



**Australian Government**

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**Department of Education, Employment and Workplace Relations**

## **Submission**

**Senate Education, Employment and Workplace Relations Committee**

**Inquiry into the Effects of Climate Change on Training and  
Employment Needs**

## **1. Introduction**

The Australian Government takes a national leadership role in education and training and aims to maximise the ability of working age Australians to participate in the workforce and to improve the productive performance of enterprises in Australia. The Australian Government works with the State and Territory governments, other Australian Government agencies, various industries, and a range of contracted service providers to provide high quality policy, advice and services for the benefit of Australians.

The Department of Education, Employment and Workplace Relations (DEEWR) provides advice to the Government and administers programs to achieve the Government's objectives for education, employment and workplace relations. DEEWR works in partnership with the states and territories, non-government authorities, providers and industry. The Department implements Government policies and programs to provide education and training opportunities for all Australians, to increase employment participation and to ensure fair and productive workplaces. Education, training and workforce participation are central to the goal of building a productive and socially inclusive nation, one which values diversity and provides opportunities for all Australians to build rewarding social and economic lives.

DEEWR's objectives are to:

- educate and build socially inclusive communities where all Australians have the opportunity to reach their full potential and to actively participate in a rewarding economic and social life;
- build and promote individual development through equitable and accessible education from early childhood services to skills training and higher education;
- increase workforce participation and promote fair and productive work practices;
- develop national economic potential and capability that builds future economic prosperity and international competitiveness through skills development and employment growth;
- actively engage with clients and stakeholders to ensure services, advice and resources respond to the needs of these groups; and
- look for efficiencies and innovative, targeted and effective solutions in developing national productivity capabilities.

## **2. Terms of reference and the department's Submission**

The Committee has been asked to inquire into and report on developing Australia's capacity in the area of climate change, with particular reference to:

- (a) the ability of universities and other research and training institutions to meet current and future demand for climate change professionals; and
- (b) measures to assist understanding of climate change in the Asia-Pacific region, including provision of training and skills assistance.

This submission first outlines the scope of the climate change challenge to Australia's education and training system. It then provides an overview of education, training and employment programs and initiatives administered by DEEWR on behalf of the Australian Government that can assist in responding to climate change. The submission

then addresses the Committee's terms of reference and reaches some conclusions about the capacity of the education and training system and employment services to respond to the challenges presented by climate change.

The effects of climate change are starting to be felt in Australia and some industries and sectors are beginning to adjust skills and training accordingly. However, it is not yet possible to predict with certainty the impacts climate change will have on particular industries, the labour market or the employment, education and training systems. Building responsiveness and capacity to adapt to change is a better approach than trying to second guess precisely what the changes will be and being prescriptive about training and skills requirements.

The education, training and employment systems are adapting to the challenges and opportunities associated with climate change. There are a range of school-based initiatives in place that will provide school students with the knowledge and skill development needed to make a successful transition into further education and training or into the workforce. For example, the Trade Training Centres will be responsive to industry demand for new 'green' skills. The new National Curriculum, to be introduced in 2011, will equip students with the analytical and problem-solving skills required to understand significant national and global issues, such as climate change. The Vocational Education and Training (VET) system is highly responsive to industry demand for 'green' skills. The Ministerial Council for Vocational and Technical Education (MCVTE) provides a strong platform for enabling the VET sector to adapt to climate change. MCVTE comprises the Australian Government and State and Territory Ministers and has overall responsibility for the National Training System. As climate change requires workers to develop new skills MCVTE will facilitate national coordination of VET policy. Universities are responding to industry and student demand by providing undergraduate and post-graduate qualifications for climate change professionals.

DEEWR will work with the States and Territories and employers and industry to further enhance the capacity of the education and training system to respond to the challenges and opportunities presented by climate change. There is, however, a need for more research and improved data collection to provide a solid evidence-base for the changing skills requirements of the economy. DEEWR will be endeavouring to increase its capabilities in these areas.

### **3. Challenges to Australia's education and training system associated with climate change.**

The Australian Government has committed to implementing a Carbon Pollution Reduction Scheme by 2010. As outlined in the Garnaut Climate Change Review Final Report (the Garnaut report)<sup>1</sup>, the Carbon Pollution Reduction Scheme will place a limit, or cap, on the amount of carbon pollution an industry can emit, and will require affected businesses and industry to buy a 'pollution permit' that will allow the holder of the permit

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<sup>1</sup> Garnaut, R. (2008) [The Garnaut Climate Change Review: Final Report](#) (the Garnaut report). Garnaut Climate Change Review, Canberra.

to emit a specified volume of greenhouse gases into the atmosphere, giving industry an incentive to reduce carbon emissions. The Garnaut report has recommended a three-year transitional period from 2010-2013 to allow the market to be established and to ensure that the scheme meets the requirements established by the 2013 international agreement.

The Carbon Pollution Reduction Scheme will have significant implications for industry. Relative prices for a range of goods and services will be affected and these will lead to changes in consumer demand. Furthermore, increased consumer preferences for 'environmentally friendly' products will alter demand patterns and this will be a key driver for industry innovation in terms of products and services produced and business practices. This in turn will mean changes in the type of skills demanded by employers.

The transition to a low carbon economy will impose obligations as well as create challenges and opportunities for the workforce and the nation's skills base. The education and training system will need to be adaptive to ensure that sufficient numbers of skilled workers are available to avoid the economic costs and inflationary pressures created by skills shortages. The education and training system will also need to support climate change mitigation and adaptation, including through the identification of skill needs, developing appropriate curriculum, reviewing workforce development strategies, and delivering training to up-skill and re-skill the workforce. Already there are some occupations where the environment is a primary focus and these are provided at **Attachment A**.

Australia's future rests on the skills and capabilities of its people. A flexible and responsive education and training system is essential for ensuring that Australia is able to develop a culture of innovation and enterprise that will maintain and build on Australia's international competitiveness. In the Garnaut report, it is noted that while Australia has a strong skills base and the capacity to re-skill workers in carbon-dependent industries, the additional requirements arising from the Carbon Pollution Reduction Scheme will place added strain on an education and training system already under pressure from the resources boom and the associated shifts in employment between key sectors.<sup>2</sup>

Climate change will require many existing workers to up-skill in new 'green' skills. Many occupations, particularly in areas such as construction, energy, design and agriculture, will probably require the same or similar skills that are currently required but end-users will increasingly demand 'green' approaches and products that will, in turn, require new skills. For example, plumbers will continue to require fundamental skills and knowledge to carry out their roles but may require additional skills and knowledge to specialise in an area such as grey water storage and reuse. The requirement for this ongoing re-skilling may extend to many occupations. According to a recent report jointly prepared by the United Nations Environment Programme (UNEP), the International Labour Organisation (ILO) and the International Trade Union Confederation (ITUC), the demand for green skills will extend to a considerable variety of occupations across agricultural, manufacturing, scientific, administrative, and service-related industries that seek "to protect and restore ecosystems and biodiversity, reduce energy, materials, and water consumption through high-efficiency and avoidance strategies, de-carbonize the

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<sup>2</sup> The Garnaut report, p586.

economy, and minimise or altogether avoid generation of all forms of waste and pollution.”<sup>3</sup>

A recent CSIRO report to the Dusseldorp Skills Forum<sup>4</sup> found that there will be a growing need for people with design skills to meet demand for energy and water efficient buildings, and construction skills for both new buildings and the retro-fit of existing buildings. There will also be increased demand for renewable and alternative energy systems and consequently for workers who can build, install and maintain those systems. Energy auditing, accreditation and accounting will become increasingly more important with the introduction of the Carbon Pollution Reduction Scheme. An increased focus on waste, water and recycling will result in an increased demand for people with skills in those occupations. Industries such as transportation, mining, manufacturing and dry land farming will also come under increasing pressure to change the way they operate and will need people with appropriate skills and knowledge. Skill needs will include technical and trade skills, design and engineering, assessment and accreditation, reliable product and market knowledge, and supply and post-sale support. Also, as identified in Skills Australia’s submission to this inquiry<sup>5</sup>, climate change could also create new skills in the professions including green accounting, carbon footprinting consultants and emissions assessors.

The Garnaut report makes the important point that many of these skills needs are in areas in which Australia is currently experiencing skills deficits<sup>6</sup>. This is likely to increase the demand on Australia’s education and training systems, but it is also important that industries and employers devote attention and resources to re-skilling and up-skilling employees.

The CSIRO also indicated that ‘green collar’ skills could include:

- planning and design;
- business leadership and entrepreneurship;
- building and facilities management;
- project management and procurement;
- specific business management expertise (such as for architectural practice, broad acre farming, fleet management, specialist manufacturing or retail);
- trade skills (such as green plumbing, construction of energy efficient buildings, renewable energy, low input gardening);
- assessment of project requirements (such as specification of inputs, system specifications, access to finance, approvals requirements, total costs) and outcomes (such as water and energy use, efficiency, market value); and
- marketing and communication.

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<sup>3</sup> United Nations Environment Programme (UNEP), the International Labour Organisation (ILO) and the International Trade Union Confederation (ITUC) (2008). [UNEP Background Paper on Green Jobs](#). United Nations Environment Programme, Nairobi, Kenya.

<sup>4</sup> Hatfield-Dodds, S., Turner, G., Schandl, H. and Doss, T. (2008) [Growing the Green Collar Economy: Skills and labour challenges in reducing our greenhouse emissions and national environmental footprint](#). Report to the Dusseldorp Skills Forum, June 2008. CSIRO Sustainable Ecosystems, Canberra.

<sup>5</sup> Skills Australia (2008). Submission to “Inquiry into the effects of climate change on training and employment needs.” Australian Government. Department of the Senate, Australian Parliament House, Canberra.

<sup>6</sup> The Garnaut Report, p584.

There will also be new occupations in 'green' industries. While many of these jobs have not yet been identified, it is important to maintain up-to-date information about the skill needs required to fully equip these industries. Comprehensive information on skill shortages, provided by DEEWR, is available on Australian Workplace ([www.workplace.gov.au/SkillShortages](http://www.workplace.gov.au/SkillShortages)). DEEWR collects skill shortage information on a six-monthly basis through its National Office and State Offices, especially for Trades and Professional occupations. The findings of the research are built around the Survey of Employers Who Have Recently Advertised (SERA) but may also include analysis of industry demand, employment or vacancy trends, migration and training commencements and completions. This approach could be used to identify green skills in demand as they arise in the new green economy.

Additionally, it can be anticipated that new skills will be required as new technologies are developed to help Australians adapt to climate change and to mitigate its impacts.

It is also anticipated that other reviews and inquiries underway will have implications for the education and training system's capacity to support the transition to a low carbon emissions economy (for example, the Bradley Review of Australian Higher Education and the Cutler Review of the National Innovation System).

#### **4. Relevant programs and initiatives administered by the Department of Education, Employment and Workplace Relations**

DEEWR administers a variety of education, employment and workplace relations initiatives across a range of sectors that will build Australia's capacity to meet the skills challenges posed by climate change. DEEWR administers a range of programs and is working in partnership with key stakeholders on initiatives that are relevant to the Senate Committee's terms of reference. A brief outline of the most relevant initiatives is provided below.

##### **4.1 School related programs**

- **VET in Schools:** as the 'green' industry sector grows and matures and new industries emerge and existing industries adapt to a sustainable future, VET in School programs will need to provide students with opportunities to gain skills in emerging careers;
- **Trade Training Centres in Schools Program:** aims to increase the proportion of students achieving Year 12 or an equivalent qualification. It will help address national skills shortages in traditional trades and emerging industries by improving the relevance and responsiveness of trade training programs in secondary schools;
- **Civics and Citizenship Education program:** helps students to become active and informed citizens by providing them with, among other things, an understanding of how they can contribute to environmental sustainability; and
- **National Science Education Programs for Schools:** will encourage students to critically engage with science education, including climate change issues and to consider science-related careers.

## 4.2 Vocational Education and Training

- **The National Training System:** will play a key role in addressing green skills needs in the emerging green economy;
- **Productivity Places Program (PPP):** the Government has made available 701,000 training places under the PPP for both existing workers and people outside the workforce. The PPP provides training to Australians in industries experiencing skills shortages, including industries that require green skills;
- **Skills Australia:** an expert advisory body that will provide advice about skills shortages to the government and industry, including 'green' skills;
- **Industry Skills Councils (ISCs):** the 11 national ISCs may identify green skills requirements across a range of industry sectors;
- **Australian Apprenticeships:** as the green economy develops, a range of 'green apprenticeships' are likely to be available;
- **COAG Targeting Skills Needs in Regions (TNSR):** three TNSR projects are funded to skill workers for climate change related jobs in regional, rural and remote locations; and
- **Workforce Innovation Program:** provides funding for projects which pilot innovative strategies to address skills shortages in vocational occupations. In 2008–2009 the Program's priority areas include supporting the government's response to climate change, particularly in terms of strategies supporting the development of 'green skills'.

## 4.3 Higher Education

- **Bradley Review of Australian Higher Education:** the Bradley Review will examine the role of the higher education sector in contributing to national productivity, increasing participation in the labour market and responding to the needs of the labour market. This includes the responsiveness of the sector to altering courses in response to both student and employer demand, as well as in response to changes in the economy, demography and the labour markets served by higher education.

## 4.4 Employment Services

- **Current Employment Services:** Some employment services are relevant to green skills development. In particular, the Green Corps youth development and environmental training program gives young people the opportunity to volunteer to conserve, preserve and restore Australia's natural environment and cultural heritage. Work for the Dole also provides work experience placements for job seekers in approved activities which provide facilities and services to local communities. Work for the Dole can include community, heritage, environmental or caring activities; and
- **New employment services:** the new employment services will provide job seekers with the skills and experience to gain sustainable jobs, including in existing and developing environmental employment. The new employment services will include an expansion of Green Corps to all ages and Work for the Dole is being retained.

## **5. The ability of schools, universities and other research and training institutions to meet current and future demand for climate change professionals**

Climate change will mean that industry and employers will demand new skills. New 'green' technologies and occupations will emerge and many existing occupations will require new 'green' skills. The challenges associated with climate change further highlight the need for a responsive and flexible education and training system.

While DEEWR has some information and research on the types of 'green' skills that may be required in Australia as we move to a green economy, it is too early to predict or specify with certainty the skill challenges that lie ahead. The focus should be on building the capacity of the education, training and employment system to respond to the future skill needs brought about through climate change. Building this capacity will require the education and training system to meet the following key requirements:

- the development of generic problem-solving, teamwork and other skills to support sustainability principles and a culture of innovation;
- more flexible/responsive development of training packages and skill sets to reflect the growth-rate in new technologies;
- professional development for the teaching workforce in new technology and sustainability principles;
- partnerships between Registered Training Organisations, industry and Industry Skills Councils to achieve workforce development outcomes; and
- support for education institutions to take on the increasing role in knowledge and technology diffusion. The sector will also need to keep pace with the skills implications of new regulations introduced to monitor and enforce a low carbon emissions economy.

### **5.1 School based Initiatives and climate change**

Young people at school are the key to the nation's future prosperity and international competitiveness. As such it is critically important to put in place measures which support their inclusion in society, their learning and skill development, and their transitions to full participation in a workforce that will be impacted by climate change.

It will be important for all Australians, particularly school students, to have access to the high quality information and advice they need to make appropriate and informed decisions about their career pathways. It will also be critical to highlight new employment opportunities arising from efforts to mitigate and adapt to climate change, and the skills and training needed to take advantage of them.

#### *VET in schools and Trade Training Centres*

The Australian Government funds and supports a range of initiatives in schools. A key feature of existing initiatives, such as Vocational Education and Training (VET) in schools and the Trade Training Centres in Schools Program, is that schools, training providers and industry work together to prepare students make a transition to employment and/or further education and training. The training delivered through these programs will ultimately respond to industry demand for new skills. As the 'green'



industry sector grows and matures, new industries and technologies will emerge and existing industries will adapt to a sustainable future and demand new skills. The training provided will also adapt.

### *Career development initiatives*

The Australian Government is also in a position to respond to the challenges imposed by climate change by utilising and building upon its existing suite of career development initiatives. Strategies include:

- working with the Career Industry Council of Australia (CICA) to ensure that career practitioners are well informed about the latest labour market trends and employment opportunities presented by climate change;
- raising awareness of new study and career opportunities for climate change professionals, through the suite of quality career information products and services currently available, (such as myfuture, Job Guide and Job Outlook); and
- working closely with the Career Advice Australia network to promote climate change career pathways to young people, parents and teachers.

### *National Goals for schooling*

The National Goals for Schooling in Australia are currently being revised. The new Declaration, which will be titled the *National Declaration on Educational Goals for Young Australians*, was released in draft form on 8 September 2008 for public comment at <http://www.mceetya.edu.au/mceetya/natgoals,24767.html>.

The preamble to the Declaration recognises that the increasingly complex environmental pressures that extend beyond national borders, such as climate change, pose unprecedented challenges, requiring countries with different priorities to work together towards shared goals. The goals will support young Australians to become successful learners who are creative and resourceful and able to think critically, analyse information and solve problems. Students will be supported to become active and informed citizens who have a desire and capacity to work for the common good, including stewardship of the natural environment. As responsible global and local citizens, students will be prepared to engage with important issues, such as climate change.

The *National Declaration on Educational Goals for Young Australians* will be released at the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) Biennial National Forum in Melbourne on 5 December 2008.

### *National curriculum*

The Australian Government is committed to the development of rigorous and world-class national curriculum from kindergarten to Year 12, starting with the key learning areas of English, mathematics, the sciences and history. A National curriculum in key learning areas will be developed by 2010, and implemented by the states and territories from 2011. As a second phase, the national curriculum will be developed in languages and geography. The National curriculum will be developed by the National Curriculum Board and will equip Australian students with the skills, knowledge and capabilities that

will allow them to compete internationally and thrive in the information-rich workplaces of the future.

The Board has commenced consultation with the wider education community, including parents, teachers, principals and professional organisations and will draw upon the considerable expertise in the states and territories when developing Australia's first national curriculum.

### *Professional development for Teachers*

*Primary Connections*, *Science by Doing* and *Scientists in Schools* provide effective models of professional learning for primary and secondary teachers in the sciences. Professional development is also a component of the Australian Sustainable Schools Initiative (AuSSI), led by the Department of Environment, Water, Heritage and the Arts, in partnership with the States and Territories. AuSSI seeks to support schools and their communities to become sustainable.

The Australian Government Quality Teacher Program (AGQTP) is the Australian Government's source of flexible funding to states and territories. Two of the main objectives of the program for 2005 to 2009 are to provide national leadership in high priority areas of teacher professional learning and to equip teachers with the skills and knowledge needed for teaching in the 21st Century.

## **5.2 Vocational Education and Training and climate change**

This section outlines how existing Vocational Education and Training (VET) programs and initiatives are meeting the challenges associated with climate change and the transition to a low carbon economy.

The Department is contributing to a rapidly expanding body of work around 'green' skills in consultation with other Commonwealth agencies, and through Council of Australian Governments (COAG) and other Commonwealth/State Ministerial fora.

### *COAG*

COAG agendas on adaptation and energy efficiency, and productivity (which includes national VET sector reforms) are key drivers of the work around sustainability. Skills priorities are emerging from the COAG Working Group on Climate Change and Water (WGCCW), and the COAG Productivity Agenda Working Group. For example, WGCCW will consider development of a sustainability skills initiative.

### *VET Sector Sustainability Action Group*

DEEWR is participating in the VET Sector Sustainability Action Group (chaired by the Queensland Department for Education, Training and the Arts). The Action Group is developing a National Policy and Action Plan for Sustainability in the VET sector. The Action Group's terms of reference include:

- identifying the scope of the national policy and action plan for sustainability in the VET sector;

- conducting an environmental scan of specific sustainability actions in place or in development, including the extent to which sustainability has been embedded in national training packages;
- considering potential for integration with, and complementary to, existing and developing sustainability and educational policies, strategies and practices;
- considering applicability of international approaches to sustainability education in VET; and
- encouragement of innovation and regional diversity reflective of local needs.

A draft Policy and Action Plan is to be provided to the Ministerial Council for Vocational and Technical Education (MCVTE) in May 2009.

#### *Australian Apprenticeships and the Productivity Places Program*

As climate change requires existing occupations to have new 'green' skills and new occupations/careers emerge in 'green' industries and in other sectors of the economy, the types of accredited training provided through Australian Apprenticeships and through the PPP will need to adapt to meet industry demand.

Priority occupations under the Productivity Places Program that are relevant to sustainability include Agricultural Advisor, Agricultural Scientist, Forester, Environmental Research Scientist, Recycler, and Earth Science Technical Operator (hydrographer).

#### *Industry responses to climate change policy directions*

'A focus on the skills needed for a low carbon economy' is one of ten priorities identified in the *Facing up to Australia's Skills Challenge* report released jointly by the Australian Industry Group, Australian Council of Trade Unions, Australian Education Union, Group Training Australia and the Dusseldorp Skills Forum (2008).

Skills Australia has made a separate submission to the Senate Committee. As outlined in their submission, Skills Australia is focussing on engaging with industry at the state and national level to obtain quantitative and qualitative input from industry on current and emerging skills needs, and to better understand the drivers of those needs. Industry engagement has been managed by the Industry Skills Councils (ISCs). Skills Australia notes that it is in a position to help ensure that Australia's training effort is directed towards supporting the skills demanded in a modern sustainable economy.

In its submission, Skills Australia outlined consultations conducted with industry representatives and ISCs to determine current and emerging skills needs. As part of this process, participants were asked to provide information on skill and labour requirements related to the 'green' economy. While the results were not conclusive, Skills Australia found evidence of green policies in the manufacturing, energy, maritime and forestry industry sectors. Skills Australia concluded that while industry is beginning to consider potential changes to training and skills requirements, as well as business opportunities and challenges in relation to climate change, there is a lack of a clear plan for industry on how to best prepare for the green economy.

Due to their close links with industry, ISCs have the potential to become change agents in introducing reforms to the work practices of all those in the Australian economy who

will be required to adapt their skills to the opportunities and challenges of climate change. Although it is currently difficult for many industries to identify their future needs, a number of ISCs are engaged in research and development to support this process and identify emerging skills needs. ISCs are well placed to provide ground level intelligence to both Skills Australia and DEEWR through their connections with industry peak bodies.

There will be many opportunities to include energy efficiency into formal qualifications. By undertaking training needs analyses and identifying skills gaps, energy efficiency knowledge and skills could be embedded into formal, nationally endorsed qualifications as well as courses developed by enterprises and accredited at a state and territory level. Nationally endorsed qualifications could take the form of 'cross-industry' units which are then contextualised for a particular industry. Within the national training system, ISCs have responsibility for consulting with industry stakeholders in developing qualifications and through endorsement by the National Quality Council the quality of these outcomes is assured.

A move towards 'green' skills will also have significant implications for Registered Training Organisations (RTOs). RTOs will need to be able to adapt quickly to new training package qualifications to enable delivery of training in a timely manner. They may need to work to attract participants to relevant courses, ensuring that information is available for potential participants about the courses and potential outcomes.

Funding for projects aimed at incorporating sustainable energy principles into national Training Packages is currently being provided by the Australian Greenhouse Office. It is also funding studies aimed at identifying greenhouse-related training priorities for the building and construction industry and for resource managers and forest growers. Some other examples include:

- NSW has established an Energy Smart Trades Program to increase awareness in the trades of the economic and greenhouse benefits that can be realised through the use of sustainable energy. Strategies to incorporate greenhouse consideration into Technical and Further Education (TAFE) courses have also been developed; and
- in Victoria, a number of agencies are working with the TAFE sector and relevant industry training boards to develop environmental competency standards for a range of training programs, including greenhouse and energy issues.

### *Workplace Innovation Program*

The Workplace Innovation Program is one part of a broader Australian Government response to workforce development. The Workforce Innovation Program assists industry in addressing skills shortages by supporting projects that aim to increase the supply of skilled labour available to industry and by re-skilling and up-skilling existing workers. In 2008-09 the priority areas for the program are:

- strengthening industry leadership in reform of the training system, particularly the role of ISCs;
- support focused on achieving the outcomes of Commonwealth/State agreements;
- responses to climate change, particularly in terms of strategies supporting the development of 'green skills'; and
- support for an innovative culture in the training sector.

Examples of projects currently funded under the program include:

- the Emerging Technologies project, which aims to develop an approach to accelerate the capacity of the national training system to engage with new and emerging technologies; and
- the Moving Women in Forestry project, which will establish peer networks that improve knowledge of work opportunities in the industry, create opportunities for skills assessment, promote discussion of climate change issues facing the industry and provide education resources on climate change.

### 5.3 Higher Education

The Bradley Review of Australian Higher Education will be assisting Government to define the future role of the sector and appropriate relationships between Government, relevant industry and professional bodies and institutions in shaping courses and units of study. The Bradley Review will examine the role of the higher education sector in contributing to national productivity, increasing participation in the labour market and responding to the needs of the labour market. This includes the responsiveness of the sector to altering courses in response to both student and employer demand, as well as in response to changes in the economy, demography and the labour markets served by higher education.

The Australian Government can indirectly influence the provision of courses by field of study by making additional commencing places available in particular fields, by varying the level of student contributions for Commonwealth supported places for particular courses, by granting partial remissions on repayments of student contributions, and by providing Commonwealth Scholarships.

As part of the 2008-09 Budget, the Government is providing incentives for people to study maths and science at university, by reducing the maximum annual student contribution amount for new Commonwealth supported students studying mathematics and science from 1 January 2009. From July 2009, eligible maths and science graduates who take up related occupations, including teaching of these subjects in secondary school, will be able to apply for a reduction (by around half on average) of their compulsory Higher Education Loan Program (HELP) repayment. This will apply to people who graduate from second semester 2008 onwards.

It is difficult to identify 'green' skills from available university enrolment data and course information. At a time of fairly rapid labour market change there is a risk in emphasising over-specialised courses that prepare graduates for only a single, specific occupation. It may be more advisable to provide – in generalist and more specialist/vocational degrees – generic skills that can be applied to a range of present and future employment opportunities. Nevertheless, it is likely that an important component of 'green skills' required now and into the future will be supplied from various different university courses in Natural and Physical Sciences and Engineering. Detailed data on trends in demand for and supply of places in these broad fields of education are included at **Attachment B**.

Universities are responding to industry and student demand by providing undergraduate and post-graduate qualifications for climate change professionals and/or incorporating

climate specific skills into existing courses. The submissions from the Universities Climate Consortium and the National Climate Change Adaptation Research Facility provide concrete examples of how a number of universities are working collaboratively to build on their existing capacity in disciplines relevant to climate change, as well as building cross-disciplinary teaching and research linkages.

### *Higher Education Research Institutes*

Following the 2007 election, changes to the Administrative Arrangements Order outlining Ministerial portfolio responsibilities resulted in innovation, research and science moving from the former Education, Science and Training portfolio to the newly created Department of Industry, Innovation, Science and Research (DIISR). DIISR would be better placed to comment on the knowledge base and research capacity of Australian universities and on the role and capacity of research institutes in fostering 'green' skills.

## **5.5 Employment services**

The Australian Government has announced new universal employment services that will commence from 1 July 2009. A key feature of the new employment services will be increased flexibility in the assistance delivered to individual job seekers. There will be scope for employment services to provide unemployed job seekers with 'green' skills and work experience and thereby help employers meet their labour needs:

- Green Corps will remain an important part of the new Employment Services and from 1 July 2009 will no longer be age restricted and will be open to all job seekers. Projects undertaken as part of Green Corps will continue to have an environmental focus and be developed within the context of Australian Government environmental principles. This should see an increase in the proportion of individuals undertaking Green Corps activities moving into employment in the environmental sector;
- Work for the Dole (WfD) will continue to provide work experience placements in conjunction with training. Approved activities can include environmental activities;
- job seekers will be able to train or re-skill in areas of skills shortage through 253 000 training places being made available under the Productivity Places Program. This increased focus on the skilling of job seekers provides great opportunity for those interested in working in the environmental sector, particularly where skill shortages are envisaged. Currently, a number of courses with an environmental focus are on Skills Australia Priority Occupations for the Productivity Places Program List;
- providers have outcome bonus payments to encourage jobseekers to undertake training in areas of skills demand and to place them in related employment. With the development of new green employment pathways there will be an increase in opportunities for skilled jobseekers; and
- a \$41 million Innovation Fund will allow for the funding of projects that offer place based solutions to address barriers to employment for groups of highly disadvantaged job seekers. There is the potential that this will include projects with an environmental focus.

## 5.6 Impact of climate change on Indigenous Australians

Indigenous Australians, particularly those living in regional and remote Australia, will face a number of challenges arising from climate change and these will require a responsive education and training system. Occupation groups where there may be increased demand for training and employment of Indigenous Australians may include:

- land and sea management including environmental management/sciences, disaster mitigation and emergency response training (due to increased serious weather events e.g. storms);
- trades and related skills to participate in 'green jobs' associated with alternate energy generation (for example: electrical trades, engineering); and
- business management skills to establish 'green' technology/service businesses and/or to manage negotiation with the 'carbon reduction industry'.

### *Corporate Sector Engagement*

Private sector employers have a key role to play in making climate-related occupations accessible to Indigenous people. The corporate sector already makes significant contributions to creating opportunities for Indigenous Australians particularly in education, training, employment and business, both in partnership with governments and independently. A good example of this has been the development of a memorandum of understanding with the mining sector for the employment and training of local Indigenous workers.

Following the Prime Minister's National Apology to Australia's Indigenous Peoples, there has been a new level of interest by corporate Australia to build partnerships with the Indigenous workforce. The recently-announced Australian Employment Covenant (AEC) highlights this new level of corporate engagement and demonstrates the capacity of the private sector to provide employment opportunities for Indigenous Australians.

### *Reforms to the Indigenous Employment Program and Community Development Employment Projects*

On 6 October 2008 the Australian Government released a paper on the Government's preferred model for Indigenous employment programs, *Increasing Indigenous Employment Opportunity*. The proposed model includes reforms to Community Development Employment Projects (CDEP) and the Indigenous Employment Program (IEP). The Government's reforms are a key element to meeting the target of halving the employment gap between Indigenous and non-Indigenous Australians within a decade.

Under the proposed new model, Indigenous employment programs will be geared towards creating opportunities and giving Indigenous people the skills and training needed to get and keep a job. IEP would be expanded and would continue to focus on support for employers across Australia with assistance to meet the specific needs of employers and Indigenous job seekers. This would include developing foundation literacy and numeracy skills, mentoring, and support for business development.

In non-remote areas with established economies, CDEP would cease and Indigenous job seekers would be supported by the reformed universal employment services and IEP. In remote areas with emerging and limited economies CDEP will be re-structured.

CDEP positions that have supported the delivery of government services would be converted to properly paid jobs. A new community support program would be established to assist Indigenous job seekers to access employment programs and other services in these areas. This will be separate from the reformed CDEP. In remote areas, CDEP will be clearly and strongly focused on building skills and work readiness. This will include:

- building individual skills and capacity to take up work where opportunities arise;
- boosting community development, including support for projects seen as priority by the community;
- expanding the capacity of local Indigenous CDEP providers to deliver a range of employment and other services; and
- supporting voluntary employment-related mobility.

A key element of the proposed reforms to CDEP would be aligning the incentives and participation requirements of CDEP participants with other Indigenous job seekers - within and across communities. This would mean new CDEP participants would be paid income support from 1 July 2009. It is proposed that existing CDEP participants would continue to be able to access wages until 31 March 2010.

Public consultations sessions on the discussion paper will be held across Australia. The paper on the proposed reforms can be obtained at [indigenous.gov.au](http://indigenous.gov.au).

## **5.7 Impact of climate change for rural, regional and remote communities**

Climate change presents specific challenges for rural, regional and remote communities. As outlined in a 2005 discussion paper produced by the Australian Greenhouse Office (AGO), Australia may become more susceptible to extreme weather events including drought and floods in coming years, and the agriculture and forestry industries will need to adapt to cope with these additional risks. Additionally, these industries will have to manage natural resources by engaging in practices such as salinity mitigation, carbon sequestration, and biodiversity conservation. These practices are likely to require a range of new skills, and regional industries will need to work closely with education and training providers to ensure that skills needs can be met in these areas.

The impact of extreme weather conditions on the agriculture industry has the potential to contribute to the problem of sustainability facing many rural communities. The Longitudinal Survey of Australian Youth paper, *Movement of Non-metropolitan Youth towards the Cities (2007)*, suggests that depressed economic circumstances are a contributing factor to young people leaving rural communities. The education and employment portfolio, regional industries and education and training providers all have a role to play in ensuring there are sufficient numbers of skilled workers to maintain the agricultural industry and the people, businesses and services that support it in rural economies. Failure to meet this challenge will have a significant impact on the ongoing sustainability of all industries located within rural Australia.



## 5.8 Other Initiatives

There may be opportunities to progress climate change induced changes to education and training needs through the Australian Government's Social Inclusion agenda. The Department of Prime Minister and Cabinet is the lead agency responsible for overseeing the implementation of the agenda, however, individual agencies such as DEEWR, will be responsible for initiatives relevant to their portfolio responsibilities. For example, DEEWR is considering options to support social inclusion through place based strategies, some of which could include a neighbourhood renewal focus.

It is possible that issues of climate change could be addressed through neighbourhood renewal and community development strategies, which bring together resources and ideas of residents, governments, businesses and community groups to tackle local causes and symptoms of disadvantage and reduce the gap between disadvantaged communities and the rest of society.

Although DEEWR has no specific existing neighbourhood renewal or community development programs, it is liaising closely with other agencies and jurisdictions with an interest or portfolio focus in these areas. For example, DEEWR is currently considering if its activities can contribute to the Sustainable Communities Initiative of the CSIRO in certain locations. CSIRO's Sustainable Communities Initiative is a three-year place-based initiative that brings together organisations from across the public, private and community sectors, to work in partnership to develop and deliver local programs to address community-specific sustainability issues relating to climate change, environmental degradation, population and migration.

DEEWR is also implementing several place-based Indigenous programs in locations across Australia, in which initiatives might be developed under the Social Inclusion agenda. Further, the new Innovation Fund, which will focus on the key Social Inclusion groups, will provide an opportunity to offer place-based solutions to assist highly disadvantaged job seekers, which may support a neighbourhood renewal and environmental focus.

Climate change is an area of policy that will have a direct impact on the quality of life of future generations and young people have a particular interest in this issue. The Australian Government has established the Australian Government Office for Youth within DEEWR. The role of the Office for Youth includes ensuring that policy and program settings across the Australian Government meet the needs of young people and are considerate of their views. As part of its youth agenda the Australian Government has established the Australian Youth Forum (AYF) to provide an opportunity for young people to maintain a dialogue with Government on issues that are important to them. The AYF is a formal communication channel between young people, the youth sector and Government and provides a useful mechanism to consult with young people directly and seek advice and ideas on issues relating to climate change.

## **6. Measures to assist understanding of climate change in the Asia-Pacific region, including provision of training and skills assistance**

### **6.1 International Education**

Climate change is a global problem. International government-to-government engagement on education provides a 'soft diplomacy' avenue for reaching multilateral, regional and bilateral agreements on measures to tackle climate change. Student and staff mobility can foster collaborative efforts to research and develop climate change technologies. Collaboration also supports the exchange of information on climate change and the diffusion and uptake of measures to address and adapt to climate change. International government-to-government engagement on education can also help Australia's education system learn about what other countries are doing to equip their populations with the skills needed to tackle climate change.

By fostering international links between students, graduates, teachers and policy makers, international education helps promote a global response. In 2007 more than 370 000 international students studied in Australia and there are estimated to be upwards of 1 million alumni around the world.<sup>7</sup> The links resulting from Australia's provision of international education (including the diplomatic, business and research links) promotes the development and adoption of the strategies required to tackle climate change.

Australia Education International (AEI), which is part of DEEWR, works with industry and governments to support the international education industry. AEI seeks to:

- create an environment for the sustainable development of Australia's international education engagement;
- lead and coordinate whole of government work to support Australia's international education engagement;
- provide advice to the Minister, the department and governments on international education policy;
- encourage more Australians to study abroad;
- enhance Australia's international profile as a leading provider of education and training to the world, with a strong domestic science and innovation capacity; and
- deliver high quality and timely advisory, information and support services to prospective Australian international students.

### **6.2 Specific DEEWR initiatives to meet training needs in the Australia-Pacific region**

In addition to international education, DEEWR is also responsible for a number of initiatives that provide training and skills assistance to Australia's neighbours. These are outlined below:

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<sup>7</sup> Australian Education International (AEI) (May 2008). *Research Snapshot: International Student Numbers*. 37. URL: [http://www.aei.gov.au/AEI/PublicationsAndResearch/Snapshots/37SS08\\_pdf.pdf](http://www.aei.gov.au/AEI/PublicationsAndResearch/Snapshots/37SS08_pdf.pdf)

### *Australia-Pacific Technical College*

The Australia-Pacific Technical College (APTC) is an Australian Government initiative announced at the Pacific Islands Forum in October 2006. The APTC provides internationally recognised Australian-standard vocational training to increase the pool of skilled workers in targeted industry sectors at nine locations across Fiji, Vanuatu, Samoa and Papua New Guinea. Courses are delivered by Australian Registered Training Organisations, and people who complete a course receive an accredited Australian qualification.

The APTC assists Pacific Islands Forum member countries to build human capital and thus improve their long-term economic sustainability. The APTC will improve the capacity of these countries to adapt to climate change by training skilled workers in several industry sectors, including tourism and hospitality, trades, and health and community services.

### *Endeavour Awards*

Australian scholarships, and in particular the Endeavour Awards, can assist in closing the skills deficit in climate change-related knowledge in both Australia and our regional neighbours. The Endeavour Awards is an internationally competitive, merit-based scholarship program providing opportunities for citizens of the Asia-Pacific region to undertake study, research and professional development in any field of study in Australia. Awards are also available for Australians to do the same abroad. The primary aim of the program is to establish ongoing links at the individual, institution and country level. The Endeavour Awards program provides opportunities for high achieving individuals to increase their skills and enhance their global awareness. In this respect, the Endeavour Awards can assist countries to develop their skill base in order to research, develop and adopt climate change technologies and improve the capacity of populations to address and adapt to climate change.

## **7. CONCLUSIONS**

Some industries and sectors are beginning to adapt to the challenges and opportunities arising from climate change, as the demand grows for 'environmentally friendly' products and practices, and employers seek to up-skill employees to meet this demand. However, it is not yet possible to predict with complete certainty the impacts climate change will have on the Australian education, training and employment systems.

Building responsiveness to change is, on the whole, a better approach than trying to second guess precisely what changes will be required. It could be costly and inefficient to invest heavily in initiatives as there remains a great deal of uncertainty surrounding the impacts of climate change on future skill and development needs. In particular, the Government's response to the Garnaut report will shape the formation of the green economy.

As outlined in this submission, the education, training and employment systems are adapting to the challenges and opportunities associated with climate change. The Australian Government is also undertaking a variety of reforms to ensure that the

capacity of the education, training and employment systems to respond to climate change is enhanced. DEEWR will need to continue to monitor and work with industry. Given the potential size of changes, the skill requirements of the economy will need to be carefully monitored. In this context there is a need for more research and more nationally coordinated analysis of the issues associated with climate change.

## Environmental Occupations

There are environment aspects in many industries and occupations, including farming and forestry and life science, including Botanist and Marine Biologist. However, the environment nature in occupations is diffusive and not reflected to any great extent in either the industry or occupation classifications. Typically the environment components are only a part of the overall nature of work in an occupation and consequently these occupations cannot be viewed as primarily environment occupations.

There are some occupations where the environment is a primary focus and these are presented in Table 1. Some of these occupations have a clear-cut environmental role (for example, Environmental Engineer and Park Ranger). For other occupations, such as Agricultural Adviser and Forester, the link is not as strong. Many of the environment occupations generally require higher education qualifications, although some have a VET focus (for example, Waste Recycler and Environmental Technical Officer).

The table presents both the ANZSCO occupational titles and codes as well as the closest ASCO 2<sup>nd</sup> edition titles and codes.

**Table 1 Environment Occupations**

<b>ANZSCO Title</b>	<b>ANZSCO Code</b>	<b>ANZSCO Skill Level</b>	<b>ASCO Title</b>	<b>ASCO Code</b>
<b>Other Specialist Managers</b>	<b>1399</b>	<b>1</b>		<b>1299</b>
Environmental Manager	139912	1	Environment, Parks and Land Care Manager	1299-17
<b>Other Engineering Professionals</b>	<b>2339</b>			<b>2129</b>
Environmental Engineer	233915		Chemical Engineer	2129-17
<b>Agricultural and Forestry Scientists</b>	<b>2341</b>	<b>1</b>		<b>2114</b>
Agricultural Adviser	234111	1	Agricultural Adviser	2114-21
Agricultural Scientist	234112	1	Agricultural Scientist	2114-19
Forester (AUS) / Forest Scientist (NZ)	234113	1	Forester	2114-13
<b>Environmental Scientists</b>	<b>2343</b>	<b>1</b>		<b>2114</b>
Environmental Officer	234311	1	Environmental and Agricultural Science Professionals nec	2114-79
Environmental Advisor / Analyst	234312	1	Environmental and Agricultural Science Professionals nec	2114-79
Environmental Scientist	234313	1	Environmental Research Scientist	2114-11
Park Ranger	234314	1	Park Ranger	2114-15
Environment Auditor, Soil Scientist)	234399	1	Soil Scientist; Environmental & Agricultural Science Profs nec	2114-17; 2114-79
<b>Occupational and Environmental Health</b>	<b>2513</b>	<b>1</b>		<b>2543</b>
Environmental Health Officer	251311	1	Environmental Health Officer	2543-13
<b>Science Technicians</b>	<b>3114</b>	<b>2</b>		<b>3112</b>
Environmental Technical Officer	311413	2	Life Science Technical Officer	3112-15
<b>Other Sales Assistants and Salespersons</b>	<b>6219</b>	<b>5</b>		<b>8299</b>
Waste Recycler	621911	5	Materials Recycler	8299-13
<b>Forestry and Logging Workers</b>	<b>8413</b>	<b>4</b>		<b>7995</b>
Tree Planter	841311	4	Forestry Worker	7995-13
<b>Recycling and Rubbish Collectors</b>	<b>8996</b>	<b>5</b>		<b>9991</b>
Waste Removalist	899611	5	Garbage Collector	9991-11

## Attachment B

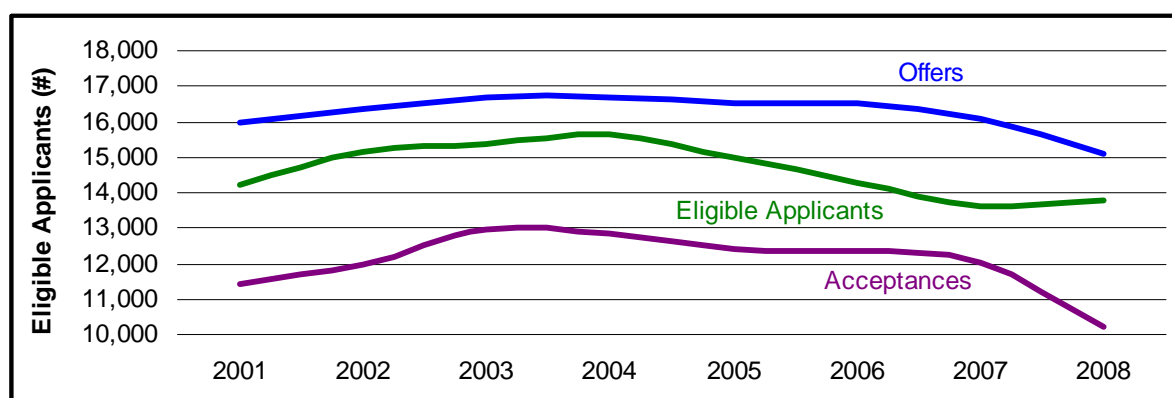
### Trends in Demand and Supply for Natural and Physical Science and Engineering higher education places

While there is not always an obvious or straightforward link between particular higher education courses/qualifications and particular occupations, those fields of education likely to have key links to the development of 'green' skills are Natural and Physical Sciences and Engineering.

Data for Natural and Physical Sciences is only available back to 2001. Before this, science fields were included in a broader 'Science' field along with Information Technology (IT). The inclusion of IT in the data makes it difficult to draw firm conclusions about demand for Natural and Physical Science subjects prior to 2001.

Applications data since 2001 shows that demand for Natural and Physical Science has been relatively stable. The number of eligible applicants with a first preference for Natural and Physical Sciences has declined by only 3.1% over the last eight years (14,230 in 2001 dropping to 13,795 in 2008). This year's figure was a slight increase on last year (1.3%).

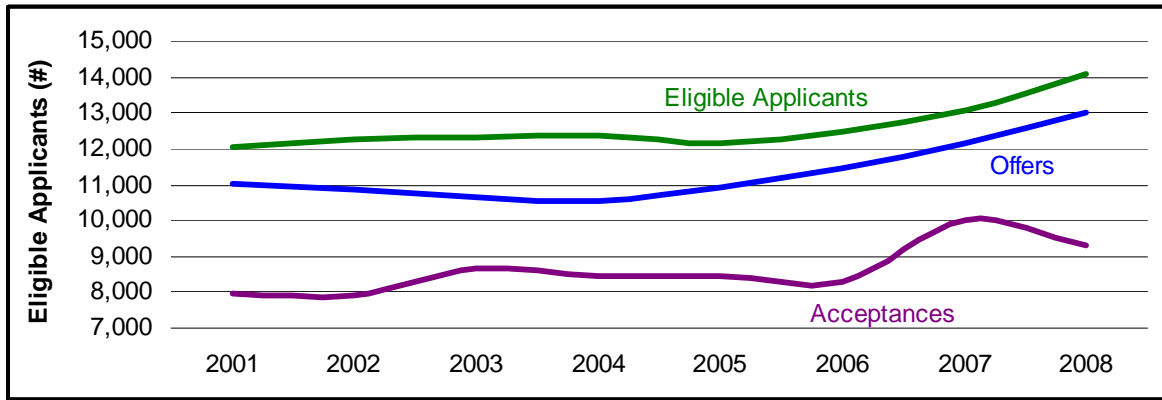
Since 2001, the number of offers has exceeded the number of applicants with sciences as their first preference. This year, the offer rate was 109.4%. This high offer rate has not resulted in a decline in the Tertiary Entrance Scores of commencing students. In 2001 the median score was 87 as it also was in 2006. The 90<sup>th</sup> percentile score also has stayed at 98, while the 10<sup>th</sup> percentile score has only dropped from 69 in 2001 to 68 in 2006.



Source: DEEWR: Undergraduate Applications, Offers and Acceptances, 2008

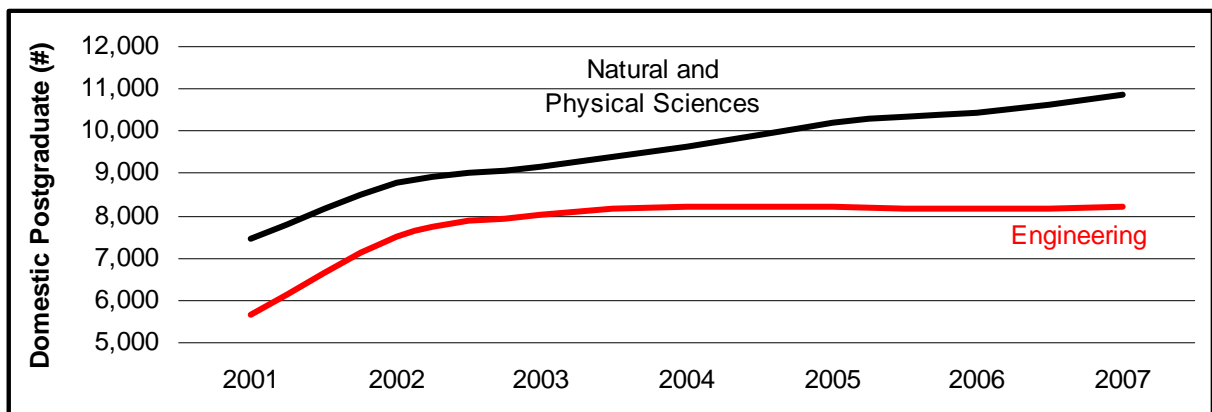
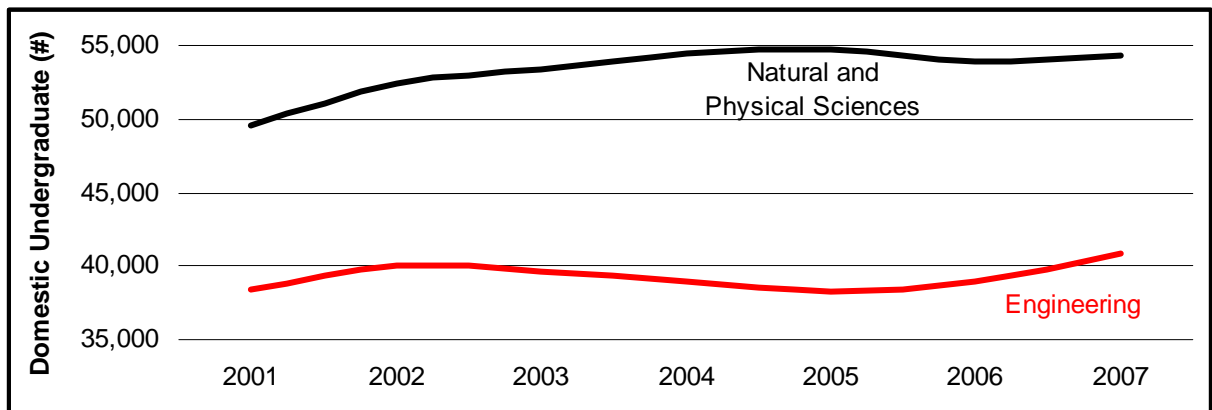
Interest in engineering has grown by 16.8% between 2001 and 2008 when measured by first preferences of eligible applicants (increasing from 12,056 to 14,085). While demand for engineering was relatively stable between 2001 and 2006, increases of 4.8% between 2006 and 2007 and 7.7% between 2007 and 2008 have been responsible for the large increase.

The proportion of applicants receiving an offer has also increased since 2005 as more places were introduced to match demand, with 92.2% receiving an offer in 2008 compared to only 85.2% in 2004.



Source: DEEWR: Undergraduate Applications, Offers and Acceptances, 2008

Comparing 2001 and 2007, domestic enrolments in Natural and Physical Sciences have increased by 9.7% for undergraduate and 45.2% for postgraduate courses. Engineering also experienced increases between 2001 and 2007. Undergraduate enrolments grew by 6.3% and postgraduate by 44.1%.



Source: DEEWR Unistats: Higher Education Student Series, Various Issues