

## **SKILL SHORTAGES IN NSW**

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# Skills shortages in New South Wales.

A submission from APESMA.



**The Association of  
Professional  
Engineers, Scientists  
& Managers,  
Australia.**

**Submission to the Legislative Assembly of the  
Parliament of New South Wales' Committee  
on Economic Development's Inquiry into skills  
shortages in NSW.**



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## **Inquiry into skills shortages in NSW**

From the time of the Snowy River Hydro scheme, the importation of engineers has been a feature of how we deal with skills shortages and how we deliver large scale infrastructure in New South Wales. The contribution that these professionals have made to the State has been – and continues to be – significant.

What has become apparent in recent years is that governments have allowed a situation to arise where our available migrant workforce is under-utilised and under-employed when compared to their Australian born counterparts, yet still skilled migration is encouraged and facilitated. This is occurring at a time when public sector retrenchments, which in the case of engineers, ultimately cost the government money, are occurring apace.

These two groups deserve consideration for focussed government attention given their professional lot has been in part determined by government policy. Demand for engineering occupations will strengthen in coming years. Governments must try to ensure that displaced public sector engineers and our migrant engineer workforce are properly utilised in meeting that demand, before any further use of skilled migration programs.

In this submission, APESMA deals with the specifically with skilled migration policies as they relate to the engineering labour market in New South Wales and the role that government can play in assuring this resource is utilised to its full extent, the engineering skills crisis in the public sector in the State and its consequences.



## The New South Wales Engineering market at a glance

New South Wales' share of the overall demand for engineers in Australia has declined, from 35.2% in 2001 to 34.8% in 2011. Demand growth in that period sits at an average of 4.1 per cent per annum, below the national average of 4.4 per cent. There has been a surge in demand in 2011 to 8.4 per cent for the State, although it is too early to whether this is an anomaly, especially when Western Australia in the same statistics demonstrated a collapse of -23.9% in demand and the "Rest of Australia" (South Australia, Northern Territory, ACT, Tasmania) a decline of 10.4 per cent<sup>1</sup>.

Over that same period (2001-2011), supply growth in New South Wales was 4.2 per cent, marginally ahead of demand growth.

At the same time, it is apparent that some disciplines in engineering remain in shortage, with Civil Engineering and Electrical Engineering Professionals listed as at "Shortage" status. However, the growth forecast for this same profession is listed as "Medium", while for Engineering Managers, Chemical and Material Engineers, Electrical Engineers, Electronic Engineers, Industrial, Mechanical and Production Engineers, Mining Engineers and Other Engineering Professionals the forecast in "High"<sup>2</sup>.

Whilst demand and supply may be relatively matched, it is clearly not across all disciplines of engineering. Nor is demand matching the available workforce, as is explored further throughout.

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<sup>1</sup> Kaspura (2012), p28. *The Engineering Profession. A Statistical Overview, Ninth Edition*.

<sup>2</sup> NSW Government (2013), pp13-16. *Smart and Skilled: Industry PROFILE. Professional, Scientific and Technical Services*. [www.det.nsw.edu](http://www.det.nsw.edu), last accessed 11 June 2013.

## Migrant engineers in New South Wales

In recent years, the importation of engineering labour in this State has begun to move towards the employer-sponsored model in the shape of 457 visas. Under this program, employers effectively take the responsibility for the quality assurance of the skills of the professional which they are sponsoring. Large number of permanently migrating engineers have also arrived in this State – in the order of 2000 per year – between the years of 2007 and 2010<sup>3</sup>. Unemployment amongst overseas born cohort remains higher than among the Australian born workforce.

The lure of well-paid engineering jobs has proved to be a cruel illusion for many of those engineers migrating to Australia. Unemployment remains stubbornly higher for this group when compared to their Australian-born engineering counterparts.

In New South Wales, unemployment amongst the overseas born labour force stands at 4.6%, more than double the 1.9% experienced by the Australian born cohort<sup>4</sup>. Of note is that over half the engineering population in New South Wales is born overseas as compared to a 45 per cent average for the nation<sup>5</sup>.

It can therefore be assumed that New South Wales not only has a comparatively large overseas born engineering labour force, but that it has a relatively under-utilised overseas born engineer labour force.

The numbers of professional engineers coming to Australia under both permanent and temporary visas are expressed below<sup>6</sup>:

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<sup>3</sup> Appendix 1. *ASCO groups by intended residence*. Department of Immigration and Citizenship, 2013.

<sup>4</sup> Andre Kaspura (2011), p2. *The Engineering Profession. A Statistical Overview, New South Wales, 2011*. Engineers Australia, Barton ACT 2600.

<sup>5</sup> Ibid.

<sup>6</sup> Andre Kaspura (2012), p65. *The Engineering Profession. A Statistical Overview, Ninth Edition*. Engineers Australia, Barton ACT 2600.



**Permanent visas**

2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
2508	3414	3941	4226	4467	5245	6865	5322

**Temporary visas**

2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
1870	2310	3270	4230	5290	4500	3040	4970

**Total**

2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
4378	5724	7211	8456	9757	9745	9905	10292

There appears to be an elasticity between temporary and permanent migration in the above figures, but a relative stability at high levels since 2007. On data provided by the Commonwealth, New South Wales has accounted for some 32% of the chosen destination of migrant engineers entering Australia since 2007-08<sup>7</sup>. What is more, the “457 visa program” has seen “A growing portion of the permanent migrant program comprises(s) employer-sponsored migrants. Of these permanent migrants, more than 70 per cent already reside in Australia on temporary 457 work visas”<sup>8</sup>. That is to say that temporary migration more often than not is becoming permanent.

The percentage of overseas born engineers employed in engineering amongst the available workforce is also instructive. Amongst overseas born engineers, 46.9 per cent are employed in engineering New South Wales whilst amongst the Australian born cohort that figure stands at 61.2 per cent. There are nearly 2,000 unemployed overseas born engineers in New South Wales and more than 10,000 not in the labour force. There are but 800 unemployed Australian born engineers in New South Wales and 8,900 not in the labour force<sup>9</sup>.

It can be argued with cohesion that skilled engineer migration intakes have not been taken into account jurisdictional demand and that this is especially the case for New South Wales, where there is a higher number of overseas born engineers, supply has kept pace with demand and we

<sup>7</sup> Appendix 1.

<sup>8</sup> Migration Council Australia (2012), p3. *More than temporary: Australia's 457 visa program*. Migration Council of Australia.

<sup>9</sup> Kaspura (2011), p3. *The Engineering Profession. A Statistical Overview, New South Wales, 2011*.

are yet to feel the full impact of public sector retrenchments on the engineering labour market more broadly.

There is an irony to the shift towards the use of 457 to auspice the importation of labour not only for those migrant engineers who are unemployed and have made the decision to relocate to Australia, but also for the many engineers which the State Government has deemed surplus to requirements in public sector agencies.

Immigration practices which see employers take responsibility for the qualifications of skilled migrants and for their employment shift public policy responsibility to the private sector, when government should be looking to take an active role in ensuring the maximum use of our available domestic labour force. To not do so entrenches higher unemployment amongst our existing engineering workforce in the State. Simply put, industry may be able to obtain skilled labour from overseas more readily than if they were to undertake the necessary measures to train or develop engineers in the State. Nor is there in place any mechanism to support them to undertake such workforce development. Instead, we have an unchecked migration system with sub optimal long-term outcomes.

Programs have continued to allow a migrant intake which has fostered high unemployment rate amongst the overseas born cohort in this State. These are the consequences of an industry driven immigration system without an eye to jurisdictional demand.

With regard to the available overseas born workforce, APESMA has advocated for short courses which aim to bring both adequate English literacy skills and a knowledge of the Australian regulatory environment to the suite of skills which migrant engineers offer: "following a detailed assessment of the effectiveness of current offerings, orientation training for migrant engineers" should be "established. The development of this course should be conducted with ANET partners and relevant education providers with assistance for marketing of the training being supported by DEEWR and DIAC<sup>10</sup>".

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<sup>10</sup> ANET (2012), p 72. *Realising an Innovation Economy*. ANET, Sydney.



## Public sector retrenchments

From examination of the available data, it is apparent that there is an under-utilisation of our existing migrant engineer workforce. There is also an emerging pool of engineers that have been displaced from public sector agencies.

Unfortunately, governments view engineering purely as a line item in a budget. They do not respect the role that engineers play in infrastructure delivery, in ensuring value for money and in making sure that projects are delivered on time, safely.

### The public sector engineering skills crisis

APESMA has argued consistently that having adequate in-house engineering expertise is vital in the delivery of infrastructure projects. A lack of engineering capacity within agencies necessarily results in the outsourcing of scope and design work to a private sector stretched by peaks and troughs of government demand. It means that the agency becomes an uninformed purchaser and drives inadequate scope and design, which can have severe consequences. 52 per cent of respondents (drawn from across sectors, public and private) to Blake Dawson in 2008, “felt their project was not sufficiently and accurately scoped prior to going to market”<sup>11</sup>, an increase of ten per cent from the same survey in 2006<sup>12</sup>. This caused “cost overruns (61%), delayed completion (58%) and disputes (30%)”, with “26% of the \$1 billion+ projects surveyed being more than \$200 million over budget”<sup>13</sup>.

Thus it is an issue for both the private and public sector. The private sector responds to poorly scoped and designed projects, which drives an increase in adversarial behaviours. The consequences of pursuing the short-term gain you may achieve by retrenching an engineering workforce is negated because it drives a cycle of under-investment which costs the taxpayer more through driving costs up in the private sector and removing your informed purchaser capacity.

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<sup>11</sup> Blake Dawson (2008), p7. *Scope for Improvement. A report on scoping practices in Australian construction and infrastructure projects*. Blake Dawson, Australia.

<sup>12</sup> Ibid.

<sup>13</sup> Ibid.

The *Building the Education Revolution Implementation Taskforce Final Report* (BER Taskforce) stated that “there is a correlation between states capacity to leverage existing public works capacity and their overall value for money outcomes”<sup>14</sup>, specifically outline a decline in engineering capacity in the public sector and identify that the “rebuilding of capacity in several roads agencies may represent a cautionary tale... and may therefore be an indication that a significant level of in-house expertise is beneficial in ensuring that governments get value for money over the life of an asset”.<sup>15</sup>

The Senate Inquiry stated that between 1984 and 2005 “the percentage of electricity, gas and water supply industry employees that are in the public sector dropped from 95.9 per cent to 54.7 per cent. In the construction sector this dropped from 12.2 per cent to 0.5 per cent”<sup>16</sup>.

Adequate public sector engineering capacity means better scoped projects delivered in a more timely fashion. By retrenching engineers, you may immediately save money, but over the longer term, you pay more because the agency has diminished capacity to assess projects and properly design and scope them in the public interest.

These are the consequences which the New South Wales public will bear in years to come as the result of decisions made by this government.

A recent APESMA survey found 80% of engineers agree with a recent Senate Inquiry finding that governments no longer have sufficient in-house expertise to avoid wasting huge amounts of public money. That places billions of taxpayers’ dollars at risk.

By ensuring that we have adequate in-house engineering expertise, we could save taxpayers dollars and deliver projects on-time and on-budget.

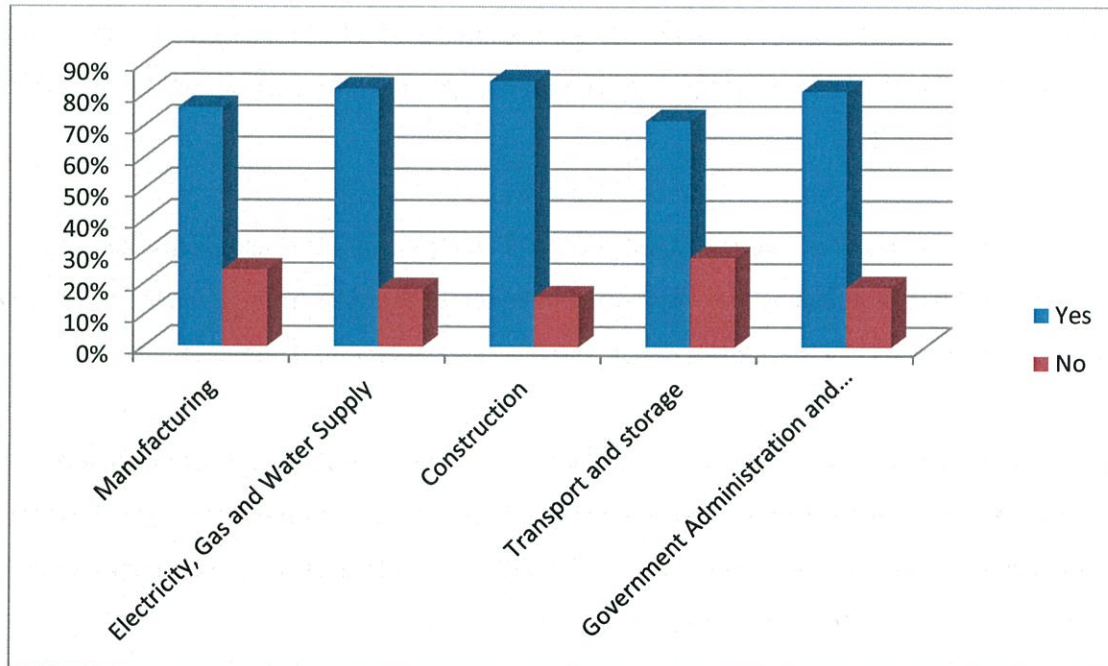
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<sup>14</sup> Building the Education Revolution Implementation Taskforce (2011), p 53. *Final Report*. Commonwealth of Australia, ACT.

<sup>15</sup> Ibid., p58.

<sup>16</sup> The Senate Education, Employment and Workplace Relations References Committee (2012), p7. *The shortage of engineering and related employment skills*. Parliament of Australia, ACT.

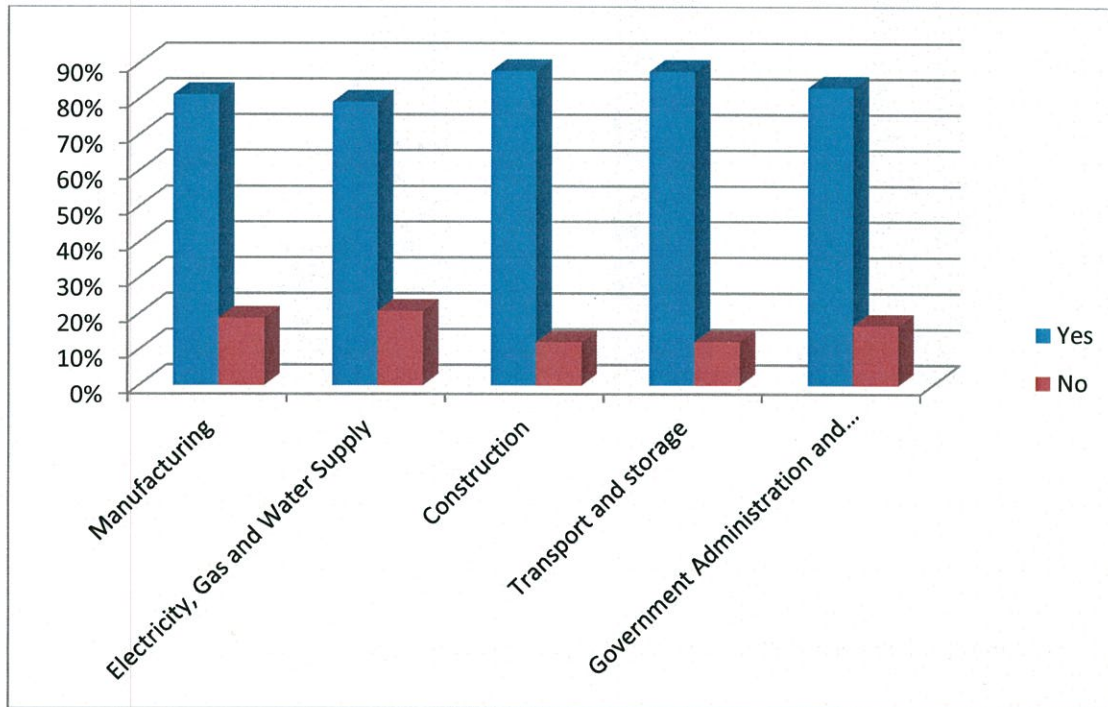
**Question: Do you agree there is virtually no in-house engineering capacity due to the shortage of engineers and chronic under-investment in in-house capability?**



While the private sector is picking up work because of this lack of internal capacity, more than 80% engineers believe the private sector is suffering from the lack of capacity in the public sector.



**Question: Does the private sector suffer from poorly scoped or designed projects?**

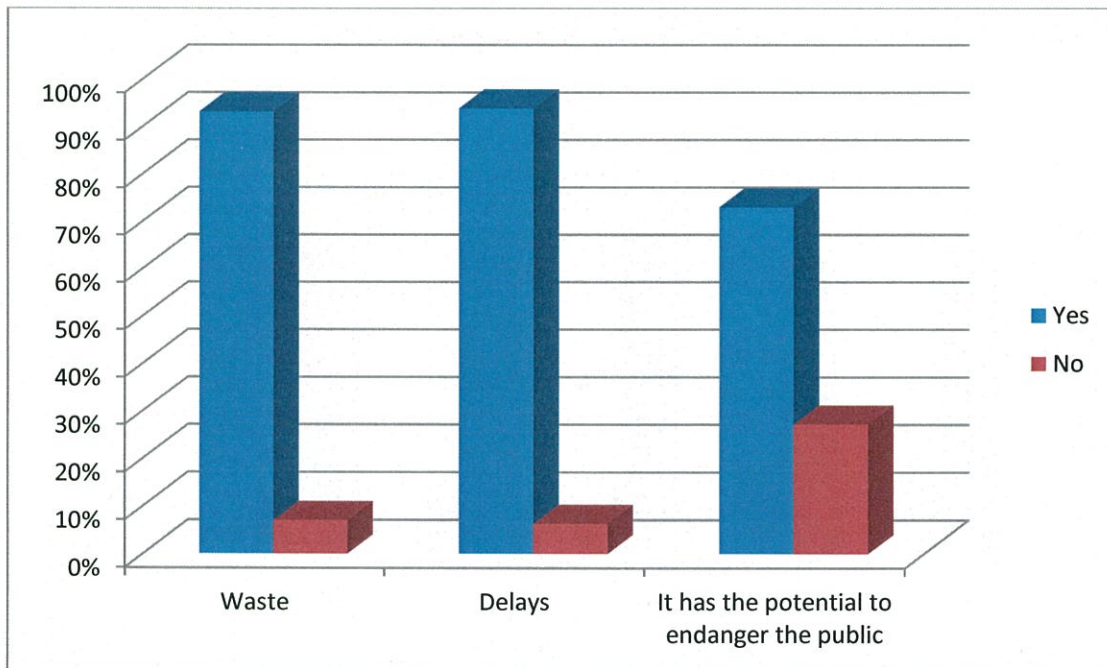


Recent cutback in engineering staff in New South Wales means that the government does not have the expertise to build proper infrastructure and the private sector can't do it efficiently. The government has outsourced its engineering capacity to the private sector, who in-turn, suffer from a lack of 'informed purchaser' capacity and the scope and design capabilities. That means there's a cycle of under-investment in engineering.

Engineers believe that the lack of in-house capacity is causing:

- Waste (93%); and
- Project delays (94%)

**Question. What do you think this lack of in-house engineering capacity is causing?**



This is a problem for both the public and the ultimate decision makers: government.

By allowing internal capacity to erode, we're seeing waste and delays, and what's worse, the lack of internal capacity is believed by 73% of engineers as having the capacity to endanger the public.

Nonetheless, such as is the case with our supply of overseas born engineers in New South Wales, engineering retrenchments leaves the State with an immediately available workforce for industry. Many of these employees will have been in government agencies for substantial periods of time. APESMA has previously advocated for "A grants program for engineering bridging courses"... to be "developed for industry to allow re-entry to the workforce for departed engineers"<sup>17</sup> and recommends that prior to any further focus on migration programs to ease perceived skills shortages, that a focus on the immediately dislocated should be a focus.

Many regional areas of the State, and in particular local government is experiencing an acute shortage of engineers. This has the consequence of this tier of government not being able to deliver amenity for ratepayers at an appropriate value. Thus, the focus of any programs the government may initiate should seek to involve regional local government in design.

<sup>17</sup> ANET (2012), p 72. *Realising an Innovation Economy*.

**Chronic underinvestment in the private sector.**

As well as addressing the problems caused by direct cuts in public sector engineering capacity and capability, Governments need to recognise the effect of broader engineering workforce development problems in the private sector. Consulting and construction companies argue that the procurement model for large complex public assets discourages investment in engineering workforce development (cadets, professional development programs, other work integrated learning). Simply stated, lowest price contracting tends to drive down the floor of engineering workforce development investment. Short term competitive advantage will be gained by individual companies through payment of premium rates for highly skilled and experienced engineers while in the medium to long term investment in entry level and early career engineers, across the sector, is squeezed. The generalised erosion of capability will see the consequences ultimately passed back to Governments and the community in the form of higher relative prices and asset life time and quality issues. As a structural driver of declining workforce capability and capacity this problem will not be fixed by the short term shift of public sector engineers to the private sector nor by simple improvements to the supply of engineers from migration or the education sector. ANET has recommended reform to the procurement model as the only means to deliver sustainable improvement.



## Conclusion

Overall, the situation in New South Wales can be summarised as follows as it relates to the engineering profession:

- Different disciplines of engineering are experiencing differing levels of demand and projections for growth;
- There is a larger number of overseas born engineers in New South Wales, who experience higher unemployment than their Australian born counterparts;
- Reductions of engineering staff in public sector agencies have yet to be shown in official figures and will potentially affect the government's ability to deliver infrastructure in the future;
- As a destination, New South Wales remains attractive for migrant engineers, although this is not supported by a growth in demand for engineers;
- The granting of visas to migrants has seen a large number of entrants to the State without adequate assessment of the labour market for those entrants. Whether it be through temporary or permanent migration seems largely immaterial as there is a tendency for temporary to translate to permanent.

The task at hand in New South Wales is:

- To ensure that there is public sector capacity to deliver projects when the need arises through maintaining an adequate engineering labour force in public sector agencies;
- To improve employment outcomes for non-Australian born engineers through education programs aimed at assisting employment;
- To ensure that industry is encouraged to employ experienced engineers from the New South Wales public sector, and education programs are put in place to support this outcome.

To this end, the Commonwealth government should be actively encouraged to make aware potential permanent migrants to the State of the potential for poor employment outcomes here. Equally, industry should be made aware of the available talent pool of domestically born engineers and overseas born engineers.

These are practical measures which the government can take to better utilise our existing engineering labour force in New South Wales and we encourage the State and Federal governments to work collaboratively to give them effect.

## Appendix A: settler arrivals in Australia by ANZSCO groups

Source: Department of Immigration and Citizenship

### Settler Arrivals: ANZSCO Groups by State of intended residence, for the financial year 2011-12.

Source: Overseas Arrivals and Departures 2011-12		State of (Intended) Residence								
Occupation		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
Engineering Professionals, nfd .		7	7		3	2				19
Chemical and Materials Engineers .		10	11	4	3	7		1	1	37
Civil Engineering Professionals .		129	86	101	36	95	1	2	3	453
Electrical Engineers .		43	25	11	6	22		2	2	111
Electronics Engineers .		7	7	1	3	4		1		23
Industrial, Mechanical and Production Engineers .		43	53	27	8	34	1		1	167
Mining Engineers .		2	2	5		8				17
Other Engineering Professionals .		16	24	12	2	12			1	67
ICT Network and Support Professionals, nfd .		3	7	5			1	2		18
Telecommunications Engineering Professionals .		5	3	3	1	1				13
Total		265	225	169	62	185	3	8	8	925

32%



**Settler Arrivals: ANZSCO Groups by State of intended residence, for the financial year 2010-11.**

Source: Overseas Arrivals and Departures 2010-11		State of (Intended) Residence								
Occupation		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
Engineering Professionals, nfd .		27	22	5	6	5		4		69
Chemical and Materials Engineers .		11	4		1	7				24
Civil Engineering Professionals .		120	94	67	19	44	1	4	5	354
Electrical Engineers .		28	25	13	8	13				87
Electronics Engineers .		6	8			2			1	17
Industrial, Mechanical and Production Engineers .		31	31	13	5	16	1	1		98
Mining Engineers .		1	1	2		7				11
Other Engineering Professionals .		8	11	3	4	3			1	30
ICT Network and Support Professionals, nfd .		10	8	6	1	1				26
Telecommunications Engineering Professionals .			1	1						2
Total		242	205	110	44	98	2	9	7	718

**Note: Total figures for Australia includes not stated.**

## Settler Arrivals: ASCO Groups by State of intended residence, for the financial year 2009-10

Source: Overseas Arrivals and Departures 2009-2010	STATE OF (INTENDED) RESIDENCE									
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia	
OCCUPATION	1	1								
BLDG & ENGINEERING PROFESSIONALS	887	632	804	341	861	22	37	63	5 647	
CIVIL ENGINEERS	122	122	71	16	63	2	2	8	406	
ELECTRICAL & ELECTRONICS ENGINEERS	66	48	16	11	29				170	
MECHNCL, PRODUCTN & PLANT ENGNRS	38	43	22	10	22			2	137	
MINING & MATERIALS ENGINEERS	2	3	4	1	7				17	
ENGINEERING TECHNOLOGISTS	7	7	2				1	1	18	
OTH BLDG & ENGNRNG PROFESSIONALS	17	14	4		3		1		39	
BLDG & ENGNRNG ASSOC PRFSSNLS	110	129	86	37	78	5	4	5	454	
CIVIL ENGNRNG ASSOC PROFESSIONALS		2	1						3	
ELECTRICAL ENGNRNG ASSOC PRFSSNLS		3	1	1					5	
ELECTRONIC ENGNRNG ASSOC PRFSSNLS	5								5	
MECHANICAL ENGNRNG ASSOC PRFSSNLS	4	2	3		2				11	
OTH BLDG & ENGNRNG ASSOC PRFSSNLS	2	1	1						4	
Total	2 260	2 006	1 015	1 417	1 065	29	45	79	6 916	



## Settler Arrivals: ASCO Groups by State of intended residence, for the financial year 2008-09

STATE OF (INTENDED) RESIDENCE									
OCCUPATION	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
	1	1							
BLDG & ENGINEERING PROFESSIONALS	483	179	785	227	807	22	25	39	4 567
CIVIL ENGINEERS	119	82	70	18	48	5	1	5	348
ELECTRICAL & ELECTRONICS ENGINEERS	60	44	28	3	10	1	1	4	151
MECHNCL, PRODUCTN & PLANT ENGRNS	43	45	28	7	28		1	2	154
MINING & MATERIALS ENGINEERS	6	2			7				15
ENGINEERING TECHNOLOGISTS	13	8	3	3	2		1		30
OTH BLDG & ENGRNRG PROFESSIONALS	18	13	5		4				40
BLDG & ENGRNRG ASSOC PRFSSNLS	166	201	119	44	137	3	2	6	678
CIVIL ENGRNRG ASSOC PROFESSIONALS	3	2	1		2	1			9
ELECTRICAL ENGRNRG ASSOC PRFSSNLS		7	1	1					9
ELECTRONIC ENGRNRG ASSOC PRFSSNLS	5	2	1		1				9
MECHANICAL ENGRNRG ASSOC PRFSSNLS	4	4	1	1	1				11
OTH BLDG & ENGRNRG ASSOC PRFSSNLS	1	1		1					3
	1	1	1		1				
Total	921	590	042	305	047	32	31	56	6 024





## Settler Arrivals: ASCO Groups by State of intended residence, for the financial year 2007-08

Overseas Arrivals and Departures 2007-08	STATE OF (INTENDED) RESIDENCE									
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia	
OCCUPATION	1	1								
BLDG & ENGINEERING PROFESSIONALS	345	115	808	264	732	22	20	34	4 340	
CIVIL ENGINEERS	84	56	53	14	29	1	2	7	246	
ELECTRICAL & ELECTRONICS ENGINEERS	42	43	16	14	16	2	1	4	138	
MECHNCL, PRODUCTN & PLANT ENGRNS	43	39	19	6	22	0	1	1	131	
MINING & MATERIALS ENGINEERS	6	1	4	1	2	0	0	0	14	
ENGINEERING TECHNOLOGISTS	12	8	2	1	2	0	2	0	27	
OTH BLDG & ENGRNRG PROFESSIONALS	15	14	8	0	6	0	0	0	43	
BLDG & ENGRNRG ASSOC PRFSSNLS	189	206	161	50	139	4	2	6	757	
CIVIL ENGRNRG ASSOC PROFESSIONALS	3	3	1	1	3	0	0	0	11	
ELECTRICAL ENGRNRG ASSOC PRFSSNLS	3	3	3	0	2	0	0	0	11	
ELECTRONIC ENGRNRG ASSOC PRFSSNLS	3	2	1	0	2	0	0	0	8	
MECHANICAL ENGRNRG ASSOC PRFSSNLS	2	3	0	0	0	0	0	0	5	
OTH BLDG & ENGRNRG ASSOC PRFSSNLS	0	2	1	0	1	0	0	0	4	
Total	1 747	1 495	1 077	351	956	29	28	52	5 735	