Australia's Project Resource Constraints

A Cross-Industry Issue

About the Helmsman Institute:

The Helmsman Institute is a Division of the Helmsman International Group.

The Institute is committed to improving project governance and project performance in Australia through world class research, education and professional development.

The Institute draws intellectual rigor and insight through it's associations with a number of leading universities and education institutions across Australia.

The research and education agenda for the Institute is entirely market driven and not by academic interest. The Agenda is determined by the Helmsman Institute Board of Industry (HIBI). The board comprises a number of participating commercial and government organisations, each seeking to address their current pressing issues as it relates to their execution capability.

HELMSMAN

EXECUTIVE SUMMARY

Australia continues to face delivery risks to its project pipeline due to resource constraints. These constraints are arising due to a dramatic and unprecedented increase capital expenditure across multiple sectors of the economy.

Federal Government
Driven predominantly by National agenda, increased spending in Defence as well as infrastructure, environment and education initiatives means that there will be an extra $64.4bn expenditure in play for Federal Government initiatives alone by 2010-11. ~80% of this will translate into project expenditure.

State Government
The NSW Government alone has committed to a record infrastructure spend of $41bn over the next four years, more than $3bn in increases are planned as part of the 2007-08 budget. QLD per capita expenditure is currently double the National average. It has more than 100% over the last 5 years, twice the rate of the rest of Australia.

Private Capital Investment
The increase in Private Sector Investment is being lead by the Mining sector which has increased more than 100% in the last 3 years. Additionally, the manufacturing sector which is Australia's largest component of private capital investment has increased 25% over the same period of time.
These 2 sectors alone account for more than $15bn in annual Capital Expenditure, 28% of Australia's total Private Capital Expenditure.

Total demand for Capital Infrastructure projects to increase on average $20-30bn annually from 2005-06 to 2010-11. This is a 100-150% increase over the previous 5 years.

The impact of this growth in demand would not be a major factor, if the supply of resources in Australia was adequate to match the demand. While there is some increase in resources in Australia, the growth does not match the demand.

There are four key resource areas in terms of increasing importance to project delivery certainty:
- Qualified Engineering resources
- Skilled Trade resources
- ICT Professionals and
- Senior Project Professionals

Leading industry bodies agree that an inability to address the limited availability of professional project skills will be a major factor in determining whether or not the new capital expenditure programs can be implemented successfully.

A good project manager would tend to have 5-15 years of experience before being in a position to manage a large project. In Australia's case the majority of senior project managers capable of taking on a large capital project are in the later years of the profession and near retirement. The next generation of project manager is not well developed.[1]

Therefore, whilst continuing quality education and focus on the development of Project Management as a recognised profession is essential it is in itself inadequate to resolve the immediate skills issue and shortage of Senior Project Professional that Australia is currently facing.

In order to minimise the impact of this shortage of Senior Project Professionals and improve the likelihood of project success for Government and Industry, the Project Management industry needs to consider a new approach to cross-industry project resourcing.

The Helmsman Institute makes 5 cross-industry recommendations to help address the immediate resource constraint issue:

1. Create the ability to share resources more effectively through forward planning and load balancing across industries
2. Create greater transparency on project opportunities and the availability of PM's particularly those with the capability to work across industries
3. Utilise the best resources where needed my properly matching competency to project difficulty across industries
4. Establish cross-industry training, familiarising PM's with the inner workings of other industries
5. Provide PM's with a better understanding of career path development so they can plan their learning and gain the experience necessary to put them in higher demand in other industries

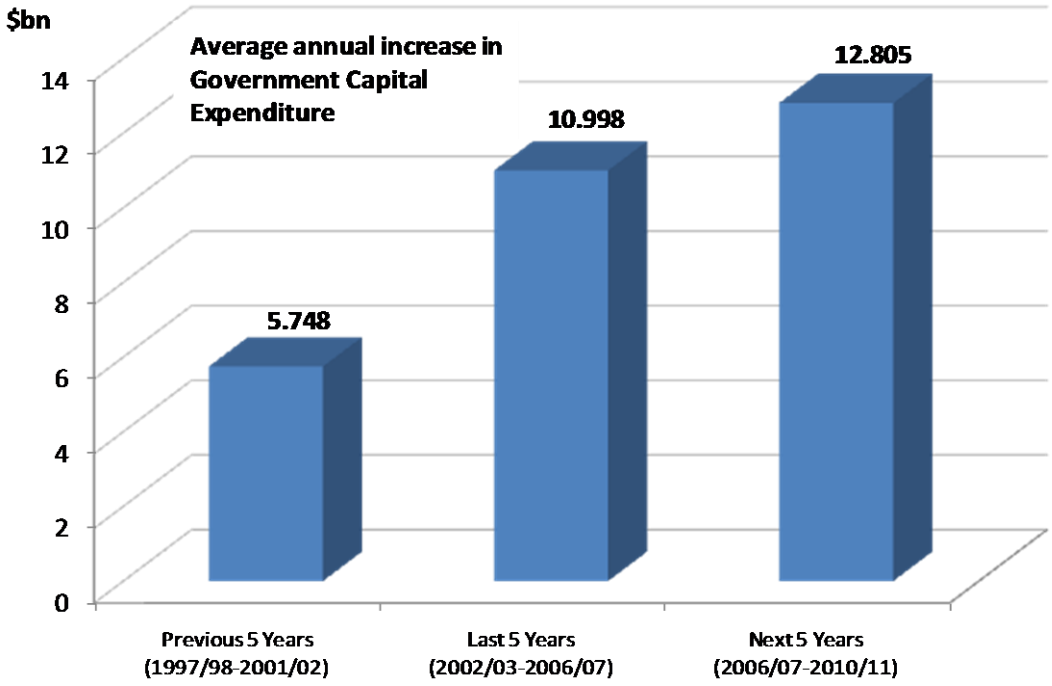
[1] Prof Dombkins, Complex project management and the skills shortage, IQPC conference on complex project management 2006

THE SITUATION

Federal Government Growth in Infrastructure spending

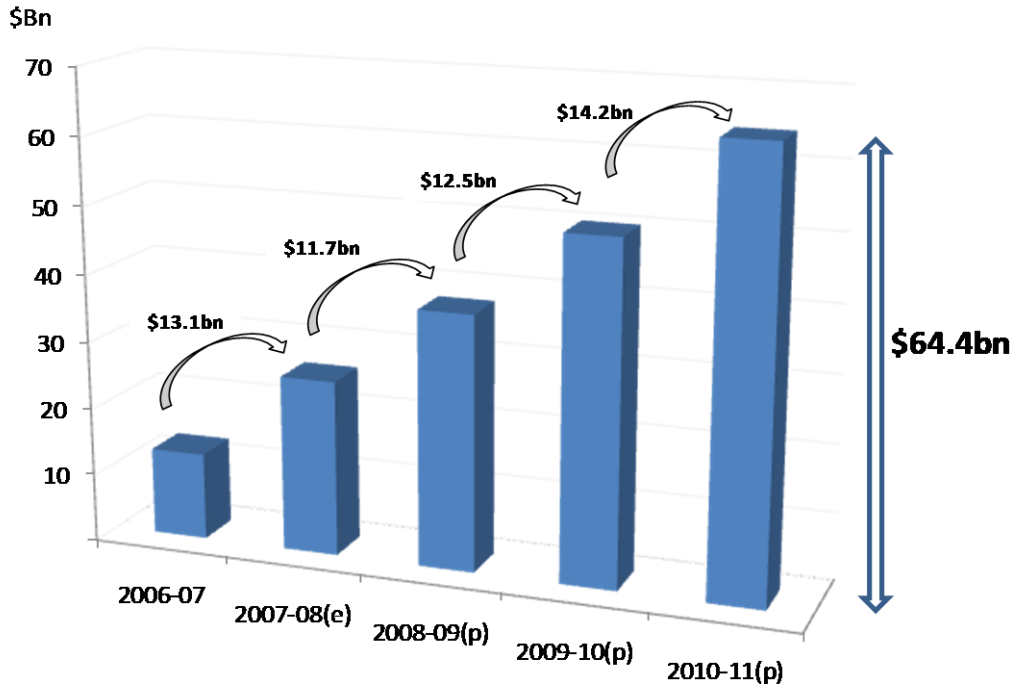
Driven predominantly by National agenda, increased spending in Defence as well as infrastructure, environment and education initiatives means that there will be an extra $64.4bn expenditure in play for Federal Government initiatives alone by 2010-11. ~80% of this will translate into project expenditure.[2]

Federal Government annual increases in Capital Expenditure have almost doubled in the last 5 years and are planned to increase at an additional 20% PA to 2010/11. In addition to the existing portfolio of initiatives and those committed as part of the 2007/08 budget, there is as yet uncommitted funding to deliver on between $6bn and $20bn* of Labour pledges required to uphold recent election promises. Eg. Funding of rollout of national broadband infrastructure, infrastructure funding required to achieve Kyoto carbon emission targets, restructuring the Federal Bureaucracy and education 'revolution' reforms.



[2] Conversations with the Department of the Prime Minister and Cabinet Implementation Unit, Federal Budget
* Senator Minchin ($20 bn) April, Kevin Rudd ($6bn) November

According to Federal Budget reports it is estimated that by 2010-11, there will be an extra $64bn expenditure in play for Federal Government initiatives



Currently, more than $28Bn has already been committed in the 2007/08 budget alone. 80% of this expenditure is on project initiatives.

MAJOR INITIATIVES IN THE 2007-2008 BUDGET

	2006-07	2007-08	2008-09	2009-10	2010-11	Total
Education and skills	-	721	978	978	969	3,647
Transport infrastructure	-	125	445	2,053	2,127	4,750
Industry assistance	-	139	184	164	167	653
Environment	-	172	737	1,398	1,881	4,189
National security and defence	34	1,633	1,466	1,477	1,193	5,803
Health and aged care	489	255	436	548	600	2,329
Families and older Australians	2,163	673	269	269	269	3,642
Support for rural Australia	77	158	165	61	59	520
Indigenous Australians	62	102	180	198	206	748
International engagement	-	544	544	695	811	2,595
Fraud and compliance	-	- 54	- 93	- 122	- 19	- 288
TOTAL ($m)	**2,824**	**4,468**	**5,311**	**7,720**	**8,263**	**28,586**

Less Funding Initiatives	
Seniors bonus payment	1,332
Bonus payment to carers	394
Child care benefit increase	548
Child care tax rebate - earlier payment	1,367
Increasing overseas aid	2,595
	6,236
Expenditure on Project Initiatives	**$ 22,350**

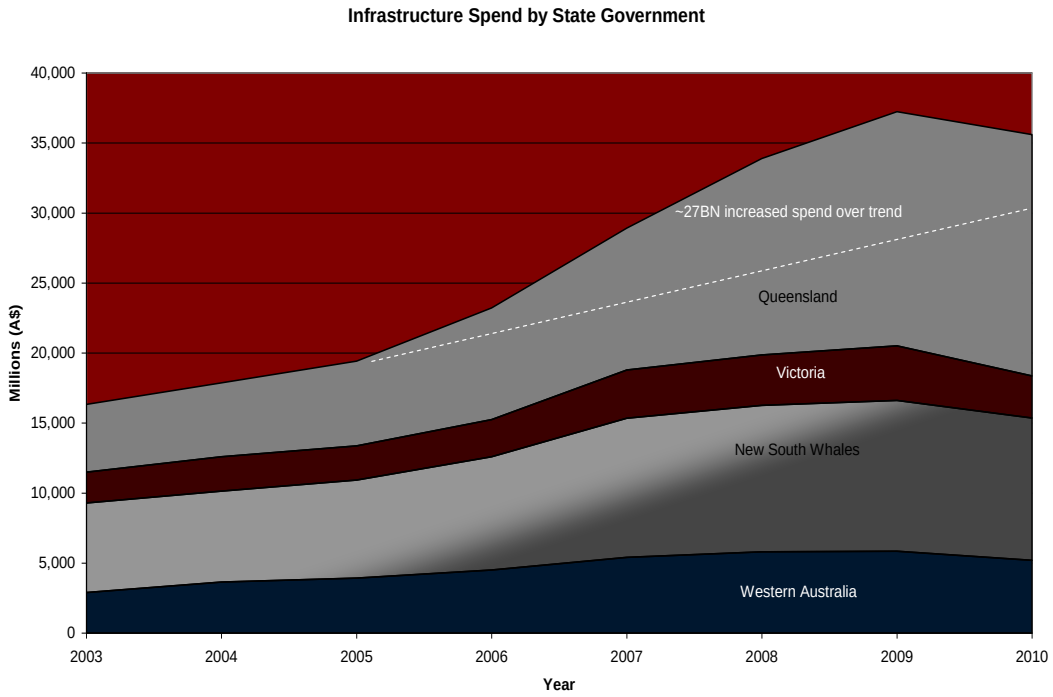
State Government Growth in Infrastructure spending

The key states of New South Wales, Victoria, Western Australia and Queensland are all substantially increasing investments in infrastructure[3]

The main investments are going into transportation and electricity infrastructure and water systems. These investments are driven by two main issues, state productivity and climate issues.

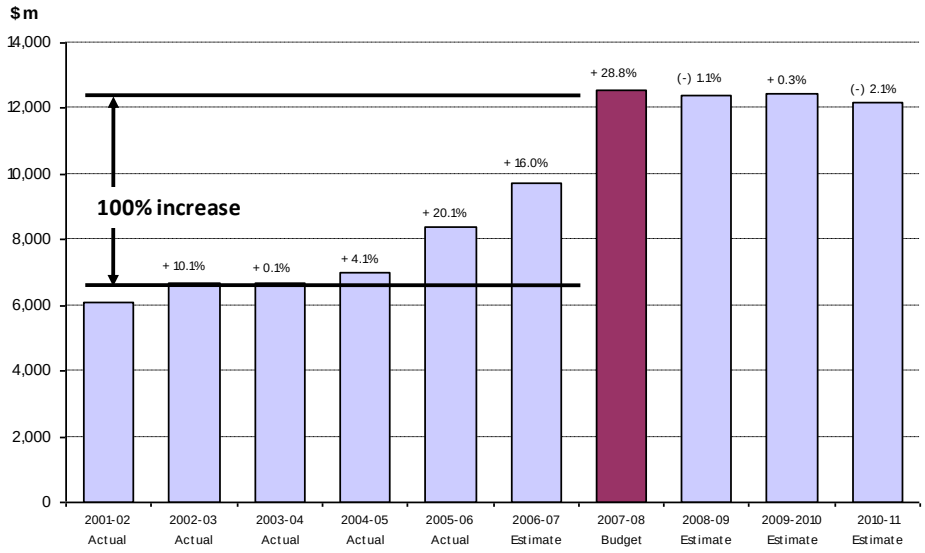
The state productivity is a major factor in WA, NSW and Queensland, where strong growth in the resource sector is placing pressure on transportation infrastructure, especially ports and rail. In addition to the need to move raw materials, the influx of labour to WA and Queensland is placing pressure on normal commuter transportation services.

Water and water conservation are key issues in all states, but Queensland and Western Australia have very large investments into water provision, with Queensland investing $9bn in water alone. The need for this investment is driven by ongoing drought which is now in its seventh year, as well as an influx of ~1,500 people per week into Queensland, which is stretching the water supply even further. The need for large amounts of water for mining makes the situation critical for the governments of these states. In South East Queensland the average dam level is between10 and 20% of capacity. Although Perth dams have improved lately, the level is still only 40%.

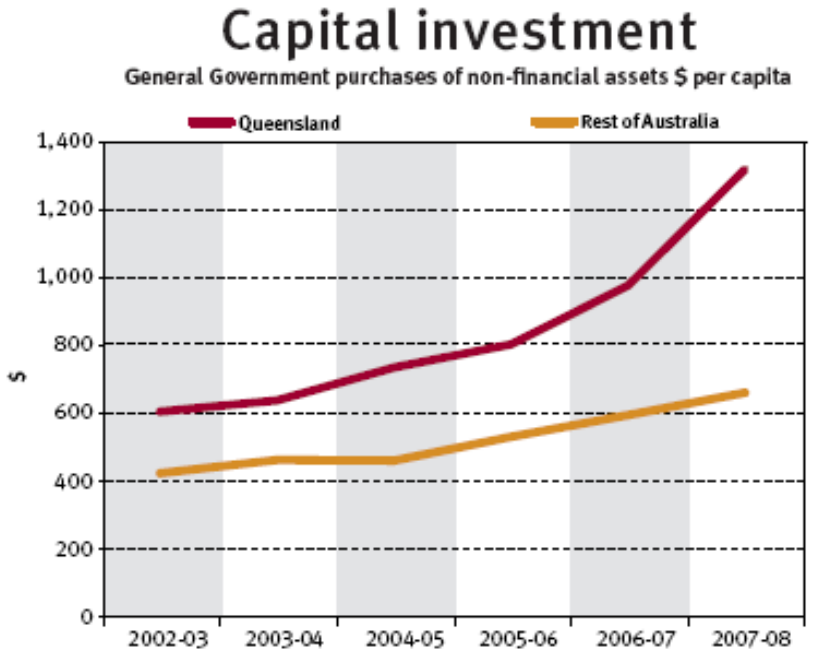


[3]The NSW Government alone has committed to a record infrastructure spend of $41bn over the next four years. This is a 100% increase over previous years.

[3] State budgets, Capital Investment Plans



NSW capital expenditure is being driven by a transport and infrastructure plan requiring a significant investment over the coming years. Initiatives in the pipeline include 256 new busses and 750 new rail cars for Sydney & Newcastle at a cost of over $700m, $300m Southern Hume duplication, completing the $2bn Chatswood to Epping rail line, $320m acceleration of the Pacific Highway upgrade and $130m to upgrade the regional rail network.



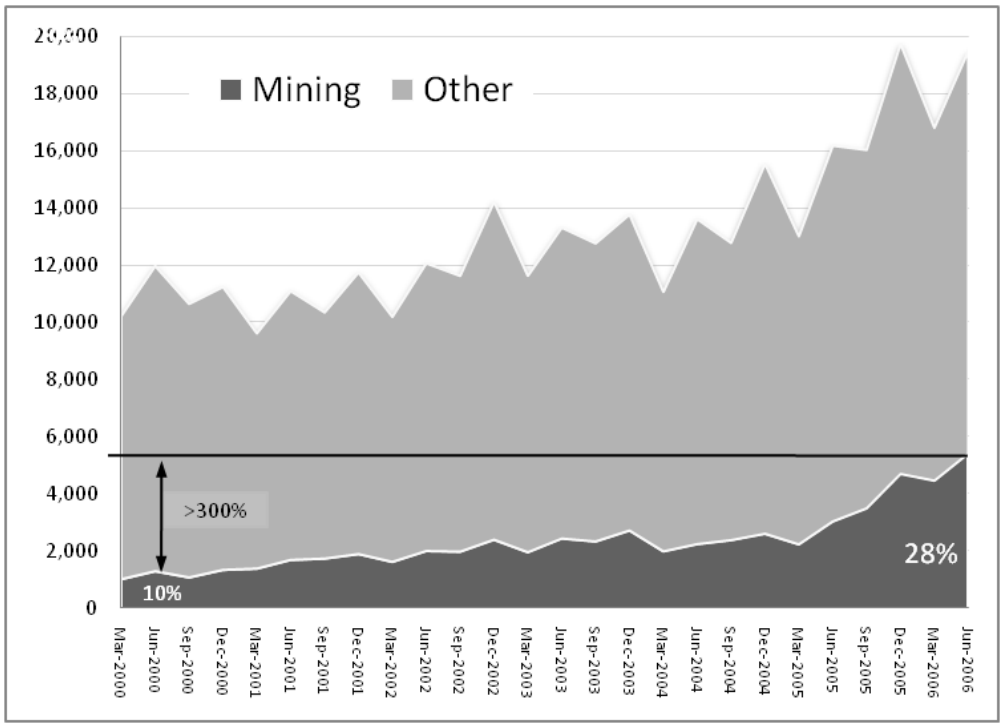
QLD per capita expenditure is currently double the National average. It has more than 100% over the last 5 years, twice the rate of the rest of Australia.
Capital Expenditure is up $2bn for 2007/08 or 20% on the previous year.
More than 80% of this increase is in Infrastructure and main roads.

Private Sector Growth in Infrastructure spending

Private Sector investment growth has been driven largely by the Mining sector, which in 2000 contributed only 10% of total private sector expenditure. It now contributes more than 28%[4].

The private sector has demonstrated a 50% increase in annual capital expenditure since 2000. During the same period the Mining Sector has increased by more than 300%.

Mining Sector relative to all other Private Investment



The growth in investment in the mining sector is driven by well understood global expansion, driven by the Chinese and Indian economic transformations. These underlying drivers of demand for resources are not expected to diminish in the mid term.

The total of planned projects is two times larger then the committed projects currently underway[5], meaning that the current growth in project work is expected to continue.

BHP has a substantial impact on the growth of investment in the mining sector, contributing around 60% of the total committed project capital investment in Mining.

[4] ABS Capital Investment series 5625, Helmsman Analyses

[5] ABARE March 2007, report on Australian projects, committed or in pipeline

Project Resourcing Constraints

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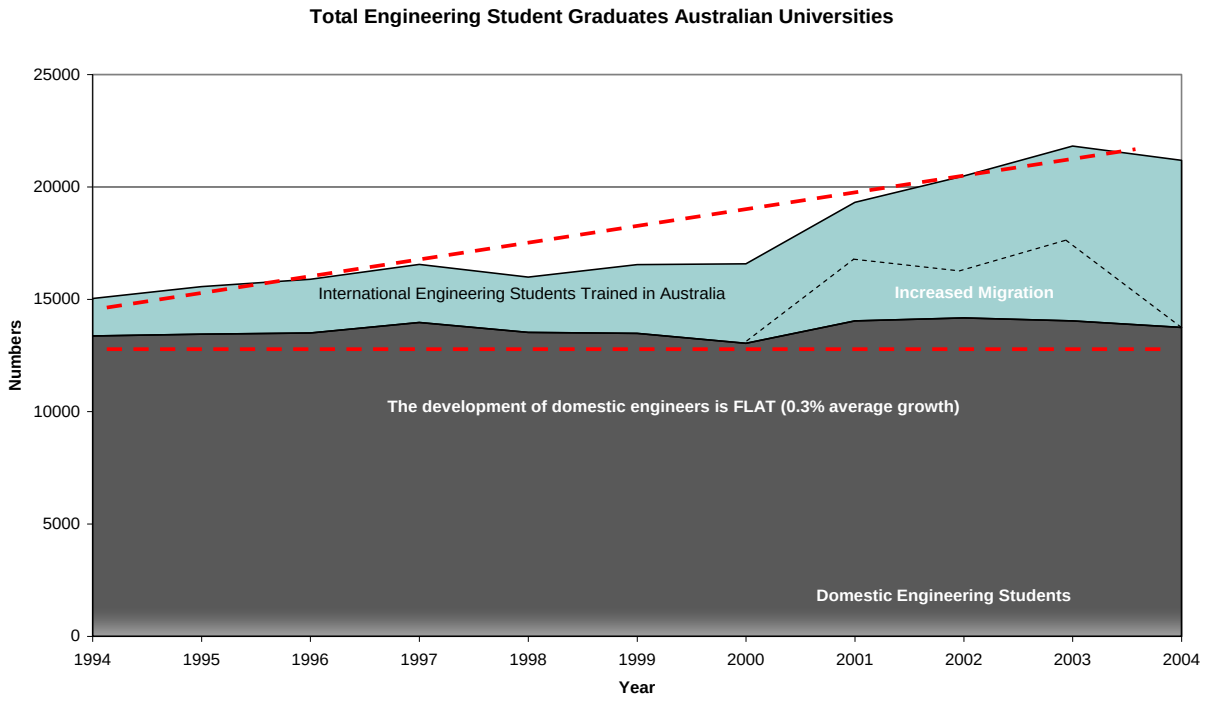
Qualified Engineering Resources

Engineering resources are especially critical to Defence & Mining projects. While tradespeople are often capable of completing maintenance and other activities without engineering support, Capital projects all require engineers in the definition, feasibility and design stages. Given the numbers of projects that are in initial phases of development, Professional engineering resources are going to be critical to satisfy demand over the 2008-2010 period.

The growth of engineering resources in Australia is essentially flat, although overall growth of Engineers is growing; this growth is with International students.[6]



[6] Engineers Australia: *THE ENGINEERING PROFESSION, A Statistical Overview, 2006*

There are two main constraints on growth in Engineers in Australia. One is the increasing reduction of places at universities due to international competition, and the other is the relative perception of Engineering as a less lucrative, satisfying profession compared to other roles in financial services, marketing and tourism (this is exacerbated by the relatively low engagement of females in engineering).

The competition for places in universities is driving universities financial needs, who gain much higher income from foreign students then domestic ones. As Universities come under additional pressure to be more self funding, the interest in government supported students is diminished.

The low levels of engineering development in Australia have been partially offset by the increased opportunities for engineering migrants to move to Australia. This policy has increased the number of available Engineers in Australia by 20%.

Given the increase in project demand of 300% in Mining and more than 200% in Defence, and the anecdotal evidence of shortage already, the Australian Engineering professionals will not be able to manage the demand locally.[7]

According to an Engineering Australia survey of Government, Private sector and Recruitment firms, the current vacancy rate is for about 21% of the current employment level. This means that for every 4 Engineering jobs in the marketplace, there is 1 engineering role that is vacant. Most of the survey participants have been experiencing skills shortages for longer than 12 months.

Examples of initiatives being undertaken by the engineering industry to address their skills shortage issue:

Infrastructure Report Cards - Engineers Australia has been drawing attention to the state of Australia's infrastructure through Infrastructure Report Cards.

The reports evaluate the condition of infrastructure and the state of an industry both on a regional/state by-state basis, as well as by industry. The assessments also rate the progress being made over time to remedy infrastructure issues.

Skills Shortage Index – The industry provides data to its members that enable a comparison to be made of the proportion of unemployed engineering graduates to the proportion of unemployed graduates across all disciplines.

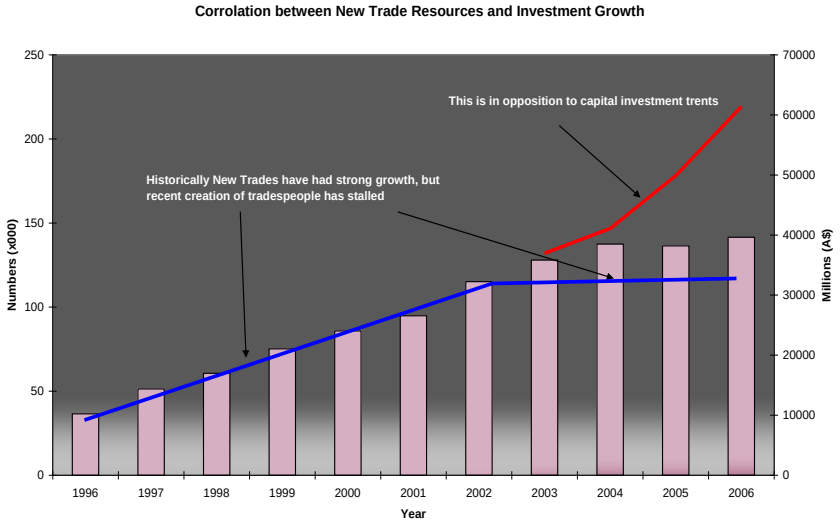
Publishing (unpublished) ABS census data – To provide greater understanding in government circles of the nature of the engineering profession to have a more precise handle on just how many engineers there are in Australia and how they are employed. ABS published statistics do not currently accurately represent the employment nature and role of qualified engineering role against roles within an engineering environment.

[7] Helmsman conversations with Defence and Engineering Executives 2005-2007

Skilled Trades Resources

Australia has had a tradition of creating tradespeople, with strong annual development of trades. In recent times, younger Australians have been seduced by non technical roles, with these roles consuming a higher percentage of the trained population.

The steady growth in tradespeople has flattened since 2002, with an average annual growth rate of 21% before 2002, and a much more modest average growth rate of 5% after 2002.[8]



Given that tradespeople are also involved in ongoing maintenance and service for existing capability that is operating at capacity and beyond across all key industries. It is believed that the current supply is inadequate to satisfy all of the demand created by industry in the 2008-2010 timeframe. A Monash University report warning that the nation could face a shortfall of 240,000 skilled workers over the next decade

Examples of initiatives being undertaken by Government and Industry bodies to address this skills shortage issue:

Evaluation of labour needs – Given the 300% increase in demand within the mining sector the Chamber of Minerals and Energy of Western Australia Inc (CME), in partnership with the Minerals Council of Australia (MCA), are conducting a project the examine the current and future skills needs of the mining industry.

The final project reports were prepared by the National Institute for Labour Studies (Flinders University), the National Centre for Vocational Education Research and the Centre for Population and Urban Research (Monash University) and undertook research to investigate labour force outlook, barriers to apprenticeships and skilled migration.

These joint research initiatives are being replicated across a number of industries from Aerospace to the Forestry Industry.

Federal Government Incentives – The Federal Government 'Skills for the Future campaign' aims to increase the proportion of skilled apprenticeships by offering incentives to business to provide training and development opportunities.

[8] NCVER report - *Australian vocational education and training statistics 2006*

ICT Professionals

According to the Australian Government Information Management Office (AGIMO), ICT vacancies over the coming year are expected to rise in the Australian Government and in industry.

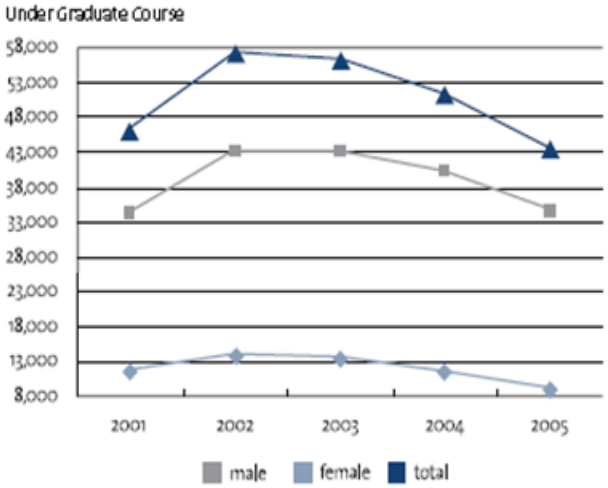
The 2006 CCS recruitment and retention report indicates that 37 per cent of organisations plan to increase their number of ICT staff, with only 8 per cent expecting to decrease.

In Candle's 2007 ICT Market Analysis report, national demand for permanent ICT staff during 2005-06 increased by 13 per cent on 2004 05, with demand in NSW up by 25 per cent.

The Department of Employment and Workplace Relations ICT Vacancy Index for February 2007 reveals that the one-year growth in ICT vacancies for Australia was 35.1 per cent, its highest level since August 2001.

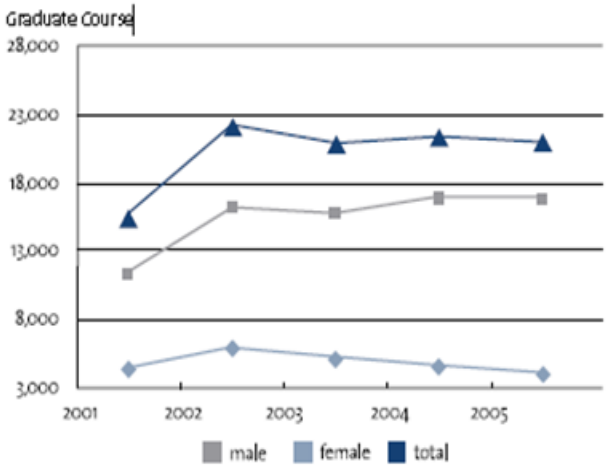
The ACT accounted for 8.0 per cent of total ICT vacancies, an increase over the year to February 2007 by 42.1 per cent.

The figures demonstrate that demand for ICT professionals since 2002 has tripled.



AGIMO reports state that enrolments in many ICT courses at both universities and TAFE colleges have been falling consistently over recent years and will take time to rebound.

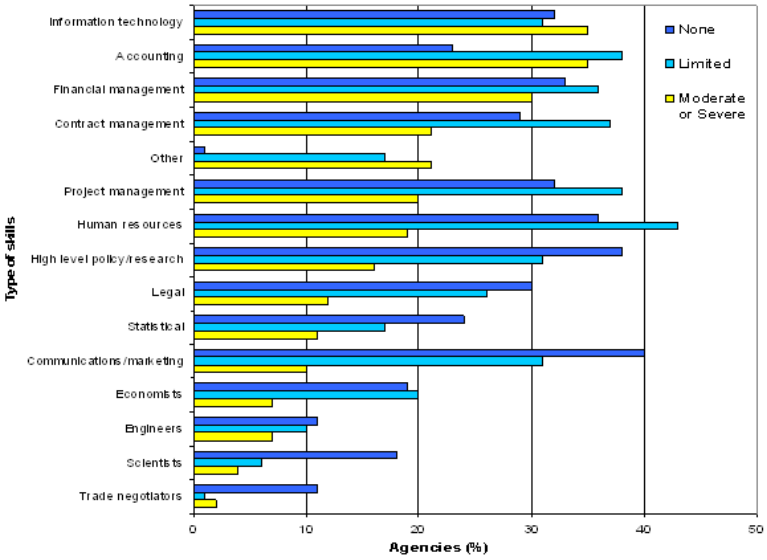
The lack of attractiveness of ICT as a career has led to declining enrolments at both the University of New South Wales and the University of Canberra, where enrolments in first year ICT courses have declined by around 70 per since 2001.



A worsening of the graduate skills shortage was indicated in the recent 2006 Graduate Outlook Survey, with 42.5 per cent of graduate employers stating that they would have employed more graduates in 2006 had more been available, an increase from 33.3 per cent in 2005.

Enrolment numbers in ICT courses at TAFE colleges have also plummeted. TAFE's Sydney Institute, which comprises campuses in the city's centre, east and south, has seen enrolments drop by more than half since 2001.

This chart below is from the 2005-06 APSC State of the Service Report and illustrates the 35% of Australian Government agencies reported that skills shortages in information technology were having a moderate or severe impact on their agency's organisational capability.
This trend is expected to increase as demand continues to grow and supply remains at best, static



A 2007 AGIMO survey of Government agencies that have, or are about to commence, significant ICT initiatives showed some ICT skills are in greater demand than others.
Skills in highest demand are Project Managers; Analysts; Enterprise Application Integration skills, such as Websphere, J2EE, and .NET; and System Testers.

This finding is mirrored in the 2006 CCS recruitment and retention report with approximately 40 per cent of respondents indicating most difficulty in recruiting Project Managers and Business Analysts.

The findings also reiterated in the results of the Diversiti IT Hiring Influencing Report which found the top 2 of 3 IT areas currently hiring in are project management (51 per cent) and business analysis (48 per cent).

Examples of initiatives being undertaken by Government and Industry bodies to address the ICT skills shortage issue:

Federal Government Established ICT Skills Foresighting Working Group:
This body is overseeing the creation of a national standard for the classification of ICT jobs and a National ICT Skills Tracking and Monitoring System.

ICT Professional and Skills Development Taskforce Report:
The Report assesses the need for information and communications technology (ICT) skills within government and provides a list of recommendations aimed at improving the recruitment, retention and development of ICT specialists in the APS.

Women in IT Executive Mentoring (WITEM) Program:
Canberra-based program aimed at accelerating development of leadership skills of women within the IT industry and profession. It combines 1:1 mentoring together with cross organisational learning and facilitated group networking.

Project Managers

Australia desperately needs more project managers. A third of the Australian Institute of Project Management membership base will leave the profession in the next 10 years. With nearly 50 per cent of the Institute's membership within the 40 to 54-year age bracket, Australia faces an acute shortage of project management skills by 2020

Peter Shears, the institute's CEO, said the retirement of up to a third of Australia's project managers in the next decade signals a significant skills shortage in sectors such as government, construction, IT, telecommunications, finance and energy.

Skilled project managers are probably the most under valued resource in capital projects. Recent research has demonstrated that skilled, professional project managers are one of the major determinates of project success. Only recently have the competencies and requirements for delivery of difficult projects become well defined.

Based on anecdotal research, most projects need in the order of one project manager for every thirty engineers, with functional engineering leaders reporting to the project manager.

AIPM (the Australian Institute of Project Managers) has indicated that the number of members joining AIPM and registering at the highest level has remained flat or declined over the last 12 months. The other main body that conducts registration of project managers PMI has indicated some increase in registration[9].

The main project training organisations[10] are indicating a sharp increase in project training course consumption, although this appears to be in the non capital industries such as Finance and Federal government.

It is less clear if there are issues with respect to Project Managers, but given that there is no clear indication of increased development of these skills, the long lead time for development of project managers would cause grave concern about the amount of project managers available to deliver projects in Australia.

Project managers are critical to the successful delivery of projects, and are even more difficult to develop then engineers. This is because project managers normally have gained technical expertise before beginning the management track that leads to the ability to successfully manage complex, multi-disciplinary projects.

A good project manager would tend to have 5-15 years of experience before being in a position to manage a large project. In Australia's case the majority of senior project managers capable of taking on a large capital project are in the later years of the profession and near retirement. The next generation of project manager is not well developed.[11]

Therefore, whilst continuing quality education and focus on the development of Project Management as a recognised profession is essential it is in itself inadequate to resolve the immediate skills issue and shortage of Senior Project Professional that Australia is currently facing.

[9] Conversations with the AIPM CEO , 2007

[10] The training industry reference group strategy – Helmsman International working group 2007

[11] Prof Dombkins, Complex project management and the skills shortage, IQPC conference on complex project management 2006

In order to minimise the impact of this shortage of Senior Project Professionals and improve the likelihood of project success for Government and Industry, the Project Management industry needs to consider a new cross-industry resourcing model with Government and Industry.

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Project Skills Shortage Summary

Australia continues to face delivery risks to its project pipeline due to resource constraints. These constraints are arising due to a dramatic and unprecedented increase capital expenditure across multiple sectors of the economy including Federal and State Governments as well as Mining and the Private Sector.

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The Australian Project Management Industry needs to implement similar initiatives to its ICT & Engineering counterparts to address the issue.

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