This project is supported by the Australian Government
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Research Team

- Dr Fabian Sack, Sustainably Pty Ltd
- Dr Mike Brown, Faculty of Education, La Trobe University
- Mohammad Ali Rahimi, Centre for Research in Educational Futures and Innovation, Deakin University
- Judy Turnbull, Sustainably Pty Ltd

Project Partners and Supporters

Project Partners
- Sustainably Pty Ltd
- WorldSkills Australia

Supporters
- TAFE Directors Australia
- International Green Skills Network
- National Centre for Sustainability, Swinburne University of Technology

Participating Organisations

- WorldSkills Australia
- TAFE NSW Hunter Institute
- TAFE NSW Sydney Institute
- Southbank Institute of Technology
- Sunshine Coast Institute of TAFE
- TasTAFE
- RMIT University
- Federation University Australia
- Pilbara Institute

Further information:

info@sustainably.net.au
www.sustainably.net.au

www.gengreen.org.au

This project is supported by the Australian Government.
“If we fail to train our students about how important sustainability is we fail them and future of our world.” (Teacher)

“It is very important that we all contribute to preserving and improving our environment for future generations and that we create an effective and safe work environment.” (Student)

“Sustainability in the workplace is critical. It will also contribute to the cost-effective operation of the workplace. On a personal level, sustainability needs to be implemented from childhood in the home.” (Teacher)
Executive summary

In this research, skills for sustainability are broadly conceived as including skills for social, economic and environmental sustainability – a triple bottom-line approach.

Since 2009 Australian governments have been implementing an agreement that embeds skills for sustainability into vocational education and training, despite scant information about the actual levels of demand for, and supply of these skills.

This study provides evidence on the actual depth and breadth of the take-up of these skills within Australian training organisations and workplaces.

The demand studied in this research is that expressed by the primary consumers of Australian Vocational Education and Training (VET) services, students who engage in VET studies, this is known in the literature as social demand for education.

VET students and teachers responded to two survey instruments that explored the sustainability values, behaviours, learning and teaching of Australian apprentices, trainees and their teachers.

The results of this study show ‘a social demand’ for skills for sustainability. In summary, the results show that:

- Apprentices, trainees and their teachers cared a great deal about social, economic and environmental sustainability;
- Supply was closely aligned to social demand for skills for sustainability so that demand for skills for sustainability from VET students was almost entirely met;
- There are important differences in the teaching, learning and utilisation of skills for sustainability that are related to gender and age; and
- In-class learning of environmental skills has increased over time and now slightly outweights learning of these skills at work, however community learning of these skills outweighs both.

Gen Green 4 Australia research provides some evidence that implementation of the Green Skills Agreement has to some extent achieved its intent.

The findings suggest that:

- Further action is required to embed green skills into the VET system, especially in the areas of energy efficiency and supply chains;
- The VET system plays an important role in supporting community cohesion and economic literacy, especially for women;
- It is important that social sustainability is properly considered in analysis informing VET policy; and
- Gender differences in values and behaviours and gender and age differences in learning skills for sustainability have important implications for the design of future skills for sustainability programs.

VET students and their teachers have unique insights into the supply of and demand for skills for sustainability, and this viewpoint can contribute, now and in the future, to the further development of skills for sustainability in Australia.
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Introduction

At the end of the United Nations Decade of Education for Sustainable Development it is timely to reflect upon progress in the formation and utilisation of skills for sustainability within the Australian economy. The Australian response to the Decade of Education for Sustainable Development has culminated in the implementation of the national Green Skills Agreement (GSA) over the last four years. Not long after the Council of Australian Governments endorsed the Agreement in December 2009, the Productivity Commission released its report on factors affecting the current and future demand for the VET workforce. Gen Green 4 Australia is a research study framed by these two influences and seeks to understand the national demand for skills for sustainability.

The purpose of the Gen Green 4 Australia research is to contribute to the existing evidence base by conducting new, national research on the current and future social demand for and supply of skills for sustainability with participants in the Australian VET sector. Specifically, the objectives of this research project are to:

- Document current student and training facilitator views on the demand for and supply of skills for sustainability using a national sample and to establish a national baseline.
- Compare the results of this national survey with the existing longitudinal data sets derived from the smaller but similar samples that have been collected to date from the Gen Green surveys 2008, 2010 and 2012, to identify possible trends.
- Review the potential impact of recent policy and funding initiatives, many of which have been focused on energy and carbon efficiency.

The demand being studied in this research is that expressed by the primary consumers of Australian VET services, students who engage in VET studies. As these students base their decisions on long-term views about future labour markets, their views provide a useful and grounded complement to the picture of labour market demand provided by employers, industry groups and economists. This is the first study of its kind, describing non-economic demand for skills for sustainability. This kind of individual demand for education is known in the literature as social demand for education. It reflects the decision of an individual as their revealed preference among the available school and work alternatives. The research presents evidence of this social demand for skills for sustainability for consideration in the current debate about the future of Australian vocational education and future responses to climate change. Importantly, this research also provides a matched and equally grounded account of the capacity of the current Australian VET system to meet this demand, as expressed by VET teachers’ views on their ability to supply these skills.

Gen Green 4 Australia especially gives a voice to the apprentices and trainees who make up 3.9% of the Australian workforce (NCVER 2013), drawing on their unique experience of skills for sustainability at the grass roots of the Australian economy. Apprentices and trainees are among the few groups who are systematically participating in substantial VET study programs while also in employment in the workplace. This unique arrangement means that they have firsthand experience of learning and skill formation within VET programs and of the application and demand for those skills in the workplace setting. Apprentices and trainees are both entry-level employees and recipients of post-school education and training. Despite the notorious difficulty of engaging this cohort in research, 649 VET students and 417 TAFE teachers participated in this study. They were mostly drawn from eight metropolitan and regional institutes of TAFE in the Australian Capital Territory (ACT), New South Wales (NSW), Queensland (QLD), and Western Australia (WA), supplemented by smaller populations attending another nine institutes of TAFE and other Registered Training Organisations (RTOs) across Australia. This cohort is made up mostly of young people, but there is also a substantial contribution from mature-aged workers. Participants in the study represent a wide range of occupational classifications, from hairdressing to horticulture, from bricklaying to business administration.
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*Gen Green 4 Australia* is focused on skills for sustainability as apprentices and trainees learn these skills in classes and in the workplace. Importantly though they also learn them at home, from family and from friends. The research takes as its sustainability paradigm the triple bottom-line business agenda expressed by the *Global Reporting Initiative* (GRI). See Appendix A for the categories and aspects used in the GRI. This approach provides social and economic points of comparison for the environmental or ‘green skills’ interpretation of skills for sustainability initially adopted in Australia. The focus on social, environmental and economic performance closely reflects the scope of Education for Sustainable Development promoted by UNESCO. The research defines these skills through a suite of relatively specific values (such as “working in a workplace that treats others fairly is important”), behaviours (such as “I always conserve power”) and learning (such as “I learn about the $ value of the materials I use”). The values, behaviours and learning used to exemplify sustainability in the research have been chosen because they are relevant to the sustainability performance of entry-level employees across a wide sweep of occupations. The full list of trigger phrases exemplifying values, behaviours and learning skills relating to sustainability in the *Gen Green 4 Australia* research is given in Table 1.

The *Gen Green 4 Australia* research is centred on a survey instrument that has been evolving since 2008, when it was first employed on a cohort of WorldSkills Australia (WSA) competitors. It has been reviewed, revised and employed again in 2010 and 2012, also with cohorts of WSA competitors. This history provides an opportunity for a longitudinal perspective on the current research findings, reaching back before many of the influences that have shaped the current state of play in skills for sustainability. It is hoped that this longitudinal research will provide employers, VET practitioners, VET and sustainability researchers and policymakers with a series of point-in-time student perspectives on the impact of skill formation for sustainability in Australia.

The *Gen Green 4 Australia* research employs two survey instruments. One of the surveys explores Australian apprentices and trainees’ experiences of sustainability values, behaviours and sources of learning, providing concrete examples while also soliciting detailed, qualitative responses to explore the reasons behind unsatisfied demand. The other survey in many ways mirrors the one used with students, as it explores Australian VET teachers’ experiences of these same sustainability values, behaviours and teachings, again providing concrete examples and soliciting detailed, qualitative responses to explore barriers to supply. The findings of this transdisciplinary and multidimensional study provide a rich and useful input into policy and research. The size of the cohort delivers some robust results directly addressing the main research objectives. Perhaps just as interesting are the textured indications given by analysis of the relative rankings of different responses and by comparison of the responses from different demographics.

To establish a context for the findings of this research, the following sections briefly explore the policy context for apprentices and trainees learning skills for sustainability in Australia and the current evidence base as described in the literature.

**Education for sustainability in Australia**

In 2002 at the *World Summit on Sustainable Development* in Johannesburg, the United Nations adopted a resolution that designated 2005–2014 to be the Decade of Education for Sustainable Development. The Australian Government responded to the United Nation’s lead with the strategy paper ‘Caring for our future’. This paper, released in 2007, was followed two years later with the release of the *National Action Plan ‘Living sustainably’* (DEWHA 2009). This plan showed an interesting shift from Education for Sustainable Development (ESD) to Education for Sustainability (EfS).
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<tr>
<td><strong>Sustainability-related values</strong></td>
<td>How important are the following issues to you?</td>
</tr>
<tr>
<td>• Protecting the environment</td>
<td></td>
</tr>
<tr>
<td>• Working in a workplace that protects the environment</td>
<td></td>
</tr>
<tr>
<td>• Treating others fairly</td>
<td></td>
</tr>
<tr>
<td>• Working in a workplace that treats others fairly</td>
<td></td>
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<tr>
<td>• Making enough money</td>
<td></td>
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<tr>
<td>• Working in a workplace that makes enough money</td>
<td></td>
</tr>
<tr>
<td>• Handing over a world in good shape for the next generation</td>
<td></td>
</tr>
<tr>
<td>• Working in a workplace that contributes to handing over a world in good shape for the next generation</td>
<td></td>
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<tr>
<td><strong>Sustainability-related behaviours</strong></td>
<td>At work/in class/at home ...</td>
</tr>
<tr>
<td>• I always conserve water</td>
<td></td>
</tr>
<tr>
<td>• I always conserve power</td>
<td></td>
</tr>
<tr>
<td>• I always conserve fuel</td>
<td></td>
</tr>
<tr>
<td>• I always sort my waste</td>
<td></td>
</tr>
<tr>
<td>• I always follow safe work methods</td>
<td></td>
</tr>
<tr>
<td>• I always treat men and women equally</td>
<td></td>
</tr>
<tr>
<td>• I always respect the culture of others</td>
<td></td>
</tr>
<tr>
<td>• I always suggest better ways to do things</td>
<td></td>
</tr>
<tr>
<td>• I always follow procedures and instructions</td>
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<tr>
<td><strong>Sustainability-related learning</strong></td>
<td>At work/in class/from family and friends I learn about ...</td>
</tr>
<tr>
<td>• The amount of energy it takes to make raw materials</td>
<td></td>
</tr>
<tr>
<td>• The amount of power used</td>
<td></td>
</tr>
<tr>
<td>• The amount of water used</td>
<td></td>
</tr>
<tr>
<td>• How toxic materials are to the environment</td>
<td></td>
</tr>
<tr>
<td>• How to protect local plants &amp; animals</td>
<td></td>
</tr>
<tr>
<td>• What we put into the air &amp; water</td>
<td></td>
</tr>
<tr>
<td>• What can be recycled</td>
<td></td>
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<tr>
<td>• How to apply safe work methods</td>
<td></td>
</tr>
<tr>
<td>• My rights at work</td>
<td></td>
</tr>
<tr>
<td>• What to do about bullying or harassment</td>
<td></td>
</tr>
<tr>
<td>• Respecting people from other cultures</td>
<td></td>
</tr>
<tr>
<td>• Treating men &amp; women equally</td>
<td></td>
</tr>
<tr>
<td>• How the people who make the materials I use are treated at work</td>
<td></td>
</tr>
<tr>
<td>• Procedures &amp; instructions for the work I do</td>
<td></td>
</tr>
<tr>
<td>• The laws that apply</td>
<td></td>
</tr>
<tr>
<td>• The $ value of the materials I use</td>
<td></td>
</tr>
<tr>
<td>• How businesses in my industry are run</td>
<td></td>
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<tr>
<td>• How to get better qualifications</td>
<td></td>
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<tr>
<td>• What customers want</td>
<td></td>
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<tr>
<td>• How to bring new thinking into the workplace</td>
<td></td>
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<tr>
<td>• How my skills contribute to the local community</td>
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An important note, in the context of this research, is that EfS began with an emphasis on environmental awareness, but soon adopted an approach providing all people with the knowledge, skills and understanding needed to make decisions based upon consideration of environmental, social and economic implications. The Action Plan recognised that adult learning for EfS occurred in informal settings, variously facilitated through government departments, educational institutions at all levels, industry bodies, community groups, zoos, botanical gardens, national parks and environmental education centres.

Strategy 2 of the ‘Living sustainably’ Action Plan argued for ‘Reor定向ing education systems to sustainability’. This strategy covered all levels and sectors of education. The discussion in Strategy 3 ‘Living sustainably’ focused on ‘fostering sustainability in business and industry’. This has high relevance for VET provision. What this meant was detailed through four key policies nested underneath the National Action Plan for Education for Sustainability:

2. The Skills for Carbon Challenge
3. The Green Skills Agreement (GSA) and the GSA Implementation Plan
4. The Clean Energy and Other Skills Package.

The Australian states and territories have also contributed to the policy context of skills for sustainability.

National VET Sector Sustainability Policy and Action Plan

This policy and action plan was written to cover the period 2009–2012 and was endorsed by Ministerial Council for Vocational and Technological Education in June 2009. At this time it provided a national framework and was written with four identified areas for results:

1. Development of a workforce that was skilled for sustainability
2. The provision of VET programs to support skill formation for sustainability
3. The fostering of sustainability values, principles and practices across the sector, and
4. The reduction of the carbon footprint for VET providers.

McDonald, Condon and Riordan (2012), writing in a commissioned paper for the TAFE Directors Australia, argued that this Policy and Action Plan was superseded by the development and release of the further refined arrangements articulated in the GSA.

Skills for the Carbon Challenge

The Skills for the Carbon Challenge initiative supported a range of research projects, pilots and other predominantly small scale activities to build the capacity of the tertiary education sector to supply the sustainability skills needed by workers and businesses. It supported the objectives of the GSA (see below).

Green Skills Agreement (GSA)

In 2010 COAG published their Green Skills Agreement (GSA). This Agreement represents the federal, state and territory governments’ commitment to collaborate with providers, employers and employees to ensure that green skills become a part of all VET provision, and that these skills remain relevant to the needs of industry. Skills for sustainability are defined in this document as ‘the technical skills, knowledge, values and attitudes needed in the workforce to develop and support sustainable social, economic and environmental outcomes in business, industry and the community’ (p. 2). The GSA has four objectives:
• Embedding skills for sustainability practice and teaching in vocational education and training, within the requirements of the national regulatory framework

• Upskilling of VET instructors and teachers to deliver skills for sustainability

• Strategic review of Training Packages (sets of nationally endorsed standards and qualifications for recognising and assessing people’s skills) to embed sustainability knowledge, skills and principles

• Implementing a transition strategy to reskill vulnerable workers.

In tandem with the GSA is the work of the Ministerial Council for Tertiary Education and Employment (MCTEE 2010), which developed the Green Skills Agreement Implementation Plan 2010–2011. This plan focused on implementation strategies to achieve the four objectives set out in the GSA.

Clean Energy and Other Skills Package.

This package, announced in July 2011, aimed to develop specific skills and knowledge for targeted occupations and professions, and to provide clean energy services, products and advice to Australian businesses and communities.

Skills for sustainability policy initiatives in New South Wales

The NSW Board of VET developed a comprehensive document on ‘Skills for sustainability’ (NSW BVET 2007 and 2009). This work provides the blueprint for sustainability and VET in NSW but has relevance to VET provision across all Australian states and territories. The content in the second edition (NSW BVET 2009) localises the issues that were raised in the much larger United Nations Environment Programme (UNEP) report ‘Green jobs research’ (2008).

Back in 2003 a review of training packages and VET programs was undertaken and major gaps and discrepancies were identified in content on the environment and sustainability. The study at the state level encouraged a similar study to be instigated at a national level in 2005 by Rickard and Condon. The national study found very similar results to those found across NSW TAFE. After this research the National Centre for Sustainability (NCS) began to look at developing guideline standards for sustainability to underpin and be included in a wide range of VET training packages. Three new standards were developed, each aimed at different levels of VET provision (Condon & Rickard 2009). By 2006 these were starting to be implemented in an increasing number of programs throughout the VET system. The three standards and their intended level are set out below.

- Operator (GCSSUS01A) Participate in environmentally sustainable work practices
- Supervisor (GCSSUS02A) Implement and monitor environmentally sustainable work practices
- Manager (GCSSUS03A) Develop workplace policy and procedures for sustainability

This national review of sustainability-oriented content in training packages was followed up and reported in the Industry Skills Councils (2009) report, ‘Environmental sustainability: an industry response’. Some Industry Skills Councils chose to undertake their own reviews such as the IBSA’s, ‘Scoping skills for sustainability’, (Toohey 2010) and Service Skills Australia, ‘Sustainability Skills Stocktake and Gap Analysis Report’ (2010).

Skills for sustainability policy initiatives in Victoria

In April 2010 the then Victorian government released its 18-point plan in the report ‘Jobs for the future economy’. The 18 points were arranged around five key themes. These included securing more jobs in construction, securing more jobs in energy, developing sustainability skills, driving low emissions industry growth and promoting innovation. Of the $175 million the government put into this initiative, two of the 18 actions were awarded 66% of the funds. These actions were constructing greener
government buildings ($60m) and resetting waste landfill levies ($59.7m). Green skills for trades was provided with $5m and sustainability skills for industry $5m.

Sustainability Victoria, a statutory authority, provided much of the leadership and resources over the past decade in training for sustainability in a wide range of occupations and professions within Victoria.

Skills for sustainability policy initiatives in Queensland

The QLD government instigated its Climate change program known as ‘ClimateQ’ in 2008. As part of this program, it strategically targeted construction industry workers and, through its green building skills fund, provided green skills training to approximately 3000 third- and fourth-year apprentices. Another initiative, the ‘Skills for the low carbon economy’ targeted three high emissions industries namely, automotive, energy and mining.

Skills for sustainability policy initiatives in Western Australia

In 2010, the report ‘Skilling for a sustainable future’ conducted extensive research into the demand for green skills and, while acknowledging them as an area of skills shortage, recommended that they be offered as elective streams in existing qualifications and that the existing VET system for initiating training in areas of skills shortage was sufficient for addressing these needs. The report states that quantifying future skill needs in this area was very difficult to do with any degree of accuracy.

Understanding demand for skills for sustainability in Australia

UNEP (2011) suggests that a sustainable economy “can be thought of as one which is low carbon, resource efficient and socially inclusive” (p.1). UNEP (2008) explains that the transition to a sustainable economy will affect employment in at least four different ways. These are that additional jobs will be created in some fields, some jobs will be substitute, other jobs such as those dependent on fossil fuels may be eliminated, and many existing jobs will be transformed (UNEP 2008, 2011). Greater efficiency in such areas as energy use and modified use of materials are cited as key goals. Fien and Guevara (2013, p. 259) argue that it may be helpful to consider:

1. Existing jobs will all require additional skill sets related to ethics and sustainability; and arguably environmental awareness.

2. New jobs will be created within existing industries, such as building and construction.

3. New and expanded industries will use existing technical skills along with ethical understanding and new technical skills, such as in the renewable energy industry.

4. New and expanded industries will develop new occupations.

Many recent reports suggest that increasing investment in a sustainable economy, including the development of the necessary sustainability-related knowledge and skills, has the potential to increase employment, provide decent jobs and maintain the environment and increase social capital. The Australian Conservation Foundation (ACF) and the Australian Council of Trade Unions (ACTU) recognised their shared interests and have written four reports on the emerging green economy (ACF/ACTU 1994; 2008; 2010; 2012). In their joint research published in 2008, ‘Green Gold Rush’, they identified six green industries believed to be well positioned to flourish. These are renewable energy, energy efficiency, sustainable water systems, biomaterials, green buildings, and waste and recycling. They estimated that these emerging jobs would easily numerically replace those that are disappearing. This estimate stands alongside the modelling provided in the Commonwealth Scientific and Industrial Research Organisation report, ‘Growing the green collar economy’ (Hatfield-Dodds, Turner, Schandl & Doss, 2008), which explained that information on sustainability skills was poor at that time – a theme that has been reiterated in numerous reports in Australia and internationally since. Nonetheless, Hatfield-Dodds et al were optimistic about the potential in these emerging green collar jobs. With hindsight, the number of new jobs being created in the green economy in Australia is not reaching the
magnitude that has been predicted or modelled. In fact, evidence from the *ClimateWorks Australia* reports of 2010 and 2013 showed that the actions identified as ways of lowering carbon emissions and transitioning to greener cleaner activities have dramatically slowed in the five industries monitored.

In 2010 the former Department of Education, Employment and Workplace Relations (DEEWR) published a survey of 1,932 employers from across eight different industries and found that just under half (48%) said they had been affected in some ways by environmental or sustainability issues in the past 12 months. Almost the same amount (47%) said that they had not been affected at all. When considering the next three to five years, 38% of employers thought that there would be a skills impact over this period. The skills most commonly identified by these employers were knowledge and understanding of compliance issues, general environmental awareness skills, specialist environmental skills, and knowledge about green products and processes. Many employers were reported as expressing concern about the rising costs associated with compliance. In terms of training, they explained their preference for in-house or private providers and short non-award programs.

In 2008 the UNEP released its comprehensive report, *‘Green jobs: towards decent work in a sustainable, low carbon world’*. The report explains that training is very important in supporting the 'just transition’ to a low carbon economy. Much is made of the shortage of skilled workers for green jobs, citing reports of labour demands from the renewable and alternative energy industries in Germany, Britain and the USA. This, they explain, is particularly the case for knowledge-intensive positions, while they list Australia, Brazil and China as reporting shortages of skilled workers more generally. This report and the later UNEP report (2011) both articulate the dual challenge for creating green jobs, of averting environmental degradation and protecting the life-supporting natural environment, while also providing decent work that brings with it the social benefits of wellbeing and dignity for the world’s population. The UNEP reports provide baseline evidence of existing green jobs and appropriate skill sets in the key economic sectors of renewable energy, building and construction, transportation, basic industry, agriculture and forestry. They also provide estimates for future green employment across the world.

The conclusions and findings from a number of studies (OECD/CEDEFOP 2014; CEDEFOP 2013 and 2012; European Union 2011) can be summarised as:

1. There needs to be increased coordination between environment, employment, and education and training policies and practices. These fields need to be recognised as being interrelated.
2. Displaced workers from some sectors will not necessarily fit into the sectors where new jobs are being created.
3. There needs to be increased access to lifelong learning, general core skills and appropriately aligned skill formation. This access to ongoing learning and the development of general skills assists workers and citizens to participate in and adjust to change as it occurs.
4. There needs to be increased dialogue between the social partners. Communication between unions, workers and employers is essential for understanding the various needs as they arise.

A 2009 report out of the USA scans the impact of green jobs on apprenticeships. It is thought that the jobs for which registered apprenticeships are used as the primary means of training will be at the forefront of green industries, with opportunities for widespread partnerships existing between the education and workforce system and registered apprenticeships. Likewise, a report on skills for sustainable growth from the Department for Business, Innovation and Skills (2010) in the UK states that "apprenticeships are at the heart of the system that we will build", (p. 7).

Young people often have passionate views about the environment, climate change and sustainability (White 2011). Research into how this is expressed through the VET student experience has been enhanced with the recent publication of findings about the perceptions of young people in this area (Sack 2012a and 2012b; Brown, Sack and Rodd 2013). The Dusseldorp Skills Forum (DSF) published the results and analysis of its *Gen Green* surveys of 2008 and 2011 (DSF 2008 and 2011) and a comparison
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of them has also been published by Sack (2012a). The 2008 survey of apprentices and trainees had 101 respondents (DSF 2008) and the 2011 survey had 97 young people respond (DSF 2011). These small-scale studies are the forerunners to this current larger national study.

In short, estimates of demand for skills for sustainability have been distorted and optimistic. Modelling and predictions have been taken as evidence and fact. Yet where actual evidence exists, such as the DEEWR survey of employers, it shows that skills for sustainability will be incorporated into most jobs and most jobs will change and adjust in at least small ways to accommodate changes in work practices and new technologies. This evidence also suggests that a few new jobs will be created that are sustainability-specific jobs but at least initially there will not be many of these specialist and dedicated work roles. Some jobs may also be eliminated; especially in high emission and resource-depleting industries. Employers expressed concern about rising costs associated with some aspects of sustainability and the transition to a green economy, particularly compliance.

There is also evidence from the small national surveys of apprentices and trainees Gen$Green$1, (DSF 2008); Gen$Green$2 (DSF 2011; Sack 2012a), and Gen$Green$3 (Sack and Brown 2013) that apprentices and trainees are showing strong demand for the full range of skills for sustainability. These same surveys show that this demand is being met by the supply of these skills for sustainability through a range of experiences in their VET courses, in their workplaces, through family and friends and through the internet.

Despite the policy emphasis on the significance of understanding sustainability, no research to date has examined VET students’ demand for skills for sustainability at a national scale or VET teachers’ supply of these skills. Thus, a mainly descriptive method of analysis with the aim of presenting the salient features of data has been adopted in this report. This current research serves as a foundation for identifying possible features of the next generation of skills for sustainability policy and flags a need to better understand the relationship between the economic demand for skills for sustainability expressed by employers and the social demand expressed by VET participants.

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1 Sources include the International Labour Organisation (ILO 2012; 2011a; 2011b; 2011c), the Organisation for Economic Co-operation and Development (OECD 2009; Kauffmann & Less 2010), The European Union and Commission (EC 2011), CEDEFOP (2010), and national governments such as Germany (Jaeger et al, 2011), France (Mathou 2010), the USA (Mass, Moss, Hopkins & Ross 2010), Brazil (Cruz Caruso, 2010) and the United Kingdom (BIS 2010; Charalambous, Lawrie & Beadle 2010; Pye & Evans 2012), Strietska-Ilinha, Hofmann, Duran Haro, & Jeon, 2011 and other work coming out of Europe see the green economy as holding potential for inclusive growth for recovering national economies. The Climate Institute (2011) reported that it is estimated that “Australia could have an additional 1.6 million people working in newly created low carbon jobs by 2020”. 

12
A national study of the demand for and supply of skills for sustainability

Research methodology

This is the most complex study in the Gen Green research series since its inception in 2008. Previous Gen Green surveys on the attitudes of apprentices and trainees towards skills and sustainability focused only on the national and international cohort of WSA competitors. This current research adopts an expanded scope to encompass institutes of TAFE from across Australia, as well as WSA competitors. This research not only captured apprentices and trainees’ attitudes and behaviours towards skills for sustainability within the home, workplace and classroom but, for the first time ever, captures the views of their teachers. Doing this establishes a dialogue around skills formation for sustainability that substantially broadens the evidence base on the demand for and supply of skills for sustainability.

Remote, voluntary engagement in research by participants within the VET sector is anecdotally very difficult to achieve (Smith, Walker & Brennan Kemmis 2011). The level of support provided by the selected institutes and the interest shown by their apprentices, trainees and teachers has been very pleasing, as evidenced by them taking time out of their busy work, training and social lives to volunteer to participate in this research. A corollary of the Gen Green 4 Australia project are findings contributing to more effective research methodologies for investigations involving apprentices, trainees and their teachers. In particular, the outcomes of this research present the opportunity to continue to refine and enhance the Gen Green research tools and recruitment strategy, developed and modified over the last five years, to even better capture Australian students’ and teachers’ experiences of skills and sustainability in the future.

Research objectives

The purpose of this research is to contribute to the existing evidence base by conducting new, national research on the current and future demand for and supply of skills for sustainability with participants in the Australian VET sector. Specifically, the objectives of this research project are to:

- Document current student and training facilitator views on the demand for and supply of skills for sustainability using a national sample, and establish a national baseline.
- Compare the results of this national survey with the existing longitudinal data sets derived from the smaller but similar samples that have been collected to date from the Gen Green surveys 2008, 2010 and 2012, to identify possible trends.
- Review the potential impact of recent policy and funding initiatives, many of which have been focused on energy and carbon efficiency.

Survey design

This quantitative research used two online surveys to ask a series of questions of apprentices, trainees and their teachers about their values, behaviours and learning in relation to skills for sustainability. The survey questions took the scope of sustainability given in the GRI Guidelines (G4), as these relate to entry-level employees. This included social, economic and environmental aspects of sustainability. Both surveys will be available for use under a Creative Commons licence and can be accessed at www.gengreen.org.au.

The surveys collected extensive demographic information on the participants in each of the cohorts. The categorisation of these demographics was matched to standard ABS classification used by the VET research community. Age data was captured in the brackets: 18–19 years old; 20–24 years old; 25–44 years old; and 45 years old and over. The gender of both teachers and students was captured. Students were asked to identify as apprentices, trainees or neither but engaged in VET studies and teachers were asked which of these groups they taught. Apprentices were also asked to nominate in which year of their apprenticeship they were engaged. The state or territory in which participants...
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studied or taught was captured, as was the institution in which they were enrolled or employed. Participants were asked about their engagement with WSA. Participants were also asked to identify their occupation (an additional category to the standard ABS classifications was included to ensure that the responses of students and teachers in environmental and natural resource management disciplines were available for comparison).

The survey instruments underwent peer review and were amended in response to comments. A pilot of the student survey and follow up focus group was conducted at South Western Sydney Institute of TAFE in September 2013. A pilot of the teacher survey was also conducted online in September 2013.

Recruitment

Participants for the survey were recruited from a selection of metropolitan and regional TAFE institutes across Australia. At least one institute in each state and territory was approached to participate. An additional arm of the study recruited WSA competitors as participants to test whether an evidence base could be established to extrapolate the results of existing Gen Green research to a national population. A total of 17 institutes across Australia agreed to participate in the research. These institutes were:

1. Canberra Institute of Technology
2. TAFE NSW Hunter Institute
3. TAFE New England
4. TAFE NSW Sydney Institute
5. The Northern Sydney Institute – TAFE NSW
6. Southbank Institute of Technology
7. Southern Queensland Institute of TAFE
8. Sunshine Coast Institute of TAFE
9. Tropical North Queensland TAFE
10. TasTAFE
11. Chisholm Institute
12. RMIT University
13. Swinburne University of Technology
14. Federation University Australia
15. Challenger Institute of Technology
16. Pilbara Institute
17. Polytechnic West

The Australian Council of Private Education and Training also agreed to feature the research in their weekly newsletter to encourage private providers to participate in the research. WSA agreed to assist in recruiting apprentices and trainees who competed in the WSA regional and national competitions and Australian competitors in the WorldSkills International Competition to the second arm of the survey. WSA also agreed to assist in recruiting teachers of apprentices and trainees from its volunteer network. In addition, the NCS at Swinburne University of Technology communicated to its alumni base of VET practitioners graduating from the Vocational Graduate Certificate in Education for Sustainability.

A suite of traditional and social media marketing materials were developed to assist institutions and peers to communicate the opportunity to participate in the survey to apprentices, trainees and their teachers. In addition, a learning resource for use by teachers to encourage their classes to participate in the survey was developed. This recognised that the Gen Green 4 Australia survey provided a good opportunity to revise previous learning about sustainability. Copies of the marketing materials are available at www.gengreen.org.au.
Research ethics

This research was made possible through Australian Government funding through The Skills for the Carbon Challenge program funded under Australian Apprenticeships Workforce Skills Development. No other funding was received to conduct this research although in-kind support from the project partners (WorldSkills Australia) in the form of communications support, and from the project supporters (NCS, Swinburne University of Technology, Ministerial Council Australia, International Green Skills Network) in the form of advice and review, was received. Independent peer review of the survey tools and the report was provided voluntarily by leading academic researchers.

The recruitment methodology was based around formal approaches to selected institutes of TAFE, informal engagement of peer networks and a social media campaign. La Trobe University Faculty of Education Ethics Committee gave ethics approval for this research in 2013. As part of the approved research approach, all apprentices, trainees and their teachers voluntarily opted in to participate in the research without inducements. Consent Forms, Participant Information Forms, Withdrawal of Consent Forms and Parent and Guardian Consent Forms were made available to all participants and participating institutions. No withdrawals of consent were received. No identifying data has been recorded.
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Results

Data collection for the Gen Green 4 Australia survey commenced on 14 October 2013 in line with commencement of fourth term at most TAFE institutes around Australia. The survey was scheduled to close on 20 December 2013, but feedback from the participating institutes suggested that extending data collection into the first term of the following year would encourage higher participation rates. The reasons given for this varied, but included survey fatigue, and the tendency for the scheduling of block training for apprentices to occur early in the year. The survey eventually closed on 7 March 2014, six weeks into the first term of study at most TAFE institutions. The survey was thus open for 21 weeks, extending over the Australian summer holiday break.

Recruitment resulted in 649 VET students and 417 TAFE teachers participating. Recruitment depended on successful engagement of participating institutes of TAFE and take-up across the institutes was highly variable, with most respondents coming from eight metropolitan and regional TAFEs in the ACT, NSW, QLD, and WA, supplemented by smaller populations attending another nine institutes. Contributing to the total number were four students and 29 teachers from private RTOs. Responses were received from 60 apprentices and trainees who had competed in the WSA regional or national competitions, or who were Australian competitors in the WorldSkills International Competitions.

Of the students responding to the Gen Green 4 Australia survey, 37% were apprentices, 21% were trainees and 34% were neither apprentices nor trainees but studied at TAFE. 52% of students were male, 48% female. Most apprentices were males in trade occupations and occupied the 18–24 years age bracket. Most trainees were females in either community or personal work, or clerical or administrative work. Their ages were more evenly spread. Students of other occupational categories did not present sufficient numbers to allow analysis, although a small number of respondents from environmental and land management were included in the analysis because of the potential special relationship they have with the subject matter of the survey (skills for sustainability). Of the student respondents, 36% studied in NSW, 25% in QLD, 18% in the ACT, 12% in WA, 3% in Victoria and 1% Tasmania. TAFEs in South Australia and the Northern Territory declined the invitation to participate in this current study, citing high levels of organisational change not conducive to the recruitment strategy.

Of the teachers responding to the Gen Green 4 Australia survey, 53% were male and 47% were female. Around 70% of both genders were 45 years or older. 31% of female teachers were aged 25–44 years compared to 25% of male teachers. Only a very small proportion of teachers responding were under 25 years of age. The 21% of teachers who taught apprentices in trade occupations were mostly men. 31% of teachers who taught trainees in clerical or administrative work or in community or personal services work were mostly women. 25% of teachers taught both apprentices and trainees and another 16% said they were delivering work-based training that was neither for apprentices nor trainees (many of these indicated that they were teaching in business management and education areas). Most of the teachers who responded were employed by TAFEs in NSW (33%), WA (19%) and QLD (16%). A larger proportion of teachers than students from Victoria (13%) and Tasmania (8%) participated in Gen Green 4 Australia. Many of these Victorian and Tasmanian teachers did not teach apprentices and trainees, explaining the difference in geographical reach between student and teacher surveys.

Drivers of social demand for skills for sustainability in 2014

The results of the Gen Green 4 Australia research showed that in 2014 both Australian VET students and teachers overwhelmingly acknowledged a positive commitment to skills for sustainability, as these skills were expressed in espoused values, acknowledged behaviours and learning and teaching experienced. All mean score responses to all questions were well above the median of 3 on a 5-point Likert Scale, showing that apprentices, trainees and their teachers cared deeply about social, economic and environmental sustainability-related issues and the development and practice of skills relating to
sustainability. This was relatively independent of occupation, age, gender, location or role as teacher or student.

Students and teachers were asked a set of mirrored questions about how important a range of issues relating to environmental, social and economic personal and workplace values were to them. They were asked to indicate the importance to them on a 5-point Likert scale. The average difference between teacher and student ratings on the importance of sustainability values was small (5%). Figure 1 shows the teacher and student mean responses. It shows that all these values were very clearly important for students and their teachers, but especially values related to equity, both personally and in the workplace. One teacher said: “Priorities should always be people first, then property, lastly environment.”

For students, workplace values ranked below their personal values. One student said: “I do not support workplaces that make excess money and are not contributing enough to the beneficial future of our society, environment and planet.” Within these rankings, environmental values ranked lower than social and economic values, although students under 18 years of age also rated economic values much lower than their peers. Students in environmental and land management occupations rated economic and equity-related values lower than their peers. Construction trade students rated personal economic value higher than their peers. Students in trade occupations rated the importance of protecting the environment lower than other students. Further, students in technology occupations rated protecting the environment lower than their trade peers. Students in clerical, administrative, environmental or land management occupations rated the importance of future generations higher than their peers.

Teachers rated environmental and social values higher than students. In particular, they rated ‘working in a workplace that protects the environment’, ‘protecting the environment’, ‘working in a workplace that contributes to handing over a world in good shape for the next generation’ and ‘handing over a world in good shape for the next generation’ as considerably more important than students did. For teachers, economic values ranked lower than other values. One teacher said: “The amount of enough money is increasing in society unfortunately enough seems to be too much.” Teachers in clerical and administrative occupations rated economic value above their peers, and construction teachers rated ‘working in a workplace that makes enough money’ higher than their trade peers. Teachers in environmental, land management, clerical or administrative occupations rated the importance of future generations higher than their peers (but did not rate environmental values noticeably higher).
Respondents were given the opportunity to comment in relation to the questions on values and 70 responses were recorded. Students and teachers commented on the following themes:

- The importance of:
  - The environment
  - Sustainability and future generations
  - Sustainability to TAFE and VET
  - Economic success
  - Fairness
  - Job satisfaction
- Hopelessness and frustration
- Economic success is not so important
- Questioning of the sustainability agenda

Students and teachers were asked a set of matched questions about the incentives for students gaining skills for sustainability (as exemplified by the suite of skills given in the survey). These questions were framed as agreement/disagreement with a set of statements on a 5-point Likert scale. Teachers were asked two additional questions about whether acquiring these skills ‘means my students can adapt to change in our industry’ and whether acquiring these skills ‘gives my students confidence to make a positive contribution to their workplace’. Students were not asked these questions as they rely on a degree of experience not available to students. Students and teachers were also given the opportunity to provide a free text response.

Figure 2 shows the student and teacher responses to questions on the incentives for gaining skills for sustainability in matched pairs. By and large, the views of students and teachers were closely aligned with both populations acknowledging personal incentives (‘feeling good’ and being ‘better at job’).
above economic and social incentives (‘get work’; ‘get more varied work’ and ‘win the approval of family and friends’). One student said: “I think a lot of jobs are based on skills these days not knowledge of sustainability skills ... places say they are environmentally friendly ... but having sustainability skills or being environmentally aware was never a requirement or a question asked. However, being able to follow instructions and having knowledge about businesses in the same industry was.” A number of students commented along the lines of “I don’t believe having the sustainability of this job wins the approval of my friends and family. My family approve of me no matter what work/life choices I make.” Teachers rated incentives relating to resilience most highly of all. One teacher commented that: “The whole width/depth of the sustainability question surprises students, often not seeing their role in or their employer’s role in anything more than water and power use.” Another teacher said: “A few of these students have acknowledged our work in their reports and thanked our organisation for highlighting the need for change in our energy and water usage after a successful implementation of the practices.”

The research indicates that in 2014, apprentices, trainees and their teachers believed that personal and intrinsic incentives for gaining skills for sustainability were more influential than economic and social incentives. In particular, students agreed most that gaining these skills made them feel good and made them better at their jobs and agreed least that it won the approval of family and friends. Most of all, according to teachers, learning skills for sustainability gave students confidence to make a positive contribution in the workplace and meant they could adapt to change in industry.

Response to social demand for skills for sustainability in 2014

The results of the Gen Green 4 Australia research supports the conclusion that in 2014 supply of skills for sustainability by TAFEs across Australia was closely aligned to social demand. Students and teachers agreed that all the skills exemplifying sustainability were respectively learnt and taught in class. However, students said they learnt environmental skills more from family and friends than in class or at work, in contrast to social and economic skills, which they said were learnt most in class and at work.

Data was collected on where students thought that they learnt skills exemplifying environmental, social and economic sustainability. They were offered the choice of ‘at work’, ‘in class’ or ‘from family and friends’. Mirrored questions were asked of teachers, asking whether they thought that they taught
these skills. In addition, teachers were asked if they taught a range of higher order skills associated with the principles of education for sustainability. These results are analysed in a number of ways, each giving an insight into the relation between student experience of the supply for skills for sustainability and teachers’ perceptions of meeting this demand.

Figure 3 shows students’ acknowledged learning of skills for sustainability as a straight ranking according to the maximum value they agreed with (across work, class and family and friends). Students agreed least with statements saying that they have learnt skills relating to the environment. ‘What can be recycled’ topped the ranking for environmental skills learnt through all three sources and ‘The amount of energy it takes to make raw materials’ was the skill learnt least of all. One student said: “This information is not given to myself nor my classmates at work or at TAFE. This is something that, if you don’t have an actual interest in it and research yourself, then you are not going to learn about it. It is a real shame and there definitely needs to be more of a focus on it.” Students agreed most that they have learnt procedural skills and skills relating to equity. The pattern here is very similar to students’ ranking of values and of behaviours – social on top, environment on the bottom.

![Figure 3](image)

Figure 3 Students’ acknowledged learning environmental, social and economic skills

Figure 4 shows the student responses on sources of learning averaged across the sets of skills exemplifying environmental, social and economic skills for sustainability. As Figure 4 shows, the research highlights a clear difference between students’ sources of learning environmental, social and economic skills. Students said they learnt environmental skills more from family and friends than in class, and least of all at work. This was particularly the case with skills relating to protecting biodiversity and energy efficiency. In contrast, they said they learnt social and economic skills more at work and in class. These results are supported by teacher and student responses on skills practiced at home, in the class and at work. One student said: “What can be recycled you learn at home.” This is sharp contrast to learning of economic and social skills which, according to students, were predominantly learnt in class and at work. The figures in Appendix B show the relative degree to which students agreed that they have learnt these environmental, social and economic skills at work, in class or from friends and family. These figures also show the extent to which teachers acknowledged teaching these skills.

The social skills that students most acknowledged learning at work and in class were ‘how to apply safe work methods’ and ‘procedure and instructions for the work I do’. These were also the skills they least learnt from friends and family. Closely following these were the skills of ‘treating men and women equally’ and ‘respecting people from other cultures’. These skills were learnt slightly more at work and in class than from family and friends. Although students almost totally agreed that they learnt about their rights at work in the workplace, one student commented: “My workplace gives a lot of education
and information on our clients/patients rights but gives us the minimal information on our rights as employees – even at meetings often questions are unanswered concerning our rights as employees.” Another student said: “I am not really "learning about" the above things, rather [than] "learning" them, [I’m] putting them into practice.”

Legal compliance is the economic skill most learnt at work and in class, according to VET students, although one student said: “It is only when you research current laws, is when you find out this information, I wouldn’t know if I was doing something wrong unless someone told me about it after.” Students acknowledged learning ‘how to get better qualifications’ and ‘how to bring new thinking into the workplace’ more in class than at work, although one student said: “You can’t find out what qualifications are available unless you specifically research it. It is not told.” Work was more acknowledged as a source of learning on ‘the $ value of the materials I use’ although one student said: “This is not known when you order things in the workplace as it is not information we are allowed to view. We also do not know how much money is in a budget for the department. No one really notices what you purchase either.”

Figure 5  Acknowledged teaching and learning of skills for sustainability in class

Students and teachers were asked a set of matched questions about which skills for sustainability were learnt or taught in class. The response rankings in Figure 5 are very similar to the rankings across all sources of learning. They also indicate that skills related to social sustainability and economic sustainability were learnt and taught in class more often than skills relating to environmental
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sustainability. Skills relating to supply chains (both social and environmental) were learnt and taught least of all in class.

Teachers’ agreement that skills for sustainability are taught in class was higher than students’ agreement that they learnt these skills. In absolute terms the divergence in views between these populations is small (the average difference was 7%). On average the gap between teachers’ acknowledged teaching of environmental skills and students' acknowledged learning was greater than between teaching and learning of social or economic skills. Teachers and students differed most on whether ‘how toxic materials are to the environment’ was taught in class, a difference of 13%. A number of teachers commented that they deliver these skills in a general way, for instance saying: “I teach these at a general awareness level and in relation to the local environment and sustainable practices students can carry out in the home and workplace.” A number of other teachers commented that they did not explicitly teach these skills saying, for example: “We teach about the equipment we work with in our industry but never talk about its environmental impact. The industry itself is always developing more efficient equipment.”

Figure 6 Teaching of education for sustainability skills (n=335)

On average the gap between teachers’ acknowledged teaching of social skills and students' acknowledged learning was smallest. They differed least that ‘how the people who make the materials I use are treated’ was taught in class, a difference of 4%. A number of teachers indicated a degree of pastoral care in their delivery of these skills, for instance commenting: “I think apprentices are impressionable and need guidance.”

Figure 6 shows the level of teachers’ agreement that they deliver skills indicative of education for sustainability (no matched data was collected from students on this). Teachers indicated a very high level of agreement that they are applying education for sustainability principles in their teaching, higher than their acknowledgement that they taught any of the specific skills for sustainability.

The practice of skills for sustainability at work, in class and at home in 2014

In alignment with their espoused values and acknowledged learning and teaching, students and teachers agreed that they practiced skills for sustainability more at home than in class or at work, though environmental behaviours were practiced least by students at work.

Students and teachers were asked to indicate their agreement with mirrored statements about their practice of behaviours relating to social, economic and environmental sustainability at work, in the classroom (which is the workplace for the teachers) and at home on a 5-point Likert scale. Figure 7 displays the mean values averaged across behaviours exemplifying environmental, social and
economic sustainability. Figure 7 shows that the match between the rankings accorded these behaviours by teacher and by student is strong, although teachers generally agreed to practicing each of these behaviours slightly more. The average difference between teacher and student ratings on their sustainability-related behaviours in the classroom were small (5%).

Students acknowledged practicing environmentally sustainable behaviours more at home than in class or work, and teachers acknowledged this even more strongly. Students acknowledged the practice of all environmentally sustainable behaviours least at work, especially energy conservation. Students experienced almost all sustainability-related behaviours slightly more in class than at work, suggesting that TAFEs are modelling sustainability behaviours required in the workplace (the exceptions were sorting waste and suggesting better ways to do things).

Students studying land and environment management acknowledged practicing behaviours relating to energy and power saving, safety, gender and cultural equity at work less than their peers in other occupations. They also acknowledged safety, gender and cultural equity behaviours less in the classroom and at home. Teachers of environment and land management acknowledged practicing water and energy conservation behaviours at work more than their peers, but this is not reflected in the responses of their students.

![Bar chart](chart.png)

**Figure 7** Students and teachers’ practice of sustainability-related behaviours in class, at work and at home

Students and teachers acknowledged practicing socially and economically sustainable behaviours more than environmentally sustainable behaviours in all contexts. Teachers particularly acknowledged socially sustainable behaviours, more than economically or environmentally sustainable behaviours at work. One teacher said: “I always respect others and the culture of others if they respect me.” Teachers and students’ comments indicated a level of frustration with their ability to influence behaviour in the workplace. One teacher said “the red tape can make it difficult to do extra”. A student commented: “I do not suggest better ways to do things as it seems in my workplace we must do as we are instructed.” Students acknowledged practicing respect for the culture of others, treating men and women equally and following safe work methods more at work than in class. By contrast, students acknowledged suggesting better ways of doing things and following procedures and instructions more in class than at work.

Students in food trade occupations acknowledged practicing all sustainability-related behaviours in class more than their peers in other trades, with the exception of ‘suggest better ways to do things’. Students and teachers in food trades occupations acknowledged waste-sorting behaviours at work more than colleagues in other trade occupations.
Unsatisfied social demand for skills for sustainability in 2014

With the exception of learning about the social supply chain, there was very little unsatisfied social demand for social and economic skills, but a relatively small proportion of students said that they did not learn environmental skills at work or in class. The Gen Green 4 Australia research collected additional data from these students. Of the minority of students who disagreed that they had learnt environmental skills in class, most said that skills relating to waste management, toxic pollution and water efficiency were required ‘right now’. They said that skills relating to protecting biodiversity and emissions would be required in the future. Their responses on skills relating to energy efficiency were mixed. Most suggested that learning about ‘the amount of power I use’ would never make them better at their job and would only be required by government, the community and employers in the future (although students thought that this skill was required by customers right now). They said that learning about ‘the energy it takes to make raw materials’ would never be required by customers and would only be required by other stakeholders in the long term. Given the size of the population these are substantial numbers of students and their cumulative views are relevant to policy questions regarding future demand for environmental skills.

The small proportion of participants who did not acknowledge learning sustainable behaviours either at work, in class or at home were given a number of set responses about when these skills might be required, whether these skills would be required by customers, employers, the government, or our community, and whether these skills would make them a better person or better at their job. Students were also asked to nominate the time frame (‘right’ now’, ‘in the next year’, ‘in five years’, ‘in ten years’ and ‘never’) in which the skills, which they had not learnt, would be required. These results varied substantially between skills. Figure 8 displays students’ responses on the future demand for environmental skills, cumulated across the reasons these skills would be required. Students who had not learnt ‘the energy it takes to make raw materials’ were most likely to think this skill would never be required. Students who had not learnt ‘the amount of water used’ were most likely to think this skill would never be required. Students who had not learnt ‘the amount of power I use’ were most likely to think this skill would be required right now.

![Figure 8](image_url)
Overall, learning about recycling and the eco-toxicity of materials were flagged as the most required environmental skills and learning about energy consumption on the job and in the supply chain were flagged as the least required environmental skills. Students flagged some medium-term demand for biodiversity protection and energy efficiency and flagged longer-term demand for emissions reduction.

The survey also collected additional data from the small proportion of participants who did not acknowledge practicing sustainable behaviours at work, in class or at home. These questions included a number of set responses, as well as a free text field enabling more detailed qualitative feedback on the reasons for not practicing sustainable behaviours. The results in Figure 9 reflect the reverse of the results shown in Figure 7; again highlighting that teachers and students say that environmentally sustainable behaviours are practiced less at work and in class, compared to socially and economically sustainable practices. The environmentally sustainable practice least acknowledged by both teachers and students was sorting waste at work. Students also acknowledged saving fuel, power and water at work much less than in class, and least of all at home. The reasons given for not acknowledging practicing environmental behaviours varied considerably between teachers and students, between different skills and between work and class (in the case of students). Although the results indicate some student demand for additional supply of environmental skills for sustainability (responses of 'I don't know how'), personal and employer commitment are more prominent factors. This suggests that culture change at work and personal transformation, rather than technical skills delivery, may be more important factors in further building the environmental sustainability capacity of entry-level employees. Time pressure and personal commitment appear to be the key issues constraining environmental sustainability behaviours of teachers. A detailed breakdown of the reasons given by teachers and students for not practicing environmentally sustainable behaviours is given in Appendix C.

Figure 9  Percentages of students and teachers not acknowledging sustainability behaviour
Barriers to teaching skills for sustainability are primarily experienced in relation to environmental skills and skills associated with understanding the supply chain. This aligns with the ranking of unsatisfied demand signalled by students; the skill that students thought was least needed, ‘the energy it takes to make raw materials’, was also the one least taught. The main barrier nominated by teachers is that it’s not in the training package.

The survey collected additional data from the teachers who responded negatively to the questions on teaching skills for sustainability. These questions provided a number of set responses. Teachers who disagreed that they had taught one of the skills exemplifying sustainability were asked to nominate whether the training package, importance to students, teaching time, teaching resources, skills, professional development or confidence were barriers to teaching that skill. The proportion of teachers saying they did not teach skills for sustainability varied between 8%, who disagreed that they taught ‘the amount of energy it takes to make raw materials’, and 0.3% who disagreed that they taught ‘what customers want’.

Figure 10 shows the cumulative barriers identified by teachers. The predominant barrier to teaching skills for sustainability, nominated by more than half the teachers, was that ‘it’s not in the training package’. For example, one teacher said: “As a trainer of landscape construction apprentices there is not much scope, nor is it embedded in the skill set, to go this deep into training delivery.” Another said: “In the business courses I teach there are minimal of the above in the courses and units.” Another main barrier for teachers was ‘I don’t believe it’s important for my students’. One teacher said: “Apprentices are resistant, and in some ways – information-fatigued. The message that they get from media is, that everything is about money.” Resource constraints and lack of skills accounted for less
than a quarter of the responses. Lack of confidence was not an issue. Appendix D shows the breakdown of responses according to the different skills exemplifying sustainability.

![Diagram showing barriers to teaching skills for sustainability](image)

**Figure 10**  Barriers to teaching skills for sustainability (cumulative across all skills)

**Responding to unmet demand for skills for sustainability in 2014**

Students said that on-the-job training and training from suppliers were the preferred ways of acquiring additional sustainability skills, closely followed by these skills being incorporated into training for the qualification. Higher education was the least preferred.

Students were asked a set of questions about what would help them develop skills for sustainability (as exemplified by the suite of skills given in the previous questions). As Figure 11 shows, training on the job was rated most highly, followed by training from suppliers and skills being incorporated into training for the qualification. Separate short courses, self-directed learning and community-based learning were less favoured and higher education least favoured. Note, however that the mean scores were very positive (3.73 to 4.17, where 4 = agree) and there was a very low rate of disagreement with any of these skill development options.
Figure 11  Students’ views on what would help them develop skills for sustainability  

The contrast of these results with firstly, students’ views on their current sources of learning (see Figure 2) and, secondly, teachers’ views on barriers, has clear policy implications. Although talking to friends and family is a less favoured source of learning environmental skills for students, it is the source of learning for environmental skills that students currently experience most. According to teachers who don’t teach environmental skills, this is largely because these skills are not in the training packages.

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2 The recruitment of 5% students from South Australia, the Northern Territory and internationally provides some indication of the effectiveness of the informal recruitment strategies.

3 The remaining 8% were either studying outside of the VET system or had completed their studies. Four VET students were enrolled at private RTOs and not TAFEs.

4 A large proportion of students (27%) were unable to identify their occupation according to the standard ABS classifications and responded as ‘other’ occupation. In particular, students in IT and web disciplines did not identify with a trades classification and healthcare workers (especially nursing students) did not identify as being in community or personal care occupations. This suggests there may be value in communications efforts around occupational classifications in VET to ensure robust data collection in national statistics. The overall spread of ‘other’ occupational responses closely mirrors the overall occupational demographics in terms of gender and age. The analysis has been conducted without reassigning these values.

5 Most of the remaining ‘other’ responses closely mirrored the overall occupational demographics in terms of gender and age. The analysis has been conducted without reassigning these values.

6 The data is well harmonised with the mean response to most questions being well above the median value of 3 on a 5-point Likert scale. This may reflect a very high level of performance in respect of the measured characteristics but our analysis has considered that this may also reflect the alignment of the subject matter with existing cultural norms. This alignment may have given rise to a social desirability bias or other forms of subjective validation. There is also the potential for a self-selection bias, in that participation in the survey was voluntary. The design of the research responds to these concerns by making every effort to recruit a large and diverse sample.

7 Only three non-environmental skills were included in this top 10: ‘How everything is connected’; ‘The $ value of the materials used in my industry’; and ‘What to do about bullying and harassment’.
Longitudinal trends in skills for sustainability 2008 to 2014

In 2008 the DSF, in partnership with WSA, initiated a program of quantitative research to capture young, skilled Australian workers’ experience of skills and sustainability – the Gen Green Survey. The initial 2008 survey recruited competitors at the WSA National Competitions in 2006 and 2008 and focused on their experience of green skills in studies and work (DSF, 2008). In March 2011, DSF applied an updated and expanded survey tool on a very similar population to conduct the second Gen Green survey; the results were published as Gen Green Survey 2011 (DSF, 2011). The second survey focused on the experiences of environmental, social and economic sustainability skills at work and in studies. In 2012, WSA established a new partnership with La Trobe University to continue the research program. This third survey, Gen Green 3, The experience of skills and sustainability by competitors in the WorldSkills Australia National Competitions (Sack & Brown, 2013) also focused on apprentices’ and trainees’ experiences of environmental, social and economic sustainability skills at work and in studies.

The Gen Green research from 2008 to 2012 recruited only apprentices and trainees who were also WSA national and international competitors. A cohort of these WSA competitors was recruited to the Gen Green 4 Australia survey to investigate whether this population’s response to the survey differed from trade apprentices and trainees who were not WSA competitors. Overall, the close alignment between the responses of WSA competitors and the responses of the complete trade cohort suggest that the historical Gen Green data is reflective of how the wider population of trades-based trainees and apprentices experienced skills for sustainability at these points in time. This is also born out by the thematic similarities between the findings of Gen Green 3 and Gen Green 4 Australia.

The four studies in the Gen Green series give a unique insight into the changing barriers to practicing skills for sustainability experienced by entry-level employees, the incentives these employees experienced to practice and develop these skills over the last half decade, and where they have learnt these skills.

Figure 12  Practice of environmental skills at work and in class from 2008 to 2014

Gen Green research shows that from 2008 to 2014, apprentices and trainees continued to be very committed to environmental values and behaviours, despite the decreasing importance accorded environmental issues by young people in the last few years, according to other research (Mission Australia, 2013; OEH, 2012). It also appears that training is increasingly addressing this interest but that apprentices and trainees have perceived a decline in commitment to the practice of sustainability.
at work from 2010 to 2014. Interestingly the Gen Green research supports other recent research on youth views that indicates the growing importance of economic and social issues – especially equity, especially for young women (Mission Australia, 2013). From 2010 to 2014, young skilled people continued to practice gender equity slightly more at work than in class, though Gen Green 4 Australia indicated that they learnt about ‘treating men and women equally’ slightly more in class than at the work in 2014.

Figure 12 compiles a key statistic from each of the Gen Green studies – the percentage of responding apprentices and trainees who experienced the practice of environmental skills at work and in training. Figure 12 shows a substantial increase in apprentices’ and trainees’ practice of skills relating to environmental sustainability (‘green’ skills) at work and in training from 2008 to 2010. It shows a further increase in the practice of green skills in training from 2010 to 2014, but a decrease in the practice of green skills at work over the same period. Apprentices and trainees practiced green skills more in classrooms than in workplaces in 2014, especially skills relating to water and energy conservation.11

The Gen Green research also indicates that from 2010 to 2014 economic sustainability skills were very frequently experienced by apprentices and trainees at work and in training, followed by social sustainability skills. Green skills were experienced least frequently. The results indicate very little movement in young skilled people’s experience of skills relating to economic or social sustainability at work or in training from 2010 to 2014 (this data was not collected in 2008).

The Gen Green research indicates that there was a large gap between young skilled people’s aspirations to develop sustainability skills and available learning opportunities from 2008 to 2012. In particular, the skills required to manage the emerging carbon-constrained economy, such as understanding supply chains, were not common in training and at work. In 2014 there were far fewer indications of unmet demand, but the supply of skills related to managing supply chains continues to lag well behind other skills for sustainability both at work and in class.

The Gen Green research indicates that in 2008, the three main barriers to practicing green skills on the job experienced by young skilled people were cost, lack of interest by the employer and work attitudes. Cost remained the most widely experienced barrier to practicing sustainability skills at work from 2008 to 2012, but there was a strong divergence between the respondents’ experience of barriers to implementing sustainability skills in different types of industries. The findings in 2014 indicated that cost was no longer the predominant barrier to practicing environmentally sustainable behaviours experienced by apprentices and trainees at work.12 Instead lack of interest by the students and their employers predominated, although lack of time and skill also featured as barriers.

In 2008 the drivers for learning green skills were training for work and personal interest, in equal measure. The proportion of apprentices and trainees indicating a strong personal interest in skills for sustainability increased from 2008 to 2012. In 2014, young skilled people continued to identify personal drivers (‘makes me feel good’, ‘makes me better at my job’) more than social and economic incentives. There was also a pronounced decline in employment-related benefits of applying sustainability skills perceived by apprentices and trainees from 2010 to 2012, which has not picked up 2014.

In 2008 apprentices and trainees viewed educational institutions and workplaces as important sources of learning and using green skills. At that time a third of these apprentices and trainees reported that they were not learning green skills at all. The Gen Green Survey 2011 saw a substantial increase in the formation of skills for sustainability since 2008. In 2014 apprentices and trainees in trades occupations continued to acknowledge TAFE slightly more as a source of learning about sustainability skills than work. They continued to learn about ‘the amount of power used’ and ‘the amount of energy it takes to make raw materials’ more in class than at work. They continued to learn about ‘the $ value of the materials I use’ slightly more at work than in class.
While analysis did not deliver powering sufficient for conclusive statistical testing (the 60 WSA competitors were part of a 210-person trades cohort and the overall results were very harmonised), no interesting differences in the pattern of responses to the survey questions between WSA competitors and other apprentices and trainees were apparent (see Appendix E for a series of figures comparing the populations). There were some minor differences between the responses of WSA competitors and the complete trades occupation cohort, mostly that the WSA cohort was slightly more conservative in their responses. This can largely be explained by the age profile of the WSA cohort, which is tightly grouped around the 20–24-year-old bracket, the most conservative age group. The WSA cohort rated the importance of ‘making enough money’ and ‘working in a workplace that makes enough money’ noticeably lower, which is likely to be the result of a significantly higher proportion of women (33.3%) in the WSA competitor cohort compared with the complete trade cohort (17.6%). The different gender profiles also largely explain the differences in acknowledgement of sustainability-related behaviours at work, in class and at home.

The methodology for collecting this data has changed between 2012 and 2014, however the structure and intent of the questions is very similar.

This further supports the contention that there is some relation between young people’s participation in work and vocational study and their commitment to sustainability (see also Sack, 2012).

Note that the metric has changed substantially, from an average of simple % positive responses to yes/no questions about the experience of specific environmental skills, to an average of responses on Likert scale questions about agreement with the practice of specific environmental skills.

The structure of the question on barriers to sustainable behaviours has changed to make it more accurate. This question now captures responses only from those who did not agree that they practice environmentally sustainable behaviours at work and in class.
Factors in social demand for skills for sustainability

Gender and age analysis was conducted on all the results collected from both Gen Green 4 Australia surveys. This analysis was complicated by gender polarisation around occupations and patterns of study in the survey populations. It was further complicated by age factors in the responses. The analysis has attempted to account for these factors, in particular:

- 37% of student respondents were apprentices, most of them 18–24-year-old men in trade occupations, and whose teachers were men 45+ years old; and
- 21% of student respondents were trainees, most of them women in either community or personal work or clerical or administrative work, and whose teachers were women 45+ years old.

The size of subpopulations in the sample does not support statistical analysis of the various subpopulations by age, gender and occupation but the data across these subpopulations was reviewed for evidence that would demonstrate that occupation alone was as important as either gender or age.

Gender as a factor in social demand for skills for sustainability

Statistical analysis showed that gender was a significant factor in a number of areas. Figure 13 shows that female students espouse sustainability-related values more than male students, with the exception of ‘making enough money’ or ‘working in a workplace that makes enough money’, where both sexes were equal. In particular, female students and teachers rated the importance of future generations noticeably higher than their male counterparts. Female teachers rated the importance of making enough money lower than their male peers. The same effect may also account for the higher level of agreement with personal and intrinsic incentives to develop skills for sustainability indicated by female teachers and students, when compared to male teachers and students. By contrast there was no appreciable gender difference in the teachers’ responses concerning social and economic incentives. Female students, however, appeared to have more positive views on how developing these skills would ‘help them pass their course’ and ‘help them get work’. Female students acknowledged sustainable behaviours more than men; in particular behaviours relating to resource efficiency, safety, compliance and cultural equity.

![Figure 13](image-url)
The research also indicates that women experienced learning skills relating to social sustainability at work and in class much more than men and, to a lesser extent, they also experienced learning skills relating to economic sustainability at work and in class more than men. Female students believed having sustainability skills helped them more than male students believed having sustainability skills helped them. In particular, they believed these skills helped them pass their courses, get work and made them feel good to a greater extent than men. Female teachers were more positive than male teachers about the contribution of sustainability skills to students’ careers and workplace resilience.

![Figure 14: Sources of learning skills for sustainability for male and female students](image)

As Figure 14 shows, there is little difference between male and female student responses on the learning of environmental skills or on learning from family and friends. There is however a substantial difference in female students' acknowledgment of learning social and economic skills in class and at work.

![Figure 15: Male and female teacher acknowledged sustainability behaviour at work and at home](image)
A national study of the demand for and supply of skills for sustainability

Statistical analysis on the student population also showed that female students acknowledge sustainable behaviours significantly more than male students, especially behaviours relating to resource efficiency, safety, compliance and cultural equity. As Figures 15 and 16 indicate, there was a general pattern of higher female acknowledgement of sustainability-related behaviours. Minor exceptions to this pattern were that female teachers agreed less with the statements ‘I always suggest better ways to do things at work’ and ‘I always conserve fuel at work’.

Figure 16  Male and female student acknowledged sustainability behaviour at work, in class and at home

Age as a factor in demand for skills for sustainability

The research also indicates that age is a factor in students’ and teachers’ experience of sustainability. Acknowledgment of sustainability values and learning by students appears to drop in early adulthood (18 to 25 years) before rising again with age. In particular, students under 18 and over 25 years of age rated the importance of values related to the environmental and future generations, and acknowledged learning of environmental skills in class, more highly than those aged 19 to 24. Figure 17 shows this age effect in class learning, also illustrating that students’ learning of environmental, social and economic skills from family and friends appears to drop with age, as does learning of economic skills in the workplace. The experience of drivers of skills for sustainability and the relevance of assistance in developing skills for sustainability appears to drop again after 45. In contrast the research
indicates that students’ acknowledgment of sustainability-related behaviours at home, in class and at work, rises with age, most markedly in the case of behaviours related to environmental sustainability.

![Figure 17](image)

**Figure 17** The impact of student age on environmental skills learning from different sources

As Figure 18 shows, age or generational attitude appears to be a factor in the importance of environmental values and the value of future generations for both student and teacher populations. No such pattern is present in the responses on social and economic values. Older teachers and students (25 and over) rated values relating to environmental and future generations higher. Students under 18 also rated values relating to environmental and future generations higher.

![Figure 18](image)

**Figure 18** Age as a factor in the importance of environmental values and the value of future generations

Figure 19 shows the average response across all environmental, social and economic skills for sustainability learnt at work, in class and from family and friends for the different ages. This indicates that learning *in class* drops in early adulthood, before rising with age but learning *at work* drops again for the over-45-year-olds and *learning from family and friends* drops with age. When the skills are disaggregated this pattern is still evident (see Figure 3).
Unlike their acknowledgement of values, and learning, students’ acknowledgment of sustainability-related behaviours, at home, in class and at work, rises with age, most markedly in the practice of behaviours related to environmental sustainability, as shown in Figure 20. Older students, particularly over-45-year-olds, agree more that they practice a range of environmentally sustainable behaviours at work, in class and at home. Older students also agreed more that they practice safety behaviours at work, in class and at home. Younger students, particularly those under 20 years old, acknowledged that they ‘suggest better ways to do things’ less than their older peers.

\(^{13}\) Independent t-test at the P<0.05 significant level was performed.
Conclusion

Building on previous *Gen Green* research, *Gen Green 4 Australia* indicates that, at the end of the international Decade of Education for Sustainable Development, the supply of skills for sustainability, both through the Australian VET system and through informal learning opportunities, closely meets social demand. Indeed the supply of skills for sustainability in Australia exhibits many of the essential characteristics of Education for Sustainable Development identified by UNESCO (2005a). It is:

(i) Based on the principles and values that underpin sustainable development
(ii) Dealing with the wellbeing of all three realms of sustainability – environment, society and economy
(iii) Promoting life-long learning
(iv) Locally relevant and culturally appropriate
(v) Based on local needs, perceptions and conditions, but acknowledges that fulfilling local needs often has international effects and consequences
(vi) Engaging formal, non-formal and informal education
(vii) Accommodating the evolving nature and concept of sustainability
(viii) Addressing content, taking into account context, global issues and local priorities
(ix) Building civil capacity for community-based decision making, social tolerance, environmental stewardship, an adaptable workforce and quality of life
(x) Interdisciplinary
(xi) Using a variety of pedagogical techniques that promote participatory learning and higher-order thinking skills

Australia’s current response to social demand for skills for sustainability underpins national efforts to build the capacity of the national workforce to support a sustainable economy and, while there has been no systematic evaluation of the GSA made public, the *Gen Green 4 Australia* research provides some evidence that implementation of the Agreement has addressed its intent to some extent.

The key findings of *Gen Green 4 Australia* align with the outcomes of previous *Gen Green* research, which suggested that there was a substantial increase in the experience of green skills in class and at work by apprentices and trainees between 2008 and 2010. *Gen Green 4 Australia* has found that commitment to environmental values, acknowledged practice of environmentally sustainable behaviours and learning of green skills in class and at work continues to lag behind the experience of socially and economically sustainable skills. However, supply accords with the social demand for sustainability skills currently expressed by VET students, informed by their experiences in the workplace. In the context of climate policies, the relatively low level of VET student demand for and supply of skills relating to energy efficiency and managing social and environmental supply chain impacts, either at work or in class, is a matter of some concern. The need to foster sustainable supply chains was flagged in 2008 (Hatfield-Dodds et al, 2008) and this need is now increasingly being flagged in public discourse and business media.

Of some interest is the importance of community-based learning and other informal learning opportunities, particularly for the development of environmental skills. It appears that community awareness and education programs are currently more effective at embedding green skills in our economy than either work experience or teaching in class. Of concern is teachers’ nomination of the industry Training Packages as the main barrier to improved provision of green skills through the VET system, although this was a small minority of teachers (between 8% and 0.3% depending on the
A national study of the demand for and supply of skills for sustainability

specific green skill). In any case, the findings of _Gen Green 4 Australia_ suggest that further action is required to embed green skills into the VET system, especially in the areas of energy efficiency and supply chains.

Teachers and students’ high level of interest in social sustainability and the importance of workplaces and classrooms as sources of learning social and economic skills, especially for women, are notable findings. This emphasises the important role that the VET system plays in building community cohesion and economic literacy. These findings underscore the importance of ensuring that social sustainability is properly considered in analysis informing VET policy. The alignment between aspects of socio-economic sustainability and recently renewed interest in the Core Skills for Work Framework (CSfW) casts another light on the role of VET in fostering social sustainability. The data collected by this research provides some insight into the current embedding of elements of the CSfW from a perspective that is more closely aligned with employer performance reporting paradigms. Further work in this area may assist in engaging employers in building shared capacity around core skills.

The gender differences in values and behaviours and the indications of gender and age differences in learning skills for sustainability revealed by this research have important implications for the design of future skills for sustainability programs. These results suggest that future programs could be made more effective by being age- and gender-targeted, in addition to the occupational targeting that happens through embedding skills for sustainability in the national training packages. More specifically, it suggests that an emphasis on values-centred approaches may be more effective with women, as well as with delivery of skills for sustainability to under-18s and over-25-year-olds. However, technical impact mitigation and hazard reduction approaches may be more effective in making the behaviour of 19 to 24-year-old male apprentices more sustainable.

Building on previous research, _Gen Green 4 Australia_ indicates that at the end of the international Decade of Education for Sustainability the social demand for skills for sustainability in Australia exhibits many of the essential characteristics of Education for Sustainable Development identified by UNESCO in 2005. It further indicates that the supply of skills for sustainability, both through the Australian VET system and through informal learning opportunities closely meets this demand, underpinning national efforts to build the capacity of the Australian workforce to support a sustainable economy. The research identifies possible features of the next generation of skills for sustainability policy and flags a need to better understand the relationship between the economic demand for skills for sustainability expressed by employers and the social demand expressed by VET participants.

Australian apprentices and trainees, and their trainers, have insight into the supply and demand of skills for sustainability by virtue of being participants in both training and work. Their considered responses to learning, behaviours, and values provide a unique insight into the work of work and training, which is not often considered. This insight can contribute, both now and in to the future, to the further development of skills for sustainability in Australia.
Appendix A – Global Reporting Initiative G4 Guidelines – Categories and Aspects

### TABLE 1: CATEGORIES AND ASPECTS IN THE GUIDELINES

<table>
<thead>
<tr>
<th>Category</th>
<th>Economic</th>
<th>Environmental</th>
</tr>
</thead>
</table>
| Aspects[^1] | • Economic Performance  
  • Market Presence  
  • Indirect Economic Impacts  
  • Procurement Practices | • Materials  
  • Energy  
  • Water  
  • Biodiversity  
  • Emissions  
  • Effluents and Waste  
  • Products and Services  
  • Compliance  
  • Transport  
  • Overall  
  • Supplier Environmental Assessment  
  • Environmental Grievance Mechanisms |

<table>
<thead>
<tr>
<th>Category</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Categories</td>
<td>Labor Practices and Decent Work</td>
</tr>
</tbody>
</table>
| Aspects[^1] | • Employment  
  • Labor/Management Relations  
  • Occupational Health and Safety  
  • Training and Education  
  • Diversity and Equal Opportunity  
  • Equal Remuneration for Women and Men  
  • Supplier Assessment for Labor Practices  
  • Labor Practices Grievance Mechanisms | • Investment  
  • Non-discrimination  
  • Freedom of Association and Collective Bargaining  
  • Child Labor  
  • Forced or Compulsory Labor  
  • Security Practices  
  • Indigenous Rights  
  • Assessment  
  • Supplier Human Rights Assessment  
  • Human Rights Grievance Mechanisms | • Local Communities  
  • Anti-corruption  
  • Public Policy  
  • Anti-competitive Behavior  
  • Compliance  
  • Supplier Assessment for Impacts on Society  
  • Grievance Mechanisms for Impacts on Society | • Customer Health and Safety  
  • Product and Service Labeling  
  • Marketing Communications  
  • Customer Privacy  
  • Compliance |

Source: Global Reporting Initiative (2013), G4 Sustainability Reporting Guidelines: Reporting Principles and Standard Disclosures, p.9
Appendix B  Sources of learning skills for sustainability

Figure 21  Students' views on where they learnt environmental skills

Figure 22  Students' views on where they learnt social skills

Figure 23  Students' views on where they learnt economic skills
Appendix C  Detailed reasons for not acknowledging ‘green’ behaviours

Reasons for not sorting waste

6.9% of students disagreed that they always sort waste at work. They indicated that this was in roughly equal measure because it takes too long, that it was not important to them or their employer was not interested. Students also said they didn’t sort waste at work because:

• It is not always practical to do so.
• Forget sometimes
• Shred sensitive info, but there are not any recycling bins around
• No resources to do so
• I need a recycling bin under my desk
• It’s not always marked easy for disposals
• Convenience
• I just throw everything into the bin, it is much easier!
• My factory doesn’t have separate bins for waste; it all goes in general waste.

7.1% of teachers disagreed that they always sorted waste at work. Most of these said it was because it takes too long or because they don’t have to. Teachers also said they didn’t sort waste at work because:

• In Port Hedland we do not have a recycling depot
• Only in relation to food waste, no recycling bin provided from the cleaners.
• Employer does not provide bins to do this-
• No recycling available in class rooms
• No recycle or waste choice in the lunchroom
• Hazardous or contaminated waste sorting has too high risk control for the time allowed

4.1% of students disagreed that they always sorted waste in class. Most of these said it was because it wasn’t important to them or because it takes too long. Students also said they didn’t sort waste in class because:

• They do not have a recycling system in place
• Only one type of bin
Reasons for not saving fuel

5.8% of students disagreed that they always saved fuel at work. They indicated that this was largely because it was not important to them or their employer was not interested. Students also said they didn’t save fuel because:

- Fuel is constantly been stolen
- Can’t afford an efficient car
- The business runs on fuel (trucks) conserving fuel isn’t a possibility
- I work in the Automotive repair industry. Repairing cars requires having them running while stationary and for extended periods of time. I would not call this conserving fuel, it is however unavoidable.
- It is quicker and easier to drive to work and public transport does not go out west from my house to where I work in one convenient and quick way

3.2% of teachers disagreed that they always saved fuel at work. Three said this was because they didn’t have to, the others said: It takes too long, my employer is not interested, “I have to drive A LOT for my work, more than I do in other areas of my life, makes it hard to conserve fuel”, “distance travelled and limited access to public transport”, “it’s not always practical or efficient with my work load”, “quality of provision of instruction” and “Conserving fuel can limit what you can achieve. There is always a new power sources being developed.”

3.8% of students disagreed that they always saved fuel in class. They indicated that this was largely because it was not important to them or it cost too much.

Reasons for not saving power

5.5% of students disagreed that they always saved power at work. They indicated that this was in roughly equal measure because it costs too much, it takes too long, it was not important to them or their employer was not interested. A sizeable number said that it was because they didn’t know how. Students also said they didn’t save power at work because:

- I don’t always conserve power, sometimes I cannot.
- With two people working from home [and] the power consumption from running servers all night we are [already] implement power saving solutions.
- Not in position to save or use amounts of energy.
- As said previously don’t agree with your Agenda 21 and globalist scheme.
- It is not something thought about in my
• I am a metal fabricator and our welding machines use a lot of power.
• It’s simply unfeasible to do so, cost too much to update everything.

2.4% of teachers disagreed that they always saved power at work. Three said this was because they didn’t have to, the other said: It takes too long, I don’t know how, “safety”, “the organisation as a whole is doing that by having flexible lighting etc”, “Sometimes I forget to.”

3.7% of students disagreed that they always saved power in class. Most said this was because it was not important to them. Some also indicated that it was because it cost too much or takes too long. One student also commented, “Welding machines use a lot of power.”

5% of students disagreed that they always saved water at work. They indicated that this was largely because it was not important to them or their employer was not interested. Students also said they didn’t save water because:
• I’m lazy
• I simply forget to
• Lack of interest
• It is not something thought about in my workplace
• Plenty of water in Cairns
• My job requires the use of large quantities of water that 100% can’t always be reused or recycled
• It’s not practical

Only 1.5% of teachers disagreed that they always saved water at work. Three said this was because they didn’t have to, the other said: “It takes too long” and that it was a “Time Factor”.

3.7% of students disagreed that they always saved water in class. Most said this was because it was not important for them. The remainder said roughly equally that it cost too much, that it takes too long and that they don’t know how.
Appendix D  Teachers' views on barriers to teaching skills for sustainability

Figure 33  Teachers' views on barriers to teaching skills for sustainability

- The energy it takes to make raw materials
- How the people who make the materials used in our industry are treated at work
- How to protect local plants & animals
- The amount of water used
- The $ value of the materials used in my industry
- What we put into the air & water
- How everything is connected
- What to do about bullying or harassment
- What can be recycled
- How toxic materials are to the environment

0  5  10  15  20  25  30

- It's not in the training package
- I don't believe it is important for my students
- I don't have the teaching time
- I don't have the teaching resources
- I don't have the skills
- I have not been able to access professional development
- I am not confident
Appendix E  Comparison of WSA competitor responses with all trades responses

Figure 34  Comparison of WSA competitor and all trades responses on importance of sustainability values

Figure 35  Comparison of WSA competitor and all trades responses on acknowledged sustainability-related behaviours at work

Figure 36  Comparison of WSA competitor and all trades responses on acknowledged sustainability-related behaviours in class
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Figure 37  Comparison of WSA competitor and all trades responses on acknowledged sustainability-related behaviours at home

Figure 38  Comparison of WSA competitor and all trades responses on sources of learning environmental, social and economic sustainability skills

Figure 39  Comparison of WSA competitor and all trades responses on preferred assistance in developing further skills for sustainability

Figure 40  Comparison of WSA competitor and all trades responses on incentives for skills for sustainability formation
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