



ENGINEERS
AUSTRALIA



The Australian Engineering Labour Market Overview



August 2024

The Australian Engineering Labour Market Overview

August 2024

ISBN: 978-1-925627-86-2

Author: Briggs, Peter

© Institution of Engineers Australia, August 2024

All rights reserved. Other than brief extracts, no part of this publication may be reproduced in any form without the written consent of the publisher. The report can be downloaded at engineersaustralia.org.au

Disclaimer: The inclusion or citation of any organisation or its work within this report does not constitute an endorsement. References are provided for informational purposes only and reflect a range of perspectives pertinent to the topics discussed.

Engineers Australia

11 National Circuit, Barton ACT 2600

Tel: +61 2 6270 6555

Email: publicaffairs@engineersaustralia.org.au

Contents

Purpose	1
Insights Summary and Outlook	1
Methodology and data sources	3
The broader Australian labour market	4
Engineering Vacancy Analysis.....	6
Engineers, professionals and the Australian total	6
Vacancies by occupation / job title	7
Vacancies by state and territory	8
Vacancies by region	9
Influencing factors for engineering labour market demand.....	11
Engineering construction activity	11
Supply of engineers via migration.....	14
Salary and compensation trends	16
Turnover, attrition and retention in the engineering labour market.....	19
Levels of experience in demand	20
Disciplines and skillsets in demand.....	21
The role of productivity on engineering vacancies.....	21
Demand forecasting.....	23
Appendix	25
ANZSCO Unit Groups.....	25
About Engineers Australia	26
Supplementary Table – Weekly Income Distribution by Occupation	27
References	28

Purpose

This Australian Engineering Labour Market Update is designed to offer a comprehensive and contemporary snapshot of the engineering labour market in Australia and the factors which influence it.

This report series will be published twice annually as the evolution of Engineers Australia's long standing Vacancy Analysis reports, which utilise the Internet Vacancy Index (IVI), a monthly count of online job advertisements compiled by Jobs and Skills Australia. The IVI can be used as a proxy for the level of Australian recruitment activity and an indicator for labour demand, however, the IVI does not reflect the absolute total number of job advertisements in the Australian labour market.

Vacancy analysis will remain core to providing insights into our understanding of the engineering labour market and will be enhanced and supplemented by other contemporary data that is available at the time of production, including migration data, engineering construction data, salary/wage data, industry reports and other relevant information sources.

Our goal is to provide our members and the community with an accurate, timely understanding of the market. This report is not just a reflection of the current state but a lens through which the future of engineering in Australia can be anticipated and shaped. By offering this comprehensive view, we strive to support our members in their professional journeys and contribute to the public understanding of the engineering labour market.

Insights Summary and Outlook

Vacancies

- **Vacancies for engineers remain at elevated levels** (16.8 percent above the indexed level recorded in January 2006).
- There was a **six month decline to March 2024** in the indexed level of vacancies that is likely due to the return of migration post-pandemic, changes to government projects and other efforts by engineering organisations to respond to recruitment difficulties. **March 2024 saw a 10 percent increase in engineering vacancies before declining slightly in April and May 2024**, illustrating the current **volatility of the engineering labour market**.
- The indexed rate of vacancies for engineers sits **above the Australian total** (4.5 percent higher) but **below that for Professionals** more broadly (18 percent lower).
- The Internet Vacancy Index records a **total of 6,293 vacancies** in May 2024 for the 10 engineering occupations examined. This figure is in the range of the total number of search results on Seek.com.au for 'engineer' at 4,388 and 9,010 results on LinkedIn.com.au respectively at the time of writing.
- By far the **largest share of vacancies are for Civil Engineering Professionals** (which includes Civil, Geotechnical, Structural and Transport Engineers, as well as Quantity Surveyors) at 39.7 percent of all jobs advertised in May 2024 (2,496 vacancies). Chemical and Materials Engineers had the lowest proportion of vacancies reported, at just 0.7 percent of the total and 44 vacancies. Industrial, Mechanical and Production Engineers, Mining Engineers and Electrical Engineers also comprised significant proportions of the vacancies analysed.
- The **vacancy index for engineers is higher in the ACT, Tasmania and WA** compared to the other states and territories. States and territories continue to have elevated levels of vacancies compared to the indexed level and years preceding COVID-19, with a decline observable in all jurisdictions except for the ACT over the last six months.

Engineering Construction Activity

- The value of engineering construction activity commenced in Australia has reduced from the post COVID-19 peak recorded in September 2022 of \$42.5 billion to \$25.1 billion in March 2024, which is 27 percent below the amount of work commenced in March 2023. The value of work yet to be commenced in March 2024 has increased by 8 percent to \$130.6 billion compared to March 2023. The pipeline of work yet to be commenced appears relatively stable.
- Roads, highways and subdivisions (28.2 percent); oil, gas, coal and other minerals (14.7 percent); electricity generation, transmission and distribution (12.4 percent); and telecommunications (8.1 percent) had the largest share of work commenced in the March 2024 quarter.
- Similarly, the highest proportion of work yet to be commenced is in roads, highways and subdivisions (26.1 percent); oil, gas, coal and other minerals (23.9 percent); railways (14.7 percent); and electricity generation, transmission and distribution (15.7 percent).
- NSW, Queensland, Victoria and Western Australia comprise 88 percent of the work commenced in the quarter ending March 2024. Similarly, NSW, Victoria, Queensland and Western Australia completed 89.7 percent of engineering construction activity in the March 2024 quarter.

Migration

- The level of permanent migration for engineers has returned to pre-COVID levels, with a 70.8 percent increase in the number of permanent settlements in 2023 compared to 2022. At 7,016 settlements for the 10 engineering occupations examined, this exceeded pre-COVID levels, with the 2017 – 2019 average being 6,841 permanent settlements per year.
- The number of temporary skilled migrant engineers residing in Australia increased 34.8 percent in 2023 compared to 2022, at 6,331 engineers, which has exceeded pre-COVID levels, with the 2017 – 2019 average being 4,500 engineers residing in Australia with temporary skilled visas.
- The resurgent availability of skilled migrant engineers has likely alleviated some workforce pressures and thus could be a contributor to some reduction in vacancy levels over 2023.

Salary trends

- The average salary of all engineering occupations is \$118,232 with an average gender pay gap of 15.1 percent (those who worked more than zero hours, with a bachelors degree in engineering and related technologies, working in Professional, Scientific and Technical Services), below Australia's total remuneration and average gender pay gap of 21.7 percent.
- Mining engineers have the highest average income of all Unit Groups within the Engineering Professionals Minor Group whereas ICT Support and Test Engineers have the lowest average income of all engineering Unit Groups.
- Many engineering disciplines have experienced strong wage growth, above the average Wage Price Index growth recorded for the Australian economy as a total. High demand for maintenance and reliability engineers as reflected in the 20 percent salary increase reported by recruiter, Michael Page, between 2023 and 2024. Similarly engineering managers and leadership roles enjoyed strong wage growth, as did occupations involved in construction, mining, and the clean energy transition.

Turnover, retention and attrition

- In 2024, Consult Australia members reported that 50 percent of engineering employers had a voluntary turnover rate of between 10-20 percent, around 28 percent had turnover rates below 10 percent and 11 percent had turnover rates between 20-30 percent.

- In 2023, Hays reported that **only 49 percent of engineers surveyed are planning on remaining with their current employer**. Top factors driving turnover were an uncompetitive salary, rising cost of living and lack of promotional opportunities.
- In 2023, the Association of Professional Engineers Australia reported that over the previous 12 months 14.9 percent of respondents had changed employer, with the **most common reason for changing employer to seek a pay increase** (57.9 percent). 14.7 percent of respondents intend to leave the engineering profession with the top reasons being lack of recognition or opportunities, wanting to pursue a different career, lack of career advancement, poor pay and workplace culture issues. Respondents cited **insufficient skills development as the issue most negatively impacting the engineering capability** of their employer.
- Engineers Australia estimates **around 5,000 qualified engineers are retiring from the workforce each year** and will continue at this level over the next two years.

Demand profile – skills, disciplines, experience level

- In 2023, Consult Australia members reported that engineers of all levels of experience remain in demand, however, the **recruitment challenges are more acute with mid-career and senior engineers**, rather than graduates or early career engineers.
- It is anticipated that over the short term **those disciplines involved in mining, energy, the clean energy transition, construction, transport and infrastructure will remain at elevated levels**.
- Consult Australia members reported that **skillsets anticipated to be in demand include digital engineering (including building information modelling), data analytics and transformation, cyber security, sustainability, environmental, strategic thinking, creativity, socio-emotional intelligence, business development and leadership skills**.

Outlook

- In 2024, Consult Australia members reported in relation to their current capacity that **“while there were strong results in all sectors for enough current work, it is worth noting that in almost all sectors a significant proportion of respondents do not have enough work**. This is particularly so in the commercial buildings sector (57%), rail (53%) and roads (52%).” Almost all sectors will reportedly have capacity in the next six months, with 77% of all respondents indicating capacity in this timeframe. Consult Australia suggests that, **“This demonstrates that the future pipeline of work is particularly uncertain for many businesses.”**
- Based on current national emissions and sector targets, Engineers Australia anticipates that **demand for engineers in the electricity sector will remain elevated to 2030**, easing to 2035 and thereafter. We expect all other sectors to have rising demand for engineers (in line with rising emissions reductions targets) from 2030, accelerating again from 2035 to meet Australia’s 2050 commitments.
- The scale of activity required to undertake the clean energy transition and decarbonise the economy by 2050, as well the infrastructure and construction demand from an increasing population, and the new investment from the Australian Government’s Future Made in Australia agenda is likely to see strong demand for engineers in the longer-term.

Methodology and data sources

This report aims to provide an understanding of the magnitude, location and type of vacancies occurring within the Australian engineering labour market using the latest data from Jobs and Skills Australia. It seeks to provide an understanding of contributing economic market drivers by analysing the latest relevant ABS data and the dynamics of the Australian economy at the time of writing in July 2024.

This report uses data from the [Internet Vacancy Index \(IVI\)](#), a monthly count of online job advertisements compiled by Jobs and Skills Australia. Data is made available by occupational groups, skill level groups, state or territory and by regional areasⁱ. The IVI measures job advertisements newly lodged on the SEEK, CareerOne and Workforce Australia online job boards during the reference month. The IVI is the only publicly available source of detailed information of this kind.

The IVI can be used as a proxy for the level of Australian recruitment activity and an indicator for labour demand. **However, the IVI does not reflect the total number of job advertisements in the Australian labour market. The IVI does not account for jobs advertised through other websites, those advertised internally by companies, social media (such as LinkedIn), newspapers, or other methods such as word of mouth, recruiters etc.** The IVI does not take account of multiple positions being advertised in a single job advertisement.ⁱⁱ

This report also utilises data compiled by the Australian Bureau of Statistics (ABS), including labour force, inflation, population, GDP, among others, and importantly, [Engineering Construction Activity](#), which provides the value of engineering construction work done, commenced and yet to be done on a quarterly basis in Australia. The series covers all engineering construction work undertaken in Australia. It excludes construction of buildings such as houses and offices.

The ABS defines Engineering Construction as any construction that does not have a roof. Where projects include elements of both building and engineering construction (for example, electricity generation, heavy industrial plant) every effort is taken to exclude the building component from these statisticsⁱⁱⁱ.

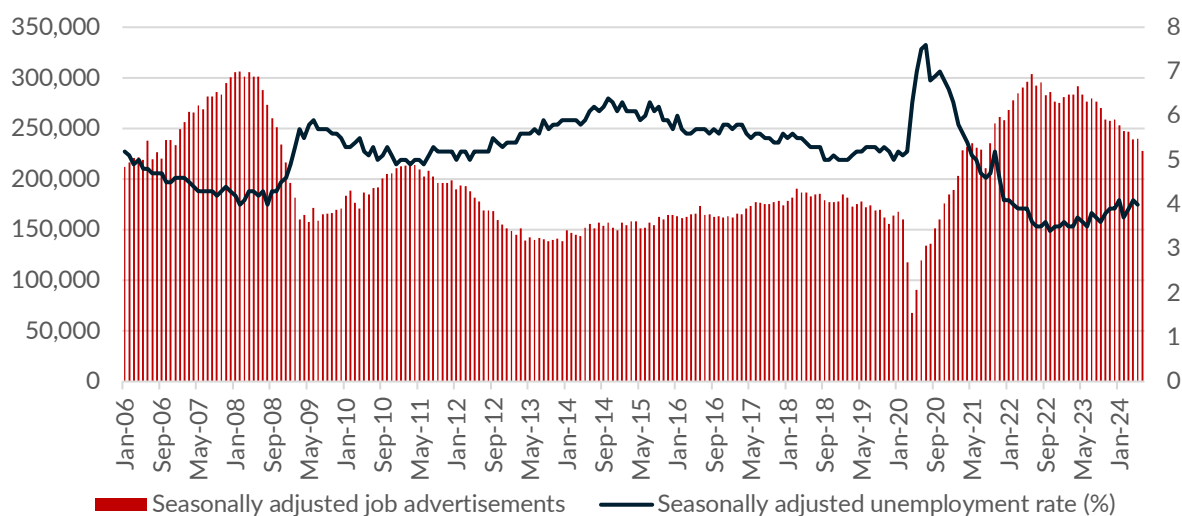
Finally, this report uses statistics provided by the Department of Home Affairs. It examines the number of permanent skilled migrants by program year in Australia, for select engineering occupations as well as the number of temporary skilled migrants currently in Australia by quarter for the same engineering occupations (the same collection used to analyse IVI data, detailed in the methodology section in the Appendix).

In all data sets used, the limitations of the Australian and New Zealand Statistical Classification of Occupations^{iv} (ANZSCO) mean that different types of engineers cannot be distinguished at the Unit Group level of ANZSCO (the fourth level of detail). For example, civil, structural and transport engineers are grouped together at this level as Civil Engineering Professionals. For more information, statistics and methodological elaboration for engineers and engineering in Australia, see [The Engineering Profession: A statistical overview 15th edition](#) and [accompanying data dashboard](#).

The broader Australian labour market

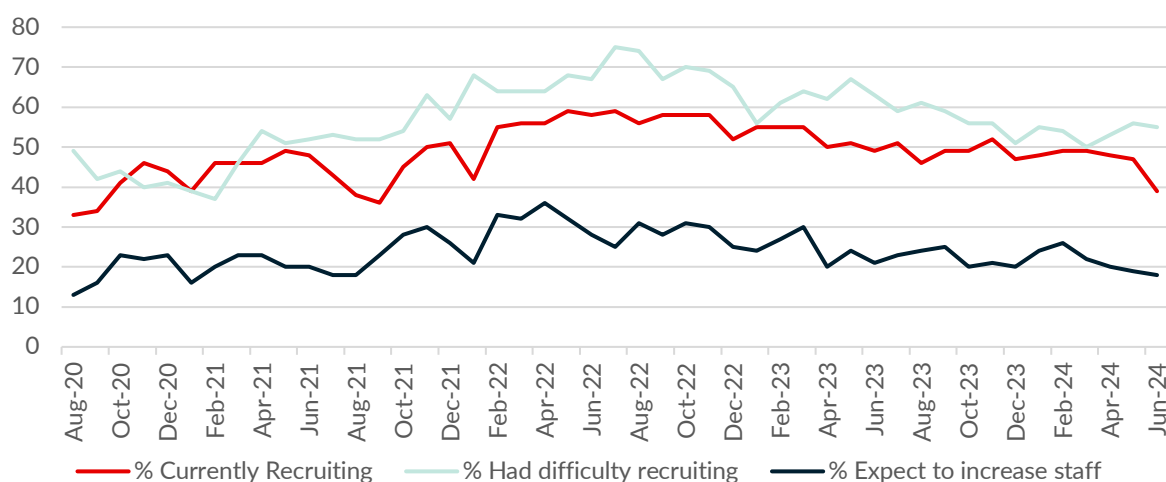
The latest seasonally adjusted count of all IVI job vacancies and the seasonally adjusted unemployment rate for Australia are shown in Figure 1 below. Unemployment throughout Australia is 14 percent higher than twelve months ago, at 4 percent. The number of job vacancies has reduced by 49,000. Job vacancies remain significantly elevated across the economy compared to the years preceding COVID-19 and unemployment remains at historically low rates.

FIGURE 1: COUNT OF ALL IVI JOB ADVERTISEMENTS AND SEASONALLY ADJUSTED UNEMPLOYMENT RATE (%) BY MONTH, JANUARY 2006 – JUNE 2024^v (JSA AND ABS).



Jobs and Skills Australia also publish the monthly Recruitment Experiences and Outlook Survey, which tracks recruitment activity, difficulty levels and intentions through a survey of 1,000 Australian employers each month. Figure 2 below shows the proportion of employers who experienced difficulty recruiting, the proportion currently recruiting and the proportion who expected to increase their staff count during each month of the survey period.

FIGURE 2: PROPORTION OF EMPLOYERS (EXPRESSED AS A PERCENTAGE) CURRENTLY RECRUITING, EXPECTING TO INCREASE STAFF NUMBERS AND THE PROPORTION WHO EXPERIENCED DIFFICULTY RECRUITING IN EACH MONTH'S SURVEY BETWEEN AUGUST 2020 AND JUNE 2024^{vi}



The proportion of employers who experienced difficulties recruiting has eased from its peak in mid-2022. There has also been a reduction in the proportion of employers currently recruiting.

Jobs and Skills Australia reported in its June 2024 Recruitment Insights Report^{vii} that recruitment activity had declined sharply and there was a decrease in the share of employers expecting to increase their staffing levels in the future. The majority of employers (64 percent) were reported to be recruiting due to staff turnover only, while 27 percent reported they were recruiting to fill new positions only.

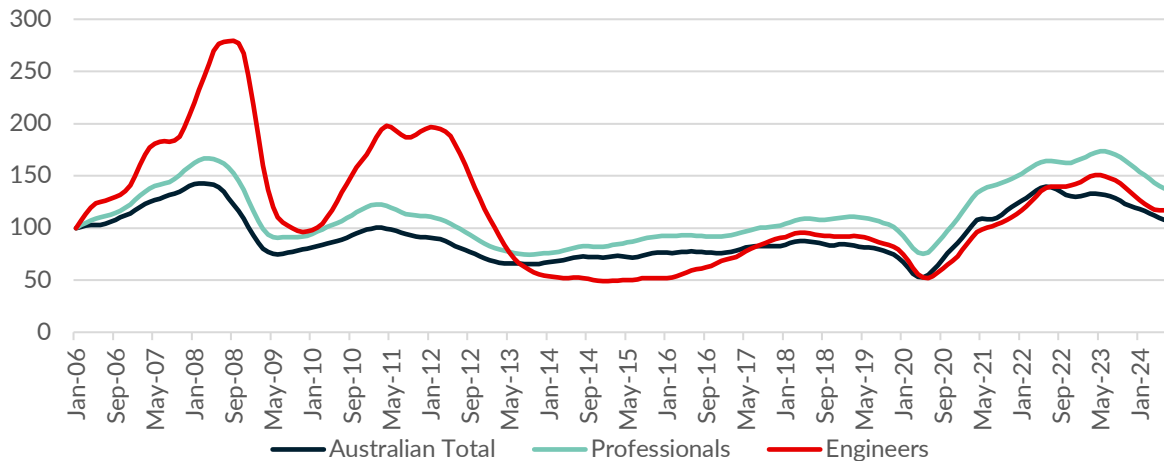
The proportion of recruiting employers who were unable to fill their vacancies within a month was reported as 55 percent in June 2024, below the peak of 75 percent recorded in July 2022.

Engineering Vacancy Analysis

Engineers, professionals and the Australian total

The trend index (relative to the indexed date of January 2006) for Engineers, Professionals and the Australian total for IVI advertisements is shown in Figure 3 below. This provides an understanding of how the demand for engineers is changing within the Australian labour market by providing comparison to an indexed level.

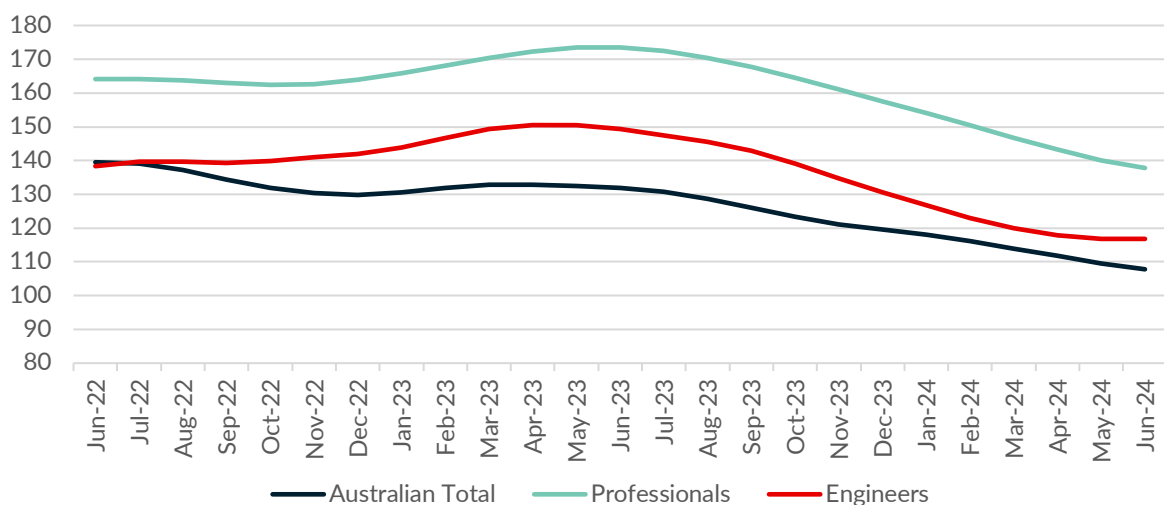
FIGURE 3: TREND INDEX (INDEXED TO JANUARY 2006) FOR ENGINEERS, PROFESSIONALS AND THE AUSTRALIAN TOTAL FOR IVI ADVERTISEMENTS, ANZSCO2, JUNE 2024^{viii}



Vacancies for engineers have been above the indexed level of January 2006 (100) since June 2021, a period of 2 years, 8 months following a significant period below index, for 8 years, 3 months, between March 2013 until June 2021.

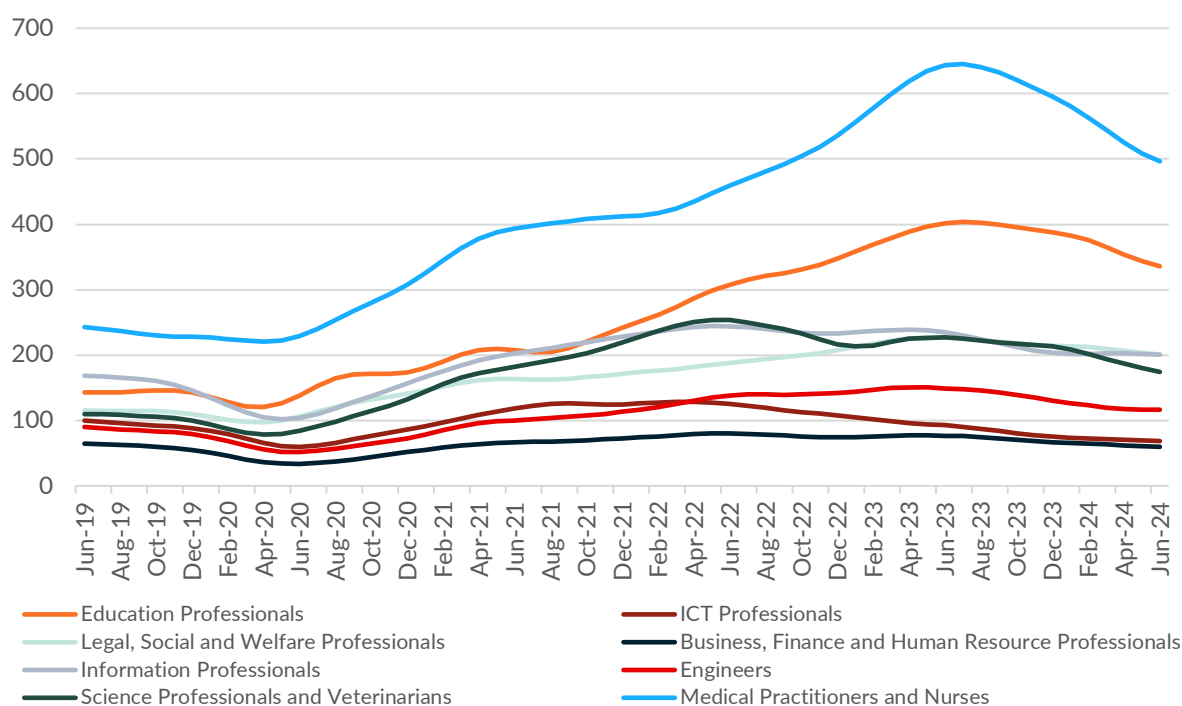
Figure 4 provides the last 24-month time series for all three groups. The level of vacancies has been dropping for all three occupational groups since August 2023, a period of 10 months. However, it is important to note that despite the fall in vacancies they remain elevated considerably above the levels experienced over most of the decade to 2020.

FIGURE 4: TREND INDEX, ANZSCO2 VACANCIES, JUNE 2022 - JUNE 2024



To provide perspective and comparison, the seasonally adjusted trend index for other professions is shown in Figure 5 below, with Medical Practitioners and Nurses and Education Professionals in extreme shortage compared to all other professions shown.

FIGURE 5: TREND INDEX, ANZSCO2 VACANCIES, ASSORTED PROFESSIONS, JUNE 2019 – JUNE 2024



Vacancies by occupation / job title

In addition to the trend index, examining the **number** of vacancies by occupation recorded in the latest IVI data provides an indication of the magnitude or volume of engineering vacancies that are present in the Australian engineering labour market.

The IVI is by no means a complete count of all jobs available in the Australian labour market for engineers (or other occupations), be they through formal or informal channels, advertised publicly or privately. The IVI provides useful indications of how the level of job vacancies is changing and the magnitude of these changes.

We have undertaken a search for common engineering job titles (which covers only a small proportion of all) for the sake of illustrating the limitations of the IVI, with our results shown in Table 1 below, for comparison with Table 2, which shows the number of IVI advertisements reported by Jobs and Skills Australia in the latest data (and in recognition that it is an indicator, rather than a comprehensive measure of all available engineering jobs).

TABLE 1: COUNT OF SEARCH RESULTS FOR ENGINEERING JOB TITLES ON SEEK.COM.AU AND LINKEDIN.COM.AU ON 19 JULY 2024

Search Term	Number of search results Seek.com.au (Engineering, Australia only)	Number of search results linkedin.com.au (Australia only)
Chemical Engineer	715	175
Civil Engineer	2,520	782
Electrical Engineer	2,990	770
Electronics Engineer	1,364	70
Engineer	4,388	9,010
Engineering Managers	2,215	270
Environmental Engineer	582	102

Search Term	Number of search results Seek.com.au (Engineering, Australia only)	Number of search results linkedin.com.au (Australia only)
Graduate Engineer	2,776	472
Industrial Engineer	244	79
Materials Engineer	168	22
Mechanical Engineer	3,726	603
Mining Engineer	373	134
Production Engineer	833	326
Project Engineer	3,401	717
Structural Engineer	1,754	344
Systems Engineer	1,401	371
Telecommunications Engineer	100	159
Traffic Engineer	225	132
Transport Engineer	212	156

Between Seek.com.au and LinkedIn.com.au there are between 4,388 and 9,010 job advertisements for 'engineers' in Australia at the time of writing. The distribution of job advertisements by engineering occupation (at the ANZSCO Unit Group level^{ix}) from the IVI data is shown in Table 2 below.

TABLE 2: NUMBER OF JOB ADVERTISEMENTS BY MONTH FOR ENGINEERING OCCUPATIONS FROM THE IVI ANZSCO4 DATA AND PERCENTAGE SHARE OF THE JUNE 2024 TOTAL

ANZSCO Unit Group	April 24	May 24	June 24	% of June 24 Total
Chemical and Materials Engineers	55	52	44	0.7%
Civil Engineering Professionals	2,575	2,583	2,496	39.7%
Electrical Engineers	621	623	598	9.5%
Electronics Engineers	89	92	84	1.3%
Industrial, Mechanical and Production Engineers	1,070	1,069	1,020	16.2%
Mining Engineers	850	839	801	12.7%
Other Engineering Professionals	446	439	410	6.5%
Engineering Managers	381	356	321	5.1%
ICT Support and Test Engineers	446	466	448	7.1%
Telecommunications Engineering Professionals	81	75	71	1.1%
Total	6,614	6,594	6,293	100.0%

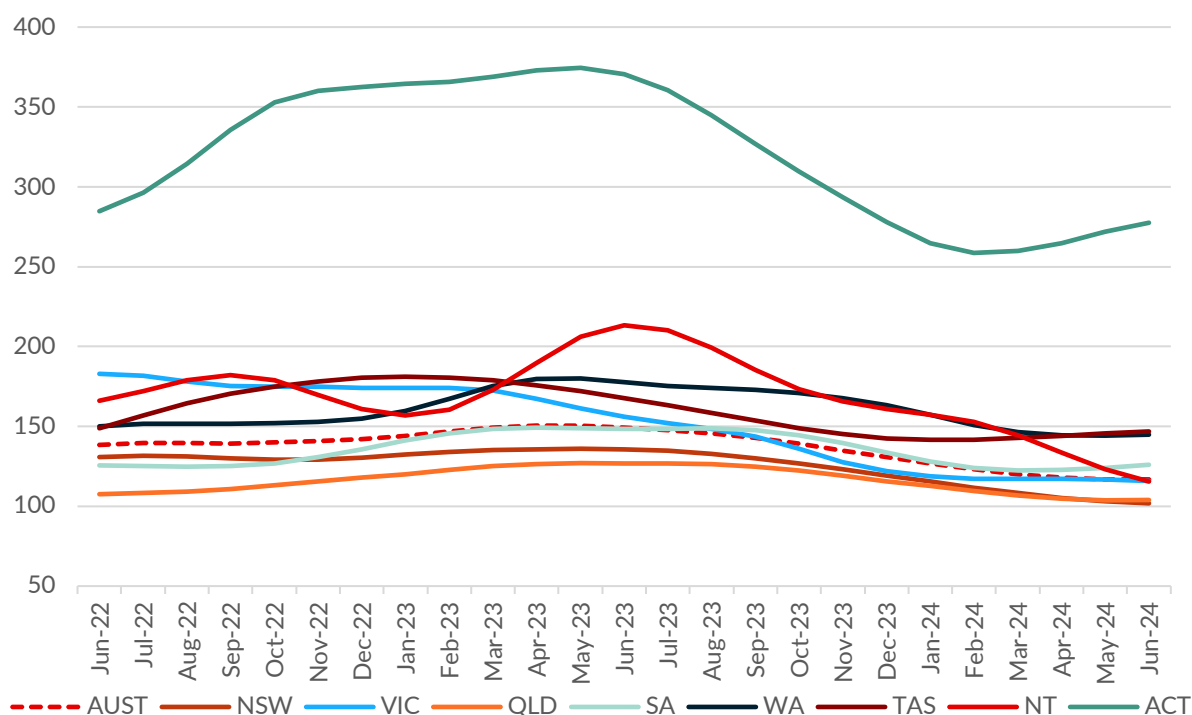
By far the largest share of vacancies are for Civil Engineering Professionals (which includes Civil, Geotechnical, Structural and Transport Engineers, as well as Quantity Surveyors) at 2,496 vacancies (39.7 percent of all engineering jobs advertised in June 2024). Industrial, Mechanical and Production Engineers, Mining Engineers and Electrical Engineers also comprised significant proportions of the vacancies analysed. Chemical and Materials Engineers had the lowest proportion of vacancies reported, at just 0.7 percent of the total and 44 vacancies.

Vacancies by state and territory

The seasonally adjusted trend index for engineering job advertisements for June 2022 – June 2024 is shown in Figure 6 below. The ACT, WA and Tasmania have comparatively high levels of indexed vacancies for engineers, however for the ACT and Tasmania note their small total respective shares of engineering vacancies.

All states and territories continue to have elevated levels of vacancies compared to the indexed level, although they have receded from their recent peaks in 2023.

FIGURE 6: SEASONALLY ADJUSTED TREND INDEX FOR ENGINEERING JOB ADVERTISEMENTS FROM JUNE 2022 TO JUNE 2024 BY STATE/TERRITORY (ANZSCO2)



The number of advertisements for engineers reported in the IVI is shown in Table 3 below for all states and territories and their relative share of the total number of vacancies in June 2024.

TABLE 3: NUMBER OF IVI JOB ADVERTISEMENTS FOR ENGINEERS BY STATE OR TERRITORY, LAST SIX-MONTH AVERAGE AND PERCENTAGE SHARE OF TOTAL (ANZSCO2)

State	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Average	% Share of Total
NSW	1,488	1,441	1,396	1,357	1,328	1,313	1,387	24.8%
VIC	849	838	836	838	834	828	837	15.0%
QLD	1,543	1,500	1,463	1,433	1,420	1,425	1,464	26.2%
SA	317	307	303	303	307	311	308	5.5%
WA	1,490	1,431	1,388	1,369	1,366	1,372	1,403	25.1%
TAS	58	58	59	59	60	60	59	1.1%
NT	76	74	70	65	60	56	67	1.2%
ACT	76	74	75	76	78	80	76	1.4%
Total	5,901	5,723	5,580	5,484	5,436	5,437	5,593	100.0%

Vacancies by region

The number of IVI job advertisements for engineers per region^x (36 in total) by state and territory are shown in Table 4 below, with the percentage change from June 2024 relative to the 2022- and 2023-year averages, as well as the share of all engineering job advertisements for that region in June 2024 and average over the preceding six months.

The state capitals (8 regions) represent 77.1% of all engineering job advertisements in June 2024. The other 28 regions, representing regional, rural and remote Australia, share the remainder.

Vacancies over the last six months have declined in most regions relative to their 2022 and 2023 averages, ranging between 6 and 46 percent lower in June 2024 than their 2023 averages. All regions except for the Fleurieu Peninsula & Murray Mallee in South Australia have recorded a fall in the number of vacancies compared to the 2023 average for each region. However, as noted earlier, vacancies for all locations across Australia remain elevated with respect to the years preceding COVID-19.

TABLE 4: NUMBER OF IVI JOB ADVERTISEMENTS PER REGION, PERCENTAGE CHANGES OVER PERIODS AND PERCENTAGE SHARE OF TOTAL JUNE 2024 VACANCIES PER REGION

State	Region	2022 Avg.	2023 Avg.	Jan-Jun 24 Avg.	June 2024	% of total	% Change from 2022 Average	% Change from 2023 Average
NSW	Blue Mountains, Bathurst & Central West NSW	45	51	42	42	0.8%	-5.9%	-17.0%
NSW	Dubbo & Western NSW	37	38	30	23	0.4%	-37.8%	-39.5%
NSW	Gosford & Central Coast	16	17	14	11	0.2%	-29.2%	-33.3%
NSW	Illawarra & South Coast	57	65	45	47	0.9%	-17.5%	-27.7%
NSW	NSW North Coast	33	45	38	40	0.8%	22.2%	-10.4%
NSW	Newcastle & Hunter	184	231	177	167	3.1%	-9.4%	-27.8%
NSW	Riverina & Murray	28	27	20	23	0.4%	-16.7%	-13.6%
NSW	Southern Highlands & Snowy	28	30	24	25	0.5%	-9.5%	-15.6%
NSW	Sydney	1,129	1,128	941	899	16.9%	-20.4%	-20.3%
NSW	Tamworth and North West NSW	20	20	15	14	0.3%	-30.0%	-30.0%
VIC	Ballarat & Central Highlands	11	13	8	7	0.1%	-36.4%	-46.2%
VIC	Bendigo & High Country	39	45	43	44	0.8%	12.8%	-2.2%
VIC	Geelong & Surf Coast	37	36	29	29	0.5%	-21.6%	-19.4%
VIC	Gippsland	28	29	15	14	0.3%	-48.8%	-50.6%
VIC	Melbourne	1,068	972	724	705	13.2%	-34.0%	-27.4%
VIC	Wimmera & Western	8	10	7	8	0.2%	0.0%	-20.0%
QLD	Brisbane	889	1,094	945	928	17.4%	4.3%	-15.2%
QLD	Central Queensland	100	135	115	104	2.0%	4.3%	-22.7%
QLD	Far North Queensland	205	206	170	164	3.1%	-19.8%	-20.2%
QLD	Gold Coast	77	104	91	95	1.8%	23.4%	-8.7%
QLD	Outback Queensland	47	36	24	18	0.3%	-62.4%	-50.9%
QLD	Sunshine Coast	36	36	31	32	0.6%	-11.1%	-11.1%
QLD	Toowoomba and South West QLD	35	45	39	38	0.7%	7.6%	-16.3%
SA	Adelaide	263	318	271	290	5.5%	10.4%	-8.7%
SA	Fleurieu Peninsula & Murray Mallee	5	6	11	9	0.2%	80.0%	50.0%
SA	Port Augusta & Eyre Peninsula	23	21	13	11	0.2%	-52.2%	-47.6%
SA	Yorke Peninsula & Clare Valley	4	6	4	2	0.0%	-41.7%	-61.1%
WA	Goldfields & Southern WA	121	102	73	66	1.2%	-45.7%	-35.6%
WA	Perth	1,053	1,304	1,156	1,133	21.3%	7.6%	-13.1%
WA	Pilbara & Kimberley	140	127	112	119	2.2%	-14.8%	-6.0%
WA	South West WA	32	46	38	32	0.6%	1.0%	-29.7%
TAS	Hobart & Southeast Tasmania	34	39	35	36	0.7%	5.9%	-7.7%
TAS	Launceston and Northeast Tasmania	15	10	7	7	0.1%	-55.6%	-33.3%

State	Region	2022 Avg.	2023 Avg.	Jan-Jun 24 Avg.	June 2024	% of total	% Change from 2022 Average	% Change from 2023 Average
TAS	North West Tasmania	12	17	16	12	0.2%	-2.8%	-31.4%
NT	Darwin	72	72	57	47	0.9%	-34.7%	-34.7%
NT	Regional Northern Territory	12	16	12	11	0.2%	-11.1%	-33.3%
ACT	Canberra & ACT	86	102	73	74	1.4%	-14.3%	-27.8%

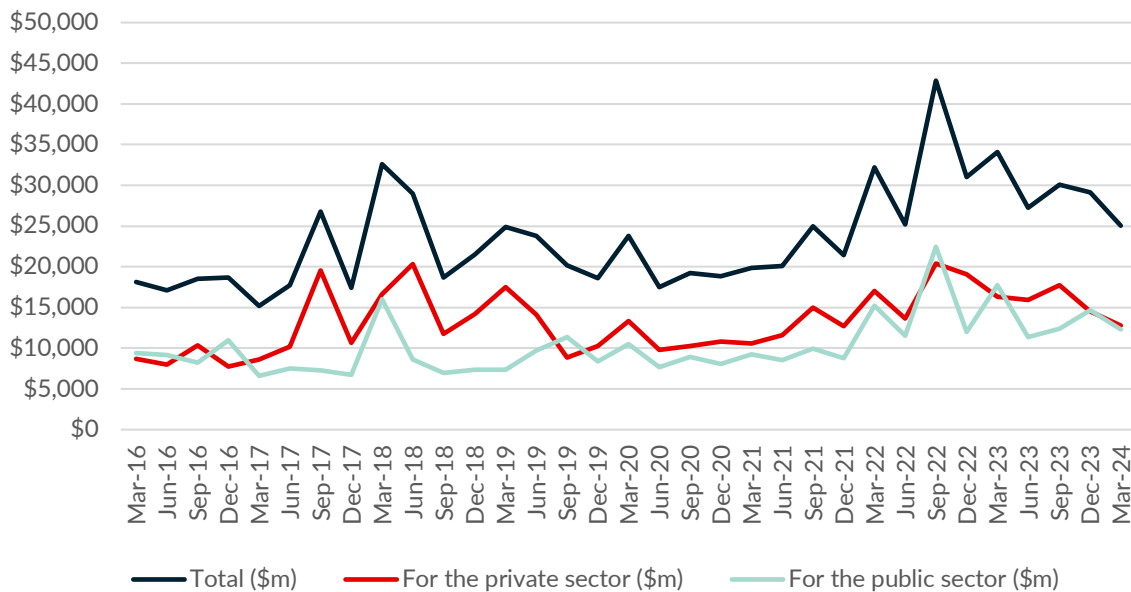
Influencing factors for engineering labour market demand

This section examines broader influencing factors and economic indicators to support a better understanding of the recent changes to the Australian engineering labour market and provide insight into possible future trends.

Engineering construction activity

The Engineering Construction Activity data series produced by the ABS via quarterly surveys of engineering organisations in Australia is one of the best indicators available of the level of engineering work being undertaken in Australia. The amount of engineering work commenced by sector in millions of Australian dollars (current value)^{xi} is shown in Figure 7 below.

FIGURE 7: ABS ENGINEERING CONSTRUCTION ACTIVITY, MARCH 2016 – MARCH 2024, VALUE OF WORK COMMENCED BY SECTOR AND TOTAL, CURRENT PRICES, \$M



As of the last quarter, the amount of work commenced for both sectors is equal at roughly AUD\$12.3 billion. There was a decline in the level of work commenced in both sectors over the last quarter, from the previous quarter. The level of work commenced peaked in September 2022 in response to post-COVID stimulus spending and generally expansionary economic conditions. The level of engineering construction activity commenced is trending down from this level.

Figure 8 shows that between March and June 2023 the amount of work done exceeded the amount of work commenced, and this has remained the case over the last twelve months.

FIGURE 8: ENGINEERING CONSTRUCTION ACTIVITY, WORK COMMENCED AND COMPLETED, CURRENT VALUE \$M AUD, MARCH 2022 – MARCH 2024

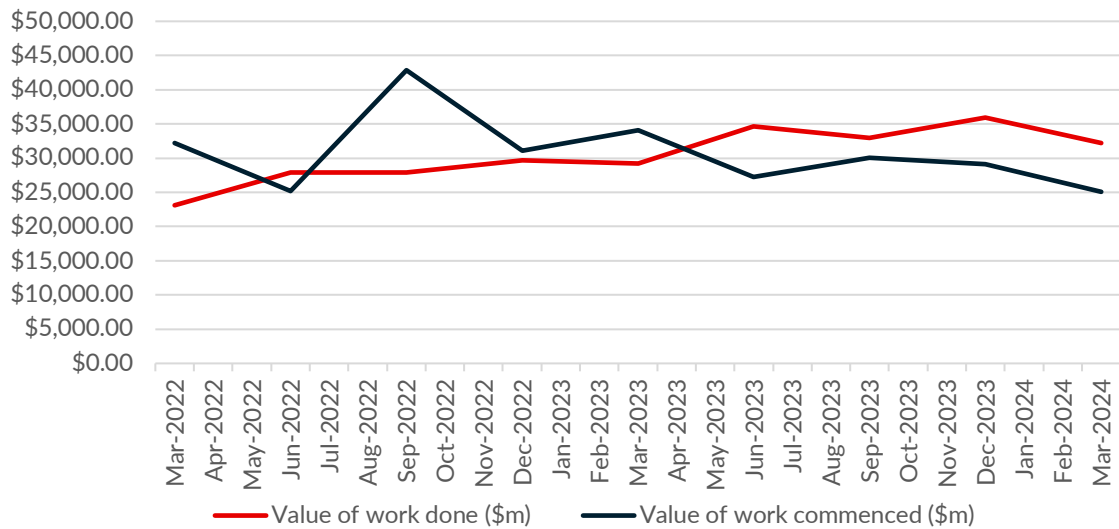
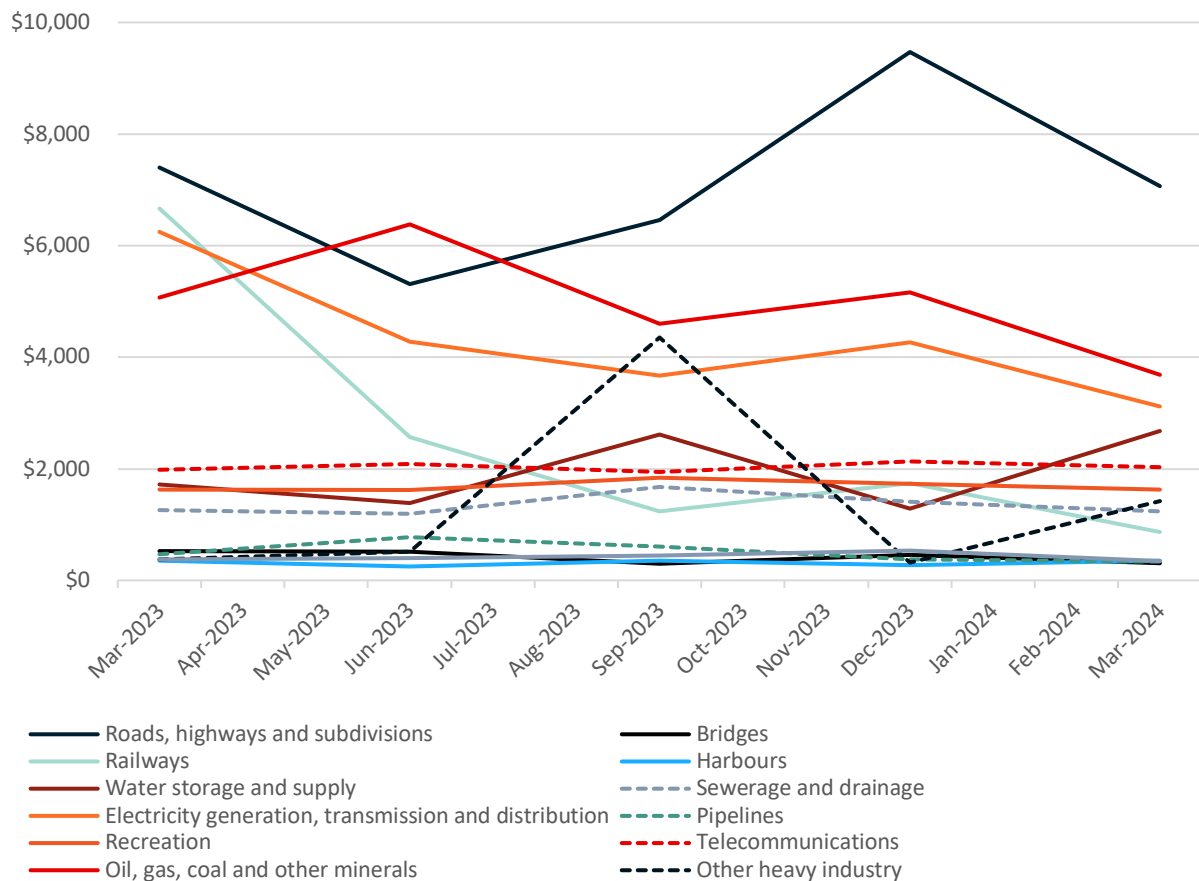


Figure 9 provides the breakdown of different types of engineering construction activity^{xii} over the twelve months to March 2024 in Australia, with roads, highways and subdivisions; oil, gas, coal and other minerals; and electricity generation, transmission and distribution having the highest value of work commenced over the year. The spike in ‘other heavy industry’ in the September 2023 quarter can likely be attributed to the commencement of construction of the Pilbara Urea Project in Western Australia.

FIGURE 9: VALUE OF ENGINEERING CONSTRUCTION ACTIVITY COMMENCED IN AUSTRALIA, BY TYPE OF WORK, MARCH 2023 - MARCH 2024, CURRENT VALUE, \$M AUD



The total value of work commenced, work done and work yet to be done for the March quarter over the last four years^{xiii} is shown in Table 5 below.

The value of work commenced in March 2024 is over 25 percent lower than a year earlier, however it remains elevated compared to March 2021 and the years preceding. The value of work completed in the March 2024 quarter rose over 10 percent, while the value of work yet to be done increased over 8 percent over the year.

TABLE 5: MARCH QUARTERLY TOTALS FOR ENGINEERING CONSTRUCTION ACTIVITY IN AUSTRALIA IN 2021-2024

	Mar-21	Mar-22	Mar-23	Mar-24
Value of work commenced (\$m)	\$19,852	\$32,219	\$34,060	\$25,078
Value of work done (\$m)	\$20,913	\$23,109	\$29,230	\$32,234
Value of work yet to be done (\$m)	\$71,791	\$88,795	\$120,580	\$130,589

The value of different types of engineering construction activity is provided in Table 6 below in current value dollars for work commenced, done and yet to be completed, including the relative share of work done and yet to be done expressed as a percentage.

TABLE 6: CURRENT VALUE DOLLARS FOR WORK COMMENCED, DONE AND YET TO BE COMPLETED IN MARCH 2024, INCLUDING THE RELATIVE SHARE OF WORK DONE AND YET TO BE DONE EXPRESSED AS A PERCENTAGE

	Value of work commenced (\$m)	Value of work commenced, % share	Value of work done (\$m)	Value of work done, % share	Value of work yet to be done (\$m)	Value of work yet to be done, % share
Roads, highways and subdivisions	\$7,060,640	28.2%	\$7,270,617	22.6%	\$34,036,438	26.1%
Bridges	\$312,677	1.2%	\$397,486	1.2%	\$1,528,343	1.2%
Railways	\$866,154	3.5%	\$3,842,062	11.9%	\$19,205,468	14.7%
Harbours	\$350,030	1.4%	\$255,370	0.8%	\$1,189,553	0.9%
Water storage and supply	\$2,677,411	10.7%	\$1,506,831	4.7%	\$10,837,166	8.3%
Sewerage and drainage	\$1,239,829	4.9%	\$1,340,742	4.2%	\$3,937,139	3.0%
Electricity generation, transmission and distribution	\$3,117,035	12.4%	\$4,845,357	15.0%	\$20,515,180	15.7%
Pipelines	\$337,146	1.3%	\$582,424	1.8%	\$454,736	0.3%
Recreation	\$1,628,684	6.5%	\$1,815,846	5.6%	\$1,653,044	1.3%
Telecommunications	\$2,033,025	8.1%	\$2,057,474	6.4%	\$376,257	0.3%
Oil, gas, coal and other minerals	\$3,684,630	14.7%	\$7,519,935	23.3%	\$31,146,326	23.9%
Other heavy industry	\$1,423,149	5.7%	\$507,610	1.6%	\$5,468,840	4.2%
Other	\$347,503	1.4%	\$292,325	0.9%	\$240,049	0.2%
Total	\$25,077,912	100.0%	\$32,234,078	100.0%	\$130,588,538	100.0%

The value of engineering construction work commenced, completed and yet to be done as of the March 2024 quarter, by state and territory^{xiv} is provided in Table 7 below. NSW, Queensland, Victoria and Western Australia comprise 88.2 percent of the work commenced in the quarter ending March

2024. Similarly, NSW, Victoria, Queensland and Western Australia completed 89.7 percent of engineering construction activity in the March 2024 quarter. Again, NSW, Victoria, Queensland and Western Australia have the majority share of engineering work yet to be done, representing 91.9 percent of the total.

TABLE 7: DISTRIBUTION OF ENGINEERING CONSTRUCTION ACTIVITIES BY STATE/TERRITORY, BY VALUE OF WORK COMMENCED, COMPLETED AND YET TO BE COMPLETED IN DECEMBER 2023.

	Value of work commenced (\$m)	% of Mar-24 total	Value of work done (\$m)	% of Mar-24 total	Value of work yet to be done (\$m)	% of Mar-24 total
NSW	\$7,496,956	29.9%	\$9,190,805	28.5%	\$40,627,367	31.1%
VIC	\$5,801,585	23.1%	\$5,762,048	17.9%	\$24,017,042	18.4%
QLD	\$5,559,277	22.2%	\$6,436,254	20.0%	\$20,105,726	15.4%
SA	\$2,111,787	8.4%	\$2,047,981	6.4%	\$3,591,383	2.8%
WA	\$3,256,470	13.0%	\$7,509,505	23.3%	\$35,258,710	27.0%
TAS	\$437,658	1.7%	\$595,351	1.8%	\$2,088,283	1.6%
NT	\$251,286	1.0%	\$507,926	1.6%	\$4,661,465	3.6%
ACT	\$162,893	0.6%	\$184,209	0.6%	\$238,562	0.2%
Total	\$25,077,912	100.0%	\$32,234,078	100.0%	\$130,588,538	100.0%

Supply of engineers via migration

Engineers born overseas who migrate to Australia, via the skilled, temporary or humanitarian migration programs, are essential to the supply of engineering capability in Australia. Engineers Australia notes that there are engineers born overseas working in Australia who are here under different visa types not examined, including temporary graduate visas, partner visas and others. However, the figures presented here provide an indication in the overall dynamics of the supply of skilled migrant engineers to Australia.

The total number of annual permanent settlements in Australia through the skilled migration program^{xv} is shown in Table 8 below, filtered to the ANZSCO Unit Group occupations examined above. We note the recovery in levels of permanent skilled migration since the COVID-19 pandemic, with a 70.8 percent increase in 2023.

TABLE 8: PERMANENT SETTLEMENTS - SKILLED MIGRATION SCHEME - ENGINEERS

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total	5,916	7,066	7,743	8,074	6,755	5,694	3,896	4,013	4,107	7,016
% change year on year	-	19.4%	9.6%	4.3%	-16.3%	-15.7%	-31.6%	3.0%	2.3%	70.8%

The number of engineers^{xvi} (again, limited to the same selection of ANZSCO Unit Group occupations as above) residing in Australia under temporary skilled visas is provided in Table 9, having also recovered significantly from the disruption caused by the COVID-19 pandemic and related border closures.

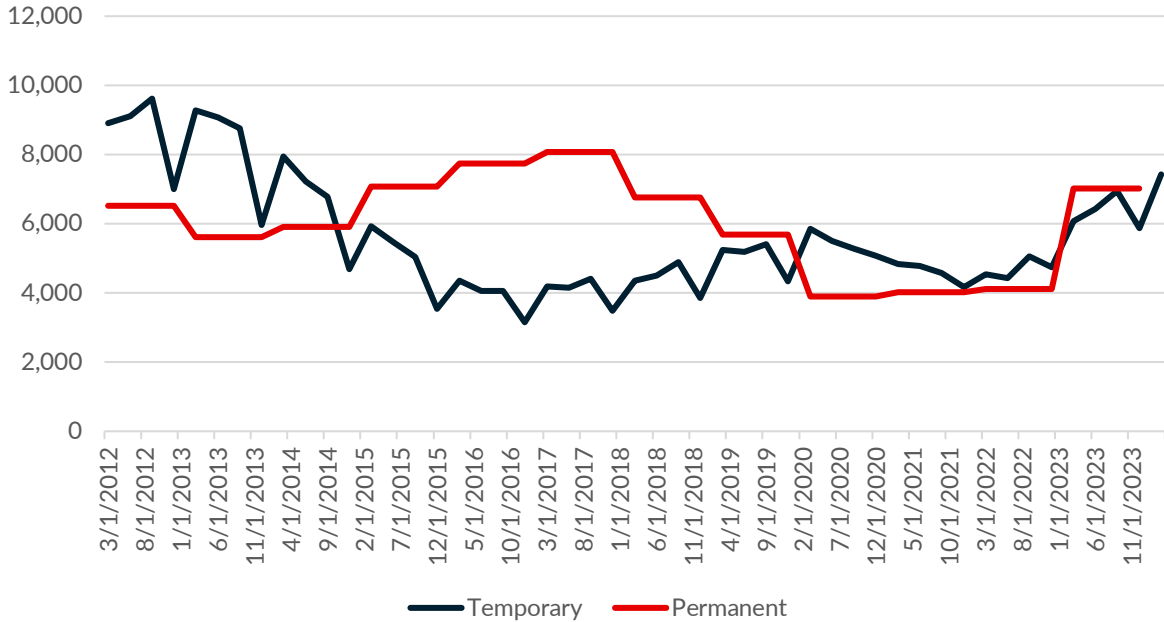
TABLE 9: ENGINEERS RESIDING IN AUSTRALIA ON A TEMPORARY SKILLS VISA BY YEAR AND QUARTER (NOTE, 2024 % CHANGE YEAR ON YEAR CALCULATED AGAINST Q1 2023).

	2017	2018	2019	2020	2021	2022	2023	2024
Q1	4,182	4,353	5,242	5,854	4,840	4,534	6,066	7,419
Q2	4,153	4,502	5,188	5,509	4,771	4,432	6,434	-
Q3	4,401	4,894	5,416	5,274	4,575	5,063	6,946	-
Q4	3,479	3,858	4,336	5,083	4,176	4,749	5,876	-
Year Average	4,054	4,402	5,046	5,430	4,591	4,695	6,331	-

% change year on year	-	8.6%	14.6%	7.6%	-15.5%	2.3%	34.8%	22.3%
-----------------------	---	------	-------	------	--------	------	-------	-------

The recovery in the number of migrant engineers settling and residing in Australia, both permanently and temporarily is shown in Figure 10.

FIGURE 10: NUMBERS OF PERMANENT AND TEMPORARY ENGINEER MIGRANTS IN AUSTRALIA, MARCH 2012 – MARCH 2024



We have also examined the proportions of migrant engineers by nominated occupation. Figure 11 provides the distribution of permanent migrant engineers by occupation for program years ending 2014-2023.

FIGURE 11: PERMANENT SETTLEMENTS BY ENGINEERING OCCUPATION, 2014-2023

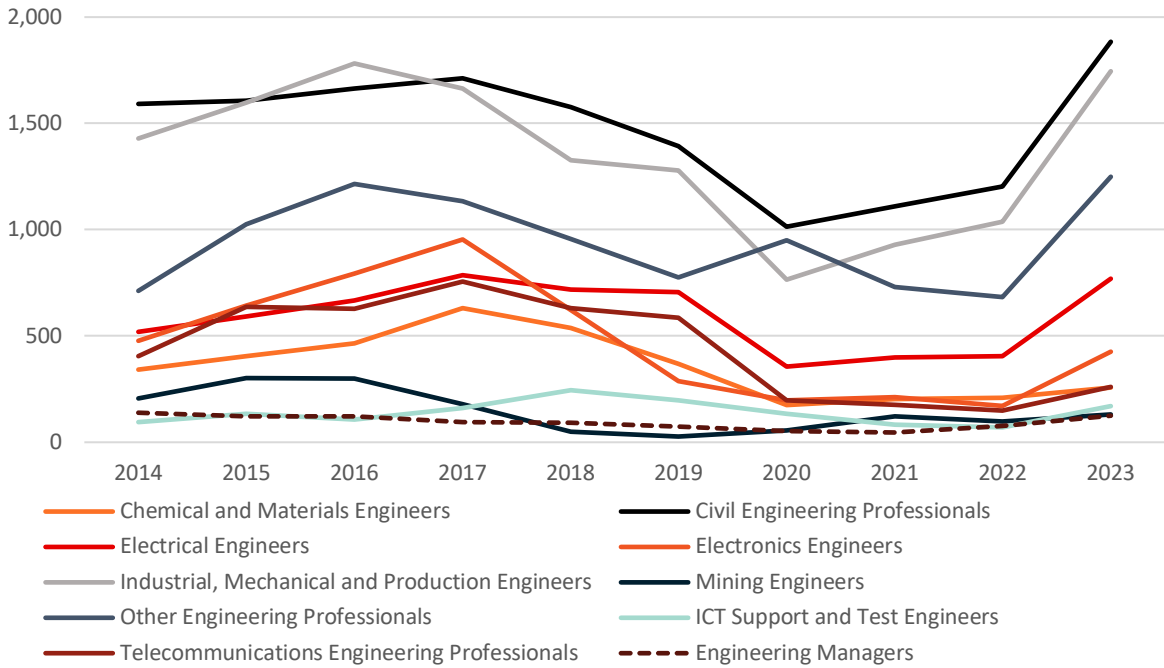
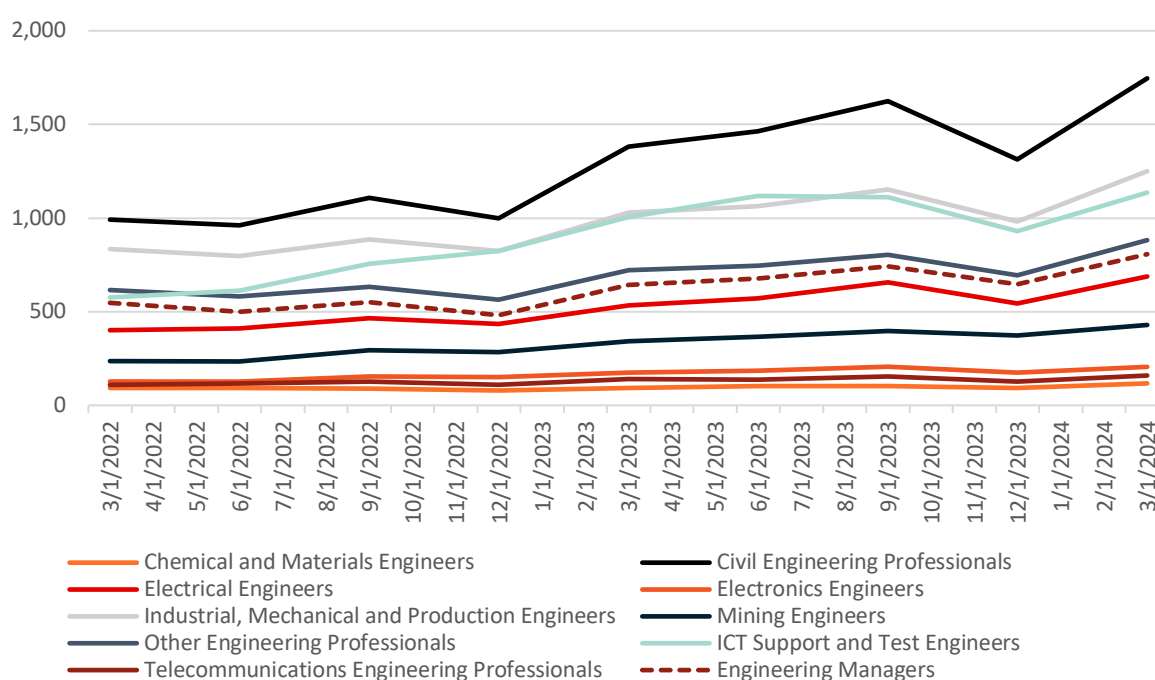


Figure 12 provides the proportion of engineer temporary visa holders in Australia by occupation between March 2022 and March 2024.

FIGURE 12: TEMPORARY MIGRANTS BY ENGINEERING OCCUPATION, MARCH 2022 – MARCH 2024



Salary and compensation trends

Salary and wage data for engineers is generally not available contemporaneously to observe the effects of supply and demand on the costs of employing an engineer within the Australian labour market in real time. However, it is still an important proxy indicator for occupations in demand, because those disciplines or areas of practice which attract higher wages often correlate with the level of demand for those skills in the economy.

Table 11^{xvii} below provides the calculated (via weighted averages) average income for the ten engineering occupations examined, plus Engineering Professionals nfd (a category where engineers are sorted to when there is not enough information to encode it to a more specific Unit Group). The analysis uses income data from the 2021 ABS Census of Population and Housing. These averages have had two years of wage price index growth applied (3.3% in 2022^{xviii}, 4.2% in 2023^{xix}) to arrive at an estimate for average incomes by occupation at the time of writing in July 2024.

TABLE 10: 2021 YEARLY INCOME BY OCCUPATION IN \$AUD AND 2024 ESTIMATE WITH WAGE PRICE INDEX GROWTH OF 7.5 PERCENT APPLIED.

Occupation	2021 \$AUD	2024 \$AUD (WPI growth applied - 7.5%)
Engineering Professionals, nfd	\$112,228	\$120,645
Chemical and Materials Engineers	\$121,653	\$130,777
Civil Engineering Professionals	\$114,116	\$122,674
Electrical Engineers	\$119,863	\$128,853
Electronics Engineers	\$107,735	\$115,815
Industrial, Mechanical and Production Engineers	\$112,072	\$120,477
Mining Engineers	\$148,663	\$159,813
Other Engineering Professionals	\$105,877	\$113,817
ICT Support and Test Engineers	\$102,335	\$110,010

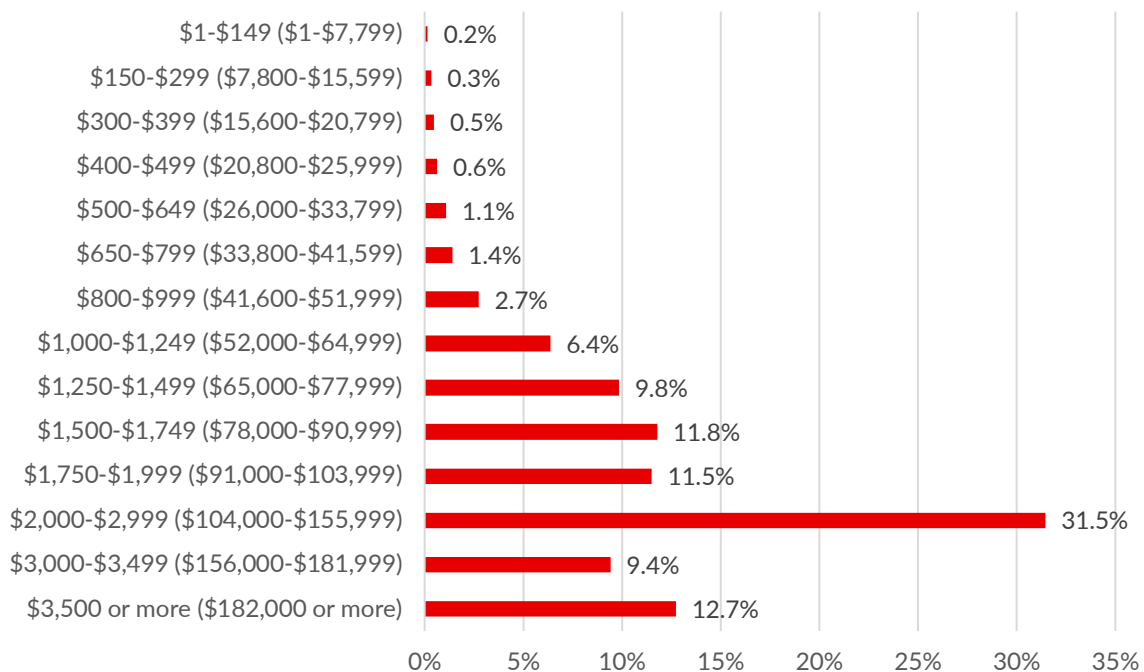
Telecommunications Engineering Professionals	\$114,696	\$123,298
Engineering Managers	\$146,371	\$157,349
Average	\$118,232	\$127,099

The average salary of these 11 engineering occupations is \$118,232, ranging from ICT Support and Test Engineers at \$102,335 to Mining Engineers at \$148,663 in 2021. The distribution of engineers by income band and occupation for the calculation of Table 11 is provided at the [Appendix](#).

Applying wage price index growth of 7.5 percent over the following two years (to December 2023), the average income for an engineer is \$127,099 in 2024. We should note that the Wage Price Index is a composite of public and private sector wages. Given that 85.7 percent of engineers are employed in the private sector^{xx}, average wages are likely to be higher in 2024 than estimated here and as we will see from industry reporting below.

The distribution of the occupations listed in Table 11 above by salary band is shown in Figure 13 below. More than 50 percent (53.6) of engineers earned more than \$104,000 in 2021.

FIGURE 13: DISTRIBUTION OF INCOME BY SALARY BRACKET FOR ALL ELEVEN ENGINEERING UNIT GROUPS, 2021



Many organisations undertake salary surveys and benchmarking activities for engineers and engineering services. Their coverage and depth are broad and diverse, we have (non-exhaustively) listed three of the most detailed annual publications providing insights into engineering salary and compensation trends. The reports and their coverage of engineering are:

1. [Michael Page Salary Guide 2024](#) (released March 2024) – covering health, safety and environment, production, manufacturing, operations, quality, technical, maintenance, reliability, civil & structural, electrical, engineering design and R&D, general engineering management, mechanical, project/programme management at varying levels of seniority.
2. [Hays Salary Guide FY24/25](#) (released May 2024) – covering civil and structural, rail infrastructure, local government engineering, building services – design, building services – delivery, energy - design engineering, oil and gas, by level of seniority/experience.
3. Association of Professional Engineers Australia (APEA), [Professional Engineers Employment and Remuneration Report 2022/23](#) (released July 2023) – by level of responsibility and sector, by state, by job function, graduates by discipline, job function, highest qualification and

industry, benefits and superannuation, among others. APEA is likely to publish an updated edition of their report later in 2024.

We recommend referring to these reports for role, location or responsibility specific levels of remuneration when undertaking salary benchmarking or research.

We have undertaken a salary comparison exercise between the 2023^{xxi} and 2024^{xxii} editions of the Michael Page Salary Guide for a non-exhaustive selection of engineering occupations to understand how the compensation (and by proxy, demand) for different occupations has changed over the last year, presented in Table 12 below (average base salaries, exclusive of superannuation).

TABLE 11: 2023 AND 2024 SALARIES FOR A SELECTION OF ENGINEERING OCCUPATIONS WITH DOLLAR AND PERCENTAGE DIFFERENTIAL

Occupation	2023 Salary	2024 Salary	Differential (\$)	Differential (%)
Maintenance Engineer	\$100,000	\$120,000	\$20,000	20.0%
Reliability Engineer	\$100,000	\$120,000	\$20,000	20.0%
Design Engineer	\$90,000	\$105,000	\$15,000	16.7%
General Manager	\$190,000	\$220,000	\$30,000	15.8%
Safety Manager	\$130,000	\$150,000	\$20,000	15.4%
Operations Manager	\$175,000	\$200,000	\$25,000	14.3%
Junior Electrical Engineer	\$80,000	\$90,000	\$10,000	12.5%
Electrical Engineer	\$85,000	\$95,000	\$10,000	11.8%
R&D Manager	\$132,500	\$147,500	\$15,000	11.3%
Product Engineer (Electrical)	\$90,000	\$100,000	\$10,000	11.1%
Junior Mine Engineer	\$90,000	\$100,000	\$10,000	11.1%
Junior Civil Engineer	\$95,000	\$105,000	\$10,000	10.5%
Managing Director	\$275,000	\$300,000	\$25,000	9.1%
Civil Engineer	\$110,000	\$120,000	\$10,000	9.1%
Site Engineer (Civil)	\$120,000	\$130,000	\$10,000	8.3%
Transport Engineer	\$120,000	\$130,000	\$10,000	8.3%
Senior Electrical Engineer	\$122,500	\$132,500	\$10,000	8.2%
Engineering Manager	\$157,500	\$170,000	\$12,500	7.9%
Electrical Engineering Manager	\$127,500	\$137,500	\$10,000	7.8%
Senior Reliability Engineer	\$130,000	\$140,000	\$10,000	7.7%
Junior Project Engineer	\$67,500	\$72,500	\$5,000	7.4%
Manufacturing Manager	\$140,000	\$150,000	\$10,000	7.1%
Senior Hydraulic Engineer	\$140,000	\$150,000	\$10,000	7.1%
Associate Structural Engineer	\$150,000	\$160,000	\$10,000	6.7%
Senior Civil Engineer	\$170,000	\$180,000	\$10,000	5.9%
Systems Engineer	\$97,500	\$102,500	\$5,000	5.1%
Mechanical Engineer	\$105,000	\$110,000	\$5,000	4.8%
Project Engineer	\$105,000	\$110,000	\$5,000	4.8%
Senior Mechanical Engineer	\$112,500	\$117,500	\$5,000	4.4%
Senior Project Engineer	\$117,500	\$122,500	\$5,000	4.3%
Drill and Blast Engineer	\$145,000	\$150,000	\$5,000	3.4%
Project Manager	\$132,500	\$137,500	\$5,000	3.8%
Senior Project Manager	\$150,000	\$155,000	\$5,000	3.3%
Program Manager	\$157,500	\$162,500	\$5,000	3.2%

Occupation	2023 Salary	2024 Salary	Differential (\$)	Differential (%)
Project Director	\$195,000	\$200,000	\$5,000	2.6%
Senior Engineer (Mining)	\$180,000	\$180,000	\$0	0.0%
Senior Structural Engineer	\$160,000	\$160,000	\$0	0.0%

Maintenance and reliability engineers experienced the greatest pay increase over the last twelve months – reflecting increased demand for their skillsets. Senior structural engineers received a 0% increase in compensation over the last twelve months. There is also a clear demand signal reflected by the significant salary increases for experienced engineers in management and leadership roles.

Junior electrical engineers received a greater increase in pay than any other junior discipline examined, with other occupations in the electrical engineering space also experiencing increased rates of compensation comparatively. This likely indicates the elevated demand for engineers involved in the clean energy transition.

In the context of the engineering labour market examining the gender pay gap is essential to ensuring fairness, promoting diversity and enhancing the profession’s overall competitiveness and innovation potential. We have calculated the average gender pay gap for female engineers who hold a bachelors degree, are in the 10 engineering occupations we have examined in this report and who work in the Professional, Scientific and Technical Services industry division at 15.1 percent as of the 2021 Census, or around \$17,779 on average^{xxiii}, below Australia’s total remuneration and average gender pay gap of 21.7 percent^{xxiv}. There has been an improvement to the gender pay gap calculated since the 2016 Census for the same population subset, which at the time was 19.75 percent or around \$21,391 on average.

Turnover, attrition and retention in the engineering labour market

From Hays 2023/24 Salary Guide^{xxv} we can obtain a number of insights into employee turnover, retention and attrition for engineering, including:

- Only 49 percent of engineers surveyed are planning on remaining with their current employer;
- The majority of respondents in Australia are expecting a salary increase above three percent;
- Two thirds of respondents were seeking a pay rise in the current financial year; and
- Top factors driving turnover were an uncompetitive salary, rising cost of living and lack of promotional opportunities.

Updated insights specific to engineering were not provided in the Hays 2024/25 Salary Guide^{xxvi}, although broader trends within the survey provided useful insights:

- 77 percent of employees are currently looking or planning to look for a new job in the next twelve months;
- While skill shortages have not dissipated, there was a 20 percent reduction in employers reporting moderate or extreme skills shortages; and
- The top reasons reported for employees looking for new employment were rising cost of living (64 percent), major personal changes in my life (61 percent), lack of promotional opportunities (60 percent), poor management style / workplace culture / purpose (59 percent) and negative mental health and wellbeing impacts (58 percent).

We can also draw on the findings of the APEA 2022/23 Remuneration Report^{xxvii} to inform our understanding of turnover in the Australian engineering labour market:

- Over the previous 12 months 14.9 percent of respondents had changed employer, with the most common reason for changing employer to seek a pay increase (57.9 percent);

- 14.7 percent of respondents intend to leave the engineering profession; the top reasons were lack of recognition or opportunities, to pursue a different career, lack of career advancement, poor pay and workplace culture issues; and
- Respondents cited insufficient skills development as the issue most negatively impacting the engineering capability of their employer.

Consult Australia reported in their 2024 Confidence and Continuity^{xxviii} report that:

- 50 percent of engineering employers had a voluntary turnover rate of between 10-20 percent, around 28 percent had turnover rates below 10 percent and 11 percent had turnover rates between 20-30 percent;
- 57% of businesses have redeployed staff to alternative projects due to changed circumstances; and
- Around 46% of businesses reported having to make resource cuts due to changed circumstances.

Engineers Australia's recent analysis^{xxix} of the 2021 Census of Population and Housing arrived at an estimate of approximately 25,000 qualified engineers who will retire from the labour force over the five years to 2026, averaging 5,000 retirements per year. As noted in that analysis, this figure represents around two-thirds of Australian born entry-to-practice graduates – with the implication that expansion of the engineering workforce over the short term will require locally trained engineers to be supplemented with migrant engineers. To date, skilled migration has been an imperfect solution to industry workforce needs, with overseas-born engineers far less likely to be working in an engineering occupation than Australian-born engineers (see Engineers Australia's [Barriers to Employment for Migrant Engineers](#) report).

Similarly, gender diversity in the engineering profession is an ongoing challenge, as is the retention of Australian-born engineers in the workforce. Engineers Australia's [Women In Engineering](#) research report and [The Engineering Profession: A Statistical Overview 15th edition](#) provide evidence of and insights into these specific issues.

Engineers Australia also gained insights, albeit with a small sample size, from an audience poll (predominantly engineers, both employers and employees) held during a panel discussion on the engineering workforce at the November 2023 Climate Smart Engineering Conference in Melbourne, about the nature of their workforce challenges:

Are you currently experiencing a skills shortage or challenges in your organisation? (121 votes)

- Yes, acutely - 36%
- Yes, but at certain times or for more specialised skills - 60%
- Infrequently - 2%
- No, we have a steady and capable pipeline - 2%

What is the nature of your workforce challenges? (165 votes)

- Insufficient number of engineers applying for vacant roles - 19%
- Insufficient expertise in specific/niche areas that we need - 46%
- Insufficient experience/capability in the engineers applying for the vacant roles - 32%
- Retention or 'churn' – it's hard to retain engineers – the workforce tends to be very dynamic - 37%
- Engineers want higher salaries and conditions we aren't used to offering - 28%
- Other - 5%

Levels of experience in demand

The difference in capability between a graduate engineer and a senior engineer with considerable experience is significant. It is important to recognise that engineering experience cannot be readily substituted with increased headcount alone.

In its 2023 Skills Survey Report,^{xxx} Consult Australia members reported that while there was difficulty in recruiting all levels of experience, recruitment difficulties were most acute with mid-level and senior engineers, rather than early career or graduate engineers. Among others, engineering organisations reported the following as key issues in recruitment challenges:

- i. Lack of talent and experience in the current market to meet demand.
- ii. Competitive market with inflated market salary expectations.
- iii. Difficulty shortlisting with very low numbers of suitable applicants.
- iv. Struggle to attract high calibre candidates (some fail job expectations at interview).
- v. High migration and sponsorship costs.

Further, the audience poll described in the previous section provided the following insights:

If you are finding it hard to recruit and/or retain engineers, what experience level are you experiencing the most challenges for? (159 votes)

- Recent graduates, 0-7 years' experience - 16%
- Mid-level engineers, around 8-14 years' experience - 69%
- Senior engineers, 15+ years' experience - 16%

Disciplines and skillsets in demand

Consult Australia members also reported in the 2023 Skills Survey Report on their perceptions of which disciplines and skillsets were in greatest demand in 2023. Survey respondents were presented with the following list of ten previously-identified disciplines in demand and asked to indicate which were in greatest demand at different levels of experience:

- civil engineering
- engineering management
- environmental science, environmental engineering, and environmental consulting
- geotechnical engineering
- geographic information systems (GIS) analysis
- hydrology
- planning (transport, environmental, urban etc)
- transport engineering (or traffic engineering)
- structural modelling and engineering (or bridge design)
- sustainability consulting.

At the graduate level, hydrology, transport engineering and geotechnical engineering were in greatest demand. Hydrology, GIS Analysis and Geotechnical Engineering were in greatest demand at an early-career level, with structural modelling and engineering, hydrology and sustainability consulting in greatest demand among mid-career roles and finally, sustainability consulting, hydrology and engineering management were the top three disciplines in demand for senior engineers.

The anticipated future skillsets in demand by Consult Australia members include:

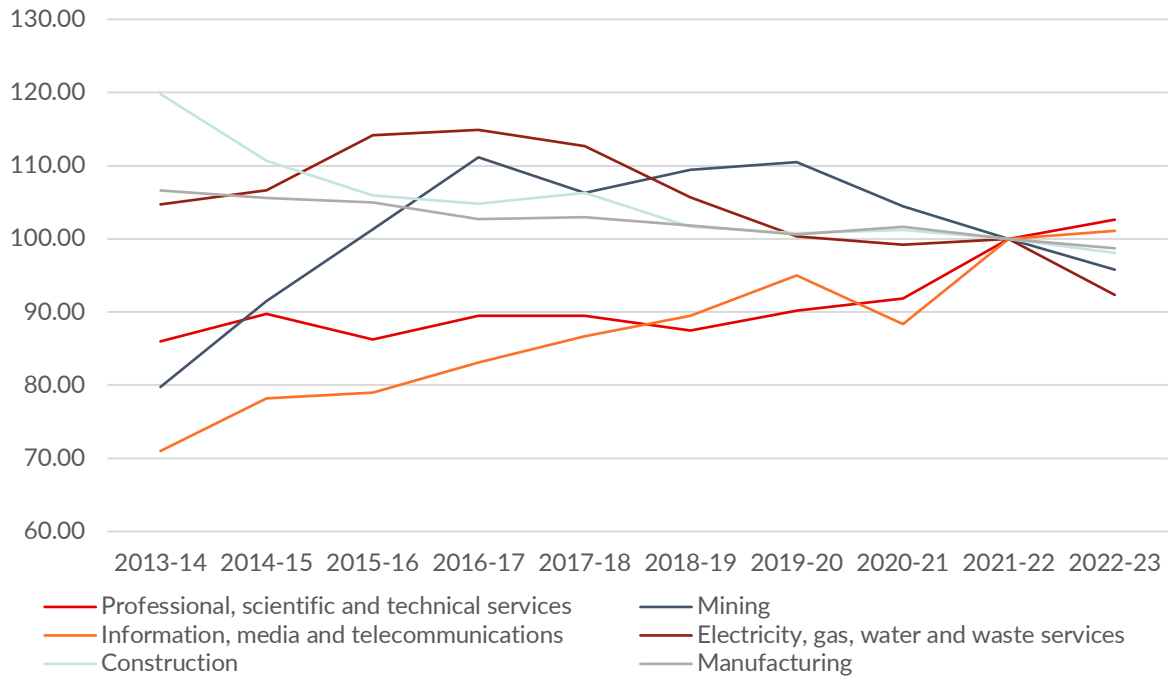
- digital engineering (including building information modelling),
- data analytics and transformation
- cyber security
- sustainability
- environmental
- strategic thinking
- creativity
- socio-emotional intelligence
- business development
- leadership skills.

The role of productivity on engineering vacancies

Productivity has an influence on the rate of vacancy generation or job creation in the economy. Increasing productivity allows firms to produce more work with the same level of input (in terms of

labour, energy, materials etc). Figure 19 below shows the multifactor productivity over the last decade for the 'Core Industries'¹ employing engineers, indexed to the 2021-2022 period.

FIGURE 14: MULTIFACTOR PRODUCTIVITY IN CORE ENGINEERING INDUSTRIES OVER THE LAST DECADE, ABS 5260.0.55.002 ESTIMATES OF INDUSTRY MULTIFACTOR PRODUCTIVITY, AUSTRALIA



Multifactor productivity in manufacturing has stagnated over the last decade, while improving in Professional, Scientific and Technical Services (the largest engineering industry, employing 23 percent of engineers in Australia in 2021), Information Media and Telecommunications, and Mining. Decreases in multifactor productivity are observed in the Electricity, Gas, Water and Waste Services, and Construction industries.

Demand forecasting

There is considerable understanding of the supply and demand dynamics in terms of the current number of qualified engineers in Australia and advertised vacancies. What is inherently less understood and much harder to quantify is the future demand for engineers, be it at 2030, 2050 or 2100. A current year 12 student aspiring to study engineering at university from next year will join the engineering workforce in approximately 2035, with the median time to complete an engineering degree being 5.5 years, with at least an additional 5 years of professional formation to develop the competence required for independent practice.

However, in terms of short term-demand for engineering, Consult Australia reported in their 2024 member survey that:

- While there were strong results in all sectors for enough current work, it is worth noting that in almost all sectors a significant proportion of respondents do not have enough work. This is particularly so in the commercial buildings sector (57 percent), rail (53 percent) and roads (52 percent).
- Almost all sectors will reportedly have capacity in the next six months, with 77 percent of all respondents indicating capacity in this timeframe. This demonstrates that the future pipeline of work is particularly uncertain for many businesses.

¹ A core industry is defined by Engineers Australia as one where the proportion of qualified engineers employed in engineering occupations in that industry is above the average for all industries within the economy (or greater than 56.1 percent in 2021), for more information refer to the Engineering Profession: a Statistical Overview 15th edition.

- Respondents reported that the biggest challenges experienced by engineering businesses in the last 12 months were escalating costs of doing business (70 percent), pipeline uncertainty (57 percent) and staff recruitment (51 percent).
- Compared to the 2023 results, higher results for capacity within 6 months shows a decreased confidence in continuity of work in bridges, defence, environment, all social infrastructure and all transport sectors.

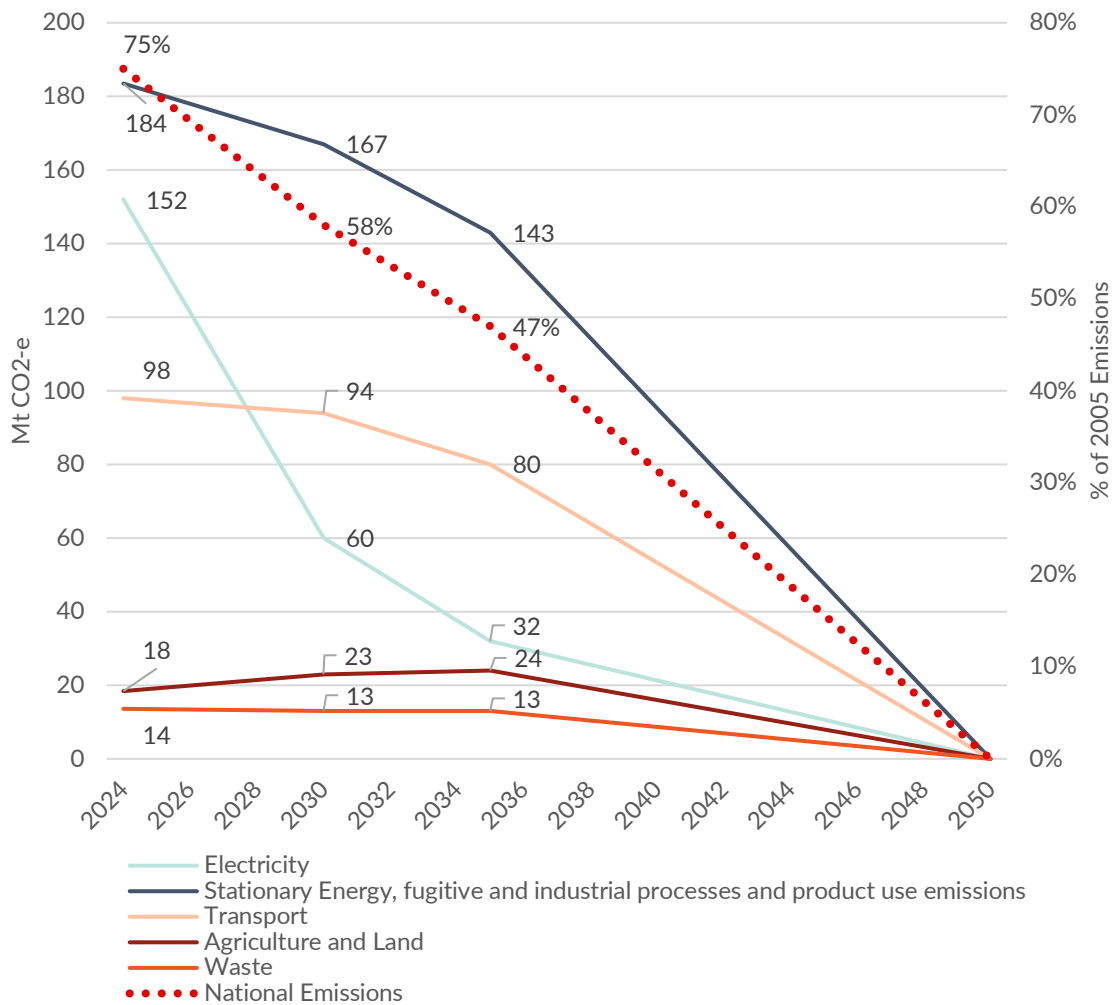
From this we can infer that the short term outlook for the demand for engineering is softening. In their 2023 Infrastructure Market Capacity Report^{xxx}, Infrastructure Australia estimated that shortages of engineers for public infrastructure projects would alleviate in metropolitan areas by 2026, but would persist in regional areas for the duration of their modelling. Infrastructure Australia estimated the current shortage of public infrastructure engineers, architects and scientists as being around 20,000 at present in metropolitan areas and 10,000 in regional areas.

When looking to the longer term, the demand signals arising from Australia's 2050 net-zero commitment provides insight as to the timing and industry basis of future demand . Figure 16 shows the national emissions and sector targets for 2030 and 2035^{xxxii}, projected linearly to net-zero by 2050.

Under current government projections, decarbonization of the electricity sector will have been largely achieved by 2030, with a reduction in the modelled rate of change to 2035 and further reduced to 2050.

Emissions for all other sectors are planned to decrease from 2035, with demand for emissions reduction accelerating from 2030 in the transport sector and the stationary energy sector (these two sectors have roughly twice the emissions of electricity as of 2024).

FIGURE 15: NET-ZERO SECTOR AND NATIONAL EMISSIONS PATHWAYS, 2024-2050 (2035-2050 IS A LINEAR PROJECTION TO NET-ZERO)



Appendix

ANZSCO Unit Groups

We use a collection of ten ANZSCO unit groups to represent engineers when analysing vacancy and immigration data, the 4-digit ANZSCO unit groups are:

ANZSCO Unit Group
Engineering Managers
Chemical and Materials Engineers
Civil Engineering Professionals
Electrical Engineers
Electronics Engineers
Industrial, Mechanical and Production Engineers
Mining Engineers
Other Engineering Professionals
ICT Support and Test Engineers
Telecommunications Engineering Professionals

About Engineers Australia

Engineers Australia is the peak national professional association for engineering in Australia. As Australia's signatory to the International Engineering Alliance (IEA), we uphold standards for engineering education through accreditation of university engineering courses and we set and maintain standards for professional practice. We encourage the development of engineering knowledge and convene engineers and other stakeholders in various forums to facilitate the exchange of ideas and information. We inform community leaders and decision makers about engineers and engineering matters. We also ensure the engineering perspective is heard on a range of national policy matters. And we recognise and promote engineering excellence and achievements of individuals and teams.

Engineering skills and expertise are unique and have no substitutes. The training, skills, and experience of engineers are highly valued and the skillset and mindset that feature problem-solving, critical thinking, quantitative analysis and systems thinking, are transferable to many other fields of work. People with engineering qualifications contribute broadly to the Australian economy in every industry and sector.

Supplementary Table – Weekly Income Distribution by Occupation

4-digit level OCCP Occupation	\$1-\$149 (\$1-\$7,799)	\$150-\$299 (\$7,800-\$15,599 p/a)	\$300-\$399 (\$15,600-\$20,799 p/a)	\$400-\$499 (\$20,800-\$25,999 p/a)	\$500-\$649 (\$26,000-\$33,799 p/a)	\$650-\$799 (\$33,800-\$41,599 p/a)	\$800-\$999 (\$41,600-\$51,999 p/a)	\$1,000-\$1,249 (\$52,000-\$64,999 p/a)	\$1,250-\$1,499 (\$65,000-\$77,999 p/a)	\$1,500-\$1,749 (\$78,000-\$90,999 p/a)	\$1,750-\$1,999 (\$91,000-\$103,999 p/a)	\$2,000-\$2,999 (\$104,000-\$155,999 p/a)	\$3,000-\$3,499 (\$156,000-\$181,999 p/a)	\$3,500 or more (\$182,000 or more p/a)	Total
Engineering Professionals, nfd	62	155	159	201	288	325	486	944	1,356	1,445	1,522	4,496	1,467	2,006	14,911
Chemical and Materials Engineers	7	17	17	17	36	44	85	184	336	393	362	1,108	421	708	3,740
Civil Engineering Professionals	56	123	212	312	526	705	1,390	3,013	5,062	6,110	5,723	14,733	4,366	6,548	48,876
Electrical Engineers	25	53	69	96	178	209	422	947	1,487	1,798	1,842	6,314	2,195	2,452	18,091
Electronics Engineers	18	35	42	37	70	96	172	348	480	668	654	1,614	335	469	5,036
Industrial, Mechanical and Production Engineers	45	80	145	203	351	468	923	2,196	3,244	3,895	3,857	10,387	2,860	3,337	32,001
Mining Engineers	8	15	13	16	35	44	67	127	204	349	458	2,240	1,554	3,193	8,326
Other Engineering Professionals	21	29	52	62	110	163	282	704	1,127	1,229	1,132	2,783	576	716	8,981
ICT Support and Test Engineers	9	39	53	64	120	169	496	1,493	2,201	2,440	2,128	4,701	845	762	15,509
Telecommunications Engineering Professionals	10	24	25	40	67	113	207	526	709	1,058	1,255	3,377	871	766	9,037
Engineering Managers	11	26	33	28	70	101	224	450	743	1,059	1,306	6,438	3,628	8,501	22,624
Total	277	599	821	1,085	1,857	2,439	4,749	10,933	16,946	20,441	20,234	58,192	19,115	29,457	187,140
% share of total in income band	0.1%	0.3%	0.4%	0.6%	1.0%	1.3%	2.5%	5.8%	9.1%	10.9%	10.8%	31.1%	10.2%	15.7%	100.0%

References

- ⁱ Internet Vacancy Index, Jobs and Skills Australia, January 2006 – June 2024, <https://www.jobsandskills.gov.au/data/internet-vacancy-index>
- ⁱⁱ Internet Vacancy Index Methodology, Jobs and Skills Australia, <https://www.jobsandskills.gov.au/data/internet-vacancy-index/methodology>
- ⁱⁱⁱ Engineering Construction Activity, Australia methodology, March 2024 reference period, ABS, <https://www.abs.gov.au/methodologies/engineering-construction-activity-australia-methodology/mar-2024>
- ^{iv} ANZSCO, <https://www.abs.gov.au/statistics/classifications/anzsco-australian-and-new-zealand-standard-classification-occupations/latest-release>
- ^v Data from Job Advertisements and Unemployment Rate – January 2006 to June 2024, <https://www.jobsandskills.gov.au/data/internet-vacancy-index>
- ^{vi} Recruitment Experiences and Outlook Survey, Jobs and Skills Australia, June 2024, <https://www.jobsandskills.gov.au/data/recruitment-experiences-and-outlook-survey>
- ^{vii} REOS Recruitment Insights Report June 2024, Jobs and Skills Australia, June 2024, <https://www.jobsandskills.gov.au/sites/default/files/2024-07/Vacancy%20Report%20-%20June%202024%20-%20Jobs%20and%20Skills%20Australia.pdf>
- ^{viii} Internet Vacancies, ANZSCO2 Occupations, States and Territories - June 2024, <https://www.jobsandskills.gov.au/sites/default/files/2024-07/Internet%20Vacancies%2C%20ANZSCO2%20Occupations%2C%20States%20and%20Territories%20-%20June%202024.xlsx>
- ^{ix} Internet Vacancies, ANZSCO4 Occupations, States and Territories - June 2024, <https://www.jobsandskills.gov.au/sites/default/files/2024-07/Internet%20Vacancies%2C%20ANZSCO4%20Occupations%2C%20States%20and%20Territories%20-%20June%202024.xlsx>
- ^x Internet Vacancies, ANZSCO2 Occupations, IVI Regions - June 2024, <https://www.jobsandskills.gov.au/sites/default/files/2024-07/Internet%20Vacancies%2C%20ANZSCO2%20Occupations%2C%20IVI%20Regions%20-%20June%202024.xlsx>
- ^{xi} Engineering Construction Activity, ABS, March 2024, Value of work commenced by sector, current prices <https://www.abs.gov.au/statistics/industry/building-and-construction/engineering-construction-activity-australia/latest-release>
- ^{xii} Engineering Construction Activity, Australia, ABS, March 2024 (released 26 June 2024), Table 6, Engineering Construction Activity, <https://www.abs.gov.au/statistics/industry/building-and-construction/engineering-construction-activity-australia/latest-release#data-downloads>
- ^{xiii} Engineering Construction Activity, Australia, ABS, March 2024 (released 26 June 2024), Table 6, Engineering Construction Activity, <https://www.abs.gov.au/statistics/industry/building-and-construction/engineering-construction-activity-australia/latest-release#data-downloads>
- ^{xiv} Engineering Construction Activity, Australia, ABS, March 2024 (released 26 June 2024), Table 5, Engineering Construction Activity, <https://www.abs.gov.au/statistics/industry/building-and-construction/engineering-construction-activity-australia/latest-release#data-downloads>
- ^{xv} Department of Home Affairs - Permanent Migration Program (Skilled & Family) Outcomes Snapshot – Annual Statistics, BP0068L Permanent Migration Program (Skilled & Family) Outcomes Snapshot –

Annual Statistics 2013-14 to 2022-23 v100, 22 March 2024,
<https://data.gov.au/data/dataset/096fd157-807c-4ba0-8c63-0754cae4ba35/resource/f0d43822-512e-4687-8bc3-fa59926306a7/download/bp0068-migration-and-child-outcome-since-2013-14-to-2023-06-30-masked-v100.xlsx>

^{xvi} Department of Home Affairs – BP0014 Temporary Work (skilled) visas holders pivot table report at 2024-03-31, 24 April 2024, <https://data.gov.au/dataset/ds-dga-2515b21d-0dba-4810-afd4-ac8dd92e873e/distribution/dist-dga-d839508a-1f4c-43cd-ba06-1a539bc70286/details?q=Visa%20Holders>

^{xvii} 2021 Census of population and housing, Occupation, Personal Income (Ranges), persons aged 15 years and over, for these 11 Unit Groups, responses for hours worked which were not stated, nil or not applicable were excluded from the analysis, table generated with TableBuilder Pro, Census of Population and Housing 2021, Australian Bureau of Statistics

^{xviii} Wage price index, ABS, December 2022 <https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/wage-price-index-australia/dec-2022>

^{xix} Wage price index, ABS, December 2023 <https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/wage-price-index-australia/latest-release>

^{xx} The Engineering Profession: A Statistical Overview, Engineers Australia 2023, <https://www.engineersaustralia.org.au/sites/default/files/2023-11/engineering-profession-statistical-overview-fifteenth-edition.pdf>

^{xxi} Michael Page Salary Guide 2023, <https://www.michaelpage.com.au/salary-guide>

^{xxii} Michael Page Salary Guide 2024, <https://www.michaelpage.com.au/salary-guide>

^{xxiii} HRWRP Hours Worked (ranges) by 4-digit level OCCP Occupation by SEXP Sex and INCP Total Personal Income (weekly) by 1-digit level HEAP Level of Highest Educational Attainment and 1-digit level INDP Industry of Employment, not stated and not applicable responses from HRWRP excluded, table generated with TableBuilder Pro, Census of Population and Housing 2016 and 2021, Australian Bureau of Statistics

^{xxiv} Gender pay gap data, WGEA, 2024, <https://www.wgea.gov.au/pay-and-gender/gender-pay-gap-data>

^{xxv} Hays Salary Guide 2023/24, Hays, 2023, <https://www.hays.com/salary-guide>

^{xxvi} Hays Salar Guide 2024/25, Hays 2024, <https://www.hays.com/salary-guide>

^{xxvii} Professional Engineers Employment and Remuneration Report 2022/23, APEA, 2023, https://apesma.informz.net/apesma/pages/2022_23_ENG_remuneration_report

^{xxviii} Confidence and Continuity 2024 report, Consult Australia, 2024, https://www.consultaustralia.com.au/docs/default-source/advocacy/2024-confidence-continuity-report.pdf?sfvrsn=2dfca33_3

^{xxix} The Engineering Profession: A Statistical Overview 15th edition, Peter Briggs, Engineers Australia, November 2023, p40 <https://www.engineersaustralia.org.au/sites/default/files/2023-11/engineering-profession-statistical-overview-fifteenth-edition.pdf>

^{xxx} Consult Australia, Skills Survey Report 2023, <https://www.consultaustralia.com.au/docs/default-source/people/skills-survey-report---may-2023.pdf>

^{xxxi} Infrastructure Market Capacity Report, December 2023, Infrastructure Australia, https://www.infrastructureaustralia.gov.au/sites/default/files/2023-12/Infrastructure%20Australia%202023%20Market%20Capacity%20Report_V1.1.pdf

^{xxxii} Climate Policy Tracker, Climate Change Authority, 30 November 2023, <https://www.climatechangeauthority.gov.au/climate-policy-tracker>