

TASC ECONOMIC OUTLOOK



Government of South Australia
Training and Skills Commission

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Summary

- The main purpose of the Commission's economic modelling is to provide a statistical basis to guide future policy and to help inform decisions on training and skills development in South Australia.
- The approach to developing a quantitative overview involves the use of a detailed economic model and incorporates a broad range of official data.
- The result is a comprehensive overview of future employment and the likely demand for skills and qualifications in South Australia.

The Commission's economic analysis provides a quantitative assessment of the employment outlook and subsequent demand for qualifications in South Australia over the period 2015-2025. The main objective is to provide useful information on skills and qualification demand to inform future policy decisions and strategies.

The report provides a comprehensive, consistent and transparent set of projections at the broad macroeconomic level, focusing on the industry driven demand for qualifications. The detailed projections present a carefully considered view of what the future might look like, they should be regarded as indicative of general trends and should not be regarded as precise forecasts.

This report seeks to answer two key questions:

- What will employment look like in SA by 2025?
- What qualifications will be required to ensure industry skills demand is met?

The analysis includes a discussion of qualification linked occupations, including those where the Commission believes government intervention in skills planning may be required to avoid shortages of critical skills.

The analysis and estimates provided in this report provide a basis for developing future training and skills policy. It may also be of value to enterprises conducting workforce planning, or to individuals in career planning. It must be remembered that the estimates are only an indication of future outcomes, and for the most part are provided at the broad macroeconomic level. The information can be used to support and complement more detailed, industry-specific analysis.

Key Findings

- South Australia can expect modest economic growth over the next decade, around 2.2% per year until 2025.
- Economic growth is expected to generate approximately 81,000 additional jobs by 2025 compared with 2015.
- The economy is expected to continue its transition to becoming more service oriented, with strong employment growth expected in health care, professional, scientific and technical services, accommodation and food, art and recreation and education.
- The projections show the decline in manufacturing and mining employment is expected to continue. However it should be noted that during industry consultation the mining industry felt more optimistic about employment over the long-term compared to the Commission's forecast. The question was raised whether the decline in manufacturing will continue as forecast, or whether over the long-term we may see the decline soften.
- In regard to broad occupation groups, the occupations expected to grow the most include managers, professionals, and community and personal service workers.
- More specifically, the greatest employment growth is expected for health and community service workers, business and public administration managers, and health and welfare professionals.
- Occupations expected to see the greatest decline in employment over the next ten years include farmers and farm managers, factory and process workers, automotive and construction workers.
- It is important to note that while some occupations may see a decline in total employment, there can still be substantial job openings in these occupations due to the need to replace workers retiring or changing occupations.
- Approximately 231,000 qualifications will need to be delivered to meet industry demand over the five years to 2020.
- The growing industry demand for highly skilled workers is leading to an increasing demand for higher level qualifications, a trend that is expected to continue over the next ten years.
- By 2025, approximately 61 percent of workers will be expected to hold a Certificate IV level qualification or higher, while the proportion of workers without a formal qualification is expected to decline.

- VET qualifications account for approximately two-thirds of industry driven demand for qualifications. Certificate III qualifications have the highest industry demand compared to all other qualification levels.
- There is some evidence to suggest the health occupation cohort should be closely monitored to ensure an effective link between industry demand for skills and training market supply.

General Approach

The Commission's economic model draws on data from the ABS¹, State and Commonwealth Governments, and includes data on GSP, population and employment, labour force participation and productivity. The Commission's projections are further supported by qualitative feedback gathered through industry consultation.

Given the inherent uncertainties in forecasting the economic outlook and future demand for qualifications, and to better understand the impact different economic outcomes will have on the demand for skills, the analysis includes two alternative sensitivity tests applied to a baseline projection. The baseline represents the expected future for employment and qualification demand, given currently available information. The sensitivity analysis involves the following variations from the baseline.

Sensitivity 1: Improved economic outlook

- This represents a better than expected improvement in the SA economy, with participation and productivity increasing at a faster rate compared to the baseline, while unemployment decreases. Gross State Product (GSP) and employment growth also increase compared to the baseline.

Sensitivity 2: Subdued global economic outlook

- This represents a slower than expected economic recovery in SA, with unemployment remaining at a higher rate compared to the baseline, while participation and productivity decrease. Employment growth and GSP are also lower compared to the baseline.

The projections provide a range of potential outcomes which can be used to inform skill and workforce development. The Detailed Modelling and Methodology section provides a more detailed description of the methodology and results.

1. Australian Bureau of Statistics

Economic outlook

The Commission's projections reflect the fact that the SA economy is growing, but we're not going to break any records—similar to much of the developed world. Low population growth, weak productivity, a low participation rate and increasing part-time employment combine to create a strong headwind for future growth.

The forecast for GSP growth has been lowered compared to the 2014 report, going from 2.2 to 2% per annum for the short-term projection. Employment on the other hand, after some ups and downs between the start of 2014 and late 2015, has been steadily growing and is expected to grow by approximately 0.9% per year to 2020, which is more optimistic than was predicted in the 2014 report. Employment growth is largely being driven by the service sector, particularly health care, professional, scientific and technical services, accommodation and food, art and recreation, and education.

The Commission's projections for productivity growth have been revised down compared to 2014, with an estimated growth rate of 1.2% per annum between 2015 and 2020. This compares to 1.6% per year over the five-year projection in the 2014 report. Stagnant productivity growth has been a point of international discussions for a while now and is described as something of a paradox by the OECD², a reference to the fact that productivity has slowed despite significant technological change and rising education levels.

Across Australia, labour productivity growth slowed after 2003, and while it picked up after 2012, it has slowed again since 2014³.

Population growth in SA is well below the national rate, 0.67% in SA for 2015 compared to 1.37% nationally⁴. Our growth rate is, however, comparable to the OECD (0.6), North America (0.8) and well above the European Union (0.3)⁵.

While the employment rate in SA has improved since its peak of 7.8% in mid-2015, down to 6.7% in September 2016 in trend terms, this has largely been the result of a decline in the participation rate and a rise in part-time employment. The 'future of work' literature suggests part-time employment will most likely continue to increase, although whether this is a bad thing is another question—it is at least partly due to more people voluntarily choosing a mix of independent work and part-time work.

South Australia continues to have the second lowest participation rate nationally, after Tasmania, which is partly a result of our ageing population. The participation rate has been falling since mid-2015, which, as mentioned, has helped to lower the unemployment rate, but not in a way that is good for the economy. In September 2016 the participation rate was 61.8 percent in SA compared to 64.7 percent nationally. The participation rate forecast over the short-term has dropped by almost one-percent compared to the 2014 report.

Table 1 provides the broad macroeconomic projections over the short and long term.

Table 1: Annual growth rate projections by sensitivity (%)

South Australia									
Key Macroeconomic Variables	Historical 15 Years	2014 Baseline		2016 Baseline		Improved		Subdued	
		Short term	Long term	Short term	Long term	Short term	Long term	Short term	Long term
Adult Population	1.0	1.0	1.0	0.8	0.9	0.8	0.9	0.8	0.9
Labour Force	1.2	0.8	0.8	0.8	0.8	1.1	1.1	0.7	0.7
Employment	1.2	0.6	1.0	0.9	1.0	1.3	1.3	0.6	0.7
Unemployment	0.3	4.7	0.1	-0.1	-1.1	-2.9	-2.2	2.6	0.8
Participation Rate*	62.0	62.5	62.8	61.9	61.8	62.7	63.5	61.7	61.0
Unemployment Rate*	6.9	6.9	5.2	6.6	5.7	5.7	5.0	7.6	7.0
Gross State Productivity	2.3	2.2	2.6	2.0	2.2	2.9	2.8	1.7	1.8
Productivity	1.1	1.6	1.5	1.2	1.2	1.5	1.5	1.1	1.1

Historical represents 1999-2000 to 2014-15

Short term represents 2014-15 to 2019-20

Long term represents 2014-15 to 2024-25

*The participation rate and unemployment rate are for the end of the period as opposed to average annual growth rates.

2. Organisation for Economic Co-operation and Development 2016

3. ABS Australian National Accounts: National Income, Expenditure and Product (cat. no. 5206.0).

4. ABS Australian Demographic Statistics: Estimated Resident Population (cat. no. 3101.0)

5. The World Bank, estimates are for 2015

Employment outlook

Summary

- Forecast employment growth of 0.9 percent per year to 2020 in South Australia.
- Strongest employment growth is expected to be in the health care and social assistance industry.
- There is expected to be approximately 258,000 job openings between 2015-2025.
- The occupations expected to be the most in demand include professionals, community and personal service workers, and managers.

Employment in South Australia is forecast to grow by 0.9 percent per year to 2020, which compares to a national growth rate of 1.6% per year. This translates to approximately 36,000 jobs being created in South Australia over the five-year period leading to 2020. Combining employment growth with the need to replace workers leaving the workforce or changing occupations, it is estimated there will be approximately 122,000 job openings over the period 2015 to 2020.

The employment projections predict strong growth in the health care and social assistance industry, followed closely by professional, scientific and technical services. On the down side, the Commission's projections show a continued decline in mining and manufacturing, at least in the short-term. It should be noted that the Commission is more optimistic about mining employment over the long-term compared to Department of Employment projections, this is partly due to industry consultation with key stakeholders in the state.

The Commission is also less than certain about the continued decline in manufacturing over the long term. Currently, the economic modelling predicts a decline in manufacturing employment of 2.1% per year, on average, to 2025. Given the significant job losses in manufacturing already experienced in SA, and the government's desire to stimulate growth in advanced manufacturing in the state, the question remains whether manufacturing will continue to decline at such a rate until 2025. On the other hand, continuing technology improvements in manufacturing, while improving productivity, are unlikely to lead to an increase in employment in the sector.

Despite the further decline in manufacturing employment projected for SA, the manufacturing industry is expected to remain one of the top five employers in 2020, although it is expected to drop outside the top five by 2025.

The health care and social assistance industry will be by far the largest employer by industry sector in the state, employing approximately 17% of the South Australian workforce by 2025.

Table 2: Short term job openings (2014-15 to 2019-20)

Job Openings	Baseline	Improved	Subdued
Expansion Demand	36,000	55,000	24,000
Replacement Demand	86,000	87,000	86,000
Job Openings	122,000	142,000	110,000

Table 3: Long term job openings (2014-15 to 2024-25)

Job Openings	Baseline	Improved	Subdued
Expansion Demand	81,000	113,000	58,000
Replacement Demand	176,000	180,000	174,000
Job Openings	258,000	293,000	232,000

Table 4: Projected average annual employment growth rates by industry for South Australia (%)

Industries	Historical 15 Years	Baseline		Improved		Subdued	
		Short term	Long term	Short term	Long term	Short term	Long term
South Australia							
Health Care and Social Assistance	3.7	2.4	2.5	2.9	2.8	2.1	2.2
Professional, Scientific and Technical Services	3.1	2.2	2.3	2.7	2.6	2.0	2.0
Accommodation and Food Services	1.2	2.0	2.0	2.4	2.3	1.7	1.7
Arts and Recreation Services	3.2	1.4	1.4	1.9	1.8	1.1	1.2
Education and Training	1.6	1.1	1.2	1.6	1.5	0.9	0.9
Construction	2.0	1.0	1.0	1.5	1.3	0.8	0.8
Public Administration and Safety	2.0	1.0	1.0	1.4	1.3	0.7	0.7
Transport, Postal and Warehousing	1.8	0.9	1.0	1.4	1.3	0.7	0.7
Administrative and Support Services	0.1	0.7	0.8	1.2	1.1	0.5	0.5
Rental, Hiring and Real Estate Services	1.1	0.7	0.8	1.2	1.1	0.4	0.5
Retail and Wholesale Trade	0.7	0.5	0.5	0.9	0.9	0.2	0.3
Information Media and Telecommunications	0.2	0.4	0.4	0.9	0.8	0.1	0.1
Financial and Insurance Services	0.3	0.3	0.8	0.7	1.1	0.0	0.5
Agriculture, Forestry and Fishing	-0.6	0.2	0.2	0.7	0.6	0.0	-0.1
Other Services	0.0	0.2	0.2	0.7	0.6	-0.1	-0.1
Electricity, Gas, Water and Waste Services	3.5	-0.6	-0.5	-0.1	-0.2	-0.8	-0.8
Mining	10.0	-2.1	-0.5	-1.6	-0.1	-2.3	-0.8
Manufacturing	-1.9	-2.2	-2.1	-1.7	-1.7	-2.4	-2.3
Total	1.2	0.9	1.0	1.3	1.3	0.6	0.7

Note: Short term includes 2014-15 to 2019-20 and long term 2014-15 to 2024-25

Table 5: Projected industry employment shares for South Australia (%)

Industries	Current Share (2015)	Baseline	
		2020	2025
South Australia			
Health Care and Social Assistance	15	16	17
Retail and Wholesale Trade	14	13	13
Education and Training	8	8	8
Manufacturing	9	8	7
Construction	8	8	8
Accommodation and Food Services	7	7	7
Professional, Scientific and Technical Services	7	7	7
Public Administration and Safety	6	6	6
Agriculture, Forestry and Fishing	5	5	5
Transport, Postal and Warehousing	5	5	5
Other Services	4	4	4
Administrative and Support Services	3	3	3
Financial and Insurance Services	3	3	3
Arts and Recreation Services	2	2	2
Information Media and Telecommunications	1	1	1
Mining	2	1	1
Rental, Hiring and Real Estate Services	1	1	1
Electricity, Gas, Water and Waste Services	1	1	1
Total	100	100	100

Figures 1 and 2 reveal the occupation change that is expected to occur between 2015 and 2025, providing an insight into where the jobs of the future are likely to be, and what skills will be in greatest demand.

Figure 1 shows that strong growth is expected for managers and professionals, as well as community and personal services occupations. Conversely, only very minimal employment growth is expected for occupations related to technicians and trades, clerical and administrative workers and labourers.

Figure 1: Occupation change 2015 to 2025, employment (000s)

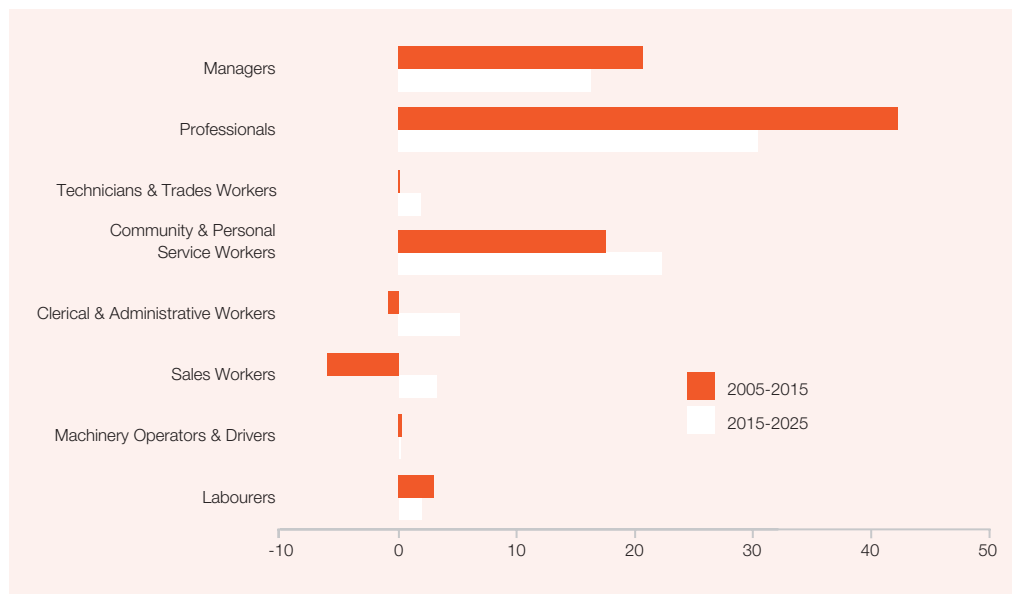


Figure 2: Occupation change 2015 to 2025, employment (000s)

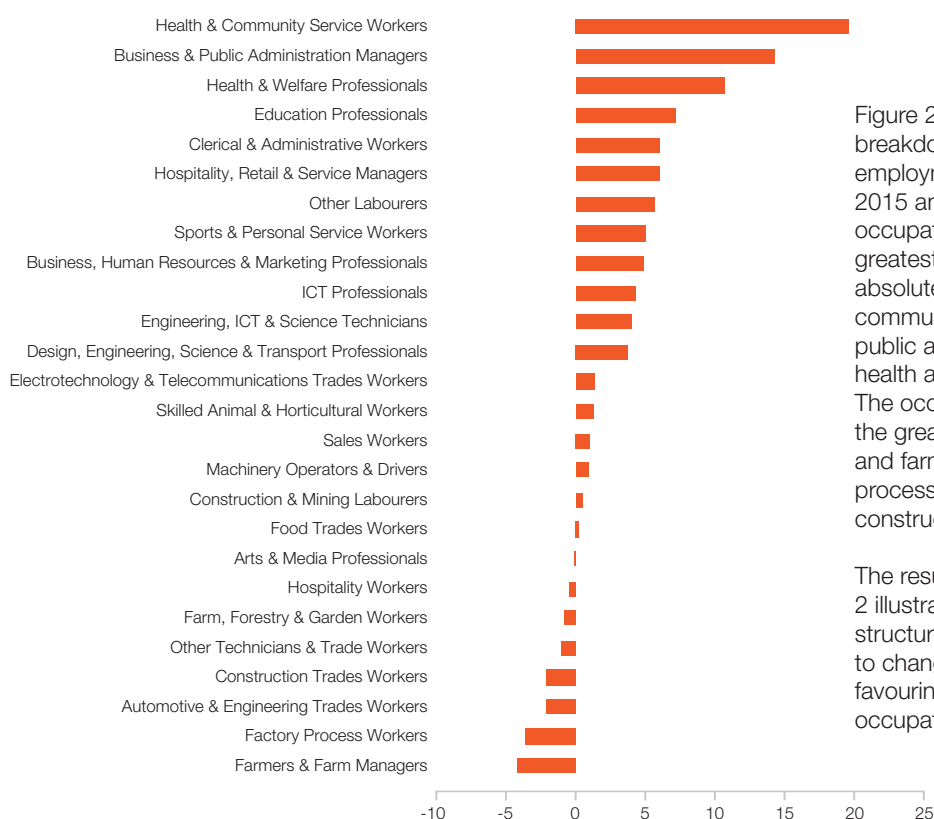


Figure 2 provides a more detailed breakdown of the change in employment by occupation between 2015 and 2025, revealing the occupations expected to see the greatest employment growth in absolute terms includes health and community services, business and public administration managers, and health and welfare professionals. The occupations expected to see the greatest decline include farmers and farm managers, factory and process workers, and automotive and construction workers.

The results outlined in Figures 1 and 2 illustrate that the occupational structure of employment is continuing to change, with employment growth favouring higher-skilled, service related occupations.

Industry demand for new qualifications

Summary

- Approximately 482,000 qualifications will need to be delivered between 2015-2025 to meet industry demand for skills.
- VET qualifications account for approximately two-thirds of total qualification demand.
- Higher level qualifications continue to make up an increasing share of training activity in South Australia.
- By 2025, approximately 61 percent of workers will be expected to hold a Certificate IV level qualification or higher
- The largest demand for qualifications is expected to come from health and community service workers.

Results

The Commission believes that industry demand rather than student demand should drive workforce planning across the economy, with government's role being to guide students to areas in which there is likely to be a demand for skilled workers that cannot be met through the general flexibility of the labour market.

The Commission's modelling of qualification demand includes:

- Skilling requirements of new entrants – to fill job openings resulting from employment growth and replacement demand.
- Upskilling of existing workers (completing higher-level qualifications).
- Existing workers gaining equivalent or lower-level qualifications (skills broadening).
- Demand for lower-level qualifications that enable people to undertake higher-level qualifications needed by industry (pathways).
- Demand by people who are not employed and who represent a necessary reserve capacity (reserve labour force demand).

A more detailed description of the demand for qualification methodology and results is provided in the Detailed Modelling Results and Methodology section.

Over the period 2014-15 to 2019-20 approximately 231,000 new qualifications will be required to meet the expected demand for qualifications. This represents a slight increase in demand over the short-term compared to the 2014 report, and coincides with an increase in expected employment growth.

The majority of qualification demand is driven by new entrants (38%) and existing workers gaining qualifications at an equivalent or lower level (31%). It's interesting to note that industry demand requires existing workers to gain a qualification at the same level or lower far more often than they require workers to gain a higher level qualification.

The industry demand for qualifications also reflects the general trend of increasing demand for highly skilled workers, followed by a decline in demand for those less well qualified. By 2025, approximately 61 percent of workers will be expected to hold a Certificate IV level qualification or higher, while around half of all workers will be required to hold a Diploma or above.

Over the short-term projection, VET qualifications account for approximately two-thirds of total qualification demand, illustrating the significant importance of vocational training in meeting industry demand. Certificate III qualifications are the most in-demand qualification level, with approximately 61,000 Certificate III qualifications required to be delivered to meet industry demand over the short-term projection, followed closely by bachelor degrees (53,000). Together, Certificate III and bachelor level qualifications account for approximately 50 percent of total qualification demand.

Table 6: Total industry demand for new qualifications (2014-15 to 2019-20)

Qualification Level	Base	Improved	Subdued
Post Graduate	26,000	28,000	25,000
Bachelor degree	53,000	57,000	50,000
Advanced Diploma/Diploma	37,000	40,000	36,000
Certificate IV	27,000	29,000	26,000
Certificate III	61,000	65,000	59,000
Certificate II	25,000	26,000	25,000
Certificate I	2,000	2,000	2,000
Total	231,000	247,000	222,000

Components may not add to total due to rounding.

Table 7: Total industry demand for new qualifications (2014-15 to 2024-25)

Qualification Level	Base	Improved	Subdued
Post Graduate	54,000	57,000	51,000
Bachelor degree	106,000	114,000	100,000
Advanced Diploma/Diploma	76,000	81,000	72,000
Certificate IV	60,000	63,000	58,000
Certificate III	127,000	134,000	121,000
Certificate II	58,000	60,000	57,000
Certificate I	2,500	2,600	2,400
Total	482,000	510,000	461,000

Components may not add to total due to rounding.

The projected strong employment growth in the health care and social assistance industry is expected to have a significant impact on the demand for qualifications in SA. Over the period 2015 to 2020, delivering qualifications to health and community service workers and health and welfare professionals is estimated to make up 22 percent of total training activity in SA. Much of this demand is VET demand; to meet the demand for skills in health care occupations, approximately 33,000 VET qualifications will need to be delivered, nearly double the amount of higher education qualifications (18,000).

Within the health related occupation cohort, the Commission's projections suggest qualification supply is generally expected to meet industry demand, however, there does appear to be some mismatch between supply and demand in certain qualification levels.

For the health and community service worker cohort, the Commission is projecting an oversupply of Certificate IV level qualifications by approximately 4000 qualifications, yet an undersupply of Certificate III level qualifications by approximately 3000 qualifications over the period 2015 to 2020.

For the health and welfare professional's cohort, the forecast suggests an oversupply of higher education qualifications by approximately 8000 qualifications, yet an undersupply of diploma to advanced diploma qualifications by approximately 3000 qualifications over the five years to 2020.

The results highlight the need for the health occupation cohort to be closely monitored to ensure there is an effective link between industry demand and training market supply.

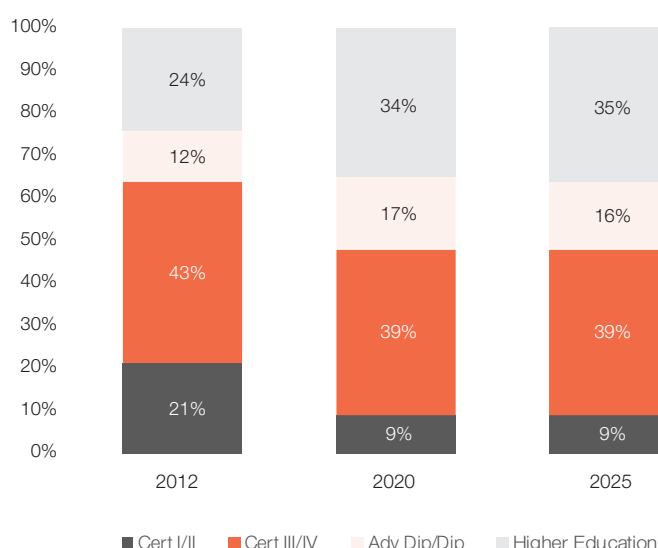
Table 8: Total industry demand for new qualifications by occupational group and qualification type (2014-15 to 2019-20)

Occupational Group	VET	Higher Ed	Total
Business and Public Administration Managers	6,600	10,200	16,800
Farmers and Farm Managers	2,200	600	2,800
Hospitality, Retail and Service Managers	6,200	2,700	8,900
Arts and Media Professionals	2,000	900	2,900
Business, Human Resources and Marketing Professionals	6,900	6,100	13,000
Design, Engineering, Science and Transport Professionals	4,600	5,000	9,600
Education Professionals	2,900	10,700	13,400
Health and Welfare Professionals	6,400	12,100	18,500
ICT Professionals	3,500	2,900	6,400
Engineering, ICT and Science Technicians	3,800	1,500	5,300
Automotive and Engineering Trades Workers	3,700	100	3,800
Construction Trades Workers	3,400	100	3,500
Electrotechnology and Telecommunications Trades Workers	4,400	200	4,600
Food Trades Workers	2,800	300	3,100
Skilled Animal and Horticultural Workers	3,600	200	3,800
Other Technicians and Trades Workers	3,300	100	3,400
Health and Community Service Workers	26,300	5,900	32,200
Hospitality Workers	3,900	1,500	5,400
Sports and Personal Service Workers	4,000	2,600	6,600
Clerical and Administrative Workers	16,100	7,900	24,000
Sales Workers	15,300	3,200	18,500
Machinery Operators and Drivers	7,800	900	8,700
Construction and Mining Labourers	1,300	100	1,400
Factory Process Workers	1,500	500	2,000
Farm, Forestry and Garden Workers	1,400	300	1,700
Other Labourers	8,500	2,100	10,600
Total	152,000	79,000	231,000

Figure 3: The changing qualification profile of employed persons 2012-2025

Higher level qualifications continue to make up an increasing share of training activity in South Australia. The proportion of employed persons who have a diploma level qualification or higher is expected to increase from 36% in 2012, to 51% by 2025. This trend is leading to an increasing demand for higher education qualifications and higher level VET qualifications.

As Figure 3 shows, an increasing proportion of employed persons are expected to attain a higher education qualification. This is not to say they do not also have a VET qualification, as Figure 3 only captures the highest level qualification held.



In regard to the balance between qualification demand and supply over the period 2015 to 2020, the Commission's projections estimate a slight oversupply of higher education qualifications, yet a notable undersupply of VET qualifications. It should be acknowledged that this is a general indication only. It is difficult to forecast the supply of qualifications over a five-year period with a high degree of accuracy, as future changes to training funding or regulation during the period can significantly affect qualification supply.

Under current estimates, the following occupational groups have an estimated oversupply of higher education qualifications, yet an undersupply of VET qualifications:

- health and welfare professionals
- design, engineering, science and transport professionals
- business, human resources and marketing professionals.

The results suggest that for the above occupation groups, industry can expect a shortage of skills acquired through VET qualifications, yet an oversupply of skills acquired through higher education.

Over recent years there has been a strong push to encourage participation in higher education, which according to some feedback the Commission received during industry consultation, has been to the detriment of participation in VET qualifications. Perhaps a better balance needs to be achieved in government policy and discourse to better align industry demand for skills with training market supply.

Qualification-linked occupations

For many occupations there is no direct relationship between the specific qualification attained and the job a person holds. For these occupations, the labour market is generally effective in responding to changing skill needs and economic fluctuations. However, for some occupations, where there is a much closer relationship between the job and a specific qualification, and where the training duration is typically long and relatively expensive, there is potential for market failure because the labour market is less able to adjust quickly. Furthermore, because the skills for these Qualification Linked Occupations (QLOs) are highly specific, the qualifications are not readily transferable.

The aim of identifying QLOs is to identify where detailed workforce planning, and potentially government intervention, may be required to avoid critical skill gaps in the labour market, particularly in skills related to achieving the Government's strategic priorities.

General approach

The Commission has adopted the following criteria for defining QLOs in the South Australian labour market.

Criterion 1: The skills are deployed for the uses intended (close occupational link).

Criterion 2: The skills are highly specialised and require extended learning and preparation over several years.

Criterion 3: The opportunity cost of the skills being in short supply is high (causing either bottlenecks in the supply chain or imposing significant costs by their absence) and/or the skills are required to implement the government's economic development priorities.

Criterion 4: There is robust intelligence from industry regarding the demand, supply and use of these skills; and there is adequate data available to assess the first three criteria.

A more detailed description of the methodology used to identify QLOs is provided in the Detailed Modelling and Methodology section.

Results

The Commission has identified 106 ANZSCO⁶ occupations at the unit group level⁷ in South Australia that meet its criteria. These represent more than a quarter of all occupations defined by the Australian Bureau of Statistics (ABS). Together, these 106 QLOs account for approximately 27 percent of total employment in South Australia and include professional occupations (61), technicians and trade workers (37), community and personal service workers (five) and managers (three).

The Commission contends that those occupations with a risk assessment rating of 'above average' should be closely monitored to ensure there are skills and workforce development strategies in place to meet industry demand. In contrast, in those occupations with a risk assessment rating of 'below average' there is less risk that the training system will be unable to respond to demand.

Table 9 also provides indicators such as historical jobs growth, median age of workers and whether the occupation has been identified as being appropriate for targeting for migration purposes, which can be considered in conjunction with the risk assessment to guide decision making in relation to workforce planning.

The following legend explains the ratings used in Table 9:

Legend - Qualification Linked Occupations

Historical Jobs Growth		DoE Skills Shortage Assessment (* = National)		Job Openings		Demand for Qualifications	
↓	≤-1.0% a year	S	Shortage	■	<100	■	<200
■	-1.0% to 1.0% a year	R	Regional Shortage	■■	101 - 299	■■	201 - 400
■■	1.0% to 2.5% a year	D	Recruitment Difficulty	■■■	300 - 799	■■■	401 - 799
■■■	2.5% to 5.0% a year			■■■■	>800	■■■■	>800
■■■■	>5.0% a year						

6. Australian and New Zealand Standard Classification of Occupations (ANZSCO)

7. ANZSCO classifies occupations within the following hierarchy: Major Group, Sub-Major Group, Minor Group, Unit Group and occupations. The Commission's QLO analysis focusses on the unit group level as this more specific category provides the most meaningful data for workforce planning.

Table 9: Qualification linked occupation assessment 2014-15 to 2019-20

Specialist Occupation	Current Employment	Historical Jobs Growth	Median Age	DoE Skills Shortage List	National Skilled Occupation List	Job Openings	Demand for Qualifications	Risk Assessment
Managers								
Construction Managers	4,176	■ ■	41		✓	■ ■ ■	■ ■ ■ ■	Above Average
Aquaculture Farmers	750	■	44		✓	■	■ ■ ■	Average
Engineering Managers	1,029	■ ■ ■ ■	45		✓	■ ■ ■	■ ■ ■	Average
Professionals								
Civil Engineering Professionals	1,895	■ ■ ■	42	D	✓	■ ■ ■	■ ■ ■ ■	Above Average
Early Childhood (Pre-primary School) Teachers	2,387	■ ■ ■ ■	48	D	✓	■ ■ ■	■ ■ ■ ■	Above Average
Marine Transport Professionals	415	↓	40		✓	■	■ ■ ■ ■	Above Average
Medical Imaging Professionals	1,243	■ ■ ■ ■	44	S	✓	■ ■	■ ■ ■	Above Average
Occupational & Environmental Health Professionals	2,158	■ ■ ■ ■	33		✓	■ ■ ■	■ ■ ■ ■	Above Average
Software and Applications Programmers	5,356	■ ■ ■	45	D*	✓	■ ■ ■ ■	■ ■ ■ ■	Above Average
Database and Systems Administrators, and ICT Security Specialists	2,333	■ ■ ■	47	D*	✓	■ ■ ■	■ ■ ■ ■	Above Average
Computer Network Professionals	2,199	■ ■ ■ ■	44		✓	■ ■	■ ■ ■ ■	Above Average
ICT Support and Test Engineers	691	■ ■ ■ ■	36		✓	■ ■ ■	■ ■ ■ ■	Above Average
Special Education Teachers	1,670	■ ■	48	ns	✓	■ ■ ■	■ ■ ■ ■	Above Average
Speech Professionals and Audiologists	1,080	■ ■ ■ ■	34	S*	✓	■ ■	■ ■ ■	Above Average
Accountants	11,332	■ ■	41	ns	✓	■ ■ ■ ■	■ ■ ■ ■	Average
Architects and Landscape Architects	1,184	■ ■	41	ns	✓	■ ■	■ ■ ■	Average
Cartographers and Surveyors	1,028	■ ■ ■ ■	37	ns	✓	■ ■	■ ■ ■	Average
Chemical and Materials Engineers	803	■ ■ ■ ■	39		✓	■ ■	■ ■ ■	Average
Complementary Health Therapists	268	■ ■ ■ ■	46			■ ■	■ ■	Average
Electrical Engineers	1,291	■ ■ ■	45	D	✓	■ ■	■ ■ ■	Average
Environmental Scientists	1,170	↓	49			■ ■	■ ■ ■ ■	Average
Generalist Medical Practitioners	5,008	■ ■ ■ ■	39		✓	■ ■ ■	■ ■ ■ ■	Average
Geologists and Geophysicists	963	■ ■	39			■	■ ■	Average
Industrial, Mechanical and Production Engineers	2,326	■ ■ ■	43	ns	✓	■	■ ■ ■ ■	Average
Internal Medicine Specialists	691	■ ■ ■ ■	38		✓	■ ■	■ ■	Average
Medical Laboratory Scientists	1,896	■ ■ ■	44		✓		■ ■ ■	Average
Midwives	982	↓	33	R	✓	■ ■	■ ■	Average
Mining Engineers	992	■ ■ ■ ■	36		✓	■ ■	■ ■ ■	Average
Nurse Managers	1,298	■ ■ ■ ■	23			■ ■	■ ■ ■	Average

Specialist Occupation	Current Employment	Historical Jobs Growth	Median Age	DoE Skills Shortage List	National Skilled Occupation List	Job Openings	Demand for Qualifications	Risk Assessment
Professionals (contd)								
Other Engineering Professionals	788	■	35		✓	■ ■	■ ■ ■	Average
Other Medical Practitioners	477	↓	40		✓	■ ■	■ ■	Average
Pharmacists	1,855	■ ■ ■ ■	39	R		■	■ ■	Average
Primary School Teachers	13,446	■ ■ ■	39	ns		■ ■ ■ ■	■ ■ ■ ■	Average
Multimedia Specialists and Web Developers	409	■ ■ ■ ■	51	D*	✓	■ ■	■ ■ ■	Average
Telecommunications Engineering Professionals	163	■	46		✓	■ ■	■ ■	Average
Judicial and Other Legal Professionals	719	■ ■ ■ ■	47		✓	■ ■ ■	■ ■ ■	Average
Psychologists	1,665	■ ■ ■ ■	52		✓	■ ■	■ ■ ■	Average
Registered Nurses	19,894	■ ■ ■	23	ns	✓	■ ■ ■ ■	■ ■ ■ ■	Average
Secondary School Teachers	9,917	■ ■	42	ns	✓	■ ■ ■ ■	■ ■ ■ ■	Average
Solicitors	2,747	■ ■ ■	50		✓	■ ■ ■ ■	■ ■ ■ ■	Average
University Lecturers and Tutors	4,771	■ ■ ■ ■	37			■ ■ ■ ■	■ ■ ■ ■	Average
Veterinarians	778	■ ■ ■ ■	40	D*	✓	■ ■	■ ■ ■	Average
Podiatrists	754	■ ■ ■ ■	40		✓	■ ■	■ ■	Below Average
Economists	113	↓	43		✓	■	■	Below Average
Fashion, Industrial and Jewellery Designers	243	↓	39		✓	■	■	Below Average
Agricultural and Forestry Scientists	731	■	46	D*	✓	■	■	Below Average
Air Transport Professionals	745	■ ■ ■	43			■	■ ■	Below Average
Anaesthetists	86	↓	47		✓	■	■	Below Average
Auditors, Company Secretaries & Corporate Treasurers	553	↓	50		✓	■ ■	■ ■	Below Average
Chemists, and Food and Wine Scientists	1,230	■ ■ ■ ■	44			■	■ ■	Below Average
Chiropractors and Osteopaths	121	↓	41		✓	■	■	Below Average
Dental Practitioners	736	↓	39		✓	■ ■	■ ■	Below Average
Dietitians	601	■ ■ ■ ■	51			■	■	Below Average
Electronics Engineers	331	■	38		✓	■	■	Below Average
Life Scientists	797	■	47			■	■ ■	Below Average
Middle School Teachers	607	■ ■ ■ ■	45			■ ■	■ ■	Below Average
Nurse Educators and Researchers	128	↓	28			■	■	Below Average
Occupational Therapists	962	■ ■	40	ns	✓	■ ■	■ ■	Below Average
Other Natural and Physical Science Professionals	485	↓	41		✓	■	■ ■	Below Average

Specialist Occupation	Current Employment	Historical Jobs Growth	Median Age	DoE Skills Shortage List	National Skilled Occupation List	Job Openings	Demand for Qualifications	Risk Assessment
Professionals (contd)								
Psychiatrists	386	■ ■ ■ ■ ■	48		✓	■	■	Below Average
Surgeons	270	↓	40		✓	■	■	Below Average
Urban and Regional Planners	396	■ ■ ■	45		✓	■	■	Below Average
Technicians and Trade Workers								
Other Building and Engineering Technicians	1,917	■ ■ ■ ■ ■	43			■ ■ ■	■ ■ ■ ■	Above Average
Airconditioning and Refrigeration Mechanics	2,275	■ ■ ■	36	ns	✓	■ ■	■ ■ ■ ■	Above Average
Civil Engineering Draftspersons and Technicians	1,141	■ ■ ■ ■ ■	34	S	✓	■ ■ ■	■ ■ ■	Above Average
Electronics Trades Workers	2,652	■	39		✓	■ ■	■ ■ ■ ■	Above Average
Metal Fitters and Machinists	7,029	■ ■ ■	36	S	✓	■ ■	■ ■ ■ ■	Above Average
Motor Mechanics	7,311	■ ■	41	R	✓	■ ■ ■	■ ■ ■ ■	Above Average
Panelbeaters	1,451	■	35	S		■	■ ■ ■	Above Average
Agricultural Technicians	505	■ ■ ■ ■ ■	39			■	■ ■ ■	Average
ICT Support Technicians	3,437	■ ■ ■ ■ ■	42			■ ■ ■ ■	■ ■ ■ ■	Average
Precision Metal Trades Workers	345	↓	35	S*		■	■	Average
Architectural, Building and Surveying Technicians	3,962	■	35	ns		■ ■ ■	■ ■ ■ ■	Average
Automotive Electricians	828	■ ■ ■	43	S*	✓	■	■	Average
Bricklayers and Stonemasons	2,227	■	35	ns	✓	■	■ ■ ■	Average
Carpenters and Joiners	5,960	■ ■ ■	36	ns	✓	■	■ ■ ■ ■	Average
Electricians	9,996	■ ■ ■	43	ns	✓	■ ■ ■ ■	■ ■ ■ ■	Average
Glaziers	888	■ ■ ■	44	S*	✓	■	■ ■	Average
Medical Technicians	1,305	■	42			■ ■ ■	■ ■ ■	Average
Painting Trades Workers	2,437	↓	41	ns	✓	■	■ ■ ■	Average
Plumbers	6,306	■ ■ ■	46	ns	✓	■ ■ ■	■ ■ ■ ■	Average
Roof Tilers	324	↓	45	S*		■	■	Average
Sheetmetal Trades Workers	609	■ ■ ■ ■ ■	38	S	✓	■	■	Average
Structural Steel and Welding Trades Workers	4,768	↓	40	ns	✓	■	■ ■ ■	Average
Telecommunications Trades Workers	1,645	■	33			■	■ ■ ■	Average
Vehicle Painters	844	■ ■	40	S		■	■ ■	Average
Wall and Floor Tilers	1,946	■ ■	41	S*		■	■ ■	Average
Chemical, Gas, Petroleum and Power Generation Plant Operators	794	■ ■	41			■ ■	■ ■	Average

Specialist Occupation	Current Employment	Historical Jobs Growth	Median Age	DoE Skills Shortage List	National Skilled Occupation List	Job Openings	Demand for Qualifications	Risk Assessment
Technicians and Trade Workers								
Electronic Engineering Draftspersons and Technicians	551	↓	40			■	■	Below Average
Mechanical Engineering Draftspersons and Technicians	227	↓	43			■	■	Below Average
Toolmakers and Engineering Patternmakers	335	↓	47			■	■	Below Average
Aircraft Maintenance Engineers	1,178	■■■■■	37			■	■■■	Below Average
Electrical Distribution Trades Workers	879	■■■■■	50		✓	■■■	■	Below Average
Floor Finishers	378	↓	29			■	■	Below Average
Metal Casting, Forging & Finishing Trades Workers	8	↓	31			■	■	Below Average
Plasterers	1,637	■■■	46	ns	✓	■	■	Below Average
Telecommunications Technical Specialists	192	↓	45		✓	■	■	Below Average
Vehicle Body Builders and Trimmers	192	↓	37			■	■	Below Average
Community and Personal Services Workers								
Ambulance Officers and Paramedics	1,328	■■■■■	42			■■■	■■■■■	Average
Dental Hygienists, Technicians and Therapists	963	■■■	43		✓	■■■	■■■■■	Average
Diversional Therapists	472	■■■■■	46		✓	■■■	■■■	Average
Enrolled and Mothercraft Nurses	4,443	■	31	ns		■■■■■	■■■■■	Average
Police	3,739	■■■	38			■■■■■	■■■■■	Average

As stated, the Commission believes those occupations with a risk assessment rating of 'above average' should be closely monitored to ensure the industry driven demand for skills is met by an adequate supply. Our modelling suggests there are 19 above average risk QLOs:

Table 10: QLO's with an 'above average' risk assessment.

Managers

Construction managers

Professionals

Civil engineering professionals
Early childhood teachers (pre-primary school)
Marine transport professionals
Medical imaging professionals
Occupational and environmental health professionals
Software and applications programmers
Database and systems administrators, and
ICT security specialists
Computer network professionals
ICT support and test engineers
Special education teachers
Speech professionals and audiologists

Technicians and Trade Workers

Other building and engineering technicians
Air-conditioning and refrigeration mechanics
Civil engineering draftspersons and technicians
Electronics trades workers
Metal fitters and machinists
Motor mechanics
Panelbeaters

Conclusions

The Commission's projections support the expectation that the jobs of the future in South Australia are more likely to be service oriented and highly skilled. The growing industry demand for more highly skilled workers is leading to an increasing demand for high level qualifications, and it is the service related industries and occupations that are expected to drive the majority of qualification demand over the next ten years.

While some occupations are expected to see a decline in overall employment, the ageing population in South Australia is feeding a substantial demand to replace workers retiring or changing occupations, meaning there are still significant job opportunities in many occupations.

The strong employment growth and demand for qualifications in health related occupations, coupled with a potential mismatch between qualification supply and demand, suggests health care occupations should be closely monitored to ensure industry skills demand is met by an appropriate supply. It will be important for the state's economic growth to avoid a skills shortage in this sector.

Looking to the future, the increasing demand for highly skilled workers presents a challenge in ensuring those without formal qualifications, or with only low level qualifications, are able to participate in the labour force in the future, and in a way that is meaningful to them and to the economy. There is a risk that the declining demand for low-skilled workers will lead to a portion of the existing labour force dropping out of the labour force altogether, with the subsequent negative impact not just on economic growth, but to the individuals, their families and communities these people belong to.

The analysis and estimates provided in this report provide a basis for developing future training and skills policy. It may also be of value to enterprises conducting workforce planning, or to individuals in career planning. It must be remembered that the estimates are only an indication of future outcomes, and for the most part are provided at the broad macroeconomic level. The information can be used to support and complement more detailed, industry specific analysis.

Detailed modelling and methodology

This section supports the information presented in the Economic Outlook and Demand for New Qualifications.

It includes:

- an outline of the sensitivity analysis used to develop the Commission's modelling
- an explanation of the approach used to derive our results
- detailed results of the Commission's modelling of the future demand for new qualifications
- an explanation of the methodology used by the Commission to identify Qualification Linked Occupations.

Sensitivity tests

The sensitivity of the baseline projections for industry demand for new qualifications to different economic developments in South Australia has been assessed by varying some of the key economic assumptions.

Sensitivity 1: Improved economic outlook

- This represents a better than expected improvement in the SA economy, with participation and productivity increasing at a faster rate compared to the baseline, while unemployment decreases. Gross State Product (GSP) and employment growth also increase compared to the baseline.

Sensitivity 2: Subdued global economic outlook

- This represents a slower than expected economic recovery in SA, with unemployment remaining at a higher rate compared to the baseline, while participation and productivity decrease. Employment growth and GSP are also lower compared to the baseline.

Economic and employment outlook

The Commission's economic model draws on data from the ABS, State and Commonwealth Governments, and includes data on GSP, population and employment, labour force participation and productivity. The Commission's projections are further supported by qualitative feedback gathered through industry consultation.

More specifically, the model is informed by:

- State budget projections of GSP and employment growth
- State Treasury projections of the unemployment rate
- ABS data on population growth
- State and federal government projections of productivity growth and the participation rate
- Commonwealth Department of Employment projections of industry employment growth
- ABS data on interstate migration
- Department of Immigration and Border Protection data on overseas migration
- Centre for the Economics of Education and Training estimations for replacement and skills broadening rates
- Department of Education data on higher education completions
- NCVER data on VET completions
- Qualitative feedback gathered through industry consultation.

The Commission's economic model is kept at a fairly high level of aggregation. This approach takes into consideration the fact that, generally, there is no clear one-to-one link between qualifications and occupational outcomes. For this reason, in projecting new qualification demand, it is of most benefit to identify general trends at the macro level, as opposed to drilling down to specific occupations. The Commission further believes that VET qualifications should, and often do, prepare individuals for a job within a broad occupational group of closely linked occupations. Again, this necessitates the analysis focusing on broad occupational groups, rather than individual occupations.

In projecting the demand and supply of qualifications, the Commission provides estimates for two periods of time. It does not attempt to identify the exact demand or supply at any point in time.

2016 Update

The Commission was more pessimistic about productivity growth in SA compared to that derived from the 2015 Commonwealth Intergenerational report, particularly for the period 2020 to 2025. This led to a downward revision from 1.5 to 1.2 percent for the long-term projection. In applying this downward revision, the Commission has taken into account recent productivity growth in SA, across Australia and internationally.

The Commission has adopted a more optimistic outlook for mining employment over the long-term compared to Department of Employment projections, this has been an outcome of industry consultation with key stakeholders in the state.

The Commission is also less than certain about the continued decline in manufacturing over the long-term. Currently, the economic modelling predicts a decline in manufacturing employment of -2.1% per year, on average, to 2025. Given the significant job losses in manufacturing already experienced in SA, and the government's desire to stimulate growth in advanced manufacturing in the state, the question is whether manufacturing will continue to decline at the estimated rate over the next ten years, or whether we may see a softer decline and possibly a stabilisation of manufacturing employment sometime over the long-term projection.

Demand for new qualifications

In estimating the demand for new qualifications, the Commission takes into consideration:

- Skilling requirements of new entrants (to fill job openings resulting from employment growth and replacement demand).
- Up-skilling of existing workers (completing a qualification at a higher level than their current highest level qualification).
- Existing workers gaining a qualification at an equivalent or lower level (skills broadening).
- Demand by people needing to undertake lower level qualifications before they can attain the higher level qualifications needed by industry (pathways demand).
- Demand by people who are not employed and who represent a necessary reserve capacity (reserve labour force demand).

The Commission's industry employment projections form the basis of the qualification demand analysis. Replacement and broadening rates are provided by the Centre for the Economics of Education and Training (CEET), while Pathways demand is derived from NCVER data on government funded VET activity.

The methodology also takes into account skills deepening—the change in the labour force qualification profile over time, which is a reflection of the increasing industry demand for highly skilled workers. The methodology ensures that the demand for new qualifications from people entering new jobs as a result of employment growth and existing workers up-skilling, is consistent with the qualification profile estimated for the end of the projection period.

New entrant demand

New entrant demand for qualifications is influenced not only by employment growth and replacement demand, but also the corresponding qualification level required by industry for new entrants to be appropriately qualified for the jobs on offer. It is assumed that the qualification profile of younger workers better reflects today's qualification requirements to enter into each occupation. Therefore, the skilling requirements of new entrants for each occupation are derived by combining the number of job openings with qualification profiles, but with weightings favouring younger workers.

Among new entrants, there is roughly an equivalent demand, in aggregate, for VET qualifications compared to higher education qualifications. That being said, bachelor degree level qualifications are the most in demand for new entrants according to qualification level. Approximately 32,000 bachelor level qualifications will be required to be delivered between 2014-15 and 2019-20. By contrast, new entrants require approximately 22,000 Certificate III level qualifications to be delivered over the same period.

The qualification profile required by new entrants is different to that required under skills broadening and up-skilling. Whereas the new entrant profile is approximately 50 percent VET qualifications, the VET component of skills broadening and up-skilling is much higher—around 65 percent.

This indicates that approximately half of new entrants are required to have a higher education qualification, yet once in the workforce, it is likely that further skills attainment will be through a VET qualification. In other words, VET qualifications are being used to supplement higher education qualifications over a worker's career.

Data updates/methodology

- The qualification profile over the projection period was derived using skills deepening rates informed by ABS Census trends and the qualification profile derived from the ABS Survey of Education and Work.
- Replacement rates are provided by the Centre for the Economics of Education and Training (CEET).

Table 11: New entrant demand (2014-15 to 2019-20)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	10,000	11,000	9,000
Bachelor degree	32,000	36,000	30,000
Advanced Diploma/Diploma	14,000	16,000	13,000
Certificate IV	9,000	10,000	8,000
Certificate III	22,000	25,000	21,000
Certificate II	2,000	2,000	2,000
Certificate I	0	0	0
Total	89,000	100,000	83,000

Components may not add to total due to rounding.

Table 12: New entrant demand (2014-15 to 2024-25)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	27,000	31,000	25,000
Bachelor degree	73,000	80,000	67,000
Advanced Diploma/Diploma	35,000	39,000	33,000
Certificate IV	21,000	23,000	20,000
Certificate III	50,000	54,000	47,000
Certificate II	4,000	4,000	4,000
Certificate I	0	0	0
Total	210,000	231,000	196,000

Components may not add to total due to rounding.

Skills broadening

Skills broadening occurs when an existing worker acquires a qualification at an equivalent, or lower, level compared to their highest qualification previously held. This component of demand does not impact the qualification profile but must be captured if the full extent of industry demand for new qualifications is to be captured. Skills broadening draws on employment, the changing qualification profile from skills deepening and ABS data on the proportion of employees with a qualification undertaking skills broadening as indicated in the Survey of Education and Training.

Skills broadening is more likely to involve VET qualifications compared to higher education qualifications, with VET making up nearly two-thirds of total skills broadening demand over the period 2014-15 to 2019-20. Certificate III level qualifications are the most in demand in relation to skills broadening, requiring approximately 25,000 qualifications to be delivered over the short-term projection. Skills broadening qualification demand is noticeably spread across all qualification levels from Certificate II upward, with similar demand for Certificate II, IV and bachelor degree level qualifications.

Data updates/methodology

- Skills broadening rates are provided by the Centre for the Economics of Education and Training (CEET), based on Survey of Education and Training data.

Table 13: Broadening demand (2014-15 to 2019-20)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	5,000	5,000	5,000
Bachelor degree	11,000	11,000	11,000
Advanced Diploma/Diploma	9,000	9,000	9,000
Certificate IV	11,000	11,000	11,000
Certificate III	25,000	25,000	25,000
Certificate II	11,000	11,000	11,000
Certificate I	1,000	1,000	1,000
Total	72,000	73,000	72,000

Components may not add to total due to rounding.

Table 14: Broadening demand (2014-15 to 2024-25)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	11,000	11,000	10,000
Bachelor degree	21,000	21,000	20,000
Advanced Diploma/Diploma	19,000	19,000	19,000
Certificate IV	24,000	25,000	24,000
Certificate III	53,000	55,000	53,000
Certificate II	26,000	26,000	25,000
Certificate I	1,000	1,000	1,000
Total	154,000	158,000	152,000

Components may not add to total due to rounding.

Up-skilling

In regard to up-skilling, it is assumed that a proportion of existing workers complete a qualification at a higher level compared to their current qualification in a manner consistent with the changing qualification profile over the projection period.

Similar to skills broadening demand, nearly two-thirds of up-skilling demand is for VET qualifications. However, unlike skills broadening, diploma to advance diploma level qualifications are expected to have the highest demand among the qualification levels. Up-skilling qualification demand is broadly spread across Certificate III to post graduate level qualifications.

Table 15: Up-skilling demand (2014-15 to 2019-20)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	10,000	11,000	10,000
Bachelor degree	8,000	8,000	7,000
Advanced Diploma/Diploma	13,000	13,000	12,000
Certificate IV	7,000	7,000	7,000
Certificate III	11,000	12,000	10,000
Total	48,000	51,000	47,000

Components may not add to total due to rounding.

Table 16: Up-skilling demand (2014-15 to 2024-25)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	14,000	14,000	14,000
Bachelor degree	8,000	8,000	8,000
Advanced Diploma/Diploma	17,000	18,000	17,000
Certificate IV	11,000	11,000	10,000
Certificate III	16,000	17,000	14,000
Total	66,000	68,000	63,000

Components may not add to total due to rounding.

Skills deepening

The change in the qualification profile, known as skills deepening, is assumed to occur over the projection period for the baseline at a rate that is informed by ABS Census trends and the ABS Survey of Education and Work. The model projects a more subdued rate of skills deepening than that observed in recent years as a result of the inevitably asymptotic path of skills deepening⁸.

It is considered that skills deepening is principally driven by the need to respond to the demands of innovation and changing technology and that these demands will not differ much across the different sensitivities. It was therefore assumed that the rate of skills deepening at every qualification level for each occupation was uniform across each of the sensitivities.

Data updates/methodology

- A continuation of historic trends, derived from the 2006 and 2011 censuses, would result in the proportion of employed persons holding at least one post-school qualification increasing by 1.36 percent per year to 2025.
- Due to the asymptotic nature of skills deepening, it was assumed that skills deepening will occur in the baseline at the slower rate of 1.23 percent per year to 2019-20 and 1.11 percent per year to 2024-25.

Table 17: Annual change in the proportion of employed persons with at least one post-school qualification 2014-15 to 2019-20 (%)

	Post Graduate	Degree	AdvDip/ Diploma	Cert IV	Cert III	Cert II	Cert I	At least 1 qual.
Baseline	0.27	0.40	0.27	0.22	0.12	-0.04	0.00	1.23
Census 2006-2011	0.34	0.55	0.27	0.23	0.23	-0.12	-0.15	1.36

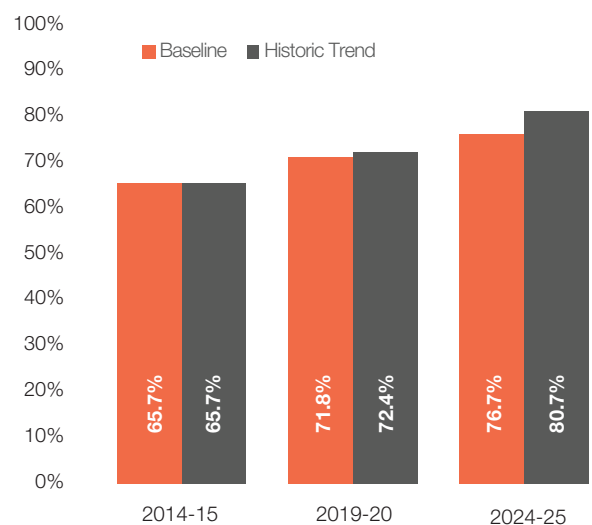
Table 18: Annual change in the proportion of employed persons with at least one post-school qualification 2014-15 to 2024-25 (%)

	Post Graduate	Degree	AdvDip/ Diploma	Cert IV	Cert III	Cert II	Cert I	At least 1 qual.
Baseline	0.25	0.36	0.24	0.21	0.08	-0.03	0.00	1.11
Census 2006-2011	0.34	0.55	0.27	0.23	0.23	-0.12	-0.15	1.36

Figure 4: Proportion of employed persons with at least one post-school qualification

The skills deepening reflected in the above tables results in a baseline projection of 71.8 percent of employed South Australians holding at least one post-school qualification by 2019-20, up from 65.7 percent in 2014-15. By comparison, the continuation of historic trends would result in 72.4 percent of employed South Australians holding at least one post-school qualification by 2019-20.

By 2024-25, skills deepening results in a baseline projection of 76.7 percent of employed South Australians holding at least one post-school qualification. The continuation of historic trends would have led to 80.7 percent.



8. The proportion of workers in any occupation with a qualification cannot exceed 100 percent, and the rate of change in this proportion is bound to decelerate as a 100 per cent rate is approached.

Note: Chart shows projected proportions based on the Commission's economic modelling as opposed to ABS actuals.

Note: Historic Trend reflects skills deepening rates implied by changes between the ABS 2006 Census and the ABS 2011 Census.

Pathways

While the modelling methodology only attempts to capture industry demand, which results in low estimates of demand for new Certificate I and II level qualifications, low-level qualifications provide an entry point for many individuals into employment, or become a stepping stone to go on to higher level study. In effect, the industry demand for higher level qualifications cannot realistically be met in some circumstances without a number of people obtaining these entry level qualifications. This applies particularly for those people who left school before completing their secondary education.

Pathways demand has, therefore, been incorporated into the modelling, given that a number of individuals will need to undertake lower level qualifications before they can attain the higher level qualifications required by industry.

Data updates/methodology

- Pathways demand for qualifications was derived using NCVER data from 2011-2014 showing student qualification levels and whether there was an enrolment for further study.
- The NCVER data enabled a percentage to be determined for the proportion of students who study a Certificate I or II and continue on to higher level study.

Table 19: Pathways demand (2014-15 to 2019-20)

Qualification Level	Baseline	Improved	Subdued
Certificate II	10,000	10,000	10,000
Certificate I	1,000	1,000	1,000
Total	11,000	11,000	11,000

Components may not add to total due to rounding.

Table 20: Pathways demand (2014-15 to 2024-25)

Qualification Level	Baseline	Improved	Subdued
Certificate II	23,000	24,000	23,000
Certificate I	1,000	1,000	1,000
Total	24,000	25,000	24,000

Components may not add to total due to rounding.

Reserve labour force

It is also recognised that there is a need to consider demand for new qualifications that is not strictly industry demand, but which incorporates demand from those who are currently unemployed or not in the labour force. This is in recognition that the economy typically requires more skilled labour than is actually employed at any point in time.

Data updates/methodology

- Demand for new qualifications from the reserve labour force was derived as a proportion of total demand for new qualifications (excluding pathways demand) at each qualification level.
- This proportion was drawn from the national projections made by the former Australian Workforce and Productivity Agency.

Table 21: Reserve labour force demand (2014-15 to 2019-20)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	1,000	1,000	1,000
Bachelor degree	2,000	3,000	2,000
Advanced Diploma/Diploma	2,000	2,000	2,000
Certificate IV	1,000	1,000	1,000
Certificate III	3,000	3,000	3,000
Certificate II	2,000	2,000	1,000
Certificate I	0	0	0
Total	11,000	11,000	10,000

Components may not add to total due to rounding.

Table 22: Reserve labour force demand (2014-15 to 2024-25)

Qualification Level	Baseline	Improved	Subdued
Post Graduate	2,000	2,000	2,000
Bachelor degree	4,000	5,000	4,000
Advanced Diploma/Diploma	4,000	5,000	4,000
Certificate IV	4,000	4,000	4,000
Certificate III	8,000	9,000	8,000
Certificate II	5,000	5,000	5,000
Certificate I	0	0	0
Total	27,000	28,000	26,000

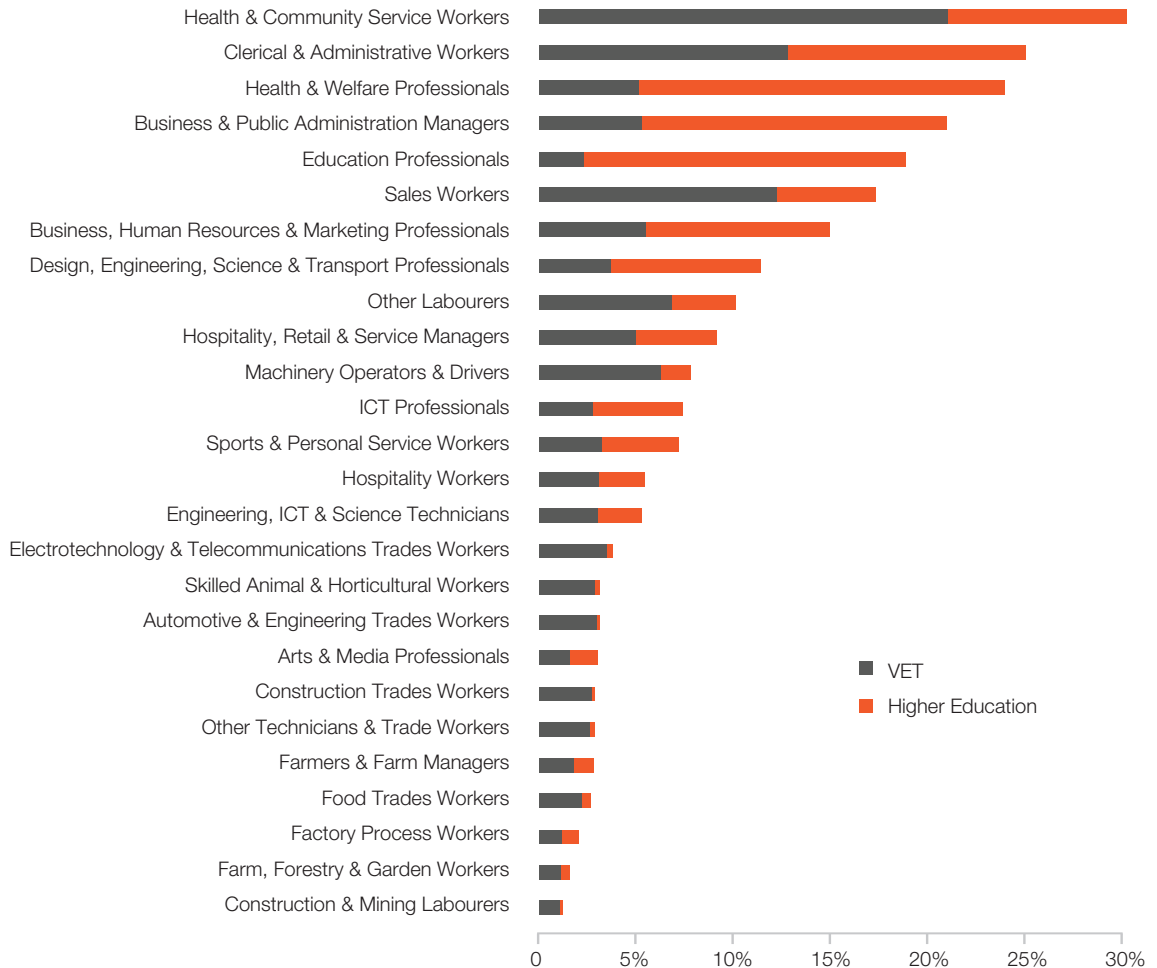
Components may not add to total due to rounding.

Table 23: Total industry demand for new qualifications by occupational group (2014-15 to 2019-20)

Occupational Group	Base	Improved	Subdued
Business and Public Administration Managers	16,800	17,900	16,000
Farmers and Farm Managers	3,000	3,000	2,700
Hospitality, Retail and Service Managers	8,800	9,700	8,500
Arts and Media Professionals	3,000	3,100	2,900
Business, Human Resources and Marketing Professionals	12,900	13,900	12,500
Design, Engineering, Science and Transport Professionals	9,600	10,200	9,200
Education Professionals	13,600	14,700	13,000
Health and Welfare Professionals	18,600	20,100	17,700
ICT Professionals	6,600	6,900	6,300
Engineering, ICT and Science Technicians	5,200	5,500	5,000
Automotive and Engineering Trades Workers	3,900	4,300	3,700
Construction Trades Workers	3,500	4,000	3,200
Electrotechnology and Telecommunications Trades Workers	4,700	5,000	4,300
Food Trades Workers	3,100	3,200	3,000
Skilled Animal and Horticultural Workers	3,700	3,800	3,700
Other Technicians and Trades Workers	3,500	3,600	3,400
Health and Community Service Workers	32,300	34,200	31,200
Hospitality Workers	5,300	5,500	5,200
Sports and Personal Service Workers	6,600	7,000	6,500
Clerical and Administrative Workers	23,900	25,800	22,900
Sales Workers	18,500	19,600	18,000
Machinery Operators and Drivers	8,800	9,400	8,500
Construction and Mining Labourers	1,400	1,500	1,200
Factory Process Workers	2,000	2,100	1,900
Farm, Forestry and Garden Workers	1,800	1,800	1,600
Other Labourers	10,600	11,200	10,300
Total	231,000	247,000	223,000

Components may not add to total due to rounding.

Figure 5: Total industry demand for qualifications by occupational group, VET and Higher Education, 2014-15 to 2019-20



Qualification-linked occupations (QLOs)

The Commission has adopted the following criteria and associated indicators, measures and data sources for defining QLOs in the South Australian labour market.

These criteria align closely with those used by the former AWPFA to identify 'specialised occupations' at the national level.

Each QLO is assigned a risk assessment rating, based on:

- Current labour market conditions (for example, are there insufficient workers with the necessary skills to meet demand).
- The projected level of industry demand for qualifications over the five-year period 2014-15 to 2019-20.
- An assessment of the training system's ability to supply sufficient skills.

In developing the risk assessment rating, more weighting has been given to industry demand for qualifications and current labour market conditions. Lower weighting has been given to the supply assessment. The main reason for these weightings is the difficulty in projecting qualification supply. Future changes to training funding or regulation during the projection period can significantly affect qualification supply.

Criterion	Indicators	Measures
1. High use The skills are deployed for the uses intended (close occupational fit).	<ul style="list-style-type: none"> • The skills which people acquire through education and training are used for their intended purpose. • A majority of people in the occupation have the requisite qualification. 	<ul style="list-style-type: none"> • Above average match between intended and destination occupation of graduates. • 60% or more of those working in the occupation have a skill level commensurate with that specified. <p><small>Source: Australian Workforce and Productivity Agency</small></p>
2. Long lead time Skills are highly specialised and require extended learning and preparation over several years.	<ul style="list-style-type: none"> • Length of course. 	<ul style="list-style-type: none"> • An occupation must be at ANZSCO Skill Level 3 or above.⁹
3. Opportunity cost The opportunity cost of the skills being in short supply is high (causing either bottlenecks in the supply chain or imposing significant costs by their absence) and/or the skills are required to implement the Government's economic development priorities.	<ul style="list-style-type: none"> • The occupation has licensing or registration requirements.¹⁰ • The occupation/skills are needed to deliver government priorities. 	<ul style="list-style-type: none"> • Registration/licensing requirement. • The occupation is associated with the State Government's economic priorities. <p><small>Sources: COAG mutual recognition arrangements ABS ANZSCO, cat. no. 1220.0 Economic Statement 2013 DFEEST STEM Occupations</small></p>
4. Industry intelligence There is robust intelligence from industry regarding the demand, supply and use of these skills. There is adequate data to assess the first three criteria.	<ul style="list-style-type: none"> • Industry Skills Boards (ISB) and other industry stakeholders (e.g. professional associations) can provide robust intelligence. 	<ul style="list-style-type: none"> • ISBs, Industry Reference Committees (IRCs) and professional associations.

Data updates/methodology

- In previous reports the QLO analysis included all working-age persons. The 2016 update restricts the analysis to include persons aged between 15 and 49.
- The methodology change takes into consideration the fact that younger workers are more likely to have received formal accredited training such as is required by new entrants into an occupation today.
- Restricting the age range should provide a better indication of whether a specific field of education will be required to prepare new entrants for an occupation.

9. Occupations at Skill Level 3 have a level of skill commensurate with one of the following: 1) AQF Certificate IV. 2) AQF Certificate III including at least two years of on-the-job training. 3) At least three years of relevant experience may substitute for the formal qualifications listed above. In some instances relevant experience and/or on-the-job training may be required in addition to the formal qualifications. Source: ABS Cat. No. 1220.0

10. Occupations for which some form of legislation-based registration, certification, licensing, approval, admission or other form of authorisation is required by individuals to practise the occupation legally.



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Training and Skills Commission

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The information contained in this document is provided in good faith and all reasonable care has been taken in its preparation. The Training and Skills Commission recommends users exercise care in interpreting this document and carefully evaluate the relevance of the material for their purpose and where necessary obtain appropriate advice specific to their particular circumstances.

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