Tracking the key policies on sustainability, VET and transition to a low carbon economy

Mike Brown & Damon Cartledge, Faculty of Education, Latrobe University

Abstract:

This paper reports on the early stages of research in progress. It is a research project being funded by the Institute for Social and Environmental Sustainability at Latrobe University to research sustainability, VET and the transition to a low carbon economy. With governments at all levels putting in place targets, policies, infrastructure and projects to initiate more sustainable living, this paper identifies and tracks some of the key policies. In the international arena, the United Nations has instigated and facilitated substantial work in these fields. While amongst the policies and plans being put in place at a federal level are the National VET Sector Sustainability Policy and Action Plan 2009-2012, the Green Skills Agreement, and The Green Skills Agreement Implementation Plan 2010-2011. All of these policies are calling for significant changes to be instigated. Jobs are changing in a number of different ways. With some jobs, modifications are occurring to accommodate a shift to more sustainable practices; this is being accompanied by the creation of new jobs in emerging industries, while less sustainable jobs stand to be eliminated. These changes to work and jobs bring skill development within VET to the fore.

Introduction

Current rates of consumption and climate change drive the need to develop a more sustainable future (Brundtland 1987). At the forefront of the strategies to bring about this change is the need to transition to a low carbon economy (UNEP 2008). This paper is part of a research project being funded by the Institute for Social and Environmental Sustainability at Latrobe University to look at sustainability, VET and the transition to a low carbon economy. Governments are developing and articulating policies to assist and encourage this transition. This paper reviews and discusses a selection of these policies identifying themes and issues. This paper is the first to be written within this research project and as a beginning provides an overview and discussion of the policies that have, or are currently impacting on aspects of sustainability and VET. The next section of the paper summarises the design of the larger research project. This allows the reader to locate the tracking of the policy work within this larger endeavour.

The Aims of the research

The first aim of the study is to collect data from VET providers about changes to job roles. These are the emerging job roles that are associated with the growth in those industries directly responding to become more sustainable. Also, in the potential (in some cases, inevitable), structural adjustments for some industries, we aim to identify the vulnerable job roles – as perceived and evidenced by participants in the project. Other job roles are expected to fall in between with adjustments being made to accommodate an increasing awareness and appreciation of sustainable development.

Another aim of the project is to review the current use and implementation strategies for nationally accredited ‘sustainability’ units of competency. Alongside this is the analysis of

revision strategies where green skills and sustainability skills have been introduced into existing national training packages.

Given the impetus of sustainability and green skills in industries, we hope to identify potential for further capacity building for sustainability within VET programs. As the move to low-carbon, 'green' practices are incrementally developed, so too is the impetus for VET professionals to be better informed on these issues of social, environmental and economic sustainability. This would necessarily include an analysis of opportunities for appropriate and timely professional development for VET professionals; to enhance their understandings and curriculum materials for the teaching of green skills.

In the development of any project based approach there is a focus brought to essential questions. The following are central to this project and also illustrate the scope of the investigation. The following key questions will be informed through pursuing the project aims:

- How are job roles changing in the transition to a low carbon economy?
- How are VET training programs changing to develop 'skills for sustainability'?
- What is the professional development needs of VET practitioners with regard to developing 'skills for sustainability'?

These questions are intended to build a clearer understanding of our roles as VET educators on the issues of 'green skills' and 'sustainability'.

Methodology

The research is exclusively qualitative and relies heavily on insider accounts of the 'green skills' process in VET. With this in mind we are aiming to include 'green skills' stakeholders that are engaged and responding to the rhetoric of sustainable practices in a variety of industries. The research is funded through a sustainability grant from La Trobe University and will be conducted in accordance with university protocols and human ethics procedures.

The study is designed to collect data through focus group interviews with key informants. In this context the principles of Patton's (1990) purposive 'typical case' sampling will be applied in meeting with a mixture of VET professionals, VET students and industry representatives who are associated with seven selected TAFE colleges in five locations. These typical cases will be illustrative of a population associated with 'green skills' as they focus on VET institutes who are already acknowledged for their initiatives in the development of green skills. Participants will be categorised as: VET teachers, VET managers, VET students over the age of 18, and industry representatives. It is envisaged to include up to 24 participants at each site. The VET professionals will be teachers and managers working within TAFE colleges across a range of different industries, courses and levels. The VET students who participate will be drawn from different courses and levels. Likewise, Industry representatives who participate will be drawn from across a range of industries. The most desirable option is to run focus groups of between four and six participants in each of the four categories. However, these research 'intentions' remain subject to the contingencies of research design and the idiosyncrasies of each site.

Alongside the consideration of students, teachers and managers will be the examination of professional development for teachers. There will be examination of the suitability of existing pedagogies and curriculum structures and their effectiveness for 'green' skills and the sustainability agenda. With this in mind, there will also be critical engagement with

employers and industry representatives to add balance to the data. The interviews with students will form a critical element of the research. Not only are we seeking their opinions as students, but in many cases looking at the data as illustrative of any generational shifts in expectation of social, environmental and economic governance.

The data from the focus groups will be thematically analysed and a matrix of emergent themes and participant categories will be constructed from the findings. Aside from organising the data, Miles and Huberman (1994) assert that the development of a data matrix is "a creative - yet systematic – task that furthers your understanding of the substance and meaning of your database" (p.240). Presenting participant voices will shape the reporting of the project. Anticipated tensions and connections in opinion, between stakeholder categories, will serve to reveal where authentically sustainable practices exist. The policy tracking that follows is the initial input to the data matrix, and provides a starting point for this research.

Fundamental to the importance of education and VET to considerations around sustainability is the push that has come through international debate and policy initiatives. Much effort has gone into making VET in Australia responsive to industry which is referred to as being demand driven. Yet the impetus to increase social consciousness about sustainability has been led by an international social movement. This social movement has directly influenced government policies. This is creating a tension between demand driven VET and the intentions of federal and state government policies and initiatives. The next section of the paper tracks through some of the main policies that have arisen from the international meetings and debates. These provide the push for green jobs and the transition to a low carbon economy. The notion of 'thinking globally, and acting locally' that arose through this movement provides a guiding principle.

International policy initiatives

As Fien, Goldney & Murphy (2009) explain publications like *Silent Spring* (Carson 1962) and *The tragedy of the commons* (Harden 1968) brought together an alliance in the 1960s between members of the scientific community and civil society groups around the realisation that growth could not continue as it had been without also bringing consequences to bear on future generations. Similarly, Gough (2006) reports that the term environmental education was first used in the education literature in the UK and USA around 1965. In 1972 the influential members of the Club of Rome released their publication *Limits to growth, (*Meadows, Meadows, Randers & Behrens, 1972). This work modelled the increasing global population against the then current rates of consumption to argue that those current trends were unsustainable. This publication was strategically released in time to inform delegates attending The United Nations Conference on the Human Environment which was held in the same year in Stockholm Sweden. This was the UN's first major conference on international environmental concerns. As Gough (2006:72) reports, 'other recommendations from this conference included that environmental education be developed "as one of the most critical elements of an all out attack on the world's environmental crisis", (UNESCO 1975).

This is considered to be the beginning of modern political consideration of global environmental problems. This meeting agreed on a Declaration containing 26 principles, an action plan and a resolution. This conference is considered to have provided European countries with a foundation politics for the environment. Another significant outcome of this conference was the establishment of the UN Environment Program (UNEP).

In 1983, the UN General Assembly established the World Commission on Environment and Development (WCED) which is also known by the name of its Norwegian Chairperson as the

Brundtland Commission. This Commission was charged with addressing concerns about the accelerating deterioration of the human environment and natural resources and the consequences of the deterioration for economic and social development. Brundtland explains, the Commission was asked 'to propose long-term environmental strategies for achieving sustainable development to the year 2000 and beyond', (Brundtland 1987: ix). Their final report '*Our common future*' was published in 1987. This report provides strategies for achieving sustainable development. They defined sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland 1987: 43). This UN report lays the foundations for sustainability to be considered in terms of the economic, social and environmental factors, what Elkington (1997) describes as 'the triple bottom line'. For most of the delegates working through the UN these three spheres remain bound together (UNESCO 2004; Gough 2009).

In 1988 the UNEP formed the Intergovernmental Panel on Climate Change (IPCC). The IPCC provides a clear scientific view on the current state of knowledge on climate change. This Panel does not undertake research but is required to assess research and provide advice on potential environmental and socio-economic impact. Their first report on the Impact of Climate Change (FAR) was published in 1990. This was an important source document for the Earth Summit held in Rio de Janeiro, Brazil in 1992. Some 172 governments participated in the Rio Conference and amongst the issues discussed were systematic evaluation of existing patterns of production; alternative sources and use of energy to replace those derived from fossil fuels; development of public transportation; and growing scarcity of water.

The UN Framework Convention on Climate Change (UNFCCC) was formed in 1994. This provided a framework for decision making. The IPCC remained the most important source for evaluating scientific, technical and socio-economic information. The relationship between the UNFCCC and the IPCC became very important as a model for interaction between science and decision-makers (IPCC 2011). In 1995 the IPCC released their Second Report (SAR). This assessment of the existing research became the basis for the development of the Kyoto Protocols that were originally negotiated in 1997 with targets and goals for implementation by 2005. The Kyoto Protocols are aimed at reducing greenhouse gas emissions. Initially 37 countries committed to the reduction targets, as of July 2010, there were 191 countries signed on. One of the first actions of the newly elected Australian government in 2007 was to sign up to Kyoto. The Kyoto Protocol allow for some 'flexible mechanisms' for reducing emissions. One of which is emissions trading.

The Third Report (TAR) on the assessment of the science and knowledge of climate change was published by the IPCC in 2001. This release was in time for the World Summit in Sustainable Development (WSSD) in Johannesburg in 2002. As noted later by one group of environmental auditors 'by the end of this Summit, more than 180 leaders had renewed—and increased—their commitment to working toward sustainable development and poverty reduction and to creating a more sustainable Earth' (INTOSAI Working Group on Environmental Auditing (WGEA), 2007: Foreword). This Summit focused mainly on following up on the implementation and progress from the earlier Rio conference. Three key outcomes emerged from the WSSD. These were, the Declaration on Sustainable Development, the Plan of Implementation, and Partnerships for sustainable development.

The main thrust of the Declaration reiterates that the essential requirements for sustainable development are eradicating poverty, changing consumption and production patterns, and protecting and managing the natural resource base for economic and social development.

The Plan of Implementation that was developed is a detailed description of how sustainable development can be achieved at international, national, and local levels. This Plan identified priority areas for each world region. Auditors identified three aspects of this plan that are considered tangible enough to be audited. These are,

- establishment of a national sustainable development strategy by 2005,
- significant reduction in the rate of biodiversity loss by 2010, and
- establishment of representative networks of marine protected areas by 2012.

In terms of partnerships there were over 200 voluntary partnerships for sustainable development established at the WSSD. The partnerships were about bringing together governments, businesses, and other non-governmental stakeholders.

At its 57th Session, in December 2002, the United Nations General Assembly passed a resolution to begin the Decade of Education for Sustainable Development (DESD). In its action plan to guide its contribution to the DESD, UNESCO identified two main areas of contribution. The first was in providing leadership, especially in providing assistance for national education systems to re-orientate towards their alignment with a commitment to sustainable development. The second was in actively creating an enabling environment for this change to occur (Fien 2006).

In 2005, the IPCC released its Fourth Report (AR4) detailing an analysis of the science of climate change in time for the World Summit of the General Assembly of the UN held in New York. Delegates at this Summit confirmed their commitment to the Millennium Development Goals. In terms of the environment, this summit agreed to the, 'recognition of the serious challenge posed by climate change and a commitment to take action through the UN Framework Convention on Climate Change.

In 2006 the Stern Review was released in the United Kingdom. This review examines the economics of climate change. Six points can be used to summarise the conclusions of this review. These are, first, there is still time to avoid the worst impacts of climate change, if we take strong action now. Second, climate change could have very serious impacts on growth and development. Third, the costs of stabilising the climate are significant but manageable; delay would be dangerous and much more costly. Fourth, action on climate change is required across all countries and it need not cap the aspirations for growth of rich or poor countries. Fifth, a range of options exists to cut emissions; strong, deliberate policy action is required to motivate their take-up. Sixth, climate change demands an international response, based on a shared understanding of long-term goals and agreement on frameworks for action. This final point was expanded when the review suggested the inclusion of the four key elements into any future international framework as, emissions trading; technology co-operation; action to reduce deforestation; and adaptation (Stern 2006: vi-ix). This report laid out the economic case for the need to change and further strengthened the need to develop a low carbon economy.

In the UNEP Report, *Green jobs: towards decent work in a sustainable, low carbon world*, the authors, Renner, Sweeney & Kubit provided what is jointly described by the United Nations Environment Programme (UNEP), the International Labour Organisation (ILO), the International Organisation of Employers (IOE) and the International Trade Union Congress (ITUC) as 'the first comprehensive report into the emergence of the 'green economy' and its impact of the world of work in the 21st century'. This report assembles evidence of existing green jobs in the key economic sectors of renewable energy, building and construction, transportation, basic industry, agriculture and forestry, providing estimates for future green

employment across the world. The report argues that prospective employment may be effected in four different ways. Additional jobs will be created in some fields, some jobs will be substituted, others eliminated and some existing jobs will be transformed (UNEP 2008).

Greater efficiency in such areas as energy use and modified use of materials are key goals. Just how efficient such endeavours need to be, lead to degrees of relative sustainability or the awareness of their being 'shades of green' possible. At the lighter end of the spectrum is what is often dismissed as 'green sloganeering' and 'green washing', while at the darker end of the spectrum are fundamental changes to mindsets (UNEP 2008). Interestingly, on the very first page of his report, Stern (2006) describes climate change as being 'the greatest and widest-ranging market failure ever seen'. One of the ramifications of this realisation is that sustainability cannot be left to the invisible hand of the market; instead governments need to actively support the transition to a low carbon economy. With this in mind, the UNEP (2008) report's list of drivers of green jobs takes on greater significance. The drivers of green jobs are described as, key policies, subsidies, carbon markets, tax reform, targets and mandate, energy alternatives, product take back, eco-labelling, R&D budgets and international aid. All are strategies for governments to take up and articulate through their various policy agendas.

Further, the UNEP 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 across the board. Recently, a useful literature review on '*Low carbon jobs in an interconnected world'* has been published by the Global Climate Network (2009). This provides further update on the information in the UNEP report.

Some Australian parallels

In 1992 the Australian Government outlined its commitment to sustainability and the environment with their policy documents, *National Strategy for Ecologically Sustainable Development*, and their *Intergovernmental Agreement on the Environment*. These documents articulated their thinking at that time and provided guidance to the departments across all levels of government. Amongst the academic research to come from Australia, Fien (2001) argues that sustainability has become a term that can mean a wide range of things. He builds on the three components of the triple bottom line and expands this when he explains that four interdependent systems provide the four pillars on which sustainability is supported. These are reiterated in Goldney et al, (2007:13), as the

- biophysical systems that provide the life support systems for all life, human and non-human;
- economic systems that provide a continuing means of livelihood (jobs and money) for people;
- social and cultural systems that provide ways for people to live together peacefully, equitably and with respect for human rights and dignity;
- political systems through which power is exercised fairly and democratically to make decisions about the way social and economic systems use the biophysical environment (Fien 2001).

A similar review to that conducted by Stern in the UK was undertaken in Australia by the economist, Professor Ross Garnaut. His report was released in 2008 with updates released through a range of issue specific papers in 2011. Garnaut's review is very comprehensive but it has been criticised. The criticism has been aimed at his method for working out costs, as he uses much higher costs than Stern in the UK, and second, at his recommendation to instigate emissions trading, which as has been shown above is one of the 'flexible mechanisms' described in the Kyoto Protocols and to which Australia is a signatory.

A similar study to that of the UNEP (2008) was conducted in Australia to look at *Growing the green collar economy* by Hatfield-Dodds, Turner, Schandl and Doss (2008). This report concluded, it is possible to develop well designed policies to combine economic growth with a reduction of the environmental footprint overtime; rapid transition to sustainability would have little to no impact on national employment (projected increase of 2.5 – 3 million jobs in next two decades), and an increase of 10% in the next decade in sectors with high potential environmental impacts (230,000 – 340,000 new jobs in transport, construction, agriculture, manufacturing and mining). The Victorian based equivalent version of this work is the DIIRD (2010) report on *Jobs for the future economy: Victoria's action plan for green jobs*.

Having tracked across some of the key policies associated with the need to develop new and existing jobs to align with the international and national push for sustainable development, it is time to turn to the development of the new and changing skill requirements that are integral to this shift. At the forefront of these considerations are changes within the provision of VET programs.

International policies on VET and sustainability

At the Second International Conference on Technical and Vocational Education held in Seoul, in 1999, calls were made to explore the integration of work, citizenship and sustainability. In their report they make this clear when they state, 'we have concluded that Technical and Vocational Education, as an integral component of lifelong learning, has a crucial role to play in this new era as an effective tool to realise the objectives of a culture of peace, environmentally sound sustainable development, social cohesion and international citizenship', (UNESCO 1999: 61). Five years later in October 2004, this was the direct focus of the International conference held in Bonn. Participants from over 100 countries committed to re-orientating Technical and Vocational Education and Training (TVET) towards, 'quality skills development that leads to economically viable, environmentally sound and sustainable communities' (The Bonn Declaration 2004). In 2009 the UNESCO Conference in Paris passed resolutions on 'skills for the world of work'. This was identified as one of the three priority areas for action over the next two years. As reported by NORRAG 'Special mention was made of the importance of TVET's contribution to furthering the goals of education for sustainable development, with particular reference to the reform of TVET systems and to building the capacity of Member States to take concrete, effective action to equip youth and adults with necessary knowledge, competencies and skills for the world of work'. An annotated bibliography of research and related literature on TVET and sustainability (1998 – 2004) is available through UNESCO & UNEVOC, while the Fien, Maclean & Park (2009) publication draws together international contributions on *Work, learning and sustainability*.

Australian policy responses: Skill development and VET

At the national level of policy on sustainability is the document '*Living sustainably*' (DEWHA 2009). This is the Australian government's *National Action Plan for Education for Sustainability*. The discussion around Strategy 3 in this report is focused on 'Fostering

sustainability in business and industry' has high relevance for VET provision. Sitting below this document is the *National VET Sector Sustainability Policy and Action Plan (2009 – 2012)* published by MCVTE (2009).

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 remains 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' (pg 2). The GSA has four objectives, these are,

- embedding skills for sustainability practice and teaching in vocational education and training, within the requirements of the national regulatory framework
- the upskilling of VET instructors and teachers to deliver skills for sustainability
- the 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 re-skill vulnerable workers.

Donavan (2010) summarised these as, the development of national standards, upskilling the VET workforce, revision of training packages, and transition strategy for vulnerable workers. In tandem with the GSA is the work of the MCTEE who have developed the *Green Skills Agreement Implementation Plan 2010 – 2011*. This plan is focused on implementation strategies that will achieve the four objectives above.

The research report by Goldney, Murphy, Fien & Kent (2007 & 2007a) provides an excellent overview of 'Sustainability and VET in Australia'. Their report '*Finding the common ground*' considers whether there is a place for sustainability education in VET, which they answered in the affirmative. This research confirmed that society was becoming more aware of environmental concerns and that education for sustainability has an ongoing and vital role to play. VET provides a means for promoting sustainability within workplaces, amongst employees and employers. They found that Training packages were a practical way of integrating sustainability into VET programs. This could be done in much the same way that generic and employability skills are included. They briefly reviewed the teaching practices within VET and found them to be compatible with the general logic of sustainability. They mention action learning, group learning and problem solving in particular in this regard. The final key message from this research states, 'if they are taught sustainability skills throughout their education, learners can develop the ability to promote these concepts in the workplace, devise and encourage sustainable work practices, and develop strategies for negotiating and justifying desirable changes with colleagues and managers', (2007:7). These researchers recognise the ongoing value of education to underpin further longer term change.

The NSW Board of VET has developed a comprehensive document on '*Skills for sustainability'* (BVET 2007 & 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 28 page second edition (BVET 2009) localises the issues that are being raised in the much larger UNEP (2008) Green jobs research. The first chapter provides a focus on sustainability and the future while the second chapter focuses on sustainability, impact on the workforce, green jobs and skills. The third chapter looks at Next steps and the fourth lists the recommendations.

In 2003 Russell working for NSW TAFE undertook a review of Training packages and VET programs and identified major gaps and discrepancies with regard to content on the environment and sustainability. A similar study at a national level was conducted in 2005 by Rickard & Condon which found very similar results. After this research the National Centre for Sustainability (NCS) began to look at developing guideline standards for sustainability to underpin and be included into a wide range of VET Training packages. Three new standards were developed with each being aimed at different levels of VET provision (Condon & Rickard 2009). By 2006 these were starting to be implemented into 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 review of sustainability orientated content within Training Packages has been followed up and reported in the Industry Skills Council (ISC 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).

Also working within Australian academic VET research, mention needs to be made to the work of Anderson who has conducted a suite of research projects on sustainability for over a decade, (Anderson 2002 & 2009a & b). At the heart of this body of research are calls for paradigm, or big picture changes from productivism to ecologism. While consistent with many of the recommendations and findings of UN research and policy documents, Anderson's work remains qualitatively different from most others in the VET sector.

Discussion on these policies and responses

The preceding tracking of the policy terrain illuminates increasing public and political pressures to move to a low carbon model for economic development. To effectively respond to these pressures there must be change in the fundamental practices of carbon-hungry industries, including developing 'green' and 'sustainability' skills that contribute to how we engage with (and maintain) our built and natural environments. This presents a significant challenge toward lofty ideal, however the change to industry practice is widely recognised as necessary and overdue (UNEP 2008; Garnaut 2008). To properly effect such change there must be some systematic reviews of how we are tooling-up in the VET sector to properly support the sustainable 'green' agendas.

The risk to an effective integration of 'green' skills is that we often play in the margins, masking the realities of VET practice for practitioners with political rhetoric, and do not really get to the core issues of sustainable practices (Karmel 2010). It is argued that a fundamental shift in thinking will be required to realign Australia's skill base with the emerging economic and environmental policy. Therefore, preliminary work in this project has distilled a number of interdependent aims to better understand where we are currently positioned and examine how we can be better engaged in a positive process of change.

A critical element in the localised context of 'green skills' and sustainability in VET is the investigation of how the political and economic imperatives manifest themselves within the day to day work in VET. There is pressure for industries to be both 'green' and 'sustainable' as the community collectively calls for more care for the environment and a greater emphasis

on low-carbon initiatives. The imperatives to be 'green' are far reaching and with schemes such as the solar energy rebates, 'smart' electricity meters, permanent water restrictions and even the failed home insulation program, the politics of being 'green' has been accelerated into our daily lives. The urgency to be carbon-neutral, or at worst low-carbon, places indirect but immediate pressure on the VET sector to support and upskill the labour force to work with new technologies, materials and systems: alongside providing for the transition period into sustainable practices from the resource hungry practices of the past (DEWHA 2009). Arguably, this 'green' mantra is being demanded immediately as the Australian population is socially (and politically) positioned as both affluent and responsible consumers (NSW BVET 2009). It has been argued that this zealous focus on 'green skills' has upset the balance of VET practice without due regard to the other fundamental dimensions of trade training (Karmel 2010). As an example, in areas such as Building & Construction we are incrementally 'greening' existing skills through more environmental regulations and consumer demand (Reardon and Shackle 2008). Skills related to maintenance and development of infrastructure are equally adapting incrementally to compliance with regulatory changes and policy initiatives.

Many of these changes require new materials and technologies. However, simply working with environmentally friendly materials does not automatically result in the development of 'greener' skills, nor does it automatically result in sustainable practices. Extending this thinking, there are plenty of adaptive models for green skills; but limited evidence of 'green jobs in green industries' (Goldney et al 2007). The inclusion of employer and industry participants in this project will help identify where the 'green jobs' may be. It appears that Australia is slow to develop sustainability as an industry in its own right, yet political rhetoric abounds on the necessary transition to a low-carbon economy as quickly as possible. On this basis it could be argued that we will continue to be ill-prepared for innovative sustainable practice in many industries because the demand remains in adaptive and compliance models of practice; for example, the automotive service industry, residential maintenance services (particularly in licensed trades) and high-cost manufacturing, where the focus is primarily on servicing historic existing demand or the costs of re-tooling may be prohibitive. On these examples the VET sector is positioned to prepare a labour force for adapting-the-past rather than preparing for the future.

Should the momentum of the 'greening' of industry practice continue in line with social, political and economic demand, then this would place VET as reactive rather than pro-active in meeting labour market needs. Moves towards sustainable practice and an ethos of sustainability may not be creating a discrete and identifiable 'green' workforce, but we can be sure that it is changing the balance of need in existing skill areas. Immediate implications for VET and TAFE in particular, seem to lay in how existing courses can respond to market forces. Recent examples in the Australian context of poorly executed work connected to government carbon-reduction initiatives have resulted in endangering lives, serious injuries and fatalities. It is easy to envisage a direct correlation here between 'green initiatives', political timelines and competitive business models. In a push to be seen to act governments have arguably created an unsustainable 'sustainability' industry where priorities have become 'money first, training later'.

Even in the management of environmental concerns 'green' business imperatives can be seen as an underpinning priority. For example, in the Carbon Neutral report of Victoria's Environmental Protection Agency (EPA), the CEO John Merritt opens the report stating that "As Victoria's environmental regulator it is vitally important we demonstrate business leadership when it comes to environmental performance" (EPA 2010, p.1). The rest of the

report articulates an emphasis on business over environmental concerns. It is easy enough to argue that the concern for environment has become the tacit core of these documents from such agencies, but it also reflects that we are still in a deficit model of how to better address the issue of sustainable 'green' practice. This positioning of sustainable practice against prior performance leads us to ask; Are we simply getting better at being bad or are we transitioning to 'new' practices? VET has a great opportunity to be on the front foot through this transition period, this particular research project is reaching into the VET sector to explore what the VET sector are already doing and what opportunities exist for proactive pre-employment preparation of the sustainability labour force. These are not new issues in Australia and 'green skills' have been part of our education and training lexicon since at least the early 1990's (Annandale, Morrison-Saunders, and Duxbury, 2004; Australian Conservation Foundation and the Australian Council of Trade Unions, 1994).

What has changed most recently is the intensity of interest in the environment, and in particular the response to arguments around climate change and the urgency with which we may need to react. The impact of significant weather events of the past 3-5 years in Australia underpins the growing community concern for the capacity to sustain our futures. In concert with this awareness is the capacity for new technologies to contribute to the 'greening' of industries and economies. The pace of technological change will be explored as an impact on the VET sector's response to sustainability. If we consider the range and frequency of 'green' initiatives in Australia, then simply 'keeping up' with change and implementation schedules is likely to emerge as an impost on current VET practice. How to create the necessary space for VET programs in new and emergent jobs will be a key issue to inform the study.

In our recent collective rush to be 'green' and attach labels to courses for the 'sustainability' market, there needs to be a caveat for well-informed, well-planned and expertly-staffed programs. So questions around what sort of 'green' worker we need for sustainability may become more relevant than a reductive list of 'skills' that we add on the back of existing structures. Otherwise, in place of VET contributing to an environmentally sustainable and responsible economy, we risk being naively 'green'.

Conclusion

As this research project develops we hope to better inform the debates and investigations of green skills in the Australian VET context. This preliminary paper outlines key policy concepts that shape being 'green' in this particular VET setting, focusing on the development of VET practice for a low carbon economy. Key informants and stakeholders are identified from within the VET community; employer and industry voices will assist to guide the investigation in the context of applying the green skills to existing and emerging jobs.

Green jobs are emerging as industry and enterprises develop an awareness of a fundamental relationship between economic prosperity and environmental sustainability. At the heart of this 'green' relationship is a growing need for an environmentally aware and sustainability-focused labour-force. Herein lies an implicit link between VET practice and a sustainable low-carbon economy. However, as our review of policy indicates, the early momentum for change has been largely driven from government initiatives.

Ultimately, this project will tell us more about the gaps to be filled in developing new green skills and greening extant VET practice. Such an investigation has the potential to reveal awkward gaps between what we would like to be doing, and what actually happens in the reality of everyday practice. More optimistically, the project also has the potential to

highlight the VET community's resolve to respond in a timely and informed way to the emergent demands of a low-carbon economy.

References:

Annandale, D., Morrison-Saunders, A. and Duxbury, M-L. (2004) Regional sustainability initiatives: the growth of green jobs in Australia. *Local Environment*, 9 (1). pp. 81-87.

Anderson D (2002) Productivism, ecological sustainability and vocational education and training in Searle, J & Roebuck R (eds) *Envisioning Practice – implementing change*, vol 21, pp. 61 – 68 Australian Academic Press: Brisbane.

Anderson D (2009a) Productivism and ecologism: changing Dis/courses in TVET in Fien J, Maclean R, Park, MG, (eds) *Work, learning and sustainable development: opportunities and challenges*, Springer & UNEVOC.

Anderson D (2009b) TVET and ecologism: charting new terrain, in Fien J, Maclean R, Park, MG, (eds) *Work, learning and sustainable development: opportunities and challenges*, Springer & UNEVOC.

Australian Conservation Foundation and the Australian Council of Trade Unions. (1994) *Green Jobs in Industry Research Report*. Australian Conservation Foundation and the Australian Council of Trade Unions, Melbourne

Brundtland G (ed) (1987) *Our Common future: the World Commission on Environment and Development*, Oxford: Oxford University Press.

Carson R (1962) *Silent Spring*, Boston: Houghton

COAG (2010) *Green Skills Agreement*, Canberra: COAG

Condon L & Rickard A (2009) Australia: the role of partnerships, Industry Skills Councils and Training packages in Fien J, Maclean R, Park, MG, (eds) *Work, learning and sustainable development: opportunities and challenges*, Springer & UNEVOC.

Department of Environment, Water, Heritage and Arts (2009) *Living sustainably: the Australian Government's National action plan for education for sustainability*, Canberra: DEWHA

Department of Innovation, Industry and Regional Development, (2010), *Jobs for the future economy: Victoria's action plan for green jobs*. Melbourne: DIIRD.

Elkington J (1997) *Cannibals with forks: the triple bottom line of 21st century business*, Oxford: capstone.

Environmental Protection Authority (2010) *EPA's carbon neutral update*. EPA (Victoria), http://epanote2.epa.vic.gov.au/EPA/publications.nsf/PubDocsLU/1361?OpenDocument accessed: 17 Feb 2011

Fien J, Maclean R, Park, MG, (eds) (2009) *Work, learning and sustainable development: opportunities and challenges*, Springer & UNEVOC.

Fien J, Goldney D & Murphy T (2009) Rethinking development: as if the planet and its people really mattered, in Fien J, Maclean R, Park, MG, (eds) (2009) *Work, learning and sustainable development: opportunities and challenges*, Springer & UNEVOC.

Fien J (2006) A letter from the future: UNESCO and the Decade of Education for Sustainable Development, in *Australian Journal of Environmental Education*, vol 22 (1), pp. 63 -70.

Global Climate Network (2009) *Low-carbon jobs in an interconnected world: literature review* http://www.climateinstitute.org.au/images/reports/gcnlowcarbonjobs.pdf accessed: 2 Feb 2011

Goldney D., Murphy T, Fien J. & Kent J. (2007) *Finding the common ground: Is there a place for sustainability education in VET?* Adelaide: NCVER

Gough A (2009) Towards a synthesis, in Fien J, Maclean R, Park, MG, (eds) *Work, learning and sustainable development: opportunities and challenges*, Springer & UNEVOC.

Gough A (2006) A long, winding (and Rocky) road to Environmental Education for Sustainability in 2006, in Australian Journal of Environmental Education, vol 22 (1), pp. 71 - 76.

Harden G (1968) The tragedy of the commons, *Science*, 162. pp 1243 – 1248.

Hatfield-Dodds S, Turner G, Schandl H. and Doss T. (2008) Growing the green collar economy: Skills and labour challenges in reducing our greenhouse emissions and national environmental footprint, CSIRO, http://www.csiro.au/files/files/plej.pdf accessed: 2 Feb 2011.

Karmel T (2010) *Skilling and reskilling for our (greener) future*, Adelaide: NCVER

MCTEE (2010) *Green Skills Agreement Implementation Plan 2010- 2011*. Canberra: D

MCVTE (2009) *National VET Sector Sustainability Action Plan (NVSSAP) 2009-2012*, Canberra: DEEWR

Meadows, D H, Meadows, D L, Randers, & Behrens W (1972) *Limits to growth*, New York: Universe Books

Miles, M. and Huberman, M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks: Sage.

National Centre for Sustainability (2006). *Transforming the way we work and live*, Melbourne: National Centre for Sustainability

Patton, M. (Ed.) (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park: Sage.

Reardon, C. and Shackle, S. (2008) *Australia's guide to environmentally sustainable homes – Technical Manual* (4th Edition). Australian Government. http://www.yourhome.gov.au/technical/ accessed 18 Feb 2011.

UNEP (2008) *Green jobs: towards decent in a sustainable low carbon world*, Washington: Worldwatch Institute.

by a carbon price. CO2. Transitions to low carbon electricity systems: Key economic and investment trends. The electricity sector may act as a catalyst for an economy-wide transition to a low carbon, climate-resilient and sustainable future. This booklet provides an overview of the nature and pace of the ongoing transition to low carbon electricity systems and discusses some of the inherent challenges. The booklet provides a reality check through selected indicators, notably in relation to income levels.1. Power sector: the engine of decarbonization.Â Political ambitions are rising in many countries, low carbon solutions are becoming increasingly cost-effective and financiers are considering climate-resilient infra-structure as an attractive investment opportunity. We have the knowledge, policies and innovation to transition to low-carbon energy. But we need political leadership and greater collaboration to make it happen.Â The key is for government leaders to work with companies to drive the policies and incentives needed across the demand side markets, such as power, transport and heavy industry, and with supply side players such as clean energy producers. All these areas of focus are extremely effective, but they require political leadership and public and private collaboration, if they are to deliver carbon neutrality by 2050. In the face of scientific facts that can no longer be ignored, bold leadership is needed to fast-track to carbon neutrality. Share. License and Republishing. A low-carbon recovery could not only initiate the significant emissions reductions needed to halt climate change but also create more jobs and economic growth than a high-carbon recovery would. Our analysis of stimulus options for a European country suggests that mobilizing â‚¬75 billion to â‚¬150 billion of capital could yield â‚¬180 billion to â‚¬350 billion of gross value added, generate up to three million new jobs, and enable a carbon-emissions reduction of 15 to 30 percent by 2030.Â In assessing stimulus measures, policy makers may wish to balance several factors, such as socioeconomic benefits, climate benefits, and feasibility, before turning to implementation.Â All of this spending and labor ought to help the countryâ€™s transition to a low-carbon economy move forward. Irelandâ€™s transition to a low carbon economy can be achieved if policy makers quickly adopt a holistic approach to carbon budgets for Ireland. This will require a cross-sectoral emissions reduction policy approach and the creation of plans that span the 2050 time horizon. In this report, we have attempted to answer these questions by investigating the energy system on the island of Ireland, considering the most appropriate technology and policy roadmap. This analysis is not intended to be exhaustive or exact, but rather to provide a realistic set of technologies and policies to give policy mak Transition to a Low-Carbon Economy. 2 Goldman Sachs. clean energy. Opportunities and Challenges of the Emerging Clean Energy Industry.Â A key role of policy is to help level the cost disadvatage that most clean energy tech-nologies face relative to fossil fuels and by doing so, further demand and capital deployment. developers to receive a cash grant in lieu of a traditional tax credit, more than 10 gigawatts of new wind generating capacity were built in the US during 2009.Â TW: Putting a price on carbon can impact clean energy development by establishing a market signal that will prompt companies to factor the costs of greenhouse gas emissions into their operating and investment decisions.