2012

The shortage of engineers.

A submission from APESMA

The Association of Professional Engineers, Scientists & Managers, Australia

Submission to the Senate Education, Employment and Workplace Relations Committees inquiry: The shortage of engineering and related employment skills.

Contents

Introduction

It is with pleasure that we take the opportunity to make a submission to the aforementioned inquiry on behalf of the some 23,000 members of the Association of Professional Engineers, Scientists and Managers, Australia (APESMA).

The matters before this committee are critical to the future of Australia. In a time when we have felt acutely the mammoth task which is before us to rebuild, repair and invest in infrastructure due to natural disasters, population growth and the pressures of the resources boom, issues relating to the procurement of infrastructure and the shortage of the key enablers of infrastructure – engineers – have never been more topical. This investment in infrastructure must be undertaken with due reference to real value for taxpayers over the life of these projects, which includes workforce development initiatives through co-investment by industry and government. Over time, these measures would ease the financial pressures on government by reducing cost over-runs and delays in project delivery.

To this end, APESMA supports the recommendations made in the submission by the Australian National Engineering Taskforce (ANET) in *Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage*.

We believe that these recommendations, if implemented, would represent a systemic public policy response to the engineering skills shortage and its impact on the effective procurement of infrastructure in Australia.

The consequential benefits of such a response will be to ensure safe, reliable and secure community and economic infrastructure, in particular through road, rail, energy and water networks and local government services.

In turn, an adequate supply of skilled engineers will improve productivity, innovation and the international competitiveness of Australian economy. Engineers are critical to finding solutions to the problems of our time and our future: to reduce carbon emissions; create an innovative manufacturing sector; and to solve problems we are yet to consider.

Engineers are also a source of significant export earnings for engineering services and play a critical role in ensuring community and environmental safety. For Australia to be a smart, innovative country we must ensure we have an adequate supply of engineers.

This submission seeks to elaborate on some of the recommendations made within the ANET report and provide further evidence to support their adoption. All of these issues are referenced within the ANET submission and can be taken as the source for comments within much of this submission. APESMA is proud to have played a key role in the establishment of ANET. In the interests of our membership, we have made some separate recommendations throughout this submission.

Critically for the committee, APESMA has undertaken research among our professional engineer membership on the recommendations contained within the ANET submission, across all engineering disciplines and in both the public and private sectors. The results of this survey are carried throughout this submission.

This submission is divided into eight topics areas:

1. Scale of the problem
2. Valuing the profession
3. Workforce development and diversity
4. Infrastructure procurement
5. Resource developments and related projects
6. Manufacturing
7. Low carbon economy and energy efficiency
8. Public sector engineers

Within this structure we propose actions that will improve supply, retention and development of the workforce through education, improved public awareness, leverage of public investments and resource developments, improved participation of women and migrants, enhanced contributions to innovation, productivity and energy efficiency and improved industrial relations arrangements.

1. Scale of the problem[1]

The shortfall in domestic engineering capacity and capability is complex but beyond dispute. Skills Australia has consistently placed engineering at the top of the list of occupations requiring interventions in order to avoid risks to the economy[2]. We import more engineers and more engineering students than we produce[3], vacancy rates are around 59 per cent [4], and falling rates of maths and science students means the number of eligible candidates for engineering careers is falling.

At the same time, some engineers are underemployed. Many graduates find it difficult to find first time employment in engineering as businesses compete for more productive experienced engineers. Many migrant engineers also find it difficult to get engineering jobs, often because of language problems and cultural barriers. Up to 90% of applicants for civil engineering positions have been deemed unsuitable by employers, presumably due to a lack of experience and technical expertise[5]. In the manufacturing sector engineers are also often subject to trends of offshoring design and production[6]. Similarly, a worrying trend has emerged in the resources sector in recent years where engineering design work is regularly sent to high cost centres in the northern hemisphere leaving highly skilled local engineers out of work. Oddly too some engineers find themselves the victims of the short-sighted decision making of state government departments or government business enterprises who continue to routinely shed engineering jobs.

While these circumstances are real and highlight the complexity of the problem, the shortfall is nevertheless widespread and entrenched. In the roads sector alone it is predicted that we will need to double the existing workforce by 2018[7].

[1] This section draws extensively from the Australian National Engineering Taskforce report, *Scoping our Future* ANET, 2010
[2] Skills Australia Specialised Occupations List (SpOL) 2011
[3] Kaspura, A (2011), *The Engineering Profession: A Statistical Overview, Eighth Edition, 2011,* Engineers Australia p39-59
[4] DEEWR 2011, *Skills Shortages List*. 2011 pg 26ff
[5] Ibid pg 29
[6] See pg 14ff
[7] BIS Shrapnel *Australia and New Zealand Road Capability Analysis 2009-2019*, for AUSTROADS, 2010

All sectors are at risk. In infrastructure, asset owners risk becoming uninformed purchasers of services, while consultants and construction companies struggle to establish and retain the engineering teams they need in order to compete successfully for work.

Poor scoping of projects is an often cited problem that results in costly reworking, delays and disputes. The Australian Constructors Association estimates that for every billion dollars spent on major projects up to 1/5 is wasted due to poor project scoping[8].

The situation is chronic in local government where wage rates demonstrate how public sector employers struggle to compete[9]. In the water, electricity, and rail sectors too asset owners and operators have generally run down their direct engineering workforces and now rely on consultants and contractors. In contrast, commercial providers of engineering services are competing in an extremely tight labour market where "poaching" of staff tends to prevail over investment in workforce development. This is the reality of an infrastructure procurement market gone bad.

Communities, consumers, taxpayers and business suffer costly and unreliable infrastructure; construction companies and consultants suffer uncertainty, disputes and unsustainable workforce practices; asset owners and governments pay too much for too little; engineers struggle to find security and reward in a profession dedicated to excellence and community service, and the Australian economy is held back by unrealised productivity and innovation potential. No one wins from this situation.

Recommendations[10]

1.1 That the Commonwealth adopts a target for an increased number of domestic engineering graduates, with an aim to increasing the available domestic engineering workforce, including targets for graduates at all relevant levels of the Australian Qualification Framework (AQF) from programs provided by both Vocational Education and Training (VET) and higher education.

[8] *Scope for Improvement*, 2008 Blake Dawson, for the Australian Constructors Association
[9] See pg 16ff
[10] Australian National Engineering Taskforce (2012) Recommendations, *Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage.* Sydney, NSW

1.2 That the Commonwealth increase its engineering capacity to ensure that it is an informed purchaser of engineering infrastructure, in line with the recommendations of the Building the Education Revolution Implementation Taskforce, and establish a small Procurement Unit, residing within the Department of Finance and Deregulation.

1.3 That the Commonwealth, through a Procurement Unit conducts an audit of its procurement capability across all agencies.

1.4 That the Commonwealth take to the relevant Standing Council of COAG a proposal that all States and Territories conduct their own audit, to ensure that the community is receiving value-for-money in infrastructure delivery.

1.5 That, following this audit, the Federal Government put in place a series of requirements for baseline engineering competence and capacity in jurisdictions, including local government, for the management of projects funded by the Federal Government.

1.6 That training programs for labour market program be developed to support engineers who need to transfer to another sector where there is greater demand.

2. Valuing the profession

Consistent feedback from APESMA's professional engineer members demonstrates that they feel that the pivotal role they play in Australian society is undervalued by the public and by government. As we have pointed out in previous submissions, successive governments at a state level have attached value to public sector professions through increasing their wages, running awareness and recruitment campaigns and through the avenues provided by day-to-day public discourse. Nursing and teaching are the two most obvious examples[11]. No such investment has been made in the engineering profession. Indeed, governments have outsourced much of their engineering capability to the private sector through the adoption of procurement models such as 'design and construct' and public-private-partnerships. As such, what has evolved is a situation where governments have become uninformed purchasers of engineering services[12].

The important role that engineers play in Australia should be a focus of government, and should be subject to a similar public policy focus as applied to other professions. For example, for science there has been the establishment of the Office of the Chief Scientist, and a similar office for architecture in the Office of the Government Architect[13]. Implicit in this is the comparative under-valuing of engineering research and practise as a profession. Engineers bring science to reality both in the research labs and out in the field, and for too long have been an afterthought in the development of public policy. An increased focus on the public importance of engineering will also help improve student respect for science and mathematics and lift participation rates in these subjects at school.[14].

A critical shortage of engineers limits the nation's ability to innovate and transition to a low-carbon economy. The implied under-valuing of the profession must be redressed by lifting the status of the profession, its visibility and the over-arching infrastructure which supports it by addressing the supply of engineering into education and training.

[11] Australian National Engineering Taskforce (2012), p33. *Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage.* Sydney, NSW.
[12] Ibid., pp 43-50.
[13] Ibid., p39.
[14] Ibid., pp32ff.

This will not be easily achieved given the absence of any existing dedicated support for the profession, as is demonstrated by the fact that engineering training is disaggregated across at least six separate Industry Skills Councils (ISC).

In a pure demand driven education and training system measures which will improve the visibility of the profession, coupled with a concerted effort to ensure that education and training offers are suitable to match industry demand are vital. These would support demand driven solutions. The success of such measures will be assured by the adoption of targets for an increased number of engineering study graduates.

In the survey of our engineer membership, the following results relate to assigning greater value to the profession:

- 86 per cent of our professional engineer membership supports the idea to establish an Office of the Australian Engineer, to lift the profile of the profession and act as an adviser to government.
- 77 per cent support the idea of establishing an Engineering Advisory Council. This body would be set up to research skills needs and develop workforce development strategies for the engineering workforce across all industries. This is described as the Australian National Engineering Workforce Development Council in the ANET submission.
- 77 per cent agree that a target should be adopted for the number of engineering graduates. 13 per cent were unsure[15].

Given the strength of support for these proposals from our members, we are confident that these initiatives would be supported by the engineering fraternity and the wider community.

Recommendations[16]

2.1 That the Commonwealth establishes an Office of the Australian Engineer, reporting to the Prime Minister. The responsibilities of this office would be:

[15] APEMSA (2012). *Survey of membership*. Melbourne, Vic.
[16] Australian National Engineering Taskforce (2012) Recommendations, .*Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage.* Sydney, NSW

2.1.1 To develop a marketing and promotion program for school teachers, students and the wider public on the engineering profession, the wide variety of important roles that engineers play in Australian society and their presence in leadership roles. Materials should be developed for early school-age that introduces engineering, and targeted materials at all school ages;

2.1.2 To advise the Chief Scientist, state governments and to work with the Australian Curriculum Assessment and Reporting Authority to increase engagement in practical engineering programs at a school-age;

2.1.3 To assess the effectiveness of current engineering engagement programs for school-aged students, and to oversee the integration of effective programs in the curriculum across Australia;

2.1.4 To work with higher education providers and the Federal Government to ensure the implementation of the recommendations of the 2011 ACED report (Godfrey and King, *Curriculum specification and support for engineering education: understanding attrition, academic support, revised competencies, pathways and access*), as well as recently completed recommendations carried in ANET publications;

2.1.5 To commission such research as is necessary to the activities of the Office;

2.1.6 To advise the Commonwealth on the effectiveness of current funding models for VET and higher education, and to try and ensure that supply is reflects demand across industry, and across disciplines;

2.1.7 To oversee the development of a national registration scheme for professional engineers, and to ensure such established boards under state legislation perform satisfactory marketing of the benefits of registration in their jurisdictions;

2.1.8 To increase diversity in the engineering workforce and attract and retain experienced engineers;

2.1.9 To work with Commonwealth to ensure that there are informed purchasers in the procurement process and that procurement agencies have the appropriate range of engineering skills internally to receive value for investment from their purchasing decisions.

2.2 That the Commonwealth establishes the Australian National Engineering Workforce Development Council, which is systemic in the context of Commonwealth funding for training and fulfils the role of an Industry Skills Council for the profession, while acknowledging its difference from trade-based occupations. Consideration could be given to the aggregation of other related professions into the new body. The current membership of ANET, with representatives from the VET sector and industry would comprise the membership. The Commonwealth could then work with the newly established Council to ensure that supply is meeting demand, and to assist in establishing dialogue between all stakeholders to ensure that pathways between VET and Higher Education are both clear and efficient.

2.3 That the Commonwealth support the policy proposals by the Australian Mathematical Sciences Institute to promote the study of mathematics at secondary and tertiary level as being intrinsic to the aim of increasing Australia's engineering skills base.

3. Workforce development and diversity[17]

The engineering profession is characterised by being overwhelmingly male, over-worked and of a higher mean age than the rest of the workforce. This is evidenced throughout ANET's *Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage*. Under-employment of our migrant workforce also constitutes both an ongoing issue for government, and presents an immediate opportunity.

Any strategy must draw on the valuable contribution women can make to engineering. To increase their participation we need to embed greater flexible workplace practices. The Commonwealth Government is in a position to ensure this is the case through using the leverage it holds due to its massive infrastructure investment.

APESMA's biannual survey *Women in the Professions: The State of Play, 2009-10* concluded that priority attention was needed to address workplace culture in male dominated professions to remove barriers to the full participation of professional women in the workforce.

> *Despite widespread reports of skills shortages in key professions and the difficulty that employers face in retaining key professional staff, the survey findings reveal that strategies to attract, retain and promote women professionals may be hampered by cultural barriers and inflexible working practices.p9*

In this report, 47.4 per cent of respondents to the survey stated that their career progression had been affected by workplace culture and 71.6 per cent of engineer respondents said taking parental leave was likely to be detrimental to their career.

[17] Here we refer to two principle sources: United Nations' *Women's Empowerment Principles – Equality Means Business*, http://www.unglobalcompact.org/Issues/human_rights/equality_means_business.html

Male Champions of Change analysis in *Our experiences in elevating the representation of women in leadership: A letter from business leaders*
www.humanrights.gov.au/sex_discrimination/publication/mcc/index.html

Nearly 40 per cent of respondents had experienced bullying, 38 per cent had experienced discrimination and 20 per cent reported experiences of sexual harassment. Nearly a quarter of respondents expected to leave their profession within five years.

APESMA's professional women members tell the same story that women in science, engineering and technical professional roles tell around the world. The existing rich body of research has identified the problem and chronicled some attempts to find solutions. Since the publication of *The State of Play, 2009-10*, APESMA's research has found that national and international women's organisations, governments, employers, the education and research sector are all expressing a real 'appetite for change'. Best practice models are being developed across industries and more recently in engineering.

APESMA's National Women's Strategy aims to create genuine change in the organisational culture of male dominated technical industries. A key element of this strategy will be to lead a project team across consulting, construction and asset owner employers to identify best practice and drive implementation. The Commonwealth can assist this project through funding, in kind support and procurement policy.

A strategy requiring gender diversity in contractor teams, such as the SA Government's 15 Percent Policy, should also be considered for all government infrastructure investments to drive best practice implementation. Such a strategy should consider gender specific training and development requirements and targeted retention measures.

Migrant engineers also need support. It is unacceptable that while we produce only a third of our supply of engineering graduates through Australian-born domestic graduates, we allow a situation to continue where our migrant workforce is unemployed at a substantially higher rate than our domestic workforce. As outlined in ANET's *Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage*, increased support for migrant engineers is required to ensure that this important segment of the workforce is utilised to its fullest. In our view, employer advocates and unions are in the best position to provide this support, as these are the bodies that are best placed to know the experience of migrant engineers and those employing them.

The provision of greater assistance for migrant engineers is an idea that 82 per cent of APESMA's professional engineer membership support. More than half of those surveyed agreed that workforce diversity plans should be required for consortia bidding for government-funded infrastructure projects.

Recommendations

3.1 That the wholly owned training arm of APESMA, the Chifley Business School, be funded to develop and deliver orientation programs for migrant engineers;

3.2 That a project team involving APESMA and Consult Australia work with consulting, construction and asset owner employers to improve women's participation in engineering by identifying best practice and publishing guides. That the Commonwealth assists this project through funding, in kind support and procurement policy.

4. Infrastructure procurement

Current common methods of procurement in Australia are playing a role in driving the shortage of engineers.

The design and scope of projects is now being performed largely outside government agencies and often done so unsatisfactorily and/or with unintended consequences. This has driven a lack of capacity in government agencies, increasing work intensity, volume and the ability to properly assess scoping and design. All these factors have combined to result in governments making poor decisions about projects, resulting in cost over-runs and project delays.

In outsourcing engineering capacity to the private sector, government has also abrogated the responsibility for training and professional development which in the past was performed and lead by their agencies. The private sector is constrained by the skills shortage in the amount of training they can provide as their internal workforce is numerically restricted and under increased pressure. Current procurement models provide no incentive for the provision of training or workforce development. As referred to ANET's *Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage*, current procurement models are driving a cycle of under-investment in the engineering profession.

Additionally, under-investment has driven increasing numbers of people out of the profession. The cumulative result is a failure to foster innovation, collaboration and skills development through cross-fertilisation of knowledge[18].

This is a responsibility that the Federal Government must take and lead. The failure of state jurisdictions to properly discharge their functions in the implementation of Building the Education Revolution, as identified in the ANET submission and the BER Implementation Taskforce Final Report speaks directly to the failure of the State based engineering capability.

[18] ANET (2012), pp43 ff. *Realising an Innovation Economy*.

This needs to be redressed to ensure that the Federal Government is deriving value for money from its infrastructure investments made on behalf of the Australian people.

There is a great need to develop collaborative models and repair the internal engineering capacity of both state and Commonwealth government agencies. This is a common theme from both the public and private sector, and is backed by a vast amount of research driven by what is widely accepted as market failure in Australia.

In many cases we have a situation where an increased investment in engineering and procurement skills would be returned multiple times over in reduced capital outlay or project costs. Yet often this investment is not made because it poses an increase in wages costs to the asset owner. Such an investment would, in reality, provide an overall saving for agencies and taxpayers. However, the logical decision is not being implemented because of inadequate assessment and protection of the public interest.

An overwhelming 89 per cent of our membership believes that methods to use government procurement and infrastructure investments for workforce development and retention of engineers need to be developed and that a government procurement office should be established to set benchmarks for engineering skills needs in government projects. Again, the profession backs the recommendations of ANET[19].

Recommendations[20]

4.1 That a Commonwealth Procurement Unit conduct a detailed examination of current procurement models in Australia, and assess the merits, suitability, longer term consequences of and relative risks associated with each method across all ranges and scope of projects. This research should inform the development of baseline requirements in procurement for Commonwealth funded projects by providing a portal through which procurement methods are assessed on a project-by-project basis.

[19] APEMSA (2012). *Survey of membership*. Melbourne, Vic.
[20] Australian National Engineering Taskforce (2012) Recommendations, .*Realising an Innovation Economy - A practical roadmap to ease the Australian engineering skills shortage.* Sydney, NSW

4.2 That for all Commonwealth-funded projects, procurement criteria and incentives should be utilised to support and encourage additional training in successful bidders, including the revival of graduate programs and cadetships.

4.3 The a Commonwealth Procurement Unit should, in consultation with the Australian National Engineering Workforce Development Council, identify models of procurement which support and provide incentives to the private sector to undertaking additional training. These procurement criteria should provide recognition of firms tendering who are already undertaking substantial training. Training arising from procurement criteria and incentives should be readily and simply identifiable. The models developed should recognise training plans and programs could go beyond the term of the project.

4.4 Similar to traineeship funding, government should subsidise or provide tax incentives for industry-sponsored cadetship programs and other workplace-based programs undertaken by engineering students.

4.5 The Commonwealth Government should consider the introduction of 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.

5. Natural resource development and related projects

While oil, natural gas and other resource developments make a large contribution to national social and economic prosperity governments must ensure that sovereign assets are used for more sustained productive development. In particular, where governments exercise rights on the development of resource leases they must insist that locally based skills and businesses are well-placed to participate in these developments.

Further, all participating businesses in such projects, must be required to undertake workforce development activities as a condition of involvement and such activities must be reported and outcomes measured and assessed. Likewise, governments must benchmark workforce skills needs arising from resource sector developments and require investment and workforce development plans.

Recommendations

5.1 In negotiating resource development projects governments require project proponents to commit to specific workforce development investments associated with all aspects of the projects. While not limiting the scope of funded activities these investments would typically go to employment/sponsorship of cadets and interns; training and professional development activities for engineer employees and consultants/contractors; mentoring programs.

5.2 That such investment and activities be measured and assessed by the proposed Australian National Engineering Workforce Development Council.

5.3 That the Commonwealth fund APESMA and industry partners to develop a proposal for the establishment of resource sector engineering design hub, or centre of excellence, in Australia.

6. Manufacturing

A strong national economy needs a strong manufacturing sector. APESMA welcomes state and Commonwealth Government action to support the manufacturing sector, including the automotive industry. We firmly believe that this sector requires a well-developed engineering workforce in order to innovate and compete internationally.

It will become increasingly important for local manufacturing to invest in the engineering workforce in order to find and optimise new opportunities. A highly-skilled innovative and productive engineering workforce will provide the means for creating a truly highly-skilled economy. APESMA supports the further action and initiatives of state and Commonwealth Governments to develop this workforce through measures such as research and development assistance and other targeted labour market adjustment programs.

Recommendations

6.1 Structural adjustment funding is provided to at-risk manufacturing sector engineers to ensure their skills development for continued employability, including assistance with transitioning between disciplines and industries.

6.2 That the Commonwealth fund and support manufacturing research and development activities in line with broader innovation and productivity targets.

7. Low carbon economy and energy efficiency

Engineers and technical professionals will design, build and maintain the low carbon economy of the future. Ensuring our economy is supplied with sufficient technical expertise to solve the myriad problems associated with transforming our economy is a legitimate role for government. Our engineering and technical professional workforce will need to be supported to ensure demand-side energy solutions are found, implemented and optimised commercially. Similarly, energy supply solutions will be best developed by an engineering workforce properly supported and developed by governments and business. At the moment, the shortfall in engineering capacity in major energy transmission businesses means that vital maintenance programs are estimated to be running behind by up to five years. This means that existing infrastructure is at risk rather than being developed and where necessary replaced in order to ensure a reliable and more efficient service.

APESMA welcomes Commonwealth Government action to assist transitions to a low carbon, energy efficient economy and calls for more specific interventions to support the engineering workforce required to find and implement solutions. Such measures would include research and development assistance and labour market adjustment programs targeting at-risk sectors, such as energy transmission.

Recommendations

7.1 The Australian National Engineering Workforce Development Council develops a workforce development strategy for energy sector engineers.

7.2 The Australian National Engineering Workforce Development Council develops training packages and professional development programs for best practice energy efficiency measures for business.

8. The critical role of public sector engineers

The Commonwealth's public sector engineering workforce is critical to ensuring that the Government can drive the delivery of a low-carbon economy and meet its obligations to provide for the infrastructure, defence and prosperity of Australia. The ability to deliver the critical assets for our defence capability is compromised by a lack of engineering capability.

The critical engineering skills shortage faced by key Commonwealth Government agencies including the Defence Material Organisation (DMO), and the Department of Defence generally is being made worse by long-standing disputes over wages and conditions.

It is our submission that state and Commonwealth governments and agencies work with APESMA to ensure industrial settlements that enhance the attraction and retention of engineers and related science and technology professionals and that this process be informed by the work of ANET and the proposed Australian National Engineering Workforce Development Council.

These matters apply equally to state government agencies, government business enterprises and other infrastructure asset owners, all of which are experiencing equally detrimental impacts that require similar solutions.

Issues that need urgent attention include:

a) The productivity dividend, which tends to have a very negative impact on government agencies ability to attract retain and develop engineers, scientists and technical professionals. The impact of this policy also undermines the capacity of agencies to ensure intergenerational transfers through the mentoring of new engineers by the ageing public sector workforce.
b) The public sector/private sector wage gap which discourages entry into the public service by the best and brightest graduates. Engineers in public sector agencies are vital in providing advice on design and scoping of projects, yet the value of the average

remuneration package paid to an experienced engineer in the public sector is 30 per cent less than that paid to an experienced engineer in the private sector.[21]

c) The disparity is even more pronounced when looking at components of the public sector. An experienced engineer working in a state public service earns an average remuneration package 36 per cent lower than their private sector counterparts, while experienced engineers working in local government earn an average remuneration package that is 41 per cent lower than the private sector rewards similarly experienced engineers [22].

As the Chief of Navy, Vice Admiral Ray Griggs said late last year, we have for far too long "viewed engineering as an overhead and not as a mission enabler". Overheads end up being cut and not invested in. It is time for change.

The Commonwealth and state governments can take the lead by bringing the pay of their engineers into line with that of the private sector, and by increasing their overall engineering capacity in both policy and program areas. It is critical that there is an in-house engineering capability across all portfolios that deliver and design policies and programs that are underpinned by science and engineering. This measure, coupled with funded mentoring programs in public sector agencies and the creation of a service-wide community of engineers would serve to ensure government engineering capacity is restored, that it becomes an informed purchaser of infrastructure and related services and provides surety to the private sector that they will not be subject to protracted disputes and adversarial behaviours.

Providing a clear career path, definitions, support and protecting the integrity of the public sector engineering workforce is vital if we are to keep the workforce both engaged and growing. Industrial instruments should retain clearly articulated classification structures for engineers.

A developed engineers' classification structure should contain the following elements:

- A clear path through undergraduate and graduate programs, through developing expertise to senior specialist professional engineers;

[21] APESMA wage survey (2011). www.apesma.com.au last accessed 25 February 2012.
[22] ibid

- Clear descriptors as to what engineers actually do that, when linked with examples, becomes a useful tool for awareness raising;
- Recognises the status of engineers and places parameters around the use of the term that assists in protection of both the occupational identity and skill set of engineers and also the integrity of the engineering profession;
- Guards against the dilution of engineering work by giving equal status at senior levels to different streams such as professional engineering on the one hand or management roles in the other;
- Provides provision for mentoring and supervision enabling succession planning and controlled career development;
- Protects the public by preventing non-specific generic structures allowing for substitution of engineers where shortages exist
- Recognition of continuing professional development and chartered professional status (or registration where required).

Given the importance of engineers, providing career paths and enhancing the status of the profession in the public sector is a good investment. An effective professional engineers salary structure also allows for accurate classification and market remuneration of engineers. Currently many sectors use third party "job value points" based systems to assess roles, however these systems fail to recognise the depth of technical skill and experience that engineers require. These systems also fail to take into account the severe supply and demand forces that currently affect engineers when indicating what remuneration is suitable.

In order to create the conditions through which these objectives may be achieved the Commonwealth and state governments can play a pivotal role in facilitating the process.

Firstly the Commonwealth can indicate its support for a Commonwealth wide separate classification stream for technology based professionals which reflects the elements of the classification structure outlined above and work with APESMA to implement it across the service.

Secondly at an agency/departmental level the Commonwealth support where necessary, separate bargaining arrangements for professional engineers in circumstances where the implementation of Commonwealth policy in regard to the retention and attraction of Professional Engineers is inhibited by the enterprise bargaining arrangements which may currently apply.

Recommendations:

8.1 That the Commonwealth Government supports a public service wide classification stream for technical professionals.

8.2 That the Commonwealth commits to ensuring there is sufficient engineering capability across all portfolios to allow optimum provision of engineering and technical services.

8.3 That a service-wide Government engineering community is established to advise and support an Office of the Australian Engineer, as recommended in the ANET submission.

8.4 That the remuneration and conditions of engineers in the Commonwealth public service is competitive with their private sector counterparts;

8.5 That the Commonwealth Government undertake diversity audits of the engineering workforce;

8.6 That industrial instruments include and retain clearly articulated classification structures for professional engineers.

8.7 That Commonwealth Government enterprise bargaining guidelines contain a provision that separate enterprise bargaining arrangements may be considered where necessary to facilitate the resolution of recruitment and retention issues for professional engineers.

Conclusion

This submission complements and supports that made by ANET to this Committee on these matters. Herein APESMA has outlined a number of measures that would further support those recommendations.

APESMA would welcome an opportunity to address the committee and provide further evidence and information.

For further information or follow up, please contact Chris Walton, Chief Executive Officer, APESMA, 163 Eastern Road, South Melbourne, VIC.