

Process Manufacturing, Recreational Vehicle and Laboratory Industry Reference Committee

Skills Forecast and Proposed Schedule of Work 2018-2022



Administrative Information

Name of Industry Reference Committee (IRC):

Process Manufacturing, Recreational Vehicle and Laboratory (PMRVL)

Name of Skills Service Organisation (SSO):

Innovation and Business Skills Australia (IBSA Manufacturing)

About the Industry Reference Committee

The **Process Manufacturing, Recreational Vehicle and Laboratory** Industry Reference Committee comprises nine members and was constituted in April 2017.

The 2018 Industry Skills Forecast and Proposed Schedule of Work was reviewed and approved by the membership below.

Mr Keith Monaghan (Chair)

Mr Ian Curry

Mr Stuart Lamont

Ms Leah Simmons

Ms Julie Warren

Mr Nigel Haywood

Ms Ceridwen Jones

Mr Han Michel

Mr Grahame Aston

Industry Reference Committee Signoff

The 2018 PMB Plastics, Rubber and Cablemaking Training Package Skills Forecast and Proposed Schedule of Work was approved as the result of a properly constituted IRC decision.

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

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Executive Summary

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 other stakeholders and provides evidence of current and emerging industry skills needs.

What are the Plastics, Rubber and Cablemaking Industries?

The Plastics, Rubber and Cablemaking industries in Australia can broadly be defined as fitting one of two categories: high volume, lower cost, standardised products (typically for the building industry, medical industry and in the production of plastic bottles, etc) and low volume, higher cost, niche products with a high degree of technical specificity (typically supplying the electrical and mining sectors).

The most significant sub-sector is the Plastics industry – which comprises 90 percent of all businesses in the broader industry.

Higher volume producers are under significant competitive threats from lower cost imports (predominantly from Asia and the Middle East). It is a highly regulated industry with many businesses being impacted by technological change and planning to introduce new technologies to enable them to compete. Electricity costs are a significant cost driver.

Critical Workforce Challenges and Opportunities

Industry figures report serious challenges in accessing high-quality Vocational Education and Training (VET) and a substantial reduction in government funding, which have led to a substantial reduction in training being undertaken in the industry. At the same time that training effort is decreasing, there has been a shift in the educational profile of new applicants looking to enter the Plastics, Rubber and Cablemaking industry. As a consequence of negative media about the future of the wider manufacturing sector, people seeking work in this segment of the manufacturing industry are increasingly being reported to have lower levels of academic attainment, and consequently to have lower levels of Science, Technology, Engineering and Mathematics (STEM) skills. This shift in the profile of applicants to the industry comes at a time when job roles are changing and there is an increasing need for STEM skills.

Forecasting Skills Priorities

In addition to the challenges faced by the industry to access training in the form of existing qualifications from the PMB Plastics, Rubber and Cablemaking Training Package, the industry requires new skills priorities. These include skills to manage and maximise the use of technology while at the same time retaining knowledge of basic plastics within the sector. In addition, generic skills, including problem-solving and decision-making skills, are seen as critical in supporting businesses to switch their operations from higher volume manufacturing to smaller runs suitable for niche industries.

Training Package Priorities

The PMB Plastics, Rubber and Cablemaking Training Package is currently under redevelopment. As a consequence, the Process Manufacturing, Recreational Vehicle and Laboratory IRC has agreed that a Proposed Schedule of Work not be submitted for this return of the Industry Skills Forecast.

Sector Overview

Industry Snapshot

The PMB Plastics, Rubber and Cablemaking Training Package covers the following sectors of the manufacturing industry:

- Basic Polymer Manufacturing
- Polymer Product Manufacturing
- Natural Rubber Product Manufacturing
- Electric Cable and Wire Manufacturing.

Details about the five qualifications in the PMB Plastics, Rubber and Cablemaking Training Package are included in the section on [Training Delivery](#).

Industry stakeholders consider that the plastics industry in Australia is divided predominantly into two areas:

- High volume – dominated by large organisations with high volume production supplying the medical industry, building and construction and packaging which produces plastic bottles and containers
- Low volume – consisting of smaller organisations supplying niche products which require high levels of technical specificity. These manufacturers cater to a wide range of industries including electrical, mining and pipes and other general items.

Within the Australian and New Zealand Standard Industrial Classification (ANZSIC) the sector is categorised by the following Classes within the Subdivisions:¹

- Subdivision 18 - Basic Chemical and Chemical Product Manufacturing
 - Group 182 - Basic Polymer Manufacturing
 - Class 1821 - Synthetic Resin and Synthetic Rubber Manufacturing
 - Class 1829 - Other Basic Polymer Manufacturing

¹ ABS publication: 1292.0 - Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (Revision 2.0)

- Subdivision 19 - Polymer Product and Rubber Product Manufacturing
 - Group 191 - Polymer Product Manufacturing
 - Class 1911 - Polymer Film and Sheet Packaging Material Manufacturing
 - Class 1912 - Rigid and Semi-Rigid Polymer Product Manufacturing
 - Class 1913 - Polymer Foam Product Manufacturing
 - Class 1914 - Tyre Manufacturing
 - Class 1915 - Adhesive Manufacturing
 - Class 1916 - Paint and Coatings Manufacturing
 - Class 1919 - Other Polymer Product Manufacturing
 - Group 192 - Natural Rubber Product Manufacturing
 - Class 1920 - Natural Rubber Product Manufacturing
- Subdivision 24 - Machinery and Equipment Manufacturing
 - Group 243 - Machinery and Equipment Manufacturing
 - Class 2431 - Electric Cable and Wire Manufacturing.

A summary of the business landscape for each of these three sectors can be found in Table 1 below, with further details in the sections that follow.

Table 1 – Business landscape in key sectors/subsectors

Industry Sector/ Subsector	Number of Businesses at 30 June 2016	% Change from 30 June 2015	Types of Businesses
Basic Chemical and Chemical Product Manufacturing	269	-3.6%	36% non-employing 49% small 13% medium 2% large
Polymer Product and Rubber Product Manufacturing	3,115	-0.3%	38% non-employing 50% small 11% medium 1% large
Electric Cable and Wire Manufacturing	96	-9.4%	27% non-employing 50% small 17% medium 6% large

Source: ABS, 2017, 8165,0 Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016

It should be noted that other definitions of the Chemical and Plastics industry includes ANZSIC 'Class 1709: Other Petroleum and Coal Product Manufacturing' which comprises approximately 1,000 businesses.² Within the VET sector, training for this industry is included in the PMA Chemical, Hydrocarbons and Refining Training Package. Accordingly, data on the size of the industry, in terms of businesses and employees, as reported in this Skills Forecast is lower than in some industry publications.

² https://chemistryaustralia.org.au/docs_mgr/PACIA_Report1_ElementsInEverything.pdf

Basic Chemical and Chemical Product Manufacturing

Synthetic rubber and synthetic resin manufacturing involves reactive chemistry manufacturing, as well as the mixing and blending of materials (often called 'formulations' within the sector). Synthetic resin manufacturing involves the conversion of base materials such as chemical gases and /or chemicals under heat and pressure into polymer and resin. Eighty percent of the outputs of the chemistry industry are inputs to other sectors.³ Products may be produced on either a customised or non-customised basis.

Business Landscape

This part of the sector is experiencing decline, with a further reduction in businesses operating in the sector of 4% in the year to June 2016. This can be attributed to the decline of the broader manufacturing sector, which it supplies to, due to the growth in competition from imports. The chemicals part of the sector has been under steady decline, though not as severe as synthetic resin manufacturing which has only a small number of entities left.

As Table 1 indicates, the industry is characterised by a large number of small players – which tend to produce specialised products. Larger organisations within the industry tend to be based in either Victoria or New South Wales. Both large and small manufacturers in this industry are facing growing competition, particularly from the Middle East and Asia.

Key Industry Stakeholders

Peak bodies in this sector include Accord, Chemistry Australia and the Vinyl Council Australia.

Regulation and Licensing

The high level of regulation across the Synthetic Resin and Synthetic Rubber sector is due to the reactive chemistry and often hazardous nature of individual gases and chemicals. Regulations are expected to further increase, with businesses in the sector having to comply with international, Commonwealth, state and local government environmental standards, Dangerous Goods regulations and workplace health and safety requirements (these include Product Stewardship, Responsible Care and Duty of Care guidelines).

The creation of new materials requires extensive testing under European REACH legislation and in Australia requires supervision by NICNAS for new materials and the importation of new materials.⁴ The industry is also required to comply with regulations related to the importation of new chemicals and industrial chemical manufacturers are also required to comply with the Chemical Weapons Convention (CWC), which is designed to restrict the production of chemical weapons.⁵ Finally, the sector is also subject to the requirements of the National Pollutant Inventory (NPI) which provides the community, industry and government with free information about substance emissions in Australia.

Chemistry Australia also has its own regulations for its members which are designed to improve the health, safety and environmental performance of its members' business operations.

3 https://chemistryaustralia.org.au/the-industry/key_statistics

4 <https://echa.europa.eu/regulations/reach/legislation>

5 The National Industrial Chemicals Notification and Assessment Scheme (NICNAS)

Polymer Product and Rubber Product Manufacturing

By far the largest segment of the Plastics, Rubber and Cablemaking industry is the Polymer and Rubber Product Manufacturing sector, with 90 percent of all business in the sector being involved in the manufacture of polymer and rubber products. In turn, Polymer and Rubber Product manufacturers can be segmented across a number of sub-sectors. Rigid and Semi-Rigid Polymer Product Manufacturing is predicted to experience growth in the short-term. Other sub-sectors of the industry are being challenged by low-cost imports and declines in the sectors to which they supply. An example is the car manufacturing sector which was a key user of products from the Polymer Product and Rubber Product Manufacturing industry. Many sectors of the polymer and rubber product industries have been in decline with a notable exception being the packaging industry. For example, all new tyres in Australia are now imported following the closure of the last tyre manufacturing plant in 2010. Rubber manufacturing in Australia is therefore now typically niche, for example, supplying rubber mounts for conveyor belts for the mining sector, with no large rubber product manufacturers left.

Business Landscape

Data recorded by the ABS shows a slight annual decline in the number of businesses operating in the sector. In addition, predictions by researchers at IBISWorld indicate future growth in some parts of this sector including Plastic Bottle Manufacturing, Plastic Flooring and Other Polymer Product Manufacturing, Fibreglass Product Manufacturing, Aluminium Rolling, Drawing and Extruding, Electrical Cable and Wire Manufacturing. Declines are predicted in other areas such as Synthetic Textile Manufacturing, Synthetic Resin and Rubber Manufacturing, Plastic Pipe and Plastic Packaging Material Manufacturing, Plastic Foam Product Manufacturing, Natural Rubber Product Manufacturing, Copper Tubes and Wire Manufacturing. They cite the strength of the Australian dollar, the lower wage and other production costs amongst competitor nations, and declining demand in traditional Australian manufacturing industries as economic drivers which are likely to have a negative impact on this industry sector. In addition, rising electricity costs in Australia are having a significant impact on production costs and ultimately an organisation's bottom line.

Organisations have had to diversify from traditional operations, such as car manufacturing, and source new markets, such as medical and related healthcare industries, to sustain operations in changing environments. Innovative approaches, technological advances and the adoption of new practices are providing opportunities for business to expand into a range of new markets, both domestically and globally.

Key Industry Stakeholders

Since the relaunch of the Plastics and Chemicals Industry Association as Chemistry Australia in 2017, the plastics converting industry no longer has an overall industry association representation in Australia. Remaining entities with coverage of the sector include Plastics Industry Manufacturers of Australia, the Association of Rotational Moulders Australasia, Composites Australia, the Vinyl Council of Australia and the Australasian Plastics and Rubber Institute. Professional associations include the Australia-New Zealand Section of the Society of Plastics Engineers and the Australian Institute of Packaging.

Regulation and Licensing

The level of regulation in the Polymer and Rubber Product Manufacturing sector is predominantly rated by IBISWorld as medium and steady. Exceptions are the Fibreglass Manufacturing sub-sector where regulation is light and steady; whereas in both the Adhesive Manufacturing and the Paint and Coatings Manufacturing sub-sectors regulations are currently 'medium' but deemed to be increasing. Reasons for this increase in regulation include heightened environmental concerns.

Electric Cable and Wire Manufacturing

The Electric Cable and Wire Manufacturing sector covers manufacture of electric and telephone cables and includes businesses involved in the manufacture of insulated optical fibre cable.

Business Landscape

While this industry has declined by nearly 10% (see Table 1) in the 12 months to June 2016, it is predicted that there will be growth in the sector in the short term as a result of the likely up-turn in the construction sector. Australian manufacturers typically supply specialist products in small quantities, and some larger organisations have offshored their manufacturing to reduce costs.

Declining revenues in the recent past have been as a result of increasing lower cost imports, uncertain demand and changes resulting from the introduction of the National Broadband Network (NBN).

Key Industry Stakeholders

The Australian Cablemakers Association is the peak body for the sector.

Regulation and Licensing

Commonwealth and state government authorities, as well as government regulation of downstream industries, are all features of the regulation in this sector. For example, state governments do not regulate cabling, but their legislative requirements on the safe installation of electric cabling, and the licensing of workers who install the cabling, have an impact on the manufacture of electrical cables as the products being installed must be safe to use.

The industry association (Australian Cablemakers Association) has its own requirements for its members, and the Australian Communications and Media Authority has a direct regulatory role.

Regulation in the sector is moderate and unlikely to increase in the short-term.

Training Snapshot

Qualifications Available

The following qualifications are available in the PMB Plastics, Rubber and Cablemaking Training Package:

- PMB20116 Certificate II in Polymer Processing
- PMB30116 Certificate III in Polymer Processing
- PMB40116 Certificate IV in Polymer Technology
- PMB50116 Diploma of Polymer Technology
- PMB60116 Advanced Diploma of Polymer Technology.

Learner Training Profile⁶

In 2016, a learner enrolled in a qualification from the PMB Plastics, Rubber and Cablemaking Training Package was more likely to be:

- Enrolled in a Certificate IV level qualification
- Studying in Queensland
- Aged 30-39 years
- Male
- Not an apprentice or trainee
- Enrolled with a private Registered Training Organisation (RTO).

Over the period 2014-2016:

- The total number of enrolments in PMB Plastics, Rubber and Cablemaking training package qualifications more than halved to less than 900.
- The largest proportion of enrolments have consistently been in Queensland (over 60% in 2016), followed by Western Australia (nearly 20% in 2016).
- The proportion of learners aged 30-39 enrolled in PMB Plastics, Rubber and Cablemaking qualifications remained relatively stable between 2014 and 2016 (over 30% in 2016), followed by learners aged 40-49 years (nearly 20% in 2016).
- Males consistently account for over 95% of enrolments.

⁶ Source: VOCSTATS VET Provider Collection, extracted on September 2017

Appendix A presents a graphical snapshot of enrolment data from the PMB Plastics, Rubber and Cablemaking Training Package. It shows that apprentice/trainee program enrolments have declined to less than 350 enrolments in 2016.

Industry figures report difficulties in attracting apprentices and trainees to the Plastics, Rubber and Cablemaking industries resulting from factors which are common across the broader manufacturing sector, including the negative perception of this being an industry in decline. In turn, this means that there are fewer work-ready applicants, often with lower skill levels, including in the vital STEM skills, at the time when the industry needs workers with higher level skills as they deal with the challenges of automation and technological disruption.

Training Delivery

As illustrated in Table 2 below, delivery by private RTOs accounts for the majority of enrolments, although this has declined to 75% in 2016. Only 35% of training was government funded in 2016 which represents a significant decline of 20% since 2015.

Table 2 - Program enrolments in PMB Plastics, Rubber and Cablemaking qualifications by Training Organisation type

Training Organisation Type	Total VET Enrolments 2015	Total VET Enrolments 2016	Proportion of enrolments that were Government Funded	
	2015	2016	2015	2016
TAFE	160	175	44%	27%
University	-	-		
Enterprise provider	64	60	0%	0%
Private training provider	1,146	669	60%	41%
School	-	-		
Community education provider	-	-		
Totals	1,370	904	55%	35%

VOCSTATS VET Provider Collection, extracted on September 2017

In February 2018, despite most students in the PMB Plastics, Rubber and Cablemaking qualifications being enrolled with private providers, the majority of providers approved to offer these qualifications were TAFE Institutes.⁷

- There were 10 registered providers of the Certificate III in Polymer Processing: six TAFE Institutes based in New South Wales, Victoria and Tasmania, and private/enterprise RTOs in Queensland, Victoria and Western Australia. All states and territories had at least 3 and up to 7 providers with scope to deliver this qualification in their state.
- The remaining PMB Plastics, Rubber and Cablemaking qualifications had between one and seven RTOs approved to deliver them, except for the Advanced Diploma of Polymer Technology which is not on the scope of any RTO.
- Seven RTOs (including 5 TAFE Institutes) were approved to deliver the Certificate IV in Polymer Technology (four of the TAFE Institutes were based in New South Wales).
- One enterprise RTO has the Certificate II qualification in Polymer Processing on scope and 4 RTOs (all TAFE Institutes) are approved to deliver the Diploma of Polymer Technology (2 in Victoria and 2 in New South Wales).

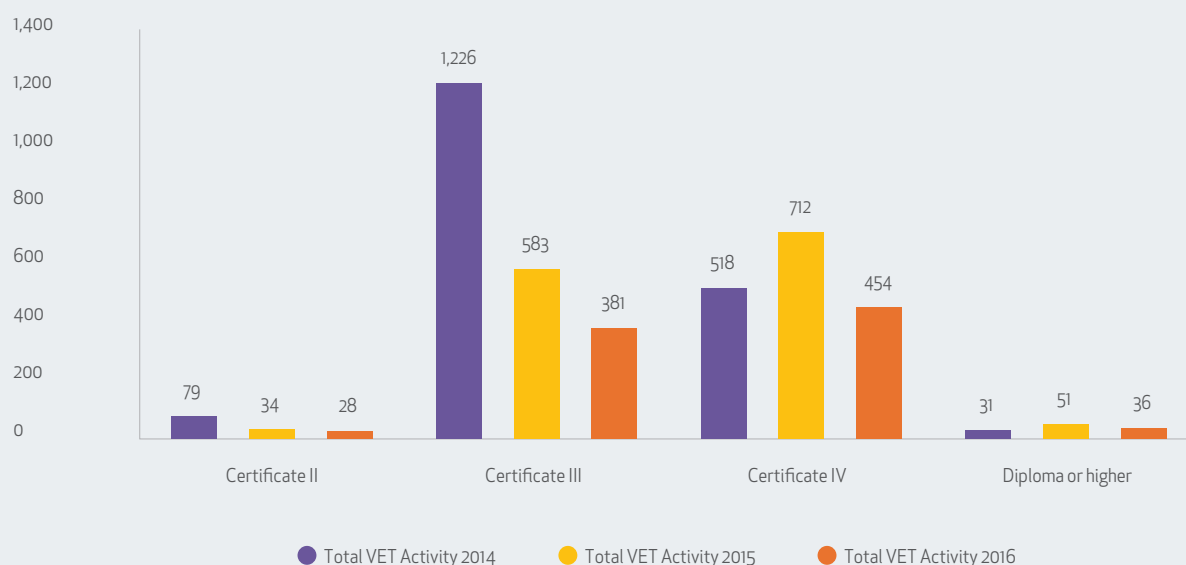
This data does not reflect the very real industry concerns about where training is being delivered and the capacity, in terms of both equipment and specialist staff, to deliver the training. Industry stakeholders consulted as part of the development of this Skills Forecast noted in particular the loss of polymer expertise in Victoria and other geographical locations. Training has either ceased because an RTO does not see the financial viability in catering to a potentially small cohort, or the training has moved to other locations, away from where most of the plastics industry is located. As a result, it is often difficult for industry to access trained employees, and this raises the question, are graduates undertaking PMB training being employed? There are also concerns about RTOs' ability to attract and retain the specialist trainers required.

⁷ Data accessed from <https://training.gov.au/> on 12 February 2018

Qualification Uptake

The uptake of qualifications in the PMB Plastics, Rubber and Cablemaking Training Package is illustrated in Figure 1 below.

Figure 1 – Total enrolments in Plastics, Rubber and Cablemaking



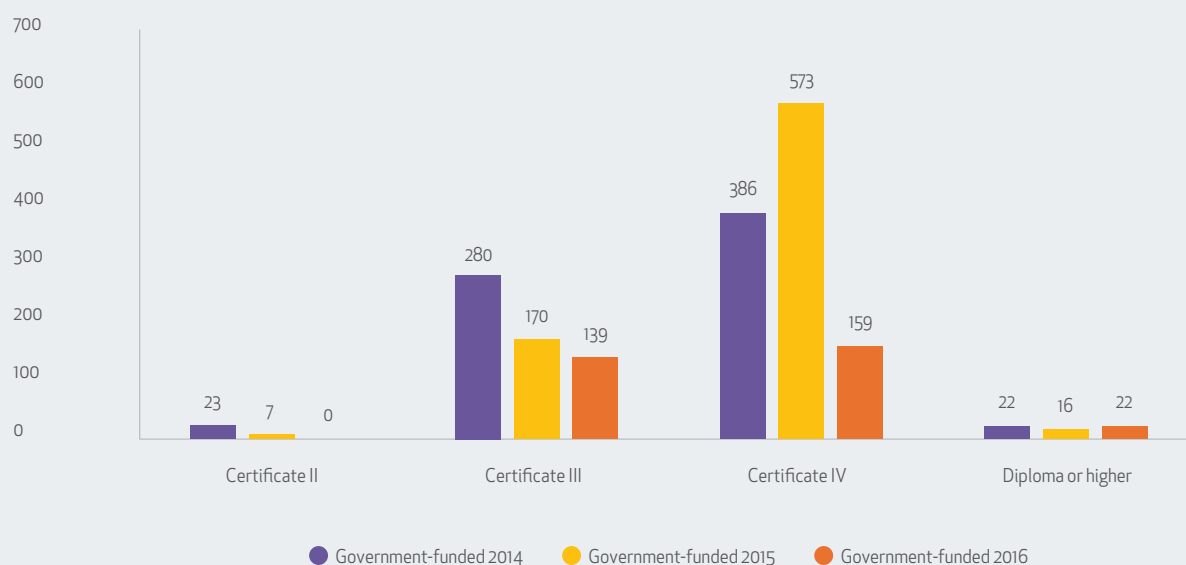
VOCSTATS VET Provider Collection, extracted on 18/9/2017

In 2014, the majority of enrolments (over 65%) in the PMB Plastics, Rubber and Cablemaking Training Package were in Certificate III in Polymer Processing. The proportion of enrolments in the Certificate III has now declined to around 40% in 2016. Nearly all of the remaining PMB Plastics, Rubber and Cablemaking enrolments were in the Certificate IV.

When government-funded enrolments are analysed (Figure 2) they broadly reflect the overall enrolment trends shown in Figure 1. That is, a decline in enrolments in Certificate II and III, and a slightly different trend in enrolments for the Certificate IV in Polymer Technology, which saw an increase in enrolments in 2015 followed by a larger decline in 2016.

Industry stakeholders also noted the considerable investment made by employers on 'in-house' or non-accredited training to ensure their employees are properly trained on the correct use and handling of chemicals, particularly when new chemicals are being introduced. The withdrawal of government funding to just one-third of all enrolments in the formal accredited training sector, combined with issues in accessing training, is accelerating the industry's withdrawal from the formal sector and increasing its reliance on the non-accredited sector. Some industry stakeholders cautioned that it would take years to reverse the current decline in training and would only be achieved with significant, sustained government investment.

Figure 2 – Government-funded enrolments in Plastics, Rubber and Cablemaking



VOCSTATS VET Provider Collection, extracted on 18/9/2017

Challenges and Opportunities

Megatrends affecting all of the sectors covered by the PMRVL IRC were identified by IRC members in a future skills workshop conducted in 2017.

A summary of the outcomes of this workshop can be found in **Appendix B**.

More specific challenges and opportunities for the sectors related to the PMB Plastics, Rubber and Cablemaking Training Package are discussed below.

For Industry and Employers

Due to the strong interactions between many parts of the Plastics, Rubber and Cablemaking sector and the broader manufacturing sector, many of the challenges and opportunities facing the sector are similar to those faced by the broader manufacturing sector (e.g. competition from cheaper imports, declining demand from Australian businesses due to industry change/offshoring, etc.)

Society and Culture

Some factors which help to explain the declining enrolments in training include the age of the workforce, with two-thirds aged 40 years and over; the declining levels of employment; and the predominance of small and micro business in the sector. The adoption of technological innovation across most parts of the sector (due to the cost involved) and the low cost of overseas imports also count against most businesses having the resources (time or financial) to invest in more training.

Business and Economics

As noted above, the serious competitive challenge posed by overseas companies is having a significant impact on many businesses in the Plastics, Rubber and Cablemaking industry. Within the sector, the brightest spots relate to the Rigid and Semi-Rigid Polymer Product Manufacturing sector (i.e. those producing plastic bottles amongst other products) where demand is increasing.

The Plastic, Rubber and Cablemaking sector is dominated by micro and small business (depending on industry subsector, between 80 and 90% of businesses have five or fewer staff⁸) making the threat from overseas competition more difficult to counter given the relative lack of capital available to these businesses.

Resources and Environment

One of the biggest challenges for Australian manufacturing is the cost of electricity. Rising electricity costs in Australia are having a significant impact on production costs and ultimately an organisation's bottom line. This in turn is impacting jobs, as employers have less ability to employ additional workers, or worse, have to decrease their staffing and operations to offset the significant increase in costs.

Technology

Technology change is occurring across the various sub-sectors of the Plastics, Rubber and Cablemaking industry. For most sectors and businesses, the rate of change is common with other areas of the economy. That is, change is occurring but is not causing significant disruption to production processes at this stage; for example, in the paint manufacturing sector, the introduction of new technologies such as nanotechnology have encouraged new product development in the industry. However, because of the relatively high cost, this innovation is likely to only be used in specialised applications or by niche businesses.

By contrast, in the manufacture of packaging materials and in the cablemaking segments of the industry, technological change is happening quickly. For cablemakers, the change involves a shift from copper to fibre optic cables, while drink container manufacturers are shifting from the use of glass to plastic (even for drinks such as wine) as a means of reducing costs and their carbon footprint.

Looking at the industry holistically, there is a reasonable degree of technological change as plants become automated or semi-automated. This in turn is allowing businesses to shift from traditional, large-scale manufacturing to smaller scale manufacturing for new and emerging industries (e.g. supplying innovative products to the packaging and medical industries).

⁸ Source: ABS, 2017, 8165:0 Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016

Political and Institutional

There are two recent political/institutional issues which have had an impact on businesses in the sector. The end of motor vehicle manufacturing in Australia has had a flow-on impact for demand for products from the plastic flooring and fiberglass manufacturing sub-sectors (major suppliers to the motor vehicle manufacturing sector). The Cablemaking sector has also been impacted by the rollout of the NBN. While the NBN has seen an increased demand for electrical cables, much of that demand has been met by imported products, meaning there has not been a significant increase in demand for cables manufactured in Australia.

Supply-side Challenges and Opportunities

As enrolments in qualifications designed for the Plastics, Rubber and Cablemaking sector have declined, there has also been a decline in enrolments in government-funded places in the sector (in 2016, 35% of all enrolments were government funded). The high level of investment by employers in the sector (on in-house, non-accredited training), combined with significant declines in government funding for training and the growing threat of overseas competition, are acting in combination and resulting in employers investing less in training due to the cost pressures they are facing.

For Learners and Training Package Development

To ensure businesses can maximise the benefits of automation and workers can value add to the production process, employees require a higher level of computer literacy and skill to understand how the technology works and to ensure new technology is well integrated into broader organisational systems.

While technological skills will become increasingly important, it was noted by industry stakeholders that workers will still need a basic level of knowledge of plastics, including matters such as the reactions of different agents, the effect on products of changes to the levels of different agents, and the flow-on impacts of these kinds of changes across the production process. Industry figures also identified the need to ensure workers contextualised their decision making against a background understanding of overall business costings and efficient manufacturing processes as new products were introduced.

Cross-industry Challenges and Opportunities

As with other sectors of the manufacturing industry, businesses (and their workers) in the Plastics, Rubber and Cablemaking sectors face serious offshore competition, the development of new products on a smaller scale to meet demands from niche industry sectors, as well as the challenges of automation.

Employment and Skills Outlook

Employment Outlook

Data on employment trends and projections of the broader occupations and industries to which PMB Plastics, Rubber and Cablemaking qualifications relate are illustrated in Table 3 below.⁹ The following observations are relevant:

- Employment is declining in the industry – while the number of businesses involved in Plastics, Rubber and Cablemaking have declined slightly in the last year, when looking at employment numbers the picture is clearer. In the past decade, employment has declined by over 40% and most of this decline has come in the past five years.¹⁰
- The industry is male-dominated and ageing, with men making up 75% of the 25,753 who reported being employed in the industry in the 2016 Census. People aged 50-59 years were nearly 30% of the workforce. While the industry has always relied on older workers, in 2006 they made up only 20% of the industry.
- The sub-industry sectors with the highest employment shares in 2016 are:
 - Rigid and Semi-Rigid Polymer Product Manufacturing (7,023 employees)
 - Paint and Coatings Manufacturing (4,831)
 - Polymer Film and Sheet Packaging Material Manufacturing (3,069).¹¹
- Employment projections indicate ongoing but more modest declines in the numbers employed in the Plastics, Rubber and Cablemaking industry are likely. Estimates suggest the sector may lose a further 10% of its workforce by 2022.¹²

However, some polymer technology and processing skills will continue to be required as they are being adopted across other manufacturing and related industries.

⁹ ABS Census of Population and Housing; 2006, 2011 and 2016

¹⁰ ABS, 2017, 8165.0 Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016

¹¹ Source: ABS Census of Population and Housing; 2006, 2011 and 2016

¹² Source: Department of Jobs and Small Business Labour Market Information Portal (LMIP) Industry Employment Projections May 2017 – May 2022

Table 3 – Employment growth and projections¹³

ANZSIC Code	Industry	Projected employment growth May 2017 – May 2022 %	
182	Basic Polymer Manufacturing	-15.4%	
191	Polymer Product Manufacturing	-10.1%	
192	Natural Rubber Product Manufacturing	-6.5%	
243	Electrical Equipment Manufacturing	-14.6%	Please note data is only available to the 3-digit ANZSIC Code

Workforce Supply Challenges and Opportunities

As with other areas of the manufacturing sector, the Plastics, Rubber and Cablemaking industry has a number of workforce challenges.

- Declining employment and future projected job losses signal a need for re-training and up-skilling amongst affected workers. This may not be from the PMB Plastics, Rubber and Cablemaking Training Package if displaced workers look for employment in new industries.
- Understanding the central role of the Plastics sub-sector in the broader Plastics, Rubber and Cablemaking industry (90% of all businesses operating in the sector) is important if workforce supply challenges are to be understood and sustainable training solutions (including funding) are to be identified.
- The loss of the automotive industry has had a significant impact on businesses in the Plastics, Rubber and Cablemaking industry in general.
- Technological change is impacting on the sector but due to the high costs involved and the relatively small size of most businesses, its adoption is likely to take time and be pursued mostly by smaller, niche players in the first instance. An exception is those involved in the packaging sector.
- Competition from overseas imports is also having a significant impact on the sector.

¹³ Department of Jobs and Small Business Labour Market Information Portal (LMIP) Industry Employment Projections May 2017 – May 2022

Skills Outlook

Plastics employers are struggling to access the training they need at a price they can afford. Given their high level of investment in non-accredited training, they require an increased investment of government funding (and better located and resourced training facilities) if they are to continue to use the formal, accredited VET sector.

More broadly, workers in the Plastics, Rubber and Cablemaking industry increasingly require computer literacy skills to ensure they are able to work within more automated plants and ensure they can integrate new technology into broader systems.

Workers will still require training in 'traditional' plastics, rubber and cablemaking skills. However, these will increasingly need to be balanced with problem-solving and decision-making skills as businesses switch their operations from higher volume manufacturing to smaller runs for niche/new industries.

This increasing demand for generic skills to complement and support industry-specific technical skills and knowledge is common across other parts of the manufacturing sector.

IRC members have ranked the importance of key generic workforce skills as indicated in Table 4 below. In several cases, there were only particular aspects of the generic skill area that were seen as important and these have been highlighted within the text in the table.

IRC members observed that although they would expect that learners would already possess the necessary underpinning Language, Literacy and Numeracy (LLN) and STEM skills when enrolling in qualifications, this is often not the case. Therefore, it is important that qualifications specify the required underpinning skills within the standards.

It was also suggested that Workplace health and safety should be added to the list of generic skills, as its high level of importance is evident across all of the industry sectors under the remit of this IRC.

Customer service skills are important for sectors that include retail businesses, such as the Recreational Vehicles sector. However, the IRC commented that 'customer' can also be defined as the next person on the production line, and that getting the 'product' to this person is critical in the manufacturing process. Similarly, customers can also be defined as different organisations within the supply chain.

Table 4 - Key Generic Workforce Skills

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

Key Drivers for Change and Proposed Responses

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 5 below.

Table 5 - Priority skills and key drivers for change

Priority Skills	Key Driver for Change	Proposed Response
Regulatory/Legislative		
The sector is subject to a moderate level of regulation.	In looking to overseas trends, challenges will emerge based on product stewardship, responsible care and extended producer responsibility.	
Industry Specific		
Improving access to high-quality training and the affordability of the training is critical if there is to be an increase in training in the Plastics sector.	No additional drivers for change are foreseen in the short-term beyond the integration of generic skills such as problem solving and decision making alongside existing industry skills.	
Business skills		
	No drivers for change are foreseen in the short-term.	
Technology		
New production methods are being adopted impacting skills required for operation and maintenance	Improved product performance as well as reduced costs and wastage	Investigate the impact of new technology on these industry sub-sectors and consider any possible changes to the Training Package.

Training Product Review - Current Activities

2017-18 Activities

In February 2018, the Australian Industry Skills Committee (AISC) approved a Case for Change to undertake broader scoping activities, consultation and analysis of the PMB Plastics, Rubber and Cablemaking Training Package. Industry expressed concerns that without a review, the training package will be obsolete and may no longer be supported by the polymer converting industry in the future. The Australian polymer converting industry is experiencing changes that will necessitate new requirements in existing qualifications. Stakeholders have also identified that current qualifications have low participation and completion rates and do not produce graduates with contemporary work ready skills.

This project will review and reconfigure the five existing qualifications to assess the need for the number, and levels, of qualifications. Alignment with industry skill needs, current work practices and equipment will be an imperative. The grouping of electives into streams will be considered, and new units will be developed where required. This work supports a number of the CISC-AISC priorities as it deletes obsolete and redundant qualifications and units of competency, as well as seeks to address stakeholders' concerns about the quality in the current training system by improving industry's expectations in assessments.

The project is due to be submitted to the AISC mid-2019.

AISC Cross-Sector Projects

The AISC identified a number of emerging cross-sectoral themes in previous IRC skills forecasts. The AISC sought to strategically address these common skills issues and commissioned nine cross-sector projects. The aim of the projects is to address changing skills needs across industries in a coordinated and efficient way and, where opportunities exist, to create flexible and transferable training package components that will benefit industry, learners and the broader VET sector.

There are a number of cross-sector projects that will potentially directly impact upon the PMB Plastics, Rubber and Cablemaking Training Package:

- The **Digital Skills** Cross-Sector Project, while initially focused on the need for coding skills in manufacturing and related training packages, this project was expanded to focus a broader set of skills related to coding and programming, CAD/CAM/CAE, and additive manufacturing/3D printing, as well as the digital analytical/diagnostic skills needed to analyse and respond to data provided by machines in the workplace. Outcomes of the project may result in recommendations for updated content for at least five units of competency in the PMB Plastics, Rubber and Cablemaking Training Package.
- The **Automation Skills** Cross-Sector Project focussed on current and emerging developments in automated processes to determine the cross-sector skills required to use robotics, drones and remote operation systems. Outcomes of the project may result in recommendations for updated content for at least two units of competency in the PMB Plastics, Rubber and Cablemaking Training Package.
- The **Environmental Sustainability Skills** Cross-Sector Project focused on identifying environmental sustainability skills that are shared by multiple industry sectors and recommend training package developments and modifications that will enable the use of training products across multiple industries, thus reducing duplication and enhancing skill transferability. Outcomes of the project may result in recommendations that at least one unit of competency from the PMB Plastics, Rubber and Cablemaking Training Package be reviewed, with potential for replacement by a cross-industry unit.

Training Product Review – Priorities 2018-2022

As outlined in the previous, Current Activities, training package development work has been approved to review and reconfigure the five existing qualifications in the PMB Plastics, Rubber and Cablemaking Training Package to better meet the future needs of the polymer industry.

The 2017 return of the PMB Plastics, Rubber and Cablemaking Industry Skills Forecast identified a number of priorities for future training package consideration which included:

- Materials knowledge; in-depth materials knowledge is required by operators to ensure product compliance with national and international standards
- Polymers; new polymer materials product design and converting processes and equipment knowledge
- Workplace Health and Safety knowledge.

Ongoing stakeholder consultation has also identified the need to consider:

- Smart synthetics and coatings.

The priorities identified in the 2017 Proposed Schedule of Work and other emerging priorities will be considered as part of the PMB Plastics, Rubber and Cablemaking Training Package review.

Proposed Schedule of Work 2018-19 to 2021-22

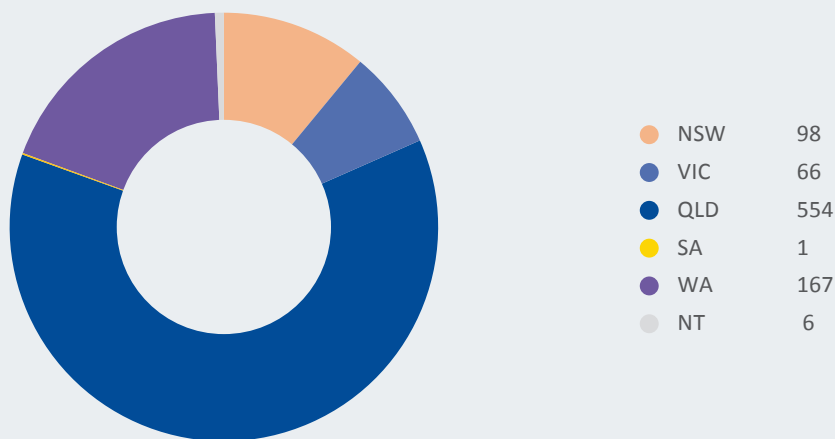
As the PMB Plastics, Rubber and Cablemaking Training Package is currently being redeveloped to meet the future needs of the industry, the Process Manufacturing, Recreational Vehicle and Laboratory IRC have agreed that a Proposed Schedule of Work not be submitted for this return of the Industry Skills Forecast.

The IRC will consider any additional priorities for training package development for the Plastics, Rubber and Cablemaking sectors in the 2019 return of the Forecast.

Appendix A: Training Package Enrolment Snapshot

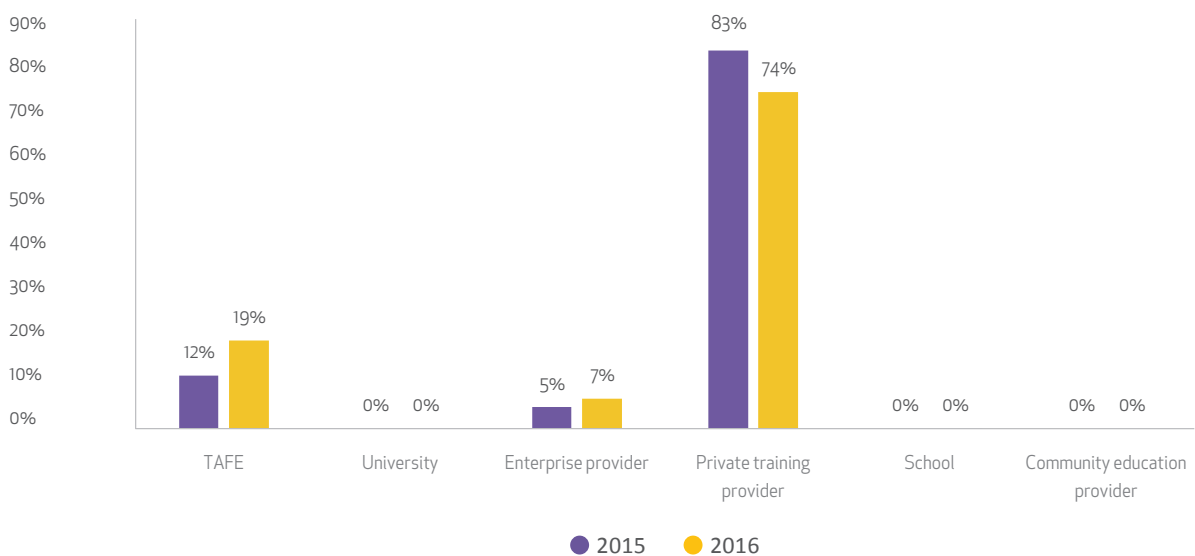
Program enrolments in PMB Plastics Rubber and Cablemaking qualifications by State/Territory of student residence

2016 Total VET Activity



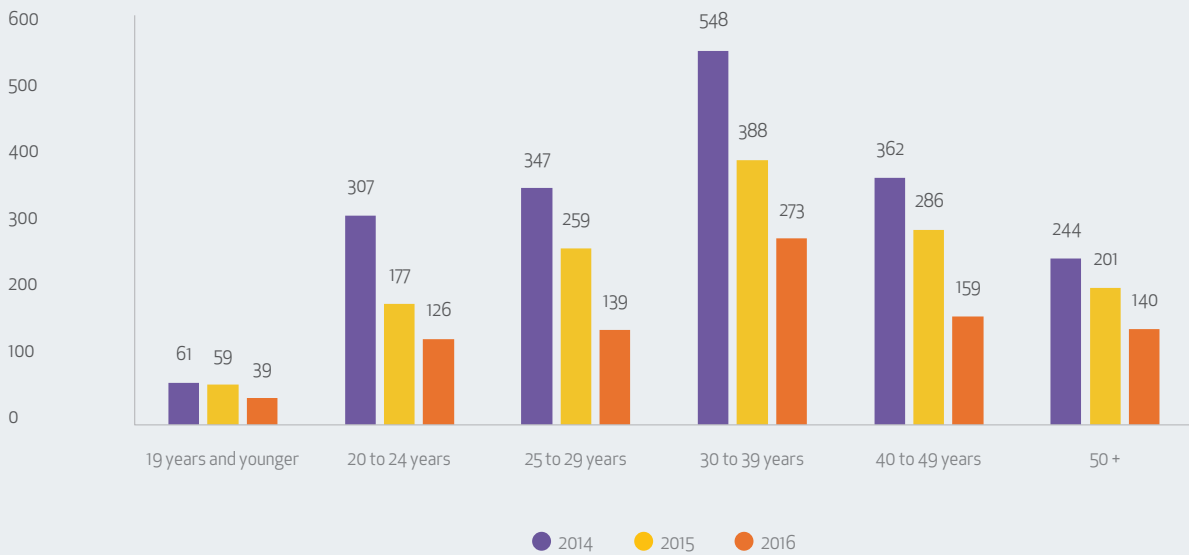
Program enrolments in PMB Plastics Rubber and Cablemaking qualifications by Training Organisation Type

Percentage of 2015 - 2016 Total VET Activity



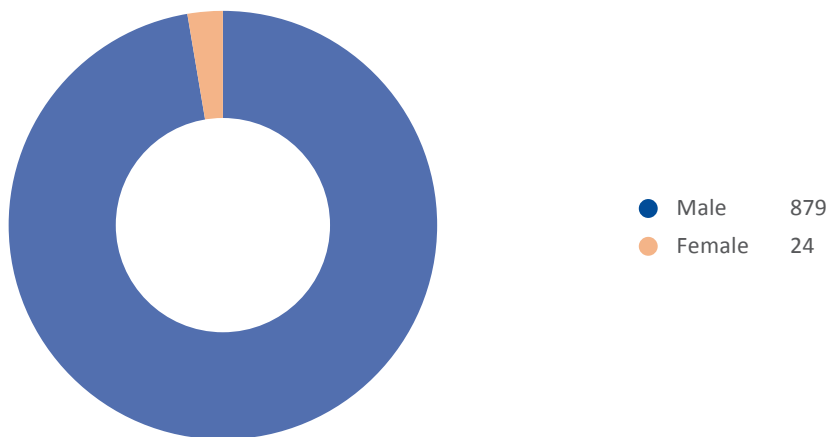
Program enrolments in PMB Plastics Rubber and Cablemaking qualifications by Age Group

2014 - 2016 Total VET Activity



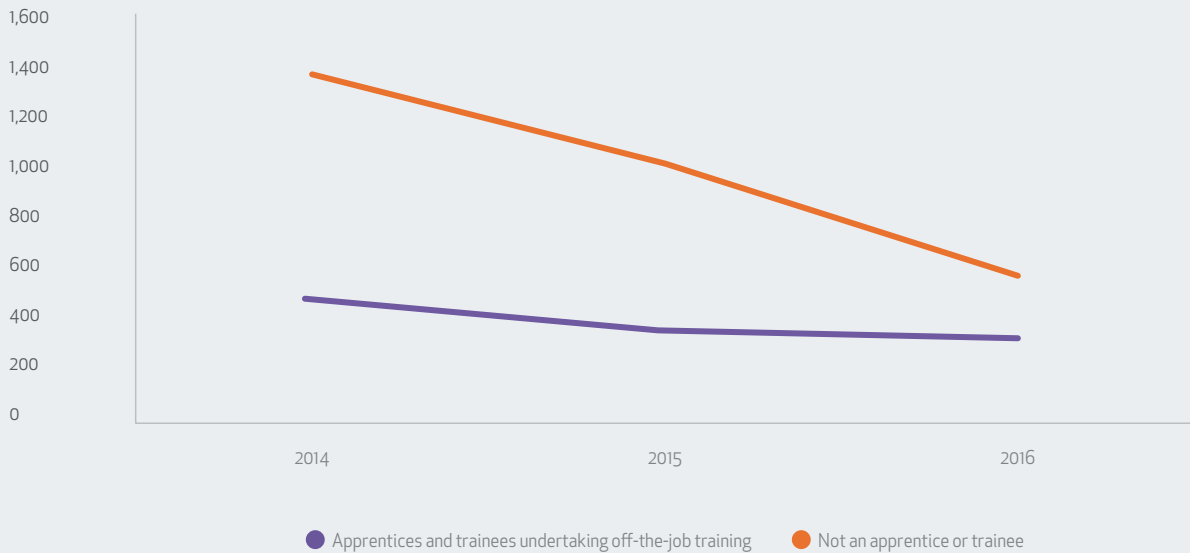
Program enrolments in PMB Plastics Rubber and Cablemaking qualifications by Sex

2016 Total VET Activity



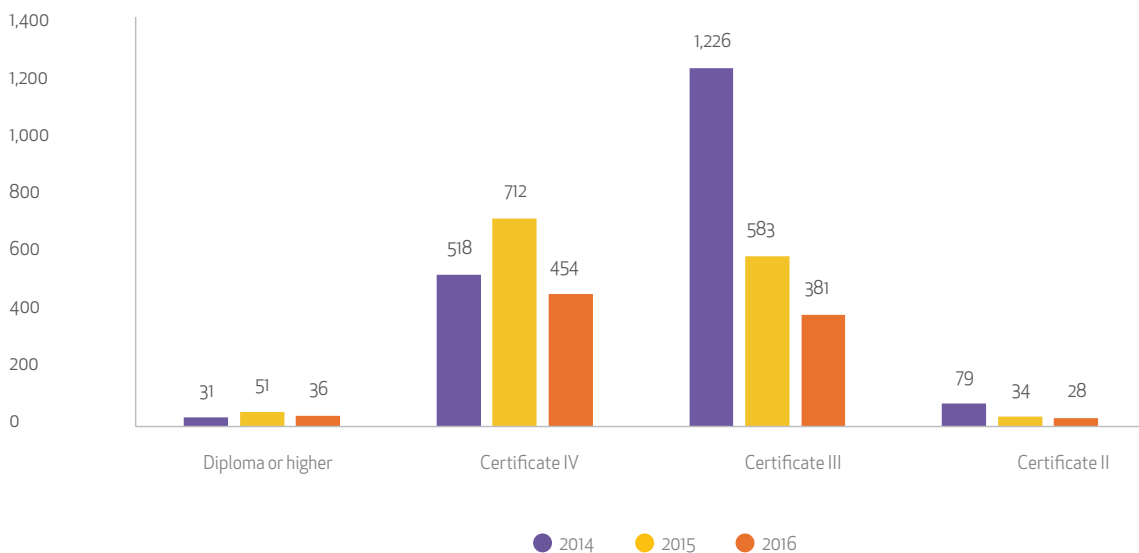
Program enrolments in PMB Plastics Rubber and Cablemaking qualifications by Apprentice/Trainee undertaking off-the-job training

Total VET Activity 2014-2016



Program enrolments by qualification level in PMB Plastics Rubber and Cablemaking qualifications

2014 - 2016 Total VET Activity



All data in this Appendix is sourced from the VOCSTATS VET Provider Collection. 2016 Government Funded and Total VET Activity Program enrolments extracted September 2017

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 B: Future Skills Outcomes

The Australian Industry and Skills Committee (AISC) commissioned the Future Skills and Training Resource which summarises data on current and future Australian and international megatrends, to support Industry Reference Committees (IRCs) in developing their Industry Skills Forecasts and Proposed Schedules of Work.

The following trends and considerations are based on Process Manufacturing, Recreational Vehicle and Laboratory IRC discussions. This appendix presents the preliminary thinking of IRC members in order to stimulate broad discussion in industry.

Trends



Technology

Technology will have an extreme impact on the Process Manufacturing, Recreational Vehicle and Laboratory sectors and will change the industry sectors as they're currently known, as well as have an effect on learning and creating knowledge.

The key trends affecting the sectors are:

Artificial Intelligence (AI) and Machine Learning: AI technologies are an established trend and have been implemented across the sectors in various ways. A significant challenge is for policy and regulation to keep up with the pace of change and implementation. Industry also needs to be better at promoting the employment and skilling opportunities of technology adoption.

Cross-Disciplinary Science: This is an emerging trend requiring people and teams to have a functional knowledge across a number of disciplines.



Society and Culture

The key trends affecting the Process Manufacturing, Recreational Vehicle and Laboratory sectors are:

Changing Work and Career Values: This is an emerging trend which will become more prevalent in workplaces, particularly with technology expansion and the acceptance of automation. Workers will have the flexibility to undertake roles which interest them, and employers can also benefit from the broader perspectives gained from employees' experience in other areas. However, if workplace changes are imposed on workers, the benefits for individuals are not always positive.

Global (and Social) Mobility: Higher level skills and industry knowledge are leaving Australia to follow industry jobs moving offshore. Lower level, technical skills are required and increasingly filled by migrants, and this poses language, literacy and numeracy challenges to workplaces. Social mobility, fuelled by social media and the internet, is having a significant impact on the industry, particularly on how people are learning, and on their career and work choices.

Political and Institutional

The Process Manufacturing, Recreational Vehicle and Laboratory sectors operate in highly regulated environments, with workplaces required to adhere to stringent workplace, health and safety requirements and many workers requiring licences to undertake their job roles.

The key trends affecting the sectors are:

Political Instability and Polarisation/Political Appetite for Reform: Frequent changes in governments impact the implementation of reform agendas that are important for industry sustainability.

Governments also need to ensure funding for training is funnelled to the right skill areas so that workers can access training, particularly to meet regulatory requirements.

Resources and Environment

The key trend affecting the Process Manufacturing, Recreational Vehicle and Laboratory sectors is:

International Sustainability Action: International regulations are emerging as a key driver of change, with Australia looking to harmonise to international standards, such as those around emission targets.

More generally, resources are more widely understood and accepted as finite challenges faced by the industry, related to disposal of process waste, cost of energy use and access to ICT-related infrastructure. Younger generations are also more concerned about environmental issues, leading business and society to give more value to sustainability and the environment.

Business and Economics

The key trends affecting the Process Manufacturing, Recreational Vehicle and Laboratory sectors are:

Empowered (Informed and Demanding) Customers: Business is guided by social and cultural dynamics. Changes in consumer demands are being driven by social media movements, which will impact not only product design, but also job design.

Changing Workplace Dynamics: There is an emerging trend with teams becoming increasingly fluid in terms of sizes, interactions and tasks. The relational aspect of working together will matter more than technical aspects. A tension exists between the drive toward innovation and the need for standardisation in the manufacturing environment. 'Structured flexibility' will become prevalent in the industry.

Start Up Thinking: Australian manufacturers have a 'can do' attitude and are innovators, often requiring 'outside the box' solutions, but current systems do not always support this. Hyper-competition is driving faster product development and business cycles. Innovation is sometimes hampered by bureaucracy as well as management within organisations. Employees need to be provided with conscious opportunities to innovate, generate ideas and test designs in supportive environments.

Access to Quality Internet: This is an important requirement for every business, particularly as workforces are increasingly spread across different geographical locations.

Financial Viability: While impacted by access to and cost of resources, the key challenge for businesses in the industry sectors is to remain financially viable in order to stay competitive and continue to employ and train people.

Considerations for Training

Employers / Industry

Skills mismatch is a huge problem, and industries are running their own workshops and campaigns to attract industry entrants. However, the gap is too large for industry to address alone.

SMEs' engagement with workforce development and training remains a challenge due to market pressures.

The VET system must become more flexible to respond to industry needs, otherwise industry will go around the system.

Learners / Workers

The flexibility that now exists in mobility, social media, and connectivity needs to translate to new training models and approaches. Flexibility and higher order 'soft skills' are essential attributes now and in the future.

Learners and workers will seek to demonstrate to employers their capacity to think, try new things, and take risks. These abilities will need to be part of the training approach.

Learners and workers will combine VET and higher education alongside independent learning to gain employment or pursue entrepreneurial paths.

Government

Regulation will be a pivotal challenge to technology adoption and filling of skills gaps. Ways of evaluating progress, impact and achievement need to be reviewed.

Government involvement in all areas and aspects of the VET system will need to continue. The barriers in relation to industry having and accessing appropriate training to meet their needs requires management. This includes ensuring national and state funding skills lists accurately represent industry demand and that appropriate funding mechanisms, which reduce the cost burden on learners, are in place to enable training for these key skills.

Industry needs an active role in VET to ensure system-wide engagement.

Education and Training

Inflexibility in cross-industry training is a key issue to be addressed. Society and industry expect the VET system to focus more on industry value chains and lifecycles, and align training with new/expanding industries.

Educators' and trainers' roles are under pressure to be reconceptualised. Greater industry demand for skill sets and 'just in time' learning means these are increasingly used instead of the traditional training package model. Full qualifications as we know them have reduced relevance for employers and employees; continued support for a skills-driven training model is evident.

Registered training organisations are also impacted by financial viability and are grappling with how to deliver flexible, customised training at competitive rates to industry.