

Chapter 1

Introduction

1.1 On 7 November 2011 the Senate referred the shortage of engineering and related employment skills to the Senate Education, Employment and Workplace Relations References Committee for inquiry and report by 30 June 2012.¹

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

- the implications of the shortage for infrastructure delivery in terms of economic development, cost, efficiency, safety and disputation;
- the impact of the long-term outsourcing of engineering activities by government on skills development and retention in both the private and public sectors;
- options to address the skill shortage for engineers and related trades, and the effectiveness and efficiency of relevant policies, both past and present;
- options for infrastructure delivery using alternative procurement models which aim to foster collaboration and achieve effective community outcomes, including skills development and retention;
- 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;
- opportunities to provide incentives to the private sector through the procurement process to undertake skills development;
- consequences of skills shortage in the construction sector to the public sector's capacity to effectively procure and manage infrastructure projects; and
- the impact of delayed and stalled infrastructure projects on economic development, workplace productivity and employment.

Structure of the report

1.3 This report is divided into five chapters:

- Chapter 1 (this chapter) sets out the administrative arrangements for the inquiry and provides a summary of other recent literature relating to the engineering skills shortage;

1 *Journals of the Senate*, No. 64, 7 November 2012, pp 1757–1758.

- Chapter 2 contains a background to engineering and the skills shortage in Australia;
- Chapter 3 outlines education and training pathways for engineering and related occupations;
- Chapter 4 discusses the impact of the skills shortage; and
- Chapter 5 examines the causes of the skills shortage and weighs up recommendations to address the problem.

Conduct of the inquiry

1.4 The committee advertised its inquiry on its website and in *The Australian* newspaper, calling for submissions by 3 February 2012.²

1.5 The committee also directly contacted a number of interested organisations and individuals to notify them of the inquiry and to invite submissions. A total of 82 submissions were received, as listed in Appendix 1.

1.6 The committee held public hearings in Perth on 27 March 2012, Brisbane on 28 March 2012 and in Canberra on 7 May 2012.

Other inquiries

1.7 The committee is cognisant of the attention that the engineering skills shortage has garnered and is aware of a number of relevant studies in recent times.

1.8 Australia's Chief Scientist, Professor Ian Chubb, released the *Health of Australian Science* report in May 2012. The report particularly focused on the important contribution that science, technology, engineering and mathematics (STEM) make to the 'future health, security, safety and prosperity as a nation, and as a planet'.³ The findings of the Chief Scientist are discussed in this report where relevant.

1.9 Skills Australia is an independent statutory body that provides advice to the government on Australia's current, emerging and future workforce skills needs and workforce development needs.⁴ Skills Australia made a number of recommendations to address engineering skills shortages in its 2010 report *Australian Workforce*

2 Advertisements appeared in *The Australian* newspaper on 23 November 2011, 7 December 2011, 1 February 2012 and 15 February 2012.

3 Office of the Chief Scientist, *Health of Australian Science*, Commonwealth Printing, Foreword, May 2012. Available online: http://www.chiefscientist.gov.au/wp-content/uploads/OCS_Health_of_Australian_Science_LOWRES1.pdf (accessed 25 May 2012).

4 Skills Australia, *Submission 80*, p. iv.

Futures.⁵ More recently, Skills Australia hosted a seminar on engineering pathways in December 2011. The key themes and observations that emerged from that seminar are discussed in chapters 2 and 3 of this report.⁶ Skills Australia was replaced by the Australian Workforce and Productivity Agency on 1 July 2012. The new agency is an expansion of the role and functions of Skills Australia.

1.10 The National Resource Sector Employment Taskforce was established in 2009 to consider how best to meet the skills requirements of more than 75 major resources projects in the pipeline over the next 5 years. The taskforce reported to government on 7 July 2010 with 31 recommendations to address skills shortages in the resources sector.⁷ The government accepted all 31 recommendations in March 2011. The key areas identified for workforce development were to:

- promote workforce planning and sharing of information;
- increase the number of trade professionals;
- graduate more engineers and geoscientists;
- meet temporary skills shortages with temporary migration;
- strengthen workforce participation;
- forge stronger ties between industry and education; and
- address the need for affordable housing and community infrastructure.

1.11 The Australian National Engineering Taskforce (ANET) was set up specifically to assess the engineering skills shortage and develop a national strategy to develop Australia's engineering workforce.⁸ ANET was established by the Association of Professional Engineers, Scientists, and Managers, The Australian Academy of Technological Sciences and Engineering, Engineers Australia, the Australian Council of Engineering Deans and Consult Australia. Together these partners represent professional industrial, commercial and academic interests in the engineering sector. In October 2010 ANET released a report titled *Scoping our future: addressing Australia's engineering skills shortage*.⁹ The report highlights the challenges that skills shortages present to a range of industries. In response to this inquiry ANET

5 Skills Australia, *Australian Workforce Futures: A national workforce development strategy*, Commonwealth of Australia, 2010. Available online: http://www.awpa.gov.au/national-workforce-development-strategy/Australian-Workforce-Futures/documents/WWF_strategy.pdf (accessed 5 July 2012).

6 Skills Australia, *Submission 80*, Appendix F.

7 National Resources Sector Employment Taskforce, *Resourcing the future*, 7 July 2010. Available online: <http://www.deewr.gov.au/Skills/Programs/WorkDevelop/ResourcesWorkforce/Pages/NRSET.aspx> (accessed 31 May 2012).

8 Australian National Engineering Taskforce, *Submission 73*.

9 Australian National Engineering Taskforce, *Scoping our future: addressing Australia's engineering skills shortage*, October 2010. Available online: www.anet.org.au.

titled its submission: *Realising an innovation economy: a practical roadmap to ease the Australian engineering skills shortage*. The recommendations made by ANET are discussed in chapter 4.

1.12 The United Nations Educational, Scientific and Cultural Organisation commissioned academics Emeritus Professor David Beanland and Professor Roger Hadgraft to research engineering education.¹⁰ In their report, the release of which is forthcoming, the authors identified a number of weaknesses in the current approach and called for significant changes to engineering education. These findings and recommendations are considered in chapter 3.

1.13 The Business Council of Australia (BCA) released a report into Australia's capital investment on 7 June 2012.¹¹ The BCA draws attention to the \$921 billion pipeline of investment in resources, energy and economic infrastructure, warning that Australia risks not being able to efficiently deliver these projects because it is becoming a 'high-cost' and therefore 'high-risk' place to invest. Further, the BCA reported that Australia's low labour productivity has reduced its competitiveness. In relation to skills shortages, the BCA concludes that Australia must train or attract 'high quality project planners and managers' in order to 'overcome major skills shortages'.¹²

1.14 The Australian Local Government Association released the 2012-2013 State of the Regions Report on 17 June 2012. The authors observed that many parts of Australia are not benefiting from the mining boom and recommend that the government establish dedicated funds to support local infrastructure projects.¹³

Acknowledgements

1.15 The committee thanks all those who contributed to this inquiry by making submissions, providing additional information or appearing before it to give evidence.

Note on references

1.16 References in this report to the Hansard for the public hearings are to the proof Hansard. Please note that page numbers may vary between the proof and official transcripts.

10 Emeritus Professor David Beanland and Professor Roger Hadgraft, *Submission 29*, p. 1.

11 Business Council of Australia, *Pipeline or pipe dream? Securing Australia's investment future*, 7 June 2012. Available online: <http://www.bca.com.au/Content/101987.aspx> (accessed 12 June 2012).

12 Business Council of Australia, *Pipeline or pipe dream? Securing Australia's investment future*, 7 June 2012, p. 17.

13 Jessican Nairn, 'Regions struggling despite mining boom: report', *ABC News Online*, 17 June 2012, <http://www.abc.net.au/news/2012-06-17/state-of-the-regions-report/4075302?section=business> (accessed 18 June 2012).