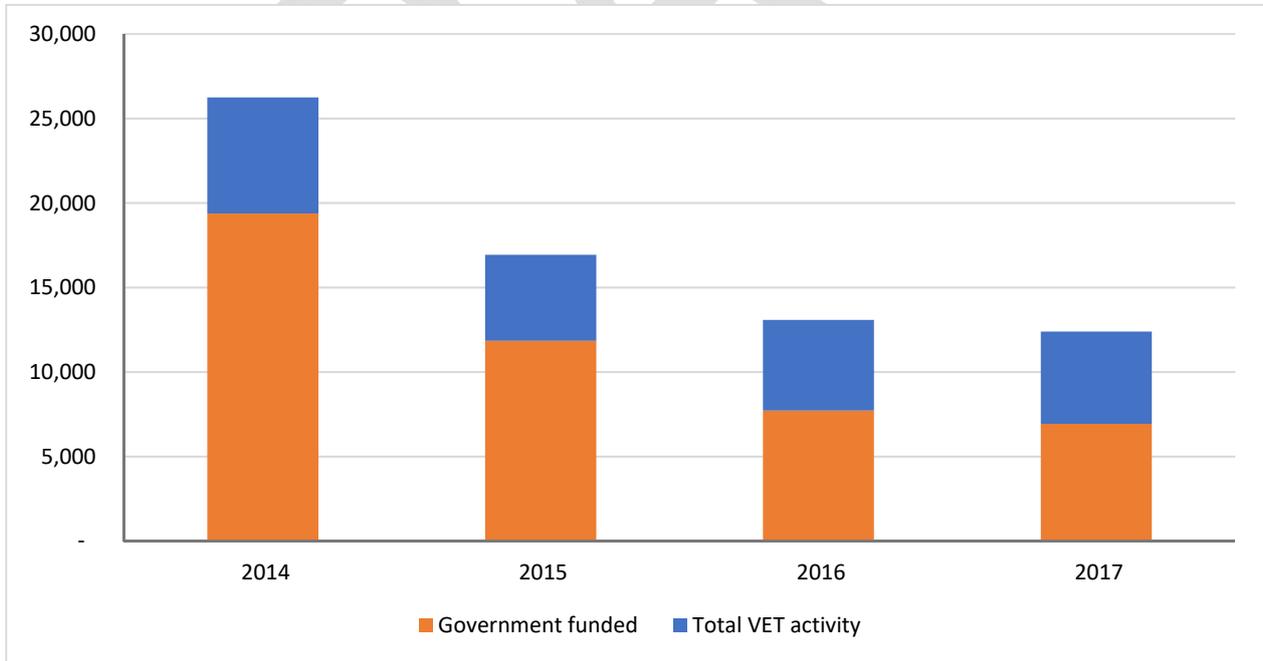
Source: Australian Bureau of Statistics (ABS) Census of Population and Housing: 2016 Census – Employment, Income and Education; 2011 Census - Employment, Income and Unpaid Work; 2006 Census – Labour Force. Data extracted using TableBuilder.

Appendix D: Enrolment Snapshot

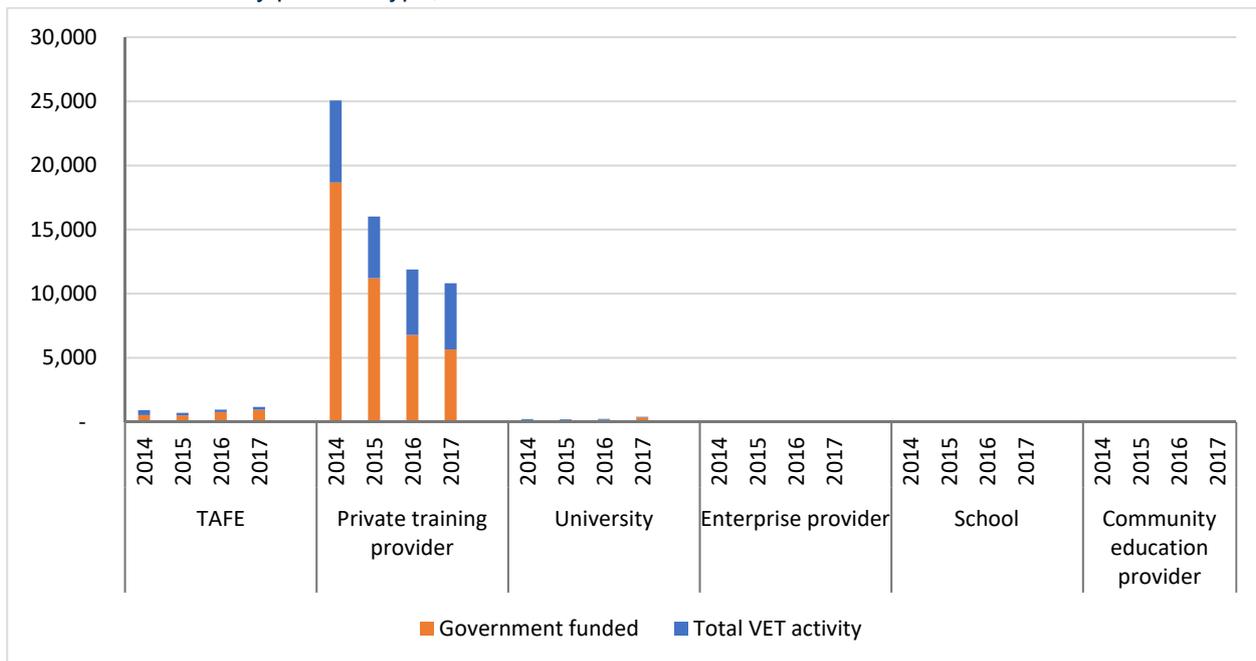
Qualification enrolments by state of student residence, 2017 Total VET Activity



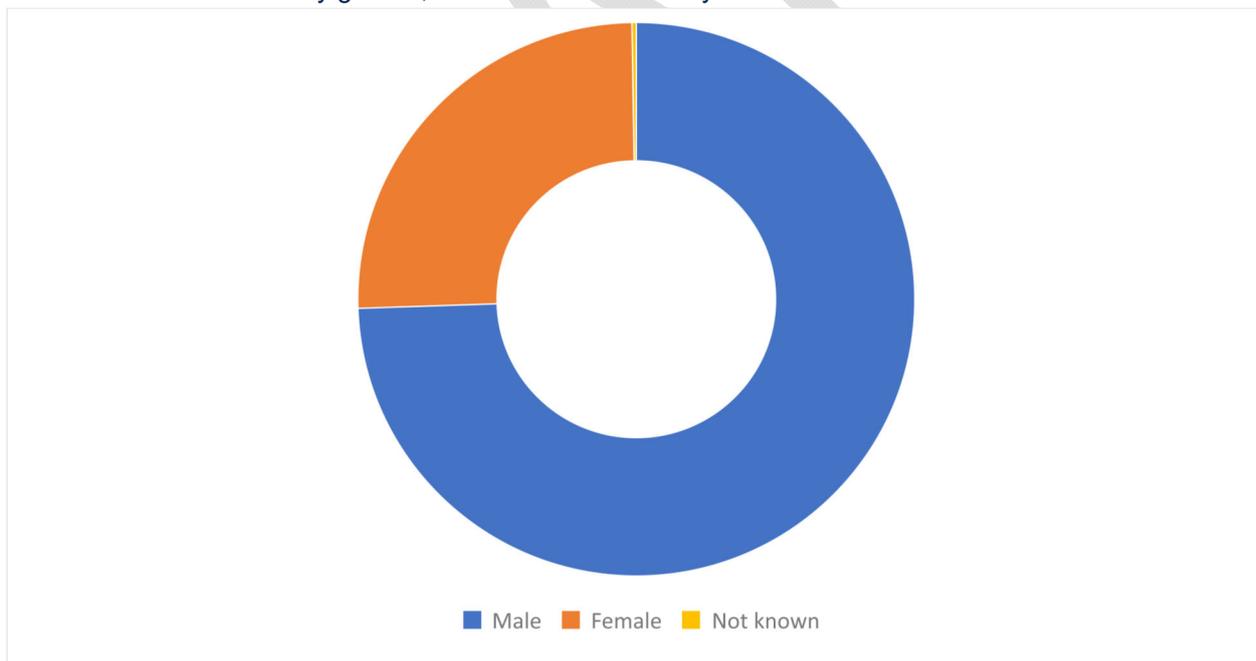
Course enrolments, 2014–2017



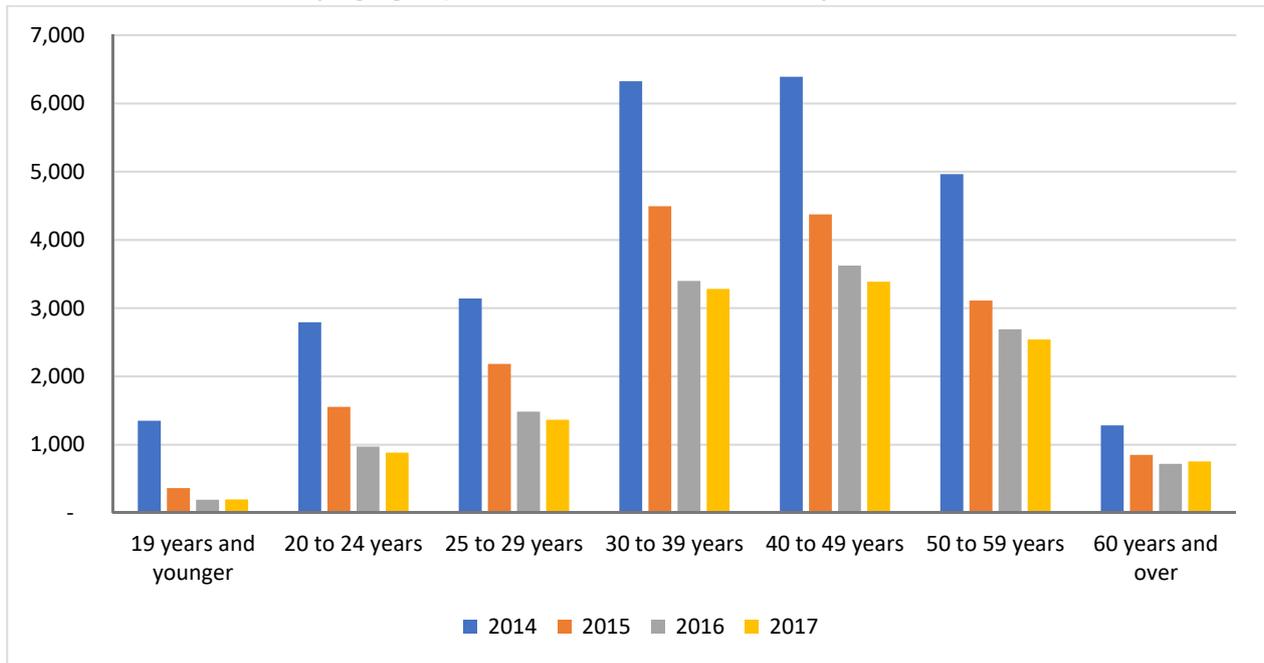
Course enrolments by provider type, 2014–2017



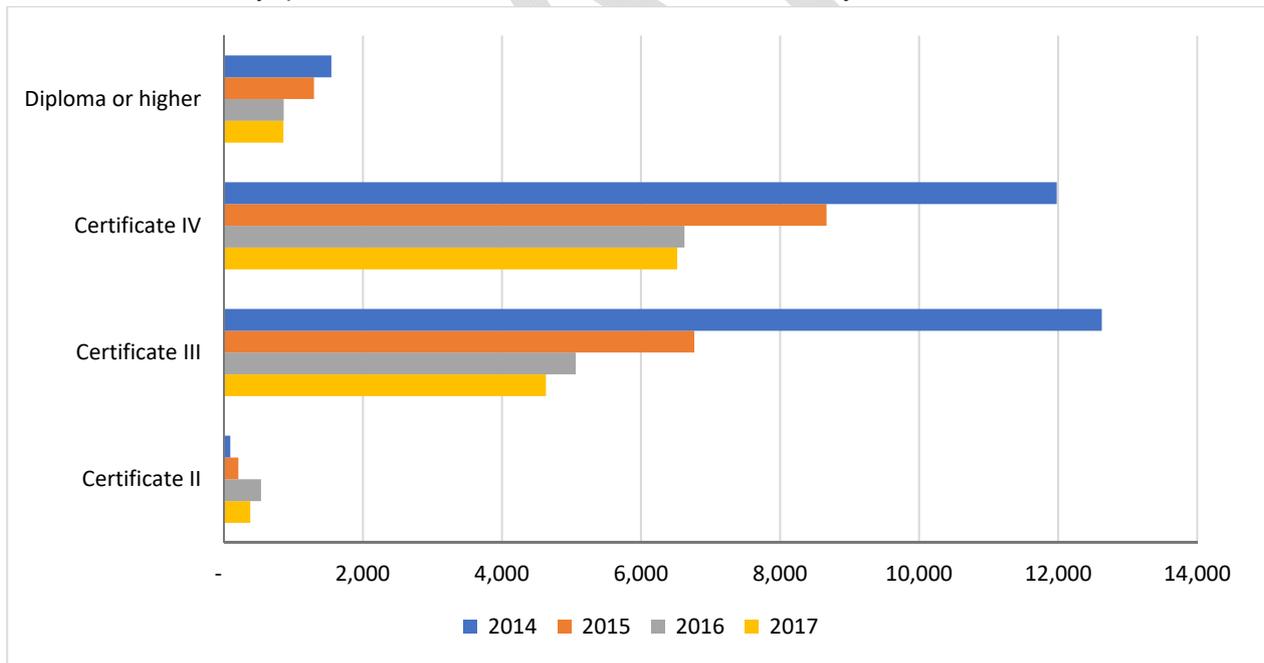
Qualification enrolments by gender, 2017 Total VET Activity



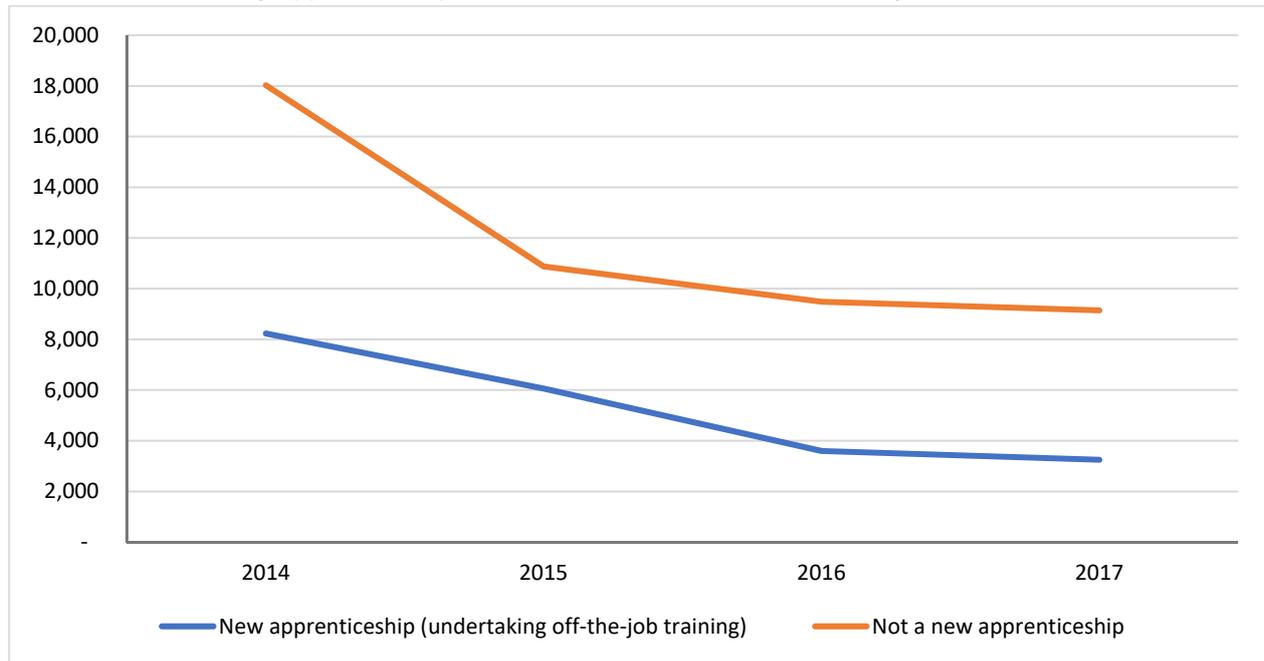
Qualification enrolments by age group, 2014–2017, Total VET Activity



Course enrolments by qualification level, 2014–2017, Total VET Activity



Course enrolments by apprenticeship status, 2014–2017, Total VET Activity



All data in this appendix was sourced from the VOCSTATS VET Provider Collection on 15/08/2018 by IBSA Manufacturing who take responsibility that the information extracted is appropriate for its intended use.

VOCSTATS data are 'randomly' adjusted by small amounts by a data perturbation tool to avoid the release of confidential data. Hence numbers are only approximate. The perturbation impact is negligible for most practical purposes. The effect can be significant and must be considered when interpreting small numbers.

Appendix E: Consultation List

Key individual and group stakeholders, identified by the Sustainability IRC, were consulted during the development of the Industry Skills Forecast. See the consultation list below.

Feedback was gathered via the following methods:

- forums, meetings and focus groups – attended in person and via webinar
- interviews and one-on-one consultation – via phone/teleconference and/or face-to-face
- nationwide and organisation-specific surveys or questionnaires.

Consultation List

Organisation	State
Australasian Thermographers Association	National
Australian Trade Training College Limited	QLD
Brickworks Building Products	WA
Covaris	NSW
CTPM Australasia	NSW
Curriculum Management Service, Victoria	VIC
Department of Training and Workforce Development	WA
Dept for Industry and Skills	SA
Distinctive Solutions Group	VIC
Efficiency Works	QLD
Envirotech Education	NSW
Envirotech education	QLD
Federation Training	VIC
Flowserve	VIC
HappyFeet Performance Academy	QLD
Leighton O'Brien	VIC
Logistics Training Council	WA
Manufacturing and Engineering Skills Advisory Body Inc.	VIC
MSA NSW ITAB	NSW
NMTAFE	WA
North Regional TAFE	WA
People Improvers	TAS
Peraco Pty Ltd	VIC
Serversa	VIC

Organisation	State
TAFE NSW	NSW
Total Training and Performance Solutions (TaPS)	NSW
University of Tasmania	TAS
Vative	VIC
Workwear Group	VIC
Australasian Thermographers Association	National
Australian Trade Training College Limited	QLD
Brickworks Building Products	WA
Covaris	NSW
CTPM Australasia	NSW

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