CONSULT AUSTRALIA

SUBMISSION TO SENATE INQUIRY

THE SHORTAGE OF ENGINEERING AND RELATED EMPLOYMENT SKILLS

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Driving Business Success for Consulting Firms in the Built and Natural Environment

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1. About the Senate inquiry

On 7 November 2011, the Australian Senate referred to the Senate Education, Employment and Workplace Relations Committee an inquiry into the nexus between the demand for infrastructure delivery and the shortage of appropriate engineering and related employment skills in Australia.[1]

The committee was asked to consider the implications of the shortage for infrastructure delivery and the impact on economic development, cost, efficiency, safety and disputation, and the long term outsourcing of engineering activities by government on skills development and retention in both the private and public sectors.

1.1 Terms of reference

The nexus between the demand for infrastructure delivery and the shortage of appropriate engineering and related employment skills in Australia, with particular reference to:

a) the implications of the shortage for infrastructure delivery in terms of economic development, cost, efficiency, safety and disputation;

b) the impact of the long-term outsourcing of engineering activities by government on skills development and retention in both the private and public sectors;

c) options to address the skill shortage for engineers and related trades, and the effectiveness and efficiency of relevant policies, both past and present;

d) options for infrastructure delivery using alternative procurement models which aim to foster collaboration and achieve effective community outcomes, including skills development and retention;

e) effective strategies to develop and retain engineering talent in the private and public sectors through industry training and development, at enterprise, project and whole-of sector levels;

f) opportunities to provide incentives to the private sector through the procurement process to undertake skills development;

g) consequences of skills shortage in the construction sector to the public sector's capacity to effectively procure and manage infrastructure projects;

h) the impact of delayed and stalled infrastructure projects on economic development, workplace productivity and employment; and

i) other related matters.

2. Introduction

2.1 About Consult Australia

Consult Australia is the association for professional services firms within the built and natural environment; influencing policy, creating value and promoting excellence.

As an association, our primary focus is on improving the commercial environment for our members and raising standards across the industry.

Formerly known as the Association of Consulting Engineers Australia, 75 per cent of large consulting companies in the built and natural environment describe themselves as providing mainly engineering design and consulting services.[2] The engineering skills shortage is therefore of great concern to Consult Australia members because of the business constraints it brings and the increased cost of doing business.

The services that our member firms offer are wide and, in addition to engineering, include: design; architecture; technology; planning; landscape architecture; surveying; cost consulting (quantity surveyors); project management; environmental science; and management solutions. We represent some of the industry's biggest players in this space with our member firms collectively employing more than 50,000 staff.

Consult Australia's vision is to drive business success for consulting companies in the built and natural environment through collaboration, education, support and advocacy. We are dedicated to providing support and advocacy to our members with integrity, commitment, evidence based positioning, responsible actions and respect.

Consult Australia achieves these goals through a range of top down (improving regulation and creating opportunities) and bottom up (building capacity and community to reduce risk) support and services to members.

Consult Australia is a member of the Australian National Engineering Taskforce (ANET), National Engineering Registration Board (NERB), Australian Chamber of Commerce and Industry (ACCI), the Australian Construction Industry Forum (ACIF), and the Australian Services Roundtable (ASR). Consult Australia is a host organisation for the annual Built Environment Meets Parliament (BEMP) summit.

2.2 Executive summary

Skills shortages are often cyclical, and that has been the case for engineering. When the current skills shortage became evident in about 2000, most Consult Australia members were relatively unconcerned—on past evidence, it was believed that it would eventually end. As will be shown below, however, the skill shortage is now exacerbated by systemic issues that must be addressed.

Without action, private sector recruitment difficulties with the knock-on effect of public sector infrastructure delivery delays will become worse.

To begin with, the scale of the engineering skills shortage is significant and getting worse as demand for engineering services surges ahead without any increase in the numbers of skilled professionals available. The engineering workforce is also getting older than other professions, is less diverse and suffers from a high number of qualified engineers not working in the sector. There is a continued

reliance on migrant engineers, but that source will reduce as the global economy recovers from current lows.

There are many causes for the skills shortage. Privatisation of public services since the 1990s has led to a loss of public sector engineering expertise, which has had a negative impact on the efficiency of public sector procurement. Importantly, the transfer of training responsibility from the public sector engineering-related agencies to private sector engineering providers has not been fully acknowledged by government, nor allowed for in procurement practices. This has led to an under-development of skills over the past two decades.

There is a reduced pool of engineers. Fewer school students study maths and science, arguably because those subjects and the careers that rely on them have lost prestige in Australia. The skilled workforce is also inefficiently used: there could be a greater use of engineering technologists and associates and efforts made to retain qualified engineers in the engineering workforce. Workforce diversity, most notably with regard to gender, must also be addressed to ensure that the greatest range of people are drawn on to pursue a career in engineering.

Consult Australia offers several solutions to address the engineering skills shortage (see section 2.3).

Procurement processes must change to enable the private sector to engage in better long-term and sustainable training and education programs. Central to this is a need for governments to have a clear and long term approach to the prioritisation of infrastructure delivery. Also, the engineering and procurement skills of the public sector must be developed. This can include sharing best practice between the public and private sectors and developing more cooperative contractual relationships between the two.

Small and medium-sized businesses need support to develop their engineering graduates, and government funding programs for industry-led training needs to include university level and post graduate level courses to allow development of the professional engineering workforce. Incentives for employer-funded training will help to correct market failures that have emerged from the shift of engineering service delivery from the public to the private sector.

An Industry Skills Council specific to engineering will coordinate the development of the profession and a new Office of the Chief Engineer will champion the engineering profession at the highest levels of Government.

Skilled migration will continue to be important to the supply of engineers and its efficient use will ensure that it continues to meet much of the demand. Most notable is the recommendation to reform the visa subclass 456 to make it simpler for qualified specialists to travel to Australia for work on short-term tasks.

2.3 Recommendations

Improving capability within Government

Recommendation 1: Reinvigorate public sector recruitment of engineering graduates and qualified engineers at all levels.

Recommendation 2: An audit of procurement expertise, capability and skills across government agencies to scope the current state of play and opportunities for intervention.

Recommendation 3: Formal training, support and continued professional development should be provided for any public servants who are moving into procurement and project management. This is particularly important when they are involved in high risk or high value projects. Governments should embrace and encourage the development of the "procurement professional".

Recommendation 4: Governments should support the work of the Australasian Procurement Construction Council (APCC) and their "Building Government Procurement Capabilities" standard.

The procurement process and training burden

Recommendation 5: Expand and further resource the office of the Commonwealth Procurement Coordinator, establishing a centralised Centre of Procurement Expertise with a mandate to develop policy, guidelines and standards for use across governments; build capacity in response to the procurement skills shortage; facilitate shared expertise in response to demand across jurisdictions; and encourage a stronger dialogue and a more collaborative relationship with industry

Recommendation 6: Develop a robust, independent and transparent process and governance model for the evaluation, prioritisation and decision-making supporting infrastructure delivery as a 'best-practice' approach for implementation across state and territory governments.

State, territory and federal infrastructure ministers and their governments should be transparently held accountable to the independent advice provided through such a governance model through the publication of an annual ministerial response; detailing the rationale informing subsequent infrastructure prioritisation and funding by governments.

Recommendation 7: Governments pursue policies and strategies supporting more collaborative contracting and a less adversarial contracting environment through policies that support fair allocation of risk, shared goals, clear communication and early engagement of all involved parties.

Recommendation 8: Government agencies should act as model clients and utilise standard contracts such as AS4122: G*eneral Conditions of Contract for Consultants.*

Recommendation 9: Consult Australia recommends that all Australian Governments support the following proposals on how to reduce the costs associated with tendering:

- More client education about best practice in tendering to improve purchasing skills;
- Greater use of electronic commerce by parties in the contractual chain to increase efficiency of the tendering process;
- Information about the required quantities of labour and materials being included in tender documents where appropriate;
- Pre-qualification of suppliers;
- Optimising the number of tenderers to achieve the right number and type;
- Sharing of tender costs where appropriate; and
- Intellectual property cost, which can be lost during the tender process to be alleviated through the development of procurement professionals who have very high ethical standards in confidentiality and sensible repercussions for those found to be in breach of those ethical standards.

In particular, Consult Australia recommends:

- Early engagement of consultants and contractors in complex projects to assist the establishment of realistic budgets and times frames. This will give greater certainty regarding the accuracy of information that is passed to the public, when a project's costs and timeframe are announced.

Recommendation 10: Government procurement processes should include a two-envelope system, separating price and non-price information alongside the use of two teams independently evaluating and selecting tenders before moving to final evaluation.

Recommendation 11: Government to support development programs for graduates. This may include government partnerships with providers of graduate 'finishing schools', accessible to graduates working in small and medium-sized firms.

Recommendation 12: Government funding programs for industry-led training should be available for all levels of education and training.

Recommendation 13: Introduce an education and training tax concession for employers that spend more than two per cent of payroll per year on training at a rate of 125 cents for every dollar spent on training.

Recommendation 14: Create a new Industry Skills Council for the needs of engineers at the associate, technologist and professional levels.

Promoting engineering

Recommendation 15: Greater emphasis must be placed on teachers' abilities to provide informed career guidance to students. This may include funding to enable school principals to employ extra careers advisors and to facilitate professional development programs to enhance teachers' links with industry.

Recommendation 16: The Federal Government should establish the Office of the Australian Engineer, reporting to the Prime Minister. The crucial differences between science and engineering mean that the Office of the Australian Engineer will deliver advice that turns scientific theory into practical policy reality.

More efficient use of the potential labour force

Recommendation 17: Introduce a nationally consistent state-based registration scheme for professional engineers. Rules governing registration should only regulate those services that must be done by competent qualified professional engineers.

Recommendation 18: The Government should ensure that companies comply with the *Equal Opportunity for Women in the Workplace Act*.

Recommendation 19: Fund EOWA and the HREOC to provide a higher level of assistance to employers who want to improve their approaches to workforce diversity.

Skilled Migration

Recommendation 20: The visa subclass 456 (and similar) should allow all types of work to be performed within those professions identified on the Skilled Occupations List and permit work for the full visa validity period, which should be at least three months, and clear guidance on visa rules is required.

Recommendation 21: The visa subclass 456 (and similar) should include an application process that is equivalent to the eVisitor and ETA systems in terms of ease of use and swiftness of approval. Development of options that offer similarly efficient processing times for highly-skilled workers from a wider range of nations should be investigated.

Recommendation 22: Increase the English language requirements for professional engineers applying for a skilled independent migrant visa to an IELTS score of 7.

Recommendation 23: Reform the eligibility criteria for the visa subclass 476 so that the list of eligible overseas institutions is aligned to the Washington and Sydney accords.

Recommendation 24: The fringe benefit tax (FBT) treatment of LAFHA benefits should be reformed so temporary resident employees will be required to maintain a home for their own use in Australia or overseas (which they are living away from for work) to access the concession, and in those cases the expenses will need to be substantiated.

Recommendation 25: If reforms to the LAFHA benefit are implemented, there should be a phased introduction to ensure that those receiving it should continue to do so until the end of their current temporary work visa validity period. A phased introduction will also ensure that salaries, payroll taxes, workers compensation and superannuation liabilities for skilled migrants do not suddenly increase and impose a significant and immediate burden on industry.

3. Scoping the problem

This chapter provides context to the engineering skills shortage. It outlines the scale of demand for people with engineering skills and examines the make-up of the current workforce. It also provides an argument for action to address the skill shortage by describing the impact that it has on employers, public and private infrastructure development, productivity and growth.

3.1 Scale of engineering demand

Types of engineer

Engineers are active in a very wide range of industries. Engineering specialisations extend into biomedical, civil, chemical, mining, aeronautics and space, construction, marine, mechanical, environmental, agricultural, software and information, telecommunications, and electronics fields. In fact, there is unlikely to be an aspect of life that is not influenced by an engineer.

Reflecting the focus of the Consult Australia membership, and the terms of reference of the Senate inquiry, this submission will focus on those engineering disciplines that are in shortage and critical to the built and natural environment.

Demand from a surging economy

A leading driver of the demand for engineering services is the minerals and energy sector. The federal Government acknowledged the extent of this sector's growth in the 2011-12 budget, saying that "Australia is facing the largest mining investment boom in its history" and that "investment in the resources sector will drive above-trend GDP growth in the period ahead, generating strong jobs growth."[3]

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) reported that at the end of April 2011 there were 94 projects at an advanced stage of development, with a record capital expenditure of $173.5 billion.[4] The Government, in the 2011-12 budget, noted that "this investment surge will ramp up further in coming years, led by very large projects in the liquefied natural gas (LNG) sector" with a "total pipeline of resources investment of over $380 billion."

The building and construction industry is growing too. Over the past decade, industrial and commercial building has grown by 12 per cent per year, engineering construction by 17 per cent per year, and new housing by 8 per cent per year.[5]

The experience of Consult Australia member firms

Strongly linked to these is the consulting services sector. As part of a knowledge-based economy, growth in professional services is a core driver of productivity, with growth in trade services often part of the broader economic response to that increased output. Consulting engineering services form a significant component of that professional services sector, with some 46,800 firms (including about 22,000 sole practitioners), employing about 221,600 people and generating revenues of around $40 billion a year.[6]

Consult Australia member firms employ people working in over 100 different types of professions. Of the large member firms however, 75 per cent describe themselves as providing mainly engineering design and consulting services, with 15 per cent providing architectural services and eight per cent delivering mainly surveying services.[7]

Small, medium and large firm sizes

The Australian Bureau of Statistics standard definition of business size is used in this report:

Small businesses:	employment of 1-19 persons
Medium businesses:	employment of 20-199 persons
Large businesses:	employment of 200 or more persons

Public sector influence

The public sector has a significant influence over the procurement of services, accounting for 42 per cent of Consult Australia large firm members' business in 2009-10. This includes 33.8 per cent driven by state and federal Governments. The work of smaller firms is much more driven by local government.

The private sector accounted for 57.7 per cent of business for large member firms.[8] However, a large proportion of this 57.7 per cent is working for a private sector head contractor on a public sector funded project.

It is estimated that consulting revenues will increase by seven per cent by the end of financial year 2011-12, and by 10 per cent in the two following years. The four biggest markets for consulting, based on estimated consulting engineering fees earned are: mining and heavy industry; roads; electricity and pipelines; and bridges, railways and harbours.[9]

New demand from other industries

A secondary demand for engineering professionals comes from other industries. Australia has to-date usually drawn its businesses leaders from the legal fraternity. This is in contrast to other cultures, especially in continental Europe and Asia, where there is a much greater concentration of engineers in business. However, there is increasing competition for engineers from industries such as banking and finance. Engineers are highly trained, numerate professionals with an ability to solve complex issues: skills attractive to any industry. Indeed in a 2011 survey, 25 per cent of Consult Australia's large member firms report competition from other industries when attempting to recruit graduate engineers.

This confluence of factors is driving continual growth in the demand for engineers and those with related skills.

3.2 The existing workforce

Australian engineers operate under three broad categories, with different qualifications achieved from the higher education and Vocational Education and Training (VET) sectors:[10]

Engineering category	Relative engineering capacity	Qualification	Duration of Qualification	Educational institution
Professional Engineer	Use engineering principles to design new solutions to problems	Bachelor of Engineering	4 years	University
Engineering Technologist	Adapt and apply known technologies to unfamiliar situations	Bachelor of Engineering Technology	3 years	University
Engineering Associate	Use and maintain known technologies in familiar situations	Associate Degree, Diploma or Advanced Diploma	2 years	University or TAFE

The number of engineers

Research by Engineers Australia provides a snapshot of the engineering workforce. Based on 2006 census data, there were 305,000 people in Australia with formal educational qualifications in engineering. Of these, about 249,785 were active in the general workforce. Of these, 142,822, or 57 per cent, were employed in engineering occupations. The balance were either employed in non-engineering occupations (99,597) or were unemployed (7,366). The 55,215 people with an engineering degree who were not active in the workforce in any way were either retired or students.[11]

About 40 per cent of engineers are employed in manufacturing and consulting industries. The remainder operate across every industry. Mining only ranks eleventh as an employer of engineers and in 2006 employed 3.6 per cent of the total,[12] but in terms of overall jobs creation it has the fastest per capita growth rate.[13]

Exact estimates for the number of engineers and related professionals required are hard to calculate. In 2008, the then Chief Executive of Engineers Australia estimated that there were "well over 20,000 vacancies" for engineers nation-wide,[14] a figure that appears to be current.[15]

Supply of engineers

Standing against this shortage and growth of industries that rely on engineering, is almost stagnant growth in the numbers of graduates from engineering and related technology courses. The number of domestic students completing such courses, ranging from associate degrees and diplomas to doctoral level qualifications, has risen by just 510 from 7,851 in 2001 to 8,361 in 2009.[16]

Importance of migrants

Skilled migration is used to bolster the engineering workforce, with the number arriving on permanent and temporary 457 visas almost tripling from 3,622 in 2002-03, to 9,120 in 2009-10.[17]

This is illustrated by the experiences of Consult Australia member firms. Some report that about 15 per cent of their workforces have been recruited from overseas under various visa subclasses in the 12 months to September 2011.[18] One large member firm with over 4,000 employees reports that over eight per cent of its workforce, for example, is employed with a visa subclass 457.

Women in engineering

The number of women working in engineering and related professions is very low. Women made up just 15.6 per cent of domestic graduates at all levels in 2009.[19] Consult Australia member firms employ a high proportion of these graduates, with 29 per cent of their graduate workforce female (with an average age of 25). As these women progress through the ranks however, their numbers drop until they represent just 11 per cent of staff at the "principal" level (with an average age of 44).[20]

An ageing workforce

The high average age of the engineering workforce is significant. Engineers Australia says that, "the average age of engineers is 1.6 years more than the average age of similarly qualified non-engineering skills groups."[21] More significantly, the distribution of ages for engineers is concentrated in the older groups, with a significant peak at the 40-44 year old age bracket group. This is in contrast to non-engineers that have a much more even spread of ages. This means that the engineering profession has far fewer young people 'coming up through the ranks'.

3.3 Impact of the shortage

It is widely accepted that national and international markets for engineering services are not operating to meet current and emerging demand, and that this shortage is a systemic rather than cyclical problem. Although mining only ranks eleventh as an employer of engineers,[22] it is growing and is becoming an ever-greater consumer of skilled workers. This means that it is drawing valuable workers from other sectors desperate for engineers and related professions.

Private sector recruitment difficulties

The Consult Australia 2011 Skills Survey shows that 90 per cent of large member firms (which employ 88 per cent of all Consult Australia member firm employees) are recruiting in response to a significant skills shortage.[23] The survey shows that shortages are most acute for construction project managers and engineering managers, and for nine engineering disciplines: Civil, Electrical, Environmental, Geotechnical, Mining, Rail, Traffic & transport, Tunnel, and Water.

Although most firms have no trouble finding graduate recruits, 25 per cent believe that there is competition from other industries for their talents, and 50 per cent do not think that there are enough female graduates.

For vacancies at more senior ranks, the recruiting difficulties increase. Twenty per cent of large-firm survey respondents reported that it takes 7-11 months to recruit to middle level roles. The problem increases with the seniority of positions: 50 per cent of respondents reported that it takes 7-11 months to recruit to Senior/ Principal level roles (and 15 per cent reported taking 1-2 years to fill such positions).

These problems are more pronounced for companies with operations in Queensland and Western Australia, and have become worse in recent years. The skills shortages described here are leading to increased expenditure on human resources and other initiatives, with 45 per cent forced to pass the added costs onto clients.[24]

Cost of labour

The demand for skills has driven up the cost of labour at an unsustainable rate. Consult Australia, in partnership with Aon Hewitt, conducts an annual salary survey of member firms. The 2011 survey shows that over the period April 2010 to April 2011, the total remuneration cost for incumbents of all surveyed professions increased by an average of 9.8 per cent. The median increase was 6.7 per cent. Average salaries for civil, electrical, environmental, mining and mechanical engineers increased by even more—from 9.9 to 11.1 per cent.

The Aon Hewitt General Industry Remuneration Report shows that growth for same incumbents in the wider economy increased by an average of just 4.3 per cent in the year to November 2010.[25]

In 2002, the overall rate of increase was 3.7 per cent. It increased to a peak of 14.8 per cent immediately prior to the global financial crises and dropped to a low of 4.7 per cent in 2010. There has therefore been a two-year slowing in demand for engineering services but the 2011 survey figures show that the unsustainable salary increases experienced between 2002 and 2008 will now continue.

The role of civil engineer at level 4, specialist team leader, is provided as an example: in 2007 the total remuneration cost was $94,845, in 2009 is grew to $103,856, before hitting $113,984 in 2011.

This salary growth for engineering skills threatens the viability of companies, increases the cost of project delivery—including public infrastructure delivery—and risks exacerbating inflationary pressures in the broader economy.

Reliance on skilled migrants

There is an over-reliance on skilled migration. Australia is part of, and benefits from, the global economy which is characterised by the flow of goods, services and people between countries. To date, this flow of people has been to Australia's benefit but the shortages are experienced worldwide. When other national economies eventually recover, it will become much more difficult to attract the necessary number of skilled migrants.

Public sector delivery delays

These recruitment difficulties affect more than just private sector employers. More broadly, this means that projects cost more and take longer to deliver. This is a poor outcome for Governments at all levels; for asset owners; is a disincentive for private investors; and results in delayed benefits for the public consumer.

Local and state governments that need engineers to deliver community infrastructure maintenance and repair work are one victim of the skills shortage. The damage caused by floods and cyclones in 2011 and the large amount of public infrastructure repair works required has highlighted this.

In early 2011 the Association of Professional Engineers, Scientists and Managers, Australia (APESMA) warned that the shortfall of engineers could lead to a 20 per cent blowout in the flood repair bill because of a lack of project scoping expertise. APESMA chief executive, Chris Walton, warned that the shortage could threaten funding from the Commonwealth under the National Disaster Relief and Recovery Arrangement because there were not enough engineers to do the necessary work.[26]

These figures are supported by finding of a 2008 Blake Dawson report, *Scope for Improvement 2008: A report on scoping practices in Australian construction and infrastructure projects.* It said that its survey,

> *revealed that inadequate scoping has severe cost consequences on projects. 61% of respondents said that inadequate scope documents resulted in a cost overrun, with more than half of those overruns costing more than 10% of the value of the project and a third more than 20%.*[27]

4. Identifying the causes

There are many reasons for the existence of the skill shortage. The shortage experienced in Australia today is exacerbated by systemic issues that must be addressed. This chapter provides an explanation of those systemic factors enabling a better informed base on which to develop solutions.

4.1 Privatisation of engineering services

Privatisation of the public sector across all jurisdictions accelerated in the 1990s. By the end of that decade, Australia had one of the largest programs of privatisation among Organisation for Economic Co-operation and Development (OECD) countries, ranked second to Britain in terms of value, and second to New Zealand relative to Gross Domestic Product (GDP).[28]

As early as 2002, the then Department of Education, Science and Training identified privatisation as a cause of the skills shortage for engineering. It noted, "On the supply side, privatisation of public utilities has reduced the traditional training ground and supply of skilled labour for engineering trades, and large companies are typically more focussed on training for their own skill requirements."[29]

A study of public sector employment share by industry between 1984 and 2005 illustrates the impact of privatisation on public sector in-house skills. The proportion of the electricity, gas and water supply industry that are public sector employees dropped from 95.9 per cent in 1984 to 54.7 per cent in 2005. Similarly, the construction industry went from having 12.2 per cent of its workforce in the public sector in 1984, to just half a per cent in 2005.[30]

4.1.1 Loss of public sector engineering expertise

Consult Australia is a member of the Australian National Engineering Taskforce (ANET). In its report, "Scoping our future",[31] the impact of privatisation was highlighted as a key factor. It noted that, "public sector engineers are increasingly affected as work is outsourced to contractors and the overall capacity of the public service is reduced. Structural changes have significantly changed the way that engineers work across the public sector." The report included the perspective of an engineer in the public service who noted that this had resulted in a severe capacity shortfall in his organization. He said,

> *"As a Government department, we moved from having a large in-house engineering workforce, to outsourcing most functions. We are now largely an administrative/ management agency. However with that outsourcing we lost a lot of institutional knowledge and capability. We struggle to remain an informed client and are desperately trying to build technical expertise in key areas that cannot be met through the private sector. The current situation is inadequate to meet current demands, let alone provide a sustainable model to meet future demands. The organisation has not successfully tackled the issue of attraction and retention of engineers and allied technical personnel."*

The loss of institutional engineering expertise described above has ramifications for the efficiency and effectiveness of public works and infrastructure development. As government agencies lose their engineering workforce, they lose the ability to be a well-informed purchaser.

Not enough time is spent on scoping and, for the public sector, political imperatives were often cited as taking precedence over realistic planning timelines. Statements of requirement that are

developed by government agency teams without the benefit of in-depth engineering analysis have a tendency to require constant revision during the project life cycle. Problems with scoping documents are most commonly picked up only when they become a problem during project execution.

The aforementioned 2008 Blake Dawson survey (see section 3.3) of organisations responsible for construction and civil infrastructure projects informed the ANET research. It found that 52 per cent of respondents felt their projects were not sufficiently or accurately scoped prior to going to market. Inexperience and insufficient level of competence of those preparing the scope documents are the most significant contributors to inadequate scoping. The skilled people identified as most difficult to find were: project managers (61%), engineers (53%), other designers (48%).[32]

Tender processes are less efficient and procurement officers are less able to assess tenders on engineering merit. The true requirements of government become evident as the project progresses, rather than at the project scoping stage. This leads to re-engineering and contract amendments. Cost blow outs are inevitable because of extensions in project delivery time and thus wages, the cost of re-engineering, changes to hardware requirements, not to mention the loss of public reputation due to late delivery of essential services.

Getting It Right: The First Time was published in 2005 by the Queensland Division of Engineers Australia highlighting the declining standards in project design documentation within the Australian Building and Construction Industries.[33] Consult Australia was pleased to participate in this study which was strongly supported by all areas of the building and construction industries and associated professional bodies as well as state and local government construction agencies. The conclusions from the study remain relevant today, in particular findings that:

- Poor documentation is contributing an additional 10-15 per cent to project costs in Australia.
- The annual cost of poor documentation is estimated at $12 billion per year across Australia.

The report finds increased safety risks where declining standards of documentation lead to inadequate structural design documentation being issued to contractors for use in construction. Declining standards are noted in the report, including:

- Inadequate project briefs based on unrealistic estimates of time and cost;
- Lack of integration along the supply chain linking the parties and between project phases;
- Devaluing of professional ethics and standards of business practice;
- Lowest cost bid selection strategy rather than value for money;
- Poor understanding and skilling in risk assessment and (risk) management processes;
- Absence of an experienced client-appointed, overall Design Manager/Coordinator;
- Poor understanding of optimised and properly documented designs;
- Inadequate availability of, and recruitment of, skilled and experienced people;
- Inadequate/ineffective use of technology in design and documentation (e.g. poor application of CAD techniques: technical specifications drawn from an organisation's database but not tailored to the particular project); and
- Lack of appreciation of the benefits of effective communication.

It was also found that poor documentation has led to:

- An inefficient, non-competitive industry;
- Cost overruns, rework, extensions of time;
- High stress levels, loss of morale, reduced personal output;
- Adversarial behaviour, diminished reputations;
- 60 per cent to 90 per cent of all variations are due to poor project documentation;
- One price variation results from every three Requests For Information (RFI);
- Estimated Cost of Variations generated by poor documentation = 12% to 15.2% of project value (PV), based on actual cost of variation works, plus extra administration costs (1.1% of PV), extensions of time (2.1% of PV).

In dollar terms, the consequences of scoping inadequacies was shown in the Blake Dawson report: scoping inadequacies, via cost overruns, delayed completion and legal disputes, resulted in 26 per cent of $1 billion+ worth of projects being more than $200 million over budget. [34] On this basis, it can be argued that the loss of public sector engineering expertise increases project costs by 20 per cent.

4.1.2 Transfer of training responsibility

Concurrent with the loss of engineering skills in public sector agencies has been the transfer of responsibility for training graduate engineers and further career development to the private sector. Understandably, the private sector is called on to deliver projects as efficiently as possible, but this has been at the expense of proper acknowledgment of the cost of long-term training and development.

This was identified in an ANET report on the engineering skills capacity in the road and rail industries. The report said,

> "…increased contracting-out in the building, renewing and maintenance of (rail) infrastructure has resulted in a major shift in the employment of rail engineers from the public to the private sector. This has a number of implications for knowledge and skill. Firstly, the ongoing funding structure of public sector organisations permits a longer-term approach to skill development compared to the project based nature of private sector firms where resource development is rarely properly reflected within the price of contracts."

Compounding this is the fact that, "Historically, the public sector defined and developed the technical capabilities required for rail engineering which means capacity in the private sector is growing from a low base and is heavily reliant, especially at the senior level, on former public sector employees and overseas-trained engineers."[35]

Public procurement processes require fundamental reform to recognise the change in training responsibilities. The private sector needs flexibility to take a long-term approach for the benefit of the broader economy.

4.2 A reduced pool of future engineers

The number of domestic students graduating with a three or four year bachelor's degree in engineering and related technology courses has remained largely static at about 6,000 each year between 2001 and 2009.[36] The introduction of student demand driven university funding should, on first glance, see an increase in engineering graduate numbers. However, at present, universities are

already taking as many people as meet entry requirements.[37] Universities are in this respect operating at capacity.

It should be noted that non-completion rates for engineering courses are not the leading concern. In fact, the attrition rate is lower than in more open entry degrees such as the sciences or arts (although higher than in other professional disciplines such as medicine and veterinary science).[38]

The untapped resources are instead school leavers who (1) are eligible for engineering studies but are not interested in it, or (2) would study engineering if they were eligible. This tells us that there is a need to motivate more school students to take an interest in technical careers and to highlight the importance of maths and science as essential preparatory subjects.

Fewer school students study maths and science

A very low number of school students study maths and science at a level suitable for engineering studies. Figures available from Engineers Australia illustrate this situation:[39] In 2009, just 10.2 per cent of Australian year 12 students studied advanced maths, 20.2 per cent studied intermediate maths, and 49 per cent studied maths at other levels unsuitable as a mathematical foundation for tertiary studies. In 2002, the respective figures were 11.1 per cent, 24.2 per cent and 45 per cent. The situation is getting progressively worse.

Physics and chemistry are also both important preparatory subjects for engineering courses. In 1976, 27.5 per cent of year 12 students studied physics, compared with just 16.5 per cent in 2001 and 14.6 per cent in 2007. For chemistry, the numbers are 28.6 per cent, down to 17.8 per cent in 2001 and 18 per cent in 2007.

A loss of prestige

A 2012 report by Universities Australia identified some of the reasons for this drop in popularity of science and maths. It found that "an unpopular image, perceptions of irrelevancy to everyday life and some uninspiring teaching are causing students to question the purpose of science and mathematics in the classroom, with less than half of those sampled totally agreeing that science is central to maintaining Australia's way of life." Universities Australia CEO, Dr Glenn Withers, said "This trend should be setting off alarm bells as it poses a risk to Australia's future as an innovative nation and an international leader in research."[40]

This was a sentiment shared by Senator the Honourable Chris Evans, Minister for Tertiary Education, Skills, Science and Research, in his address to the Australian Mathematical Sciences Institute (AMSI) on 8 February 2012. He said, "…it has never been more important for Australia to stay on the front foot, to focus on the future—a citizen-focused future driven by industry and innovation, and underpinned by research and science."[41]

Increasing the number of students studying higher level maths and science at school is vital and should be a core focus of primary and secondary education spending.

4.3 Inefficient utilisation of the skilled workforce

4.3.1 Engineering technologists and associates

The engineering skills shortage debate is most often centred on professional engineers. This hides, however, the essential role of engineering technologists and associates.

The number of domestic graduates of three year engineering degrees, necessary to become an engineering technologist, is largely static. There was a spike in completions in 2005 and 2006, but the long term trend is for graduate numbers of about 500-600 each year.[42] Numbers of domestic graduates of two year associate degrees or advanced diplomas, necessary to become an engineering associate, are also static at about 3,500 per year.[43]

At a December 2011 Skills Australia Engineering Pathways Seminar, it was noted that there is a need to better define the purpose and job outcomes for engineering technologists and associates. Sometimes the two and three year qualifications are seen as pathways to becoming a professional engineer, but they should instead have clear occupational outcomes in their own right.[44] They have a valuable role to play and better utilisation of those with such skills allow professional engineers to focus on the higher level work for which they have been trained.

The ANET report on investigations of engineering skills capacity in the road and rail industries supported this view. It said that "engineers at both the reviewing and design management ends felt that they were spending too much time drafting and/or making drafting amendments to drawings, suggesting that there is a shortage of drafters."

This was supported by another ANET research report that found:

> "There is significant unmet demand among employers for two-year trained engineering paraprofessionals with qualifications at the Advanced Diploma or Associate Degree level. Demand for three-year-trained Engineering Technologists also has the potential to grow, but this occupational category remains ill-defined. Increasing the output of graduates with two-year para-professional qualifications could alleviate Australia's acute shortage of technically-trained engineering staff in the short term as well as increase the number of professional engineers (through HE pathways) in the longer term. This could be particularly beneficial to employers suffering acute skills shortages in areas such as road and rail infrastructure, the water industry and in civil engineering generally."[45]

The training for engineering associates, in particular, does not always meet the needs of employers. This is because training packages are constructed by Industry Skills Councils (ISC), none of which has a focus on engineering.

Engineering-related qualifications are offered in training packages developed by at least seven of the eleven national ISCs. This has the potential to create inconsistency in the development of training packages in engineering-related fields.[46]

For example, training packages *RII50509 Diploma of Civil Construction Design* and *RII60509 Advanced Diploma of Civil Construction* lead to careers as civil engineering associates. They have been developed by the Drilling, Mining, Quarrying, Civil Infrastructure ISC (SkillsDMC) which has a focus on the needs of the mining sector, leading to training packages that lacked a holistic approach to civil engineering design.

In this particular instance, Consult Australia has taken the initiative to work with the ISC, Engineers Australia and education providers to reform the training packages, but it points to a systemic problem with the structure of ISCs and the development of associate degree courses. There needs to be a single ISC to focus on the full range of engineering trades and professions.

4.3.2 Retention of the current workforce

The market for engineers is competitive on a global scale. For example, of Consult Australia large member firms, 75 per cent report that employees are being poached. However this is not the most concerning aspect of workforce retention. There is a greater concern for why a large number of qualified engineers are not active in the engineering workforce, including many women who leave the industry at about age 30-40 and do not return.

At the 2006 census, the number of people in Australia with an engineering qualification of some sort was 305,000. Of these, 7,366 were unemployed (a rate of 2.6 per cent compared with the overall workforce rate of 5.2 per cent), 55,215 were either retired or in full time education, 142,822 were working in engineering roles, and 99,597 were active in the workforce but not in engineering roles.[47]

Encouraging this large pool of almost 100,000 qualified engineers to re-enter the engineering workforce is an important step. A more long-term approach, however, is to understand why so many people choose not to work as an engineer.

The drop in the numbers of women at about age 30-40, for example, is not simply because they leave to have children: a Consult Australia survey showed that parents who take parental leave are very likely to return to their employer at the end of the leave period.[48] Anecdotal evidence suggests that, eventually, women leave the engineering workforce to work in other professions. There are therefore workforce diversity issues at play, and they are addressed in the section below.

For those who have been out of the engineering workforce there are barriers to re-entry. Engineering is a fast-moving profession and continuity in the workforce is important for maintaining skills and knowledge. Access to re-training for anyone wishing to re-enter the workforce is however difficult to find. Employers competing for work from clients who demand low cost solutions do not have the capacity to re-train engineers, and government funding for workplace training is rarely available for university-level courses.

4.3.3 Gender imbalances

Compounding the skills shortage is the fact that many professions consulting in the built and natural environment do not appear to be representative of the broader population, particularly on the basis of gender.

In 2011 Consult Australia conducted a survey of member firms to measure the extent to which women are represented in the industry, with a focus on technical and managerial roles. The survey represented data for over 15,000 employees and identified differences in pay, turnover and age at different levels of seniority. Headline results include:

- Eleven per cent of board members are women.
- Thirty per cent of junior professional staff are women (where the average age of surveyed women is 28), and this ratio drops to 11 per cent at the ‘principal’ level (where the average age is 44).
- Female graduates earn two per cent more than men but nine per cent less at the ‘senior’ level, before rising again to be within one per cent of male colleagues at the ‘principal’ level.

At the supply side, applications from men to study engineering at university increased by 2.1 per cent between 2009 and 2010, but from females the rate dropped by 3.9 per cent. In recognition of the challenge of achieving a gender balance in the workforce, universities have nonetheless

maintained the proportion of women who are offered places to study.[49] The numbers of women graduating with a bachelors degree has been roughly static, ranging from 1,027 in 2001 to 902 in 2009. Women made up just 14.9 per cent of all domestic bachelor degree graduates in 2009.[50]

The low level of workforce diversity is a problem. Employing a more diverse workforce makes sound financial sense: A 2007 report by McKinsey & Company, *Women Matter: Gender diversity, a corporate performance driver* showed that companies with a higher proportion of women in their top management have better financial performance.[51] This is not to say that women are the only driver for success, but that firms that value diversity and inclusiveness are better performers.

And at an even more basic level, a profession or industry that does not generally employ women is halving the pool of potential talent. Workforce diversity, including attracting more women to, and retaining them in, the engineering professions will be significant factors in addressing the skills shortage.

This data confirmed significant opportunities to improve the participation of women. This finding was not a surprise to Consult Australia and its members, but has provided a mandate for collective action supported by objective data.

To advance this issue, Consult Australia has formed the Workforce Diversity Roundtable, a forum of member firm representatives. Its first item of work was a best practice benchmarking report released at an event to mark International Women's Day in March 2012. Further work will focus on delivery of a tool kit to help employers attract and retain people with a wider range of skill-sets, experiences, needs and abilities.

5. Providing solutions

In the submission thus far, the scope of the problem and its key causes have been identified. They relate to:

- improving capability within Government,
- the procurement process and training burden,
- a need to promote the engineering professions to the wider population and school children in particular,
- more efficient use of the potential labour force, and
- skilled migration.

The following are recommendations for action against these core areas. If followed they will bring long-term and sustainable benefits.

5.1 Improving capability within Government

The loss of engineering expertise

It has been shown at section 4.1 that the loss of in-house engineering expertise in public sector agencies is leading them to be ill-informed purchasers. The consequences in terms of project delays and overall costs 'blow out' has also been examined and is widely accepted by Consult Australia member firms, and industry associations involved in this debate, as real.

The solutions to this are clear: recruit more professional engineers to key public agencies; treat government procurement officers as skilled professionals and train them to operate as such; foster a more open, cooperative relationship between government and private sector providers of engineering services.

To implement the first of those solutions, government agencies need to reinvigorate graduate engineering programs and general recruitment of engineers. Retaining their services is a challenge when competing with private sector wages, but public service employment provides other benefits of value to many people and should not be ignored. These include the opportunity to contribute to a wide range of interesting projects, career progression and work/life stability. Public sector agencies should not try to compare themselves with the resources sector; they should highlight the positive differences to attract engineers.

Recommendation 1: Reinvigorate public sector recruitment of engineering graduates and qualified engineers at all levels.

The procurement skills shortage

A consequence of government outsourcing has been an ongoing critical shortage of staff with skills in procurement at all levels of government. An erosion in governments' skills base in those aspects of engineering and construction critical to successful project management and procurement means that the standard of procurement and value for money outcomes are reduced. This is demonstrated in our members' ongoing concerns in relation to:

- Poor quality tender and project scope documentation;
- Poor risk management; and

- Poor quality contractual terms and conditions and undue reliance on external legal advice.

These are evident throughout government indicating a systemic procurement skills shortage at all levels. This issue is increasingly of concern to state and territory governments. For example, this is an issue being addressed as part of the current NSW Government Review of Procurement. However, a national response is necessary to support and catalyse action at a state and territory level.

The Australasian Procurement and Construction Council (APCC) as part of their guide, *Developing the Procurement Professional*, acknowledge that:

> *"Until now, procurement professionalism in Australia has not been clearly recognised or defined. Public procurement too often is undertaken without professional support which results in sub-optimal value for money decisions and unnecessary high prices being paid for goods and services."*

The guide aims to raise the profile of procurement. It sets out the three main pathways to becoming a procurement professional and describes the characteristics of such a professional based on four levels of progression. It is also important for procurement officers to learn how to apply procurement principles efficiently—to avoid creating unnecessary administrative requirements for engineering service providers (also see section 5.2.1). Consult Australia believes that the guide is a useful tool in raising awareness about procurement in terms of it being a career within the public service.

Recommendation 2: An audit of procurement expertise, capability and skills across government agencies to scope the current state of play and opportunities for intervention.

Recommendation 3: Formal training, support and continued professional development should be provided for any public servants who are moving into procurement and project management. This is particularly important when they are involved in high risk or high value projects. Governments should embrace and encourage the development of the "procurement professional".

Recommendation 4: Governments should support the work of the Australasian Procurement Construction Council (APCC) and their "Building Government Procurement Capabilities" standard.

5.2 The procurement process and training burden

Concurrent with the loss of engineering skills in public sector agencies has been the transfer of responsibility for training graduate engineers and further career development to the private sector. Understandably, the private sector is called on to deliver projects as efficiently as possible, but this has been at the expense of proper acknowledgment of the cost of long-term training and development.

To help the private sector better take on this relatively new role, Consult Australia makes several recommendations for action by Governments. Taken together, they offer the best hope for initiating long-term reform of the system to foster skills development. The two key themes are to restructure public procurement processes and to re-think training delivery.

The shift in responsibility for training from the public to the private sector is fundamental to the current skills shortage. First among all recommendations for change must be a move from procurement being based on lowest cost to one based on overall value. In the public sector, a long-

term and more socially holistic approach is possible: price is just one of many factors, together with finding providers who are investing in the long-term skills needs of their employees.

Also, procurement practices that give employers confidence to invest in long term development are required. The following recommendations point to several ways that this can be achieved.

5.2.1 Restructuring public procurement processes

Sharing best practice procurement expertise across government

Consult Australia's members operate across jurisdictions and with every level of government. The wide variation in procurement expertise and skills, the variations in procurement policy, standards and guidelines is clearly demonstrated.

The Commonwealth Procurement Coordinator within the Australian Government Department of Finance and Deregulation is a critical role in providing a centre of expertise on procurement, setting guidelines and standards across government. However with the devolution of procurement capability to government agencies in recent years, the benefits of a more centralised approach to build capability are less evident.

The benefits of expanding and better resourcing the office of the Commonwealth Procurement Coordinator are multiple. A centralised unit could take a stronger role in policy and standards development, build procurement skills through training and guidance material and facilitate better engagement both with industry and with state, territory and local governments. Ultimately, such a team could facilitate shared procurement expertise across jurisdictions. For example, expertise on complex alliance projects, or public private partnerships, often established within states in response to specific pipeline projects, could be brought together and shared with the support of a central federal government unit. A more centralised model would help overcome the procurement skills shortage often evident where agencies are required to deliver complex projects, through delivery models where there is little prior experience, or need to hold such experience in-house.

Recommendation 5: Expand and further resource the office of the Commonwealth Procurement Coordinator, establishing a centralised Centre of Procurement Expertise with a mandate to develop policy, guidelines and standards for use across governments; build capacity in response to the procurement skills shortage; facilitate shared expertise in response to demand across jurisdictions; and encourage a stronger dialogue and a more collaborative relationship with industry

Forward planning of infrastructure to help plan for skills development

A clear and transparent, long term approach to the prioritisation of infrastructure delivery is essential at all levels of government. Many projects are prioritised through clear and rational assessment, but in some cases decision making risks being misconstrued and may appear to be driven by political demands where no clear process or guidelines for assessment have been developed. When communities are competing for public dollars, clear processes are essential to assess, rank and prioritise infrastructure delivery. These must be robust and stand the test of changing political and economic circumstances.

Although Infrastructure Australia has instituted clear processes to assess and evaluate projects—and improve transparency through the commitment to publish cost-benefit analyses—to date such a process is not replicated across all states and territories. This has led to delays in infrastructure

delivery, budget blow-outs, and the politicisation of project prioritisation and selection. In an increasingly competitive labour market, the implications for industry and the wider economy are significant where resource planning, forecasting and delivery estimates are compromised.

An emphasis on the development of more robust infrastructure plans across the states and territories is commendable towards identifying needs, but does not in itself go far enough to provide secure funding over the medium to long-term. Nor does this adequately prioritise delivery and decision making through a robust and consistent framework.

Recommendation 6: Develop a robust, independent and transparent process and governance model for the evaluation, prioritisation and decision-making supporting infrastructure delivery as a 'best-practice' approach for implementation across state and territory governments.

State, territory and federal infrastructure ministers and their governments should be transparently held accountable to the independent advice provided through such a governance model through the publication of an annual ministerial response; detailing the rationale informing subsequent infrastructure prioritisation and funding by governments.

Better contractual relationships for a more confident private sector

Consulting engineering firms supply professional services to government on an extensive range of services and projects. Some 42 per cent of consulting engineers' income in 2009-10 was earned directly from Australian governments.[52] This does not include the very significant contribution that Consult Australia members make working as consultants to 'design and construct' contractors working on government contracts.

More collaborative contracting: Consult Australia has long supported and promoted the use of relationship or collaborative contracting as a valuable tool to deliver projects that benefit all participants. We respect the principles on which relationship contracting has been built, and it has evolved to be an increasing component of our member firms' business over the last fifteen years.

The more common form of collaborative contracting is alliance contracting which has seen much success in Australia in recent years through more efficient project delivery, effective risk management and less disputation. Australia has increasingly demonstrated the strength of alliance contracting through projects such as:

- Roe Highway Stage 7 (Main Roads Western Australia);
- Tullamarine-Calder Interchange (VicRoads);
- Anthony's Cutting (VicRoads);
- South Morang Rail Extension (VicRoads, Metro Trains and Department of Transport);
- Northern Hume Alliance (Roads and Traffic Authority);
- Lawrence Hargrave Drive (Roads and Traffic Authority);
- Inner Northern Busway (Queensland Department of Transport);
- Ipswich Motorway Project (Queensland Department of Main Roads); and
- SAFELink Alliance (Queensland Department of Main Roads).

The projects delivered above were successful because they adopted a collaborative process that promoted openness, trust, and risk- and responsibility-sharing through the alignment of interests between clients, designers and constructors. These principles should not be restricted to alliance

contracts, and opportunities to reduce the adversarial nature of 'design and construct' contracting should also be considered.

Traditional design and construct contracting in Australia is often inherently adversarial and competitive with high levels of disputation and associated increased costs and delays. With increasing project complexity and the use of tools and systems such as Building Information Modelling (BIM) and Integrated Project Delivery (IPD), it is increasingly important to build collaborative arrangements between all parties to a project. Emphasis should shift from defensive risk allocation, to strategies for fair risk allocation, and shared goals for mutual advantage. In part, collaboration and trust in traditional contracting can be built through fairer contract terms, but improved communication, early engagement and best-practice procurement generally all will support a less adversarial contracting environment.

Recommendation 7: Governments pursue policies and strategies supporting more collaborative contracting and a less adversarial contracting environment through policies that support fair allocation of risk, shared goals, clear communication and early engagement of all involved parties.

Onerous contract terms: Procurement practices adopted by some government agencies are being used to drive consulting engineers to accept onerous contract terms that seek to shift the risk of the project outcome to the consultant regardless of whether the consultant has any control over those risks or is able to bear the risk.

Government's procurement advice in respect of risk is that it should be borne by the party best able to bear it. Consult Australia disagrees: risk management is not only about the party that can financially bear it, and risk should be borne by the party that has practical control of the risk and is in a position to manage the risk. It is Consult Australia's position that the contractual terms and procurement processes should reflect this.

A better procurement process—at all stages of project life—will give private companies the confidence to invest time, money and effort in the skills development of staff and use existing trained staff more efficiently. The following are areas for improvement to deliver real cultural change to the procurement process.

Few government agencies are prepared to negotiate contract terms in a meaningful way, typically if a consultant does not agree with the contract contained in the tender document they are barred from further consideration in the tender process. Consult Australia member's regularly report being told to, 'take it or leave it'.

It is often the case with other government agencies that the consultant is required within 24 hours of submission of the tender to withdraw the qualifications to the contract or the tender will be declared non-conforming and not considered further. Alternatively on being selected as the preferred tenderer, it will be made conditional on the withdrawal of the qualifications to the contract terms.

Consistency in contracts: Furthermore there is a fundamental lack of consistency in the contracts being used by governments, rarely are two contracts the same, regardless of whether the project is of the same size and nature. This is adding significant costs to both the agencies involved, in obtaining the legal advice, and for the consultant who must continually seek its own legal advice in order to interpret the contract. This is a significant factor in a small consulting engineering firm's

decision on whether or not to bid for the work. It in fact penalises small consulting engineering businesses.

Recommendation 8: Government agencies should act as model clients and utilise standard contracts such as AS4122: G*eneral Conditions of Contract for Consultants.*

Probity: What should be considered standard rules regarding probity and transparency are not always properly observed in all projects. It is not always clear that procurement officers in Government are supported or guided by established policies and procedures. For example our members report cases where procurement officers' responses to questions regarding the tender are not published for the information of all firms submitting; potentially creating unfair advantage across bids. Our members report that other 'standard' requirements are not implemented consistently across agencies, for example in relation to Workplace Health and Safety.

Improving the efficiency of the tender process: The costs of tendering are generally understood to governments who acknowledge the importance of minimising these costs to industry and support value for money outcomes for the tax payer. While it is difficult to identify the precise costs of tendering,[53] it is less difficult to identify opportunities to minimise those costs through greater efficiencies and quality procurement processes.

In the late nineties the Office of Building Asset and Building Policy in Victoria documented tender costs that are still relevant today in understanding how costs are accrued:

- For a $320,000 public facility, one tender submission by an architectural consultant cost $9,000 to prepare. 102 tenders were submitted. Potentially $918,000 was spent on the preparation of submissions by tenderers and the total cost of tendering equated to almost 3 times the project value.
- For another public facility, the client found that tender bids were too high so made minor changes to the tender documents and re-tendered the projects. The client was effectively bid-shopping, but this required the tenderers to put in extra work.
- For a $5-6 million project a consultant spent $100,000 to prepare a bid, the successful bid was for $180,000, meaning that the consultant only received $80,000 for the project and the rest covered his tender costs. The unsuccessful tenderers did not recoup any costs.

As demonstrated through these examples, the costs associated with the deployment of skilled professionals, intellectual property, bid preparation and administration across all parties to a tender are substantial. In the interests of productivity, governments are obliged to seize all opportunities to deliver greater efficiency in the tender process.

The quality of project briefs: It is important that the cost of tendering is minimised through the release of project briefs that are accurate and contain all information that is available and required by the tenderers. Consult Australia members have reported instances where project briefs have been released by Government agencies that appear not to have been reviewed for accuracy, that do not contain all relevant background information, and where additional information released is difficult to access. More specifically, Consult Australia members report:

- The re-issue by agencies of entire project briefs, but without track changes, making it extremely difficult and time consuming for tenderers to ascertain where the changes have been made and the implications for a tender already underway;
- Project briefs that do not correctly refer to known industry standards;

- Project briefs in a 'state of flux' evolving throughout the tender period with additional information catering to changing client demands;
- Tender advertisements referring to published information that is not available online;
- Additional documents being issued, sometimes the day before a tender deadline, with no time extension;
- References to parts of a project that are not actually relevant to the project being tendered;
- Project briefs that refer to construction phase services for projects where there is no need for such services; and
- Increased demands for building information modeling (BIM) without associated increases in time to prepare such requirements.

Recommendation 9: Consult Australia recommends that all Australian Governments support the following proposals on how to reduce the costs associated with tendering:

- More client education about best practice in tendering to improve purchasing skills;
- Greater use of electronic commerce by parties in the contractual chain to increase efficiency of the tendering process;
- Information about the required quantities of labour and materials being included in tender documents where appropriate;
- Pre-qualification of suppliers;
- Optimising the number of tenderers to achieve the right number and type;
- Sharing of tender costs where appropriate; and
- Intellectual property cost, which can be lost during the tender process to be alleviated through the development of procurement professionals who have very high ethical standards in confidentiality and sensible repercussions for those found to be in breach of those ethical standards.

In particular, Consult Australia recommends:

- Early engagement of consultant and contractor in complex projects to assist the establishment of realistic budgets and times frames. This will give greater certainty regarding the accuracy of information that is passed to the public, when a project's costs and timeframe are announced.

Evaluating and finalising tenders: Consult Australia members report an undue emphasis on price in tender selection rather than capacity to deliver, experience, or value for money. Relative workloads should be considered in evaluation criteria as part of determining tenderers' capacity. Assessment criteria appear overly quantitative with reference to requirements for detailed information regarding costings and hours budgeted, rather than a qualitative assessment of deliverables.

Recommendation 10: Government procurement processes should include a two-envelope system, separating price and non-price information alongside the use of two teams independently evaluating and selecting tenders before moving to final evaluation.

5.2.2 Re-thinking training

Training graduates

Engineers at the 'graduate' level are not in short supply. Just 10 per cent of small, medium and large-sized Consult Australia member firms have difficulty finding graduates, or even junior engineers.[54] When asked if graduates are at an appropriate level of job-readiness when they join their firm, however, differences appear. For large firms, 80 per cent are happy with the quality of graduates, compared with just 20 per cent of small and medium-sized firms.[55]

There are two main reasons for this: larger firms hold greater prestige and attract the best graduates, and larger firms have more resources to coach and mentor graduates.

Large firms do employ the majority of the engineering workforce, but the employment contribution of over 20,000 small and medium-sized employing firms is also significant. Governments can play a role in coordinating graduate development programs to pool resources and training expertise. Funding and administrative support can help mitigate the cost of supervision of qualified but not-yet-independent engineers at all levels.

Recommendation 11: Government to support development programs for graduates. This may include government partnerships with providers of graduate 'finishing schools', accessible to graduates working in small and medium-sized firms.

Funding for further education

The Australian Government has provided significant funds for industry-led training initiatives. The most recent of these is the National Workforce Development Fund (NWDF). Through the Fund the Australian Government will provide $558 million over four years to industry to support training and workforce development in areas of current and future skills need.[56]

This and other similar funding programs that have been announced in recent years are suitable for those undergoing Vocational Education and Training (VET) level education, but eligibility criteria exclude those wishing to undertake higher education courses.

For engineering associates and technologists to progress to the level of professional engineer, higher education qualifications are essential. Without access to the NWDF (or similar), the cost is prohibitive, especially as many are likely to be mature-aged students with families, mortgages and other commitments that draw on finances.

As professional engineers develop their careers, the need for further training at the Graduate Certificate, Masters or Doctoral level is necessary. Business degrees for those who move into engineering management roles and specialist masters programs for engineers building their skills in a particular field enable the growth of the profession. The time and course costs can however be prohibitive without funding assistance.

It has been shown that there is a large number of qualified professional engineers who are not active in the engineering labour force: they often include parents who have taken time out to raise young children or people who have tried other careers. It is important to note that these people cannot simply re-enter the workforce at a moment's notice. Engineering is a fast-moving, cutting edge discipline, and maintaining currency is vital to maintaining competence.

Human Resources managers in the Consult Australia Skills Roundtable, a forum of HR representatives of member firms, report that many of those engineers not working as engineers are keen to re-enter the workforce as engineers, but the time and money required to re-gain currency are prohibitive. Funding streams such as the NWDF would be ideal for such people if eligibility criteria did not lock them out.

Rather than limiting funding streams for industry-led training to particular levels of education and training, employers and employees should be given the flexibility to use funding for the training most appropriate to their needs.

Recommendation 12: Government funding programs for industry-led training should be available for all levels of education and training.

Incentives for employer investment in training: correcting market failures

The shift of engineering services from the public to the private sector has caused the emergence of an unintended market failure in the provision of on-going training for engineers in the workplace. A huge increase in projects to be completed and a skills shortage has made it harder to justify expenditure on training.

Training levies have often been promoted as the solution to training shortfalls. While levies may be suitable for very structured trades that utilise apprenticeship programs, they are not suitable for the needs of the engineering professions.

Requiring employers to attach training plans for individual projects is also unsuitable. Consult Australia members, for example, do not allocate funding to particular projects. Their staff work across several projects and education and training programs aim to enhance their overall skills base rather than prepare them for individual projects.

An alternative approach is to apply tax incentives to reward those companies that take a sustained approach to education and training.

The model proposed by Consult Australia is that when expenditure on education and training activities exceeds two per cent of payroll per year, employers are rewarded with a concession rate of 125 per cent of every dollar that exceeded the two per cent threshold.

A concession rate of 125 per cent will ensure that indirect costs associated with training, such as time spent at training courses, does not act as a disincentive for firms to invest in training where labour is tight and projects prolific.

The target of two per cent is recommended as it is the level that DIAC requires businesses to meet before being authorised to sponsor foreign workers on temporary resident work visas. The two per cent target also recognises that employers have an ordinary obligation to invest in their staff.

This initiative will lead to a higher skilled and motivated workforce that will improve the productivity of employers and the country. The scheme would also be optional, meaning it will not increase the regulatory burden on firms and enable firms to tailor their approach to training to suit their individual circumstances. The concession could be capped, or other restrictions placed on its use, to manage the potential financial risk to the Federal Government.

The concession eligibility criteria must be broad reaching, and simple for businesses to administer. Employers should only be able to claim the concession for approved types of education and training. An example of this would be placement of graduate employees on graduate development courses (see section 5.2.2, above).

Recommendation 13: Introduce an education and training tax concession for employers that spend more than two per cent of payroll per year on training at a rate of 125 cents for every dollar spent on training.

Industry Skills Council

Industry Skills Councils (ISC) have been created to:

- Provide integrated industry intelligence and advice to Skills Australia, government and enterprises on workforce development and skills needs
- actively support the development, implementation and continuous improvement of high quality training and workforce development products and services including training packages
- provide independent skills and training advice to enterprises, including matching identified training needs with appropriate training solutions; working with enterprises, employment service providers, Registered Training Organisations and government to allocate training places under the Productivity Places Program
- engage with State and Territory Governments, State and Territory industry advisory bodies and peak representative bodies in their area of industry coverage.[57]

They can play a powerful coordination and advocacy role for the engineering professions but, unfortunately, no single ISC has that responsibility. In fact, engineering-related qualifications are offered in training packages developed by at least seven of the eleven national ISCs. This has the potential to create inconsistency in the development of training packages in engineering-related fields.[58]

A new ISC is required to take ownership of the needs of associate, technologist and professional engineers. The ISC can better coordinate appropriate training packages that suit their needs, and act as an advocate for engineering skills development.

Recommendation 14: Create a new Industry Skills Council for the needs of engineers at the associate, technologist and professional levels.

5.3 Promoting engineering

5.3.1 Career advice and promotion for school students

Current careers advice support for secondary school students is well below what students require. A large factor in this is the low number of careers advisors at secondary schools. Furthermore, careers advisors cannot be expected to fully comprehend and appreciate every career path available, let alone one so specialised as engineering in all its forms.

Consult Australia believes that classroom teachers must be engaged in delivering careers advice to students. Classroom teachers have a significant impact on students due to high levels of interaction in classes and a consequent understanding of individual students. This includes an understanding of students' strengths, weaknesses and interests, enabling them to provide targeted guidance.

There is universal support for encouraging more people to study to become teachers. The budget should also provide enough funding to the education sector to enable teachers to retain links with industry and careers related to their area of academic expertise once working as teachers. One model is to facilitate industry groups communicating with classroom teachers to provide insight into the industry's ever changing and evolving workforce.

When considering the engineering industry for example, historically there were five different types of standard engineer occupations; now over one hundred different types of engineering and related roles can be classified. Classroom teachers would not be expected to know this, but using very simple methods like industry group meetings or giving teachers access to industry newsletters would improve their knowledge.

Formal industry outreach programs could become part of teachers' Key Performance Indicators and teachers could be rewarded for electing to use their professional development time to proactively enhance their general teaching skills, knowledge and understanding of career paths available for students who enjoy maths and science.

This will result in up-to-date and student-specific careers advice being delivered through the classroom to motivate more young people to study maths and science and use them as the foundation for rewarding careers in engineering.

Recommendation 15: Greater emphasis must be placed on teachers' abilities to provide informed career guidance to students. This may include funding to enable school principals to employ extra careers advisors and to facilitate professional development programs to enhance teachers' links with industry.

5.3.2 Office of the Chief Engineer

The Office of the Chief Scientist was established by the Commonwealth Government to provide "high-level independent advice to the Prime Minister and other Ministers on matters relating to science, technology and innovation".[59] They also function as Executive Officer of the Prime Minister's Science, Engineering and Innovation Council, which has been established "as the Government's principal source of independent advice on issues in science, engineering and innovation and relevant aspects of education and training".[60] Chief Scientists also exist at a State level throughout Australia. Of note however, is the establishment in New South Wales of the Office of the Chief Scientist and Chief Engineer.

There is no doubt this is an important role. Much of the recently commissioned research by the Chief Scientist focused on the engagement of school-aged children in science is welcome and important. However, there are crucial differences between science and engineering. What is important is the notion that engineering brings science to life, and as such is able to give practical demonstration of the importance of science, and of its application for students through school years.

The report 'Engineering: turning ideas into reality' by the British Parliament's House of Commons-Innovation, Universities, Science and Skills Committee puts this case when it states "notwithstanding

niche research areas, science and engineering are disciplines that differ fundamentally, particularly in their goals: scientists set out to find out how things work whereas engineers typically are more interested in whether they can turn ideas into reality. In a policy situation the distinction is obvious".[61]

It is not only an important distinction for the engagement of students in science and maths, it is an important distinction for the provision of advice to government on procurement and bringing practical relief to real policy problems such as climate change. Simply put, a scientist can advise on issues relating to science, while an engineer can deliver.

As advocated by ANET, Consult Australia supports the creation of the Office of the Australian Engineer. The responsibility of this office would be to advise federal and state Government, education agencies and providers at all levels on how to include it in curricula, how to best deliver it in engaging and motivating ways, and other methods of promotion for the profession.

The Chief Engineer can also commission such research as is necessary to support the activities of the office, and ensure that recommendations are followed with action.

Recommendation 16: The Federal Government should establish the Office of the Australian Engineer, reporting to the Prime Minister. The crucial differences between science and engineering mean that the Office of the Australian Engineer will deliver advice that turns scientific theory into practical policy reality.

5.4 More efficient use of the potential labour force

5.4.1 Engineering associates and technologists

As described above at section 4.3, the value of engineering associates and technologists can be underestimated. They are, in fact, well trained and capable of supporting professional engineers at a high level. A barrier to greater use of associates and technologists is client expectations that a 'professional engineer', rather than the most appropriately qualified engineer, will work on their project.

The time it takes to train associates and technologists, too, is much shorter, and the pool of potential entrants is larger.

With these factors in mind, it makes sense to make greater use of them, thus freeing professional engineers to focus on the higher-level work for which they are trained. This provides better value for the education dollar it takes to qualify them.

The number of people graduating with a diploma or advanced diploma in engineering is relatively stable, so efforts to promote engineering to school children and others should also include discussion of roles other than professional engineers.

5.4.2 National registration scheme for professional engineers

Consult Australia and its partners on the National Engineering Registration Board (NERB) are working with state and territory Governments to promote the creation of a national registration scheme for professional engineers.

Queensland is the only jurisdiction to have a comprehensive registration scheme, though there are 14 separate acts and regulations governing the work of engineers to some respect. Other states are considering the introduction of their own registration schemes.

It is recommended that a uniform state-based national registration scheme be introduced. The Council of Australian Governments (COAG) agenda for a Seamless National Economy (SNE) is the best vehicle for its promotion and introduction.

Registration for professional engineers helps to safeguard consumers and the public against unqualified professional engineers. Most importantly for efforts to deal with the skills shortage, a national registration scheme aids labour mobility across jurisdiction borders: at present the differing systems in Australian states and territories create barriers to efficient transfers of skills.

The legislation must be careful, however, not to over-regulate all engineering related functions. A balance must be struck so that only activity that must be done by a competent professional engineer with a minimum of a four year degree is regulated. All other work that is suitable for engineering associates and technologists to do unsupervised should not be the subject to a professional engineers' registration scheme.

Recommendation 17: Introduce a nationally consistent state-based registration scheme for professional engineers. Rules governing registration should only regulate those services that must be done by competent qualified professional engineers.

5.4.3 Workforce diversity

The skills shortage experienced by many Australian industry sectors means that striving for workplace diversity is about much more than corporate social responsibility or a moral obligation to avoid discriminatory workplace behaviours.

The raw economic benefits are clear and have been described above at section 4.3.3. As workplaces becomes known as more welcoming to a wider range of people, they will attract new entrants; the engineering professions will begin to lose their stigma as 'male' professions and those needing to work part time as they start a family or transition into retirement will be encouraged to remain engaged as active workforce participants.

Consult Australia member firms acknowledge this and know that the bulk of the work to improve workforce diversity must be done within the industry.

To advance this, Consult Australia has created the Workforce Diversity Roundtable to explore a range of issues related to diversity, with an initial focus on women. The release of a best practice benchmarking report in March 2012, *Diverse Approaches*, represents the first stage of work.[62] It provides an examination of existing best practice for improving workforce diversity, and explores the different ways that various professions and industry sectors have chosen to tackle workforce diversity.

The next step for Consult Australia will be to draw on these discussions to develop advice specific to consultants in the built and natural environment. Whilst much is generic to any profession or industry sector, this report demonstrates that challenges vary across firms and industries and certain cultural and job-specific issues require tailored responses.

It should be noted, too, that 'workforce diversity' very often means 'gender diversity'. This may be because it is the most obvious of issues, but that causes pause to consider those people more hidden from view. It is important to ensure that initiatives to achieve more inclusive workplaces embrace diversity in the broadest sense of the word.

Existing mechanisms to encourage employers to take this subject seriously exist: The Australian Securities Exchange (ASX) guidelines for gender diversity, and Equal Opportunity for Women in the Workplace Agency (EOWA) reporting requirements.

ASX Corporate Governance Principles have applied to listed entities since 2003, with the latest version applying since January 2011. Principle 3 is to "promote ethical and responsible decision-making", and includes three key recommendations:[63]

> *Recommendation 3.2: Companies should establish a policy concerning diversity and disclose the policy or a summary of that policy. The policy should include requirements for the board to establish measurable objectives for achieving gender diversity and for the board to assess annually both the objectives and progress in achieving them.*
>
> *Recommendation 3.3: Companies should disclose in each annual report the measurable objectives for achieving gender diversity set by the board in accordance with the diversity policy and progress towards achieving them.*
>
> *Recommendation 3.4: Companies should disclose in each annual report the proportion of women employees in the whole organisation, women in senior executive positions and women on the board.*

Companies with more than 100 employees are required to report to EOWA on, among other things, the gender make-up of the company. To comply with the *Equal Opportunity for Women in the Workplace Act* (the Act), companies with more than 100 staff must develop a "workplace program" (a strategic approach to eliminating discrimination and contributing to equal opportunity for women in the workplace) and make annual public reports against that program. Non-compliant companies may be included in a public report, and may be unable to tender for government contracts and industry assistance.[64]

Consult Australia member firms take the EOWA reporting requirements very seriously, and covet the awarding of EOWA Employer of Choice awards. There is anecdotal evidence , however, that the sanctions available to Government to apply to companies that do not comply with the legislation are not utilised. This dissolves the effectiveness of the law and fails to provide those doing the right thing with the full benefits available.

In March 2011, the Government announced changes to legislation that will see the reporting requirements enhanced, with changes likely to become effective from 2013. Reforms will see the Act recast to acknowledge pay equity and caring responsibilities of both men and women as central to gender equality. Agency powers to check the accuracy of reports and to ensure non-compliant companies are unable to participate in government procurement will be strengthened.[65]

Recommendation 18: The Government should ensure that companies comply with the *Equal Opportunity for Women in the Workplace Act*.

Setting targets and measuring progress also makes good sense: it helps identify initiatives that are making a real difference. And it is more than just counting the number of women. If a company introduces a flexible working program, for example, it can be useful to track usage and match it to changes in employee satisfaction surveys. Accountability can be ensured by including relevant targets in the performance criteria of managers. [66]

Coming to a full understanding of the value of and need for workforce diversity is an evolutionary process. Not all companies are at the same point in that process and require greater assistance to update their business operations and employment practices. Government agencies such as EOWA and the Human Rights and Equal Opportunity Commission (HREOC) should be given the resources to provide that assistance. Business mentors, such as the Sex Discrimination Commissioner's Male Champions of Change, and workshops are just two ways in which assistance can be provided.

Recommendation 19: Fund EOWA and the HREOC to provide a higher level of assistance to employers who want to improve their approaches to workforce diversity.

5.5 Skilled migration

Efficient skilled migration programs can help to alleviate the skills shortage. Several areas for improvement are made below, but it is also important to identify skilled migration successes and encourage that this good work continue.

First among these is the high level of the resources that are allocated to processing applications for 457 visas. Of Consult Australia's large member firms, 95 per cent of their 457 visa applications are approved within 60 days (20 per cent are approved within 3 weeks).[67] This standard of service from the Department of Immigration and Citizenship (DIAC) helps to keep industry moving and funding allocations to processing teams should be maintained.

The recent introduction of a scheme to enable employers to apply for accredited status which will qualify them for priority processing for all subclass 457 nominations and visa applications is also welcome. Anecdotal evidence from Consult Australia member firms is that this new scheme has brought visa assessment times down to just a few days.

Thirdly, the Industry Outreach Officer (IOO) scheme is a very effective tool for increasing the efficiency of the skilled migration program, and Consult Australia is a strong supporter. Member firms value being able to speak with IOOs who have developed an in-depth understanding of the industry's particular needs. This sector-specific and personalised service from the department contributes to the good working relationship between the Department and Consult Australia's member firms. To improve the IOO program, Consult Australia encourages the placement of IOOs with sector-specific organisations, rather than the current trend for placement with state chambers of industry.

There are three areas that do require attention to ensure that the skilled migration program is as efficient and effective as it can be. These are the amendment of the visa subclass 456, setting realistic language standards for independent skilled migrant professional engineers, and minor amendments to the visa subclass 476. A related issue is the proposed reform to the treatment of Living Away From Home Allowance (LAFHA).

5.5.1 Visa subclass 456

Engineering consultancy work is characterised by projects that require the input of highly specialised engineering professionals, sometimes for just four to six weeks and at short notice. To ensure that projects are completed efficiently, consulting firms need quick access to the global talent pool. This includes inter-company secondments and transfers to Australia within trans-national firms, and recruitment of specialists from overseas.

Feedback from Consult Australia members indicates that the *Temporary Business (Long Stay) - Standard Business Sponsorship (Subclass 457)* meets most of their long-term recruiting needs, with the *Business (Short Stay) (subclass 456)* and subclasses 459, eVistitor (651) and ETA (956 and 977) assisting firms in bringing specialised workers to Australia for shorter-term business needs.

However, improvements to the shorter term visas are required to meet these needs of business more effectively.

Consult Australia agrees that the use of foreign workers should not reduce job opportunities for suitably qualified Australian citizens and permanent residents. It is important to understand, though, that multi-national companies operating in Australia often have employees based in other countries who are suitable for short-term tasks that are not easily filled by Australian-based workers. Australia is part of, and benefits from, the global economy which is characterised by the flow of goods, services and people between countries. To achieve maximum efficiency, multi-national companies draw on their global workforce and should be allowed to easily use their existing staff to enter Australia for short-term work.

Existing business visas such as the subclass 456 are restrictive in the types of work that can be performed by the visa holder, and Consult Australia members require clear advice on what the limits of those restrictions are. Guidelines should be developed.

Of greatest benefit to Consult Australia members would be a short stay visa that allows all types of work to be performed within those professions identified on the Skilled Occupations List. This approach would deliver the greatest level of flexibility to industries suffering from a skills shortage.

The subclass 456 allows for some work to be undertaken for a period of "generally less than six (6) weeks"[68] over the course of the visa's validity period which is "in general, [for] up to three months stay".[69] Employers would benefit from a visa that allows at least a three month stay, with clear guidelines on the length of stay permitted and, for ease of use, work should be permitted for the full length of stay.

Furthermore, the existing business visitor and short stay visa subclasses have different entry limits, ranging from three months, to 12 months, or for the life of the visa holder's passport. Overseas-based engineering consultants are often required for just a few weeks of work in Australia, but at several key points in long-term projects. Although the visa will have limitations on how long someone may work in Australia, it should permit multiple entries. It should also be possible for the visa to be granted to individuals several times. Guidance to employers on these provisions needs to be transparent.

Many applicants for the visa subclass 456 are also eligible for the eVisitor (visa subclass 651) and ETA (visa subclasses 956 and 977). Those visa subclasses enable extremely rapid approval of visas for nationals of certain countries. The visa subclass 456 should preserve an application process that is equivalent to the eVisitor and ETA systems.

Also, whilst those application processes are available to some, many multi-national engineering consultancy firms employ highly specialised people from non-eVisitor and non-ETA countries. Development of options that offer similarly efficient processing times for highly-skilled workers from a wider range of nations should be investigated. We would be pleased to discuss our priority needs in more detail with the Department.

The ability to bring specialised professionals to Australia for short periods of work will ensure that national infrastructure design and construction will be less susceptible to delays and other inefficiencies caused by a skills shortage.

The Department is aware that Australia is in a battle for global talent. The Short Stay Activity Visa (SSAV) proposed by the government in its 2010 discussion paper, *Simpler Visas: Implementing a simpler framework for temporary residence work visas*, will expose employers to a pool of highly qualified professionals who could become sponsored under longer term work visas.[70]

Consult Australia is aware that under current rules workers can, once in Australia under a short-term business visa, apply to remain in Australia for a longer period of time under other visa types such as the visa subclass 457. Clear DIAC guidelines would help industry understand the extent to which this pathway to long-term employment may be utilised.

In the battle for global talent, especially for those professions that are in short supply (such as engineering professions), Australian employers need flexible tools to find and recruit suitable workers. Visa rules and DIAC policies should enable SSAV holders to transfer to longer term visa classes, such as the visa subclass 457.

The SSAV rules must not discourage transferring from the SSAV to a longer term visa. Engineers are in the fortunate position of being in demand across the world. Any unnecessary processes that delay temporary or permanent migration, or lead to uncertainty over the length of time that a worker can stay in Australia, pushes skilled migrants to competitor countries.

The SSAV will enable highly skilled workers to come to Australia for short-term work. There should be no unnecessary barriers to their transferring to longer term visas and contributing to the economic growth of Australia.

Recommendation 20: The visa subclass 456 (and similar) should allow all types of work to be performed within those professions identified on the Skilled Occupations List and permit work for the full visa validity period, which should be at least three months, and clear guidance on visa rules is required.

Recommendation 21: The visa subclass 456 (and similar) should include an application process that is equivalent to the eVisitor and ETA systems in terms of ease of use and swiftness of approval. Development of options that offer similarly efficient processing times for highly-skilled workers from a wider range of nations should be investigated.

5.5.2 Realistic language standards

Anecdotal evidence suggests that many migrant professional engineers are in Australia but working in jobs that do not utilise their skills. This includes jobs as divergent from engineering as taxi driver or retailer. Consult Australia discussions with the NSW Adult Migrant English Service (AMES), an agency of the NSW State Government, indicates that many of these people have arrived in Australia on

skilled permanent independent migrant visas. The English language standards for these are currently an International English Language Testing System (IELTS) score of 6.

Migrants arriving on an *employer* sponsored visa will have English language skills that meet the requirements of their immediate employer. However, in designing English language standards for *independent* skilled migration applicants, it is important to consider the usual needs of the main employer base.

Professional engineers working for consulting firms usually require a minimum score of 7 in each of the four components of the International IELTS test to effectively secure future employment in the Australian market. For independent skilled migration, however, the English language threshold is a minimum score of six. This has led to a pool of very skilled professional engineers migrating to Australia and not being able to secure work in their chosen field due to a disconnect between English language requirements for visa purposes and for industry needs.

It may be tempting to bolster skilled migrant numbers by reducing the English language threshold, but Consult Australia recommends that English language standards are in fact increased for skilled independent migrant professional engineers to an IELTS score of 7.

Recommendation 22: Increase the English language requirements for professional engineers applying for a skilled independent migrant visa to an IELTS score of 7.

5.5.3 Visa subclass 476 and the list of recognised overseas institutions

The visa subclass 476 enables recent graduates of engineering degrees to work in Australia for any employer on a full time basis. DIAC has reported that 76 per cent of all holders of the visa subclass 476 are later granted a permanent General Skilled Migration visa--this is a very high rate of conversion.[71] That conversion rate indicates that the caliber of 476 visa holders coming to Australia is very high and in demand.

Unfortunately, to be eligible for the visa subclass 476, the applicant must have graduated from a university that is on the "list of recognised overseas institutions" (the list). The list does not fully represent all institutions that provide engineering qualifications of substantial equivalence to those provided in Australia. Furthermore, although the list is updated in consultation with Consult Australia and other industry associations, these organisations are not best placed to provide such advice.

Consult Australia recommends that the list be aligned with degree programs recognised under the Washington and Sydney Accords. The Accords are international agreements managed through the International Engineering Alliance, an umbrella body representing national engineering associations such as Engineers Australia.[72]

The Washington and Sydney Accords are the preferred methods for verifying the equivalence of engineering and engineering technologists programs, with a focus on specific programs of study offered at particular institutions rather than the institution as a whole. They provide an industry-recognised list of overseas programs of substantial equivalence to those delivered in Australia.

National engineering representative bodies may apply for their country to become signatories to the Accords. The representative body making an application on behalf of each country must verify that it

is the appropriate organisation for that country. For example, the Australian representative body is Engineers Australia.

The potential benefits to industry are large. To illustrate why, the treatment of British graduates is examined with the use of data supplied by DIAC.[73] The United Kingdom is a signatory to the Accord and has supplied the equal third greatest number of graduates under the scheme to date (53). However, just 10 of a possible 115 institutions with accredited bachelor of engineering courses are on the DIAC list of recognised institutions. That represents just 8.7 per cent of potential British institutions. Using these figures, if 100 per cent of accredited institutions were eligible, some 609 graduates from British institutions could have applied for and been granted a visa over the same 40 month period. In the longer term, and applying the 76 per cent conversion rate experienced to-date, that could lead to an extra 462 young permanent migrant engineers each year from Britain alone.

The table below shows similar results for a selection of countries that are signatories to the Washington accord, have institutions on the list of recognised overseas institutions, and have previously supplied nationals under the visa scheme. All except Canada are also on the list of top 10 citizenships of migrants to Australia in 2009-10.[74]

Country	Visa grants Sep 2007 - Dec 2010	Institutions recognised by DIAC	Institutions accredited under the Washington accord	Potential Number of visa grants	Potential number of permanent migrants each year
Canada	32	9	43	153	116
Malaysia	11	8	33	45	34
South Africa	12	4	10	30	22
UK	53	10	115	609	462
USA	8	16	386	195	148
Totals	**116**	**47**	**587**	**1,032**	**782**

Based on 2008 figures for domestic graduates of bachelors' degrees in engineering or related technology courses,[75] this would give a four per cent boost to the number of graduates available to industry.

The high level of conversion from the visa subclass 476 to a permanent visa also suggests that the calibre of applicant utilising the visa subclass 476 is very high and welcomed by industry. Encouraging such high calibre and sought after young professional engineers to work and live in Australia on a permanent basis would make a significant contribution to easing the skills shortage.

Consult Australia has been cooperating with the Department to introduce these reforms since late 2010. Effecting change would be simple and we urge the Government to introduce the reforms soon.

Recommendation 23: Reform the eligibility criteria for the visa subclass 476 so that the list of eligible overseas institutions is aligned to the Washington and Sydney accords.

5.5.4 LAFHA

The proposed reform of the fringe benefits tax treatment of living-away-from-home allowance (LAFHA)[76] will have a significant impact on Consult Australia members' abilities to attract and retain the skilled workers necessary to meet the demands of the Australian economy. Consult Australia is concerned with the impact that reforms to LAFHA will have on temporary skilled migrants employed by its members.

One Consult Australia member with operations in 160 countries reports that, for many negotiations with potential recruits, "the tax free status of the LAFHA is the differentiator." They anticipate competition for talent from Asia, South America and Canada will increase if the proposed LAFHA reforms proceed. This is because the skilled engineering workforce operates at a global scale, and the skills shortage exists in many countries.

The immediate impact of the proposed changes will be severe for individual workers who have made financial commitments (such as rental contracts, or career changes for spouses), based on the benefits available from the existing LAFHA arrangements. They will be forced to reconsider their situation and it is expected that many will choose to return to their country of origin (a brain-drain for Australia), or incur a sudden drop in take home salary.

For example, URS, a Consult Australia member, shared the stories of two employees who have relocated to Australia but, due to the poor cost benefit of renting or selling their home, maintain residences in their country of origin. Hyder, another member firm, shared the example of an employee whose wife is expecting a baby. They have made financial plans based on the expectation of continuing to receive LAFHA and any sudden change to the Fringe Benefits Tax rules will have an immediate and severe impact on their lives. These are not isolated instances.

The proposed reforms state, "the changes will ensure a level playing field exists between hiring an Australian worker or a temporary resident worker living at home in Australia, in the same place, doing the same job." However, the impact of relocation costs and public school education fees for 457 visa holders is not considered. Also, temporary residents are unable to access benefits available to a permanent resident including Family Tax benefit A and B, and the child care rebate. These factors must be considered before a revised LAFHA framework is finalised.

Companies forced to offer higher salaries to retain the services of temporary migrants affected by the proposed reforms will incur unplanned increases to payroll tax, workcover and superannuation liabilities. This will increase costs to business that may not be able to be passed on to clients. Pay parity issues with the local workforce will also emerge.

An examination of payroll tax and superannuation liability changes for one Consult Australia member that employees over 250 overseas workers who receive LAFHA benefits offers an example of this impact. If each employee requires a conservative $10,000 boost to their base salary to keep them in Australia, at a NSW payroll tax rate of 5.45 per cent this leads to an additional payroll tax liability of $136,250. The employer superannuation payments would also increase by $225,000.

When extrapolated across the entire workforce, this becomes an enormous cost to industry. Employers need time to plan for these kinds of cost increases. For example, firms will have entered service contracts based on current wage structures will struggle to deliver projects at planned costs without entering negotiations for fee adjustments. Any reforms to LAFHA that increase payroll tax and other employment liabilities must have a phased introduction.

Recommendation 24: The fringe benefit tax (FBT) treatment of LAFHA benefits should be reformed so temporary resident employees will be required to maintain a home for their own use in Australia or overseas (which they are living away from for work) to access the concession, and in those cases the expenses will need to be substantiated.

Recommendation 25: If reforms to the LAFHA benefit are implemented, there should be a phased introduction to ensure that those receiving it should continue to do so until the end of their current temporary work visa validity period. A phased introduction will also ensure that salaries, payroll taxes, workers compensation and superannuation liabilities for skilled migrants do not suddenly increase and impose a significant and immediate burden on industry.

6. Conclusion

There is widespread agreement that there is an engineering skills shortage in Australia. Consult Australia has provided an overview of the scope of the problem and identified the several causes that, together, have created the shortage experienced today. Twenty-five recommendations are provided that, taken together, will break the long-term cycle of private sector recruitment difficulties and public sector infrastructure delivery delays.

Consult Australia looks forward to meeting with the Senate Committee to expand on the issues and solutions presented in this submission. Consult Australia can also facilitate discussion with industry to hear the concerns of employers and their vision for the future of the engineering workforces.

To discuss this important issue further, please contact Megan Motto, Consult Australia Chief Executive, on , or contact Jonathan Russell, Senior Policy Advisor for the skills portfolio, by e-mail

7. Glossary

ABARES: Australian Bureau of Agricultural and Resource Economics and Sciences

ACED: Australian Council of Engineering Deans

ANET: Australian National Engineering Taskforce

APESMA: Association of Professional Engineers, Scientists and Managers, Australia

APCC: Australasian Procurement and Construction Council

ASX: Australian Securities Exchange

ATSE: Australian Academy of Technological Sciences and Engineering

BIM: Building Information Modelling

COAG: Council of Australian Governments

DEEWR: Department of Education, Employment and Workplace Relations

DIER: Department of Infrastructure, Energy and Resources

EOWA: Equal Opportunity for Women in the Workplace Agency

FBT: Fringe Benefits Tax

HREOC: Human Rights and Equal Opportunity Commission

IELTS: International English Language Testing System

IOO: Industry Outreach Officer

IPD: Integrated Project Delivery

ISC: Industry Skills Council

LAFHA: Living Away From Home Allowance

NERB: National Engineering Registration Board

NSW AMES: NSW Adult Migrant English Service

NWDF: National Workforce Development Fund

NILS: National Institute of Labour Studies

OECD: Organisation for Economic Co-operation and Development

PV: Project Value

SkillsDMC: Drilling, Mining, Quarrying, Civil Infrastructure Industry Skills Council

SNE: Seamless National Economy
SSAV: Short Stay Activity Visa

VET: Vocational Education and Training

WRC: Workplace Research Centre

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